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The following document was too large to scan as one unit, therefore, it has been broken down into section.

DOCUMENT #: DOE/RL 92-67

EDMC#: 0025845

SECTION: 2 OF 3

DOE/RL-92-67
DRAFT A

Final Remedial Investigation/ Feasibility Study Report for the 1100-EM-1 Operable Unit, Hanford

Date Published
November 16, 1992

9312320609

Prepared for the U.S. Department of Energy
Office of Environmental Restoration and
Waste Management

United States
Department of Energy
P.O. Box 550
Richland, Washington

Not Approved for Public Release

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APPENDIX A

1100-EM-1 PHASE II RI
MONITORING WELL BORING LOGS AND
HORN RAPIDS LANDFILL TRENCHING LOGS

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APPENDIX A CONTENTS

Monitoring Well Boring Logs A-1
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1100-EM-1 PHASE II RI
MONITORING WELL BORING LOGS

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Site 1100-EM-1 Page 1 of 3 Pages

Boring No. MW-7A Desig. MW-7A Diam.(Casing) 8 inch"

Co-ordinates N 378386.4 E 1944622.6

TEST BORING FIELD LOG

Elevation Top of Boring	388.0	M.S.L	Hammer Wt.		Boring Started MAY 2 91
Total Overburden Drilled	58.3	Feet	Hammer Drop		
Elevation Top of Rock		M.S.L	Casing Left		Boring Completed MAY 6 91
Total Rock Drilled	0.0	Feet	Subsurface Water Data	▽ 40.5	Page
Elev. Bottom of Boring	329.7	M.S.L	Obs. Well		
Total Depth of Boring	58.3	Feet	Drilled By:	R. Jones	
Core Recovered %	Boxes	No.	Mfg. Des. Drill:		
Core Recovered Ft:	Diam.	In.	Inspected By:	K. Singleton (WHC)	
Soil Samples In. Diam.		No.	Classification By:	K. Singleton (WHC)	
Soil Samples In. Diam.		No.	Classification By:	J. McBane (CENPW)	

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
						0.0 - 20.0 Portland cement			0 - 2.0 SAND; 10YR5/3 olive; moderately sorted;no reaction to acid; 96% sand (35% VCS, 25% CS, 20% MS); 70% quartz, 30% basalt; subrounded to angular; <3% silt, <2% gravel.
385									2.0 - 3.5 SANDY GRAVEL; 10YR5/3 olive; moist; no to very slight reaction to acid; poorly sorted; gravels have calcium coating having a strong reaction to acid; 65% sand (35% MS, 20% CS, 20% others, 65% quartz, 35% basalt, subrounded to subangular); 35% gravel (15% VCP, 15% others, 95% ba salt, 5% quartz and others); <5% silt.
	5	W50	8.0	5.0 5.5	100				3.5 - 15.0 SANDY GRAVEL; 10YR7/1 light gray; moist; strong reaction to acid; poorly sorted; 60% gravel (30% CP-VCP, 10% small pebbles, 14% others; 85% basalt, 15 % others; subrounded to rounded); 37% sand (30% MS-CS, 70% others; 90% basalt, 10% others; subrounded to subangular); 3% silt.
380									Color @ 7.5 ft 10YR6/2 light grayish brown; basalt content increase to 90-95%.
	10	W51	8.0	10.0 11.3	100				
375									

GENERAL REMARKS:

Depths provided as feet below the existing ground surface; elevations in feet above mean sea level. All sample numbers prefaced by B00-. All samples collected for soil moisture content analysis and archiving.

Site 1100-EM-1 Boring No. MW-7A Desig. MW-7A Page 2 of 3 Pages

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	CORE/SAMPLE BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
370		W52	8.0	15.0 16.5	100				15.0 - 19.0 SANDY GRAVEL; 10YR4/4 dark yellowish brown;moist; poorly sorted;strong reaction to acid; 65% gravel (35% CP-VCP, 10% small pebbles, 20% others; 95% basalt, 5% quartz; rounded); 30% sand (20% CS, 10% others; 95% basalt mostly subrounded, 5% quartz and others mostly angular to subangular); 5% silt.
		W53	8.0	19.0 20.0	100				19.0 - 24.5 SANDY GRAVEL; 10YR4/3 dark brown; moist; poorly sorted; strong reaction to acid; 50% gravel (25% MP, 15% CP, 10% others; 90-95% basalt, rounded to subrounded; 5% quartz); 45% sand (30% CS, 10% VCS, 5% others; 95% basalt, 5% others; subrounded to rounded); <5% silt.
20						20.05 - 28.4 (8-20)Bentonite crumbles			
365									
25		W54	8.0	25.0 26.0	100				24.5 - 28.5 SANDY GRAVEL; 10YR4/3 dark brown; moist; reaction to acid slight in soil matrix, strong from particle coatings; poorly sorted; 50-55% sand (15% CS, 15% VCS, 15% FS, 10% VFS; 95% basalt, 5% quartz; subrounded); 40-45% gravel (20% CP, 10% VCP, 10% MP-VFP; rounded; 90% basalt, 10% others); <5% silt.
360									From 27.5 - 27.9 ft silt content increases mostly as a coating around gravels.
						28.4 - 31.8 (1/2 inch)Bentonite pellets			28.5 - 33.2 SANDY GRAVEL; 10YR6/2 light grayish brown; poorly sorted; moderate to slight reaction to acid; moist; 57% sand (20% MS, 20% VFS, 17% others; 60% quartz, 40% basalt; angular); 37% gravel (20% CP & MP, 10% FP, 6% others; 80-85% basalt, 15-20% quartz and others); 6% silt. Reaction to acid strong @ 30.0 ft.
30		W55	8.0	29.6 30.3	100				
355									Hanford/Ringold fm contact based on gravel mineralogy.
35			8.0	35.5 36.0	100	35.0 - 55.0 0.010 slot, continuous wrap stainless steel screen			33.2 - 42.0 SANDY GRAVEL; 10YR5/3 brown; poorly sorted; moist; moderately strong reaction to acid; 50% sand (15% MS, 15% CS, 10% VCS, 10% others; 80% quartz and feldspar, 20% others; angular to subangular); 46% gravel (25% CP, 10% MP, 11% others; 70% quartzite, 30% granites, basalt, and mudstone; rounded); <4% silt; <2% mica. 0.2 ft thick silt-rich (6-7%) layer @ 35.8 ft.
350									
40			8.0	40.5 41.0	50				

BORING No. MW-7A

9312220619

Site 1100-EM-1 Boring No. MW-7A Desig. MW-7A Page 3 of 3 Pages

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
345									42.0 - 44.0 SILTY SANDY GRAVEL; 50% gravel, 40% sand, 10% silt; moist; poorly sorted; gravels subrounded, sands subangular; 75% quartzite and feldspar, 25% basalt; strong reaction to acid.
	45		8.0	45.0 46.4	100				44.0 - 48.5 SANDY GRAVEL; 55% gravel, 43% sand, 2% silt; 10YR4/3 dark brown; wet; poorly sorted; gravels rounded to subrounded, sands subangular; 75% quartzite, feldspar and others, 25% basalt.
340									
			8.0	48.5 50.1	100				48.5 - 52.0 SILTY SANDY GRAVEL; 50% gravel, 40% sand, 10% silt; 10YR4/3 dark brown; wet; poorly sorted; gravels subrounded, sands subangular to angular; 80% quartzite, feldspar and others, 20% basalt; strong reaction to acid.
	50								
335			8.0	52.5 53.5	100				52.0 - 53.5 SLIGHTLY GRAVELLY SAND; 10% gravel, 85% sand, 5% silt; 10YR4/3 dark brown; wet; moderately sorted; gravels subrounded, sands subangular; 90% quartz and feldspar, 10% others; moderate to strong reaction to acid.
			8.0	53.5 55.7	100				53.5 - 58.3 SANDY GRAVEL; 50% gravel, 45% sand, <5% silt; 10YR4/2 dark grayish brown; wet; poorly sorted; gravels rounded to subrounded, sands subangular; 95% quartzite and feldspar, 5% others; slight to moderate reaction to acid.
	55					56.0 - 58.3 Borehole caved			
330									Bottom of Boring MW-7A @ 58.3 ft depth.

BORING No. MW-7A

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Site 1100-EM-1 Page 1 of 3 Pages

Boring No. MW-8A Desig. MW-8A Diam.(Casing8 inches"

Co-ordinates N 377299.6 E 1947303.7

TEST BORING FIELD LOG

Elevation Top of Boring	386.2 M.S.L	Hammer Wt.		Boring Started	MAY 2 91
Total Overburden Drilled	58.4 Feet	Hammer Drop			
Elevation Top of Rock	M.S.L	Casing Left		Boring Completed	MAY 9 91
Total Rock Drilled	0.0 Feet	Subsurface Water Data	▽ 40.5 ▼	Page	
Elev. Bottom of Boring	326.2 M.S.L	Obs. Well			
Total Depth of Boring	60.0 Feet	Drilled By:	D. Rossman		
Core Recovered %	Boxes No.	Mfg. Des. Drill:			
Core Recovered Ft:	Diam. In.	Inspected By:	K. Singleton (WHC)		
Soil Samples In. Diam.	No.	Classification By:	E. Freeman (WHC)		
Soil Samples In. Diam.	No.	Classification By:			

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	SIZE	DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
385						0.0 - 3.3 Neat cement			0.0 - 4.0 SILTY SAND; medium brown; moderately well sorted; slightly calcarious (reacts slightly to acid); rounded to subrounded; 60% quartz, 40% basalt; 90% sand (60% VFS, 30% FS, 10% MS), 10% silt; dry.
						3.3 - 18.65 Cement grout			
	5	VQ8	5.0	4.8 6.8	100	4.8 - 6.8 Sample W57			4.0 - 9.0 SANDY GRAVEL; 35% gravel, 60% sand, 5% other; poorly sorted; 2.5Y6/2 light brownish gray; strong reaction to acid; dry; sand subrounded to rounded, 60% MS, 30% FS, 10% VFS; gravel rounded to subrounded, 10%VFP-FP, 70% MP-CP, 20% VCP, 95% basalt.
380									
	10	VQ9	5.0	9.8 12.9	100	9.8 - 12.9 Sample W58			9.0 - 11.0 GRAVELLY SAND; 2.5Y4/2 dark grayish brown; strong reaction with acid; slightly moist; 30% gravel, 70% sand; sand subrounded to subangular, 60% CS, 20% FS, 10% VFS, 70% basalt, 20% quartz, 10% other felsics; gravel 50% VCP, 40% CP, 5% MP, 5% FP, 70% basalt, 30% felsics; poorly sorted.
375									11.0 - 12.0 SILTY CLAY CONGLOMERATE"; not calcareous; held together by fines.
									12.0 - 20.0 GRAVELLY SAND; 10YR5/1 gray, slightly moist; slightly reactive with acid; 85% sand, 15% gravel; sands - 30% VCS, 15% CS, 50% MS, 5% FS, subrounded to subangular, 90% basalt, 10% others; gravels - subrounded, 30% VCP, 40% CP, 20% FP, 20% VFP, 80% basalt, 20% others;

GENERAL REMARKS:

Depths provided in feet beneath the existing ground surface; elevations in feet above mean sea level. All sample numbers prefixed by B00-. V** samples were collected for chemical analysis, W** samples for physical analysis.

Site 1100-EM-1 Boring No. MW-8A Desig. MW-8A Page 2 of 3 Pages

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
									poorly sorted.
370		VR0	5.0	15.4 17.7	50	15.4 - 17.7 Sample W59			
						18.65 - 27.9 Bentonite crumbles			
	20	VR1	8.0	20.2 22.3	60	20.2 - 22.3 Sample W60			20.0 - 49.0 SANDY GRAVEL; 10YR4/1 dark gray; moist; no reaction with acid; 80% gravel (85% basalt, 15% quartzite; subrounded; 5% large cobbles, 5% small cobbles, 50% VCP, 20% CP, 10% MP, 10% FP), 20% sand (95% basalt, 5% others; subrounded to subangular; 35% VCS, 35% CS, 20% MS, 10% FS); poorly sorted.
365									
	25	VR3	5.0	25.0 27.5	60	25.0 - 27.5 Sample W61			Soil reacts strongly with acid @ 25 ft.
360						27.9 - 31.5 (1/4 inch)Bentonite pellets			
	30	VR4	5.0	29.8 32.3	75	29.8 - 32.2 Sample W62			
355						31.5 - 60.0 (20-40)Colorado sand			
	35	VR5	5.0	34.9 37.6	50	34.9 - 37.6 Sample W63 35.3 - 55.6 0.010 inch, continuous wound stainless steel screen			
350									
	40								
345		VR7	5.0	40.8 43.6	70	40.8 - 43.6 Sample W64			

BORING No. MW-8A

9 3 1 2 3 3 2 0 6 2 2 2

Site 1100-EM-1 Boring No. MW-8A Desig. MW-8A Page 3 of 3 Pages

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
	45	VR9	5.0	45.3 48.0	80	45.3 - 48.0 Sample W65			
340									
	50	W66	8.0	49.5 50.8					49.0 - 52.0 SAND; 10YR7/1 light gray; wet; weak reaction to acid; 90% quartz, 5% basalt, 5% granitics; 90% CS, 10% MS; well sorted; subrounded to subangular.
335		W67	8.0	51.5 53.0					52.0 - 53.5 SANDY GRAVEL; 10YR6/1 light gray; strong reaction with acid; slightly cemented; saturated; 70% gravels (subrounded; 5% small cobbles, 10% VCP, 20% MP, 50% FP, 15% VFP; 95% granitics, 5% basalt), 30% sand (subrounded to subangular; 90% granitics, 10% basalt; 20% VCS, 20% CS, 40% MS, 10% FS, 10% VFS); poorly sorted.
	55								53.5 - 57.0 SAND; 10YR7/1 light gray; wet; weak reaction to acid; 90% quartz, 5% basalt, 5% granitics; 90% CS, 10% MS; well sorted; subrounded to subangular.
330									57.0 - 60.0 GRAVELLY SILTY SAND; 5Y5/2 olive gray; no reaction with acid; 20% gravel (40% andesitic, 60% granitic; subrounded; 1% VCP, 20% CP, 50% MP, 20% FP, 9% VFP), 50% sand (10% MS, 40% FS, 50% VFS), 30% silt; poorly sorted.
	60	VS0	5.0	58.0 60.0	100	58.0 - 60.0 Sample W68			
									Bottom of Boring MW-8A @ 60.0 ft.

BORING No. MW-8A

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Site 1100-EM-1 Page 1 of 4 Pages

Boring No. MW-18 Desig. MW-18 Diam.(Casing) 8 inch"

Co-ordinates N 367795.9 E 1947500.9

TEST BORING FIELD LOG

Elevation Top of Boring 399.7 M.S.L
Total Overburden Drilled 69.1 Feet
Elevation Top of Rock ____ M.S.L
Total Rock Drilled 0.0 Feet
Elev. Bottom of Boring 330.6 M.S.L
Total Depth of Boring 69.1 Feet
Core Recovered ____ % Boxes ____ No.
Core Recovered ____ Ft: ____ Diam. ____ In.
Soil Samples ____ In. Diam. ____ No.
Soil Samples ____ In. Diam. ____ No.

Hammer Wt. ____
Hammer Drop ____
Casing Left ____
Subsurface Water Data ▽ 48.4 ▼ ____
Obs. Well ____
Drilled By: G. Thomas
Mfg. Des. Drill: ____
Inspected By: K. Singleton (WHC)
Classification By: K. Singleton (WHC)
Classification By: ____

Boring Started JAN 17 91
Boring Completed JAN 22 91
Page ____

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	SIZE	DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
		1	10.0	0.0 1.0	100	0.0 - 2.8 Neat cement			0 - 2.0 SAND; 2.5Y3/3 dark olive brown; angular; well sorted; moist; no reaction to acid; 98% sand (80% CS & MS, 20% others; 80% quartz, 15% feldspar; 5% others); 2% silt.
						2.8 - 20.8 Portland cement			2.0 - 7.5 SILTY SANDY GRAVEL; 10YR4/2 dark grayish brown; poorly sorted; well graded; slightly moist to moist; strong reaction to acid; 40% gravel (50% VCP, 15% CP, 15% large cobbles, 10% MP & FP, 10% others; 90% basalt, 10% others; rounded; some calcite coating); 53% sand (70% MS & CS, 20% VCS, 10% others; subangular to subrounded; 90% basalt, 10% others); 7% silt, non-plastic.
395	5	2	10.0	5.0 6.0	100				
390	10	3	10.0	10.5 11.5	100				7.5 - 15.0 SANDY GRAVEL; 10YR4/2 dark grayish brown; poorly sorted; moist to slightly moist; strong reaction to acid; 50% gravel (65% VCP, 20% CP, 15% others; 90% basalt, 10% others; rounded); 47% sand (70% CS & MS, 20% VCS, 10% others; subangular to subrounded; 90% basalt, 10% others); 3% silt. @ 13.1 ft - no reaction to acid
385									

GENERAL REMARKS:

Depths provided as feet below the existing ground surface; elevations in feet above mean sea level. All sample numbers prefixed by MW-18-. All samples collected for soil moisture content determination.

BORING No. MW-18

9312230624

Site 1100-EM-1 Boring No. MW-18 Desig. MW-18 Page 2 of 4 Pages

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
		4	10.0	15.1 16.1	100				15.0 - 16.5 SANDY GRAVEL; 10YR4/1 dark gray; poorly sorted; no reaction to acid; slightly moist to moist; 55% sand (30% CS, 30% VCS, 25% MS, 15% other; 90% basalt, subangular to subrounded, 10% other, angular); 42% gravel (60% VCP, 20% CP, 10% VFP, 10% others; 95% basalt, 5% others); 3% silt.
		5	10.0	17.0 18.0	100				16.5 - 21.5 GRAVELLY SAND; 10YR4/1 dark gray; slightly moist to moist; poorly sorted; no reaction to acid; 73% sand (30% CS, 30% MS, 20% VCS, 20% others; 95% subrounded to subangular basalt, 5% angular to subangular others); 25% gravel (50% VCP, 20% CP, 10% small cobbles, 20% FP & VFP; 90% basalt, 10% others; rounded to subrounded); 2% silt.
380	20					20.8 - 35.5 Bentonite crumbles			
		6	8.0	22.0 23.0	100				21.5 - 29.8 SANDY GRAVEL; 10YR3/2 very dark grayish brown; poorly sorted; slightly moist to moist; slight to no reaction with acid; 55% sand (60% CS & MS, 25% VCS, 15% others; 90% basalt, 10% others; subrounded to angular); 42% gravel (50% VCP, 20% CP, 20% MP, 10% others; 90% basalt, 10% others); 4% silt. @ 24.5 ft color change to 10YR4/2 dark grayish brown.
375	25								
		7	8.0	28.0 29.0	100				
370	30								29.8 - 30.2 SAND; 10YR2/1 black; slightly moist to moist; well sorted; no reaction to acid; 96% sand (30% CS, 30% MS, 20% VCS, 20% other; 85% basalt, 15% other; subrounded to subangular; <2% gravel; <2% silt. 30.2 - 35.3 SANDY GRAVEL; 10YR4/2 dark grayish brown; slightly moist to moist; slight to no reaction with acid; poorly sorted; 50% sand (60% CS & MS, 25% VCS, 15% others; 90% basalt, 10% others; subangular to subrounded); 46% gravel (70% CP & MP, 30% others; 95% basalt, 5% others; rounded); 4% silt.
365	35								
		8	8.0	35.5 36.5	100	35.5 - 39.3 Bentonite pellets			35.3 - 36.7 SLIGHTLY GRAVELLY SAND; 10YR4/2 dark grayish brown; strong reaction to acid; moist to slightly moist; well sorted; 85% sand (30% MS, 30% CS, 30 % VCS, 10% other; 80% basalt, 20% quartz and feldspar; subrounded to angular); 10% gravel (MP & FP); 5% silt, non-plastic. 36.7 - 49.5 SANDY GRAVEL; 10YR4/2 dark grayish brown; slightly moist to moist; slight to no reaction with acid; poorly sorted; 51% gravel (70% CP & VCP, 20% MP, 10% others; rounded); 45% sand (60% CS & MS, 25% VCS, 15% others; 90% basalt, 10 % others; subrounded to angular); 4-8% silt, non-plastic.
360	40					39.3 - 66.3 20-40 Colorado sand			
		9	8.0	41.0 42.0	100				

BORING No. MW-18

9312136225

Site 1100-EM-1 Boring No. MW-18 Desig. MW-18 Page 3 of 4 Pages

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT / CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
						42.0 - 64.0 .010" slot, continuous wound stainless steel screen			
355	45								
		10	8.0	46.0 47.0	100				
350	50								Hanford/Ringold formation contact @ 49.5 ft. 49.5 - 63.5 SILTY SANDY GRAVEL; 10YR5/3 grayish brown to brown; very poorly sorted; no reaction to acid; 60% gravel (30% VCP, 20% CP, 20% small cobbles, 20% MP, 10% others; 55% quartz,. 35% basalt, 10% others; rounded to subrounded); 34% sand (65% MS & CS, 20% VCS, 15% others; 85% quartz, 15% others); 6% silt, non-plastic.
345	55								
340	60	11	8.0	60.0 61.0	100				
335	65								63.5 - 69.1 SANDY GRAVEL; 10YR7/4 very pale brown; poorly sorted; no to very weak reaction to acid; 60% sand (60% MS, 20% CS, 20% others; 90% quartz, 10% basalt; angular to subangular); 38% gravel (30% VCP, 20% small cobbles, 20% CP, 20% MP, 10% others); <2% silt.
						66.3 - 69.1 borehole caved			

BORING No. MW-18

9312230626

Site 1100-EM-1 Boring No. MW-18 Desig. MW-18 Page 4 of 4 Pages

SCALES		CORE/SAMPLE			BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
ELEV.	DEPTH	NO. SYMBOL	SIZE	DEPTH RANGE					
									Bottom of Boring MW-18 @ 69.1 ft.

BORING No. MW-18

9312236227

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WALLA WALLA DISTRICT

Site 1100-EM-1 Page 1 of 3 Pages

Boring No. MW-19 Desig. MW-19 Diam.(Casing) 8 inch"

Co-ordinates N 373112.6 E 1946073.6

TEST BORING FIELD LOG

Elevation Top of Boring	384.6	M.S.L	Hammer Wt.		Boring Started JUN 8 91
Total Overburden Drilled	54.0	Feet	Hammer Drop		
Elevation Top of Rock		M.S.L	Casing Left		Boring Completed JUN 19 91
Total Rock Drilled	0.0	Feet	Subsurface Water Data	▽ 34.8 ▼	Page
Elev. Bottom of Boring	330.3	M.S.L	Obs. Well		
Total Depth of Boring	54.3	Feet	Drilled By:	Gary Lydin	
Core Recovered ____ %	Boxes ____	No.	Mfg. Des. Drill:		
Core Recovered ____ Ft: ____	Diam. ____	In.	Inspected By:	K. Singleton (WHC)	
Soil Samples ____ In. Diam.		____ No.	Classification By:	K. Reynolds (WHC)	
Soil Samples ____ In. Diam.		____ No.	Classification By:	R.S. Edrington (WHC)	

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	SIZE	DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
380	5	Z25	8.0	5.0 7.0	100				0.0 - 15.0 SLIGHTLY GRAVELLY SAND; 2.5YR7/1 light gray; dry; 5-10% gravel, predominantly subangular to subrounded; 70% medium to coarse sand, subangular to subrounded, moderately sorted, unconsolidated, 70% felsic, 30% mafic; ~10% fine to very fine sand; trace to 10% silt/clay. Interbedded SLIGHTLY GRAVELLY SAND and GRAVELLY SAND to a depth of 15.0 feet.
375	10	Z26	8.0	10.0 12.0	100				
370									

GENERAL REMARKS:

Depths provided in feet below the existing ground surface; elevations in feet above mean sea level. All sample numbers prefixed by B00-. All samples collected for soil moisture content determination.

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Site 1100-EM-1 Boring No. MW-19 Desig. MW-19

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	SIZE	DEPTH RANGE	BLOWS PER FT / CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
		Z27	8.0	15.0 17.5	100	15.0 Radiation sample			15.0 - 28.0 SANDY GRAVEL; 45% gravel, 50% sand, 5% silt; 15% VCS, 15% CS, 10% MS, 5% FS, 5% VFS; 5YR6/1 gray; dry; very poorly sorted; larger particle sizes subrounded, smaller sizes subangular; 95% basalt, 5% felsic; smaller particles reactive to HCl, larger sizes slightly reactive.
365	20	Z28	8.0	20.0 23.0	100	20.0 Radiation sample			
360	25	Z29	8.0	25.0 28.0	100	25.0 Radiation sample			
355	30	Z30	8.0	30.0 32.0	100	30.0 Radiation sample			28.0 - 40.0 GRAVELLY SAND; 25% gravel, 70% sand, 5% silt; 10% VCS, 10% CS, 40% MS, 5% FS, 5% VFS; 5Y8/3 pale yellow; slightly moist; moderately to poorly sorted; larger particle sizes subrounded, smaller subangular; 80% felsic, 20% basalt, <2% mica; strong reaction to HCl. Hanford/Ringold formation contact @ 28.0 ft depth.
350	35	Z31	8.0	35.0 37.0	100	Static Water Level on 6/11/91, 1600 hrs. 35.0 Radiation sample			GRAVELLY SAND; 35% gravel, 60% sand, 5% silt; slightly higher moisture than above, but otherwise consistant.
345	40					40.0 Radiation sample			40.0 - 45.0 SANDY GRAVEL; 50% gravel (<2% cobbles), 45% sand, 5% silt; 10% VCS, 10% CS, 10% MS, 10% FS, 5% VFS; 5Y6/2 light olive gray; wet; very poorly sorted; subrounded to subangular; 80% felsic, 20% mafic, <2% mica; moderate reaction to HCl.

BORING No. MW-19

9 3 1 2 3 5 2 0 6 2 9

Site 1100-EM-1 Boring No. MW-19 Desig. MW-19 Page 3 of 3 Pages

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
340	45					45.0 Radiation sample			45.0 - 50.0 GRAVELLY SAND; 25% gravel, 70% sand, 5% silt; 5Y6/2 light olive gray; wet; moderately sorted; subrounded; 50% mafic, 50% felsic, <2% mica; slightly reactive to HCl.
335	50					50.0 Radiation sample			50.0 - 52.0 SLIGHTLY GRAVELLY SILTY SAND; 10% gravel, 75% sand, 15% silt; 10% VCS, 20% CS, 30% MS, 10% FS, 5% VFS; 5Y6/2 light olive gray; wet; moderately sorted; subangular; 60% felsic, 40% mafic, <2% mica; moderate reaction to HCl in fine grain sizes only.
									52.0 - 54.3 SILT; 5% VFS, 95% silt; 10YR8/3 very pale brown; moist; moderately plastic; very well sorted; >98% felsic, 2% mica, <2% mafic; non-reactive to HCl; some small sand pockets from 52.0 to 53.0 ft.
									Bottom of Boring MW-19 @ 54.0 ft.

BORING No. MW-19

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Site 1100-EM-1 Page 1 of 3 Pages

Boring No. MW-20 Desig. MW-20 Diam.(Casing) 8 inch"

Co-ordinates N 375956.3 E 1946115.4

TEST BORING FIELD LOG

Elevation Top of Boring	383.5 M.S.L	Hammer Wt.		Boring Started	JUN 4 91
Total Overburden Drilled	67.7 Feet	Hammer Drop			
Elevation Top of Rock	M.S.L	Casing Left		Boring Completed	JUN 7 91
Total Rock Drilled	0.0 Feet	Subsurface Water Data	▽ 35.8 ▼	Page	
Elev. Bottom of Boring	315.8 M.S.L	Obs. Well			
Total Depth of Boring	67.7 Feet	Drilled By:	Tim Gifford		
Core Recovered %	Boxes No.	Mfg. Des. Drill:	Walker Neer		
Core Recovered Ft:	Diam. In.	Inspected By:			
Soil Samples In. Diam.	No.	Classification By:	G.B. Gould (WHC)		
Soil Samples In. Diam.	No.	Classification By:			

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	SIZE	DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
						0.0 - 2.5 Neat cement			0.0 - 5.5 SAND; 10YR5/4; moist; no reaction w/10% HCl; 60% quartz and others, 40% basalt; very fine to medium grained; angular to rounded; no apparent sorting.
						2.5 - 17.4 Cement slurry			
380									
	5	Z15	8.0	5.5					
		Z16	8.0	5.8					5.5 - 6.0 GRAVELLY SILT; 10YR4/4 yellowish brown; moist; lenses of calcareous material in soil; silt 50%, gravel 30%, sand 20%; rounded to well rounded; strong reaction to 10% HCl; quartz and others 50%, basalt 50%; sand very fine to medium, angular to subrounded; non-plastic.
				5.8 6.1					
		Z17	8.0	7.0					
375				7.3					6.0 - 43.0 SILTY SANDY GRAVEL; 10YR6/3 pale brown; dry; 40% gravel, angular to well rounded, basalt 40%, quartz and others 60%; 50% sand, angular to subrounded, basalt 45%, quartz and others 55%, very fine to very coarse; 10% silt; strong reaction with HCl.
	10	Z18	8.0	9.8					Soil in sample B00Z18 @ 9.75 ft was pulverized from the drive barrelling process. Moisture retention may be skewed as a result. Formation is believed to be continuous with above.
				10.1					Basalt boulder at 11.0 ft.
370									Basalt boulder at 14.0 ft.

GENERAL REMARKS:

Depths provided in feet beneath existing ground surface; elevations in feet above mean sea level. All sample numbers prefixed by B00-. All samples collected for soil moisture content determination.

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Site 1100-EM-1 Boring No. MW-20 Desig. MW-20 Page 2 of 3 Pages

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
		Z19	8.0	15.0 15.3					Color change at 17.0 ft. to 10YR4/2; moist; gravel size decreasing; oxidation stains apparent; basalt 70%, quartz and others 30%.
365						17.4 - 20.8 Bentonite crumbles			
	20	Z20	8.0	20.0 20.3					
						20.8 - 20.9 3/8" Bentonite pellets 20.9 - 64.6 20-40 & 8-12 Colorado Sand			
360									
						24.1 - 45.1 .010 in. slot continuous wound stainless steel screen			
	25	Z21	8.0	25.0 25.3					
355									Color change to 10YR5/2; dry; increased amounts of quartz and others; moderate reaction to HCl; poorly sorted; Hanford/Ringold formation contact at 28.0 feet based on gravel mineralogy.
	30	Z22	8.0	30.0 30.3					
350									
	35	Z23	8.0	35.0 35.3					
						35.8 ft. Static Water Level on 5 JUN 91			
345									
	40								

BORING No. MW-20

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Site 1100-EM-1 Boring No. MW-20 Desig. MW-20 Page 3 of 3 Pages

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
340									43.0 - 44.5 SAND; 5Y5/2 olive gray; fine to coarse; some fine cobbles noted; moderately sorted; wet; angular to rounded; basalt 25%, quartz and others 75%; moderate reaction to 10% HCl.
	45								44.5 - 53.0 SANDY GRAVEL; 5Y6/2 light olive gray; wet; 55% gravel, subrounded to well rounded, very fine to very coarse pebbles, basalt 45%, quartz and others 55%; 45% sand, angular to subrounded, basalt 40%, quartz and others 60%; soil poorly sorted; no reaction to 10% HCl. Possible lense of sand from 46.5 to 47.0 ft; same lithology as 43.0 to 44.5 ft; very well rounded larger gravels; very micaceous soil.
335									
	50								
330									53.0 - 55.0 SAND; 5Y5/2 olive gray; saturated; very fine to medium sand; angular to subrounded; basalt 25%, quartz and others 75%; well sorted; weak reaction to 10% HCl.
	55								55.0 - 60.0 SANDY GRAVEL; 50% sand, very fine to very coarse, basalt 40%, quartz and others 60%, angular to subrounded; 50% gravel, very fine to coarse pebbles and small cobbles, basalt 45%, quartz and others 55%, subrounded to well rounded; poorly sorted; saturated; weak reaction to 10% HCl. Sand lense observed at 58.4 ft; very fine to medium grained. Sand lense observed at 59.0 ft; very fine to medium grained.
325									
	60								60.0 - 64.8 GRAVEL; 10YR5/4; saturated; well sorted; very fine to very coarse pebbles; less than 5% sand; some small cobbles noted; larger grains of gravel are very well rounded; basalt 25%, quartz and others 75%. Thin sand lenses noted at ~62.0 ft.
320									Silty lenses observed at 64.7 ft.
	65					Boring caved below 64.6 ft. depth			64.8 - 66.0 SILTY SANDY GRAVEL; 5Y5/2 olive gray; moist; 10YR6/8 discoloration noted as clasts; 50% sand, very fine to medium grained, angular to subrounded, basalt 50%, quartz and others 50%; 35% gravel, very fine to coarse pebbles, subrounded to well rounded, 15% silt, slightly cohesive; poorly sorted; no reaction to 10% HCl.
		Z24	8.0	66.5 67.7					66.0 - 67.7 SILT; 10YR7/1 with lenses of 10YR7/4; moist; low plasticity; no reaction to 10% HCl.
									Bottom of MW-20 @ 67.7 ft.

BORING No. MW-20

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Site 1100-EM-1 Page 1 of 5 Pages

Boring No. MW-21 Desig. MW-21 Diam.(Casing 10 inch"

Co-ordinates N 374482.6 E 1945427.5

TEST BORING FIELD LOG

Elevation Top of Boring 379.5 M.S.L
Total Overburden Drilled 98.5 Feet
Elevation Top of Rock ____ M.S.L
Total Rock Drilled 0.0 Feet
Elev. Bottom of Boring 281.0 M.S.L
Total Depth of Boring 98.5 Feet
Core Recovered ____ % Boxes ____ No.
Core Recovered ____ Ft: ____ Diam. ____ In.
Soil Samples ____ In. Diam. ____ No.
Soil Samples ____ In. Diam. ____ No.

Hammer Wt. ____
Hammer Drop ____
Casing Left ____
Subsurface Water Data ▽ 30.5 ▼ ____
Obs. Well ____

Boring Started MAY 30 91
Boring Completed JUL 1 91
Page ____
Drilled By: Dave Rossman
Mfg. Des. Drill: Wellmaster
Inspected By: K. Singleton (WHC)
Classification By: J.A. McBane (CENPW)
Classification By: ____

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	SIZE	DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
						0.0 - 2.0 Neat cement			0.0 - 3.0 SAND; 100% medium sand; 10YR5/2 grayish brown; moist; well sorted; subangular; 75% basalt, 25% quartzite, feldspars, and others; reaction to acid strong.
						2.0 - 20.0 Portland cement			
375									3.0 - 5.0 SANDY GRAVEL; 60% medium sand, 40% gravel; 10YR5/3 brown; poorly sorted; sand subangular, gravels subrounded; 80% basalt, 20% others; reaction to acid strong; moist.
	5	YZ7	8.0	5.0 6.3	100				5.0 - 12.0 GRAVELLY SAND; 75% medium sand, 23% gravel, <2% silt (coating gravels); 10YR5/3 brown; poorly sorted; sand subangular, gravels subrounded to rounded; 80% basalt, 20% others; reaction to acid strong; moist. Sand % increase @ 6.5 ft to 85%, minor calcite coating on gravels.
370									
	10	YZ8	8.0	10.0 11.0	100				
365		YZ9	8.0	14.5	50				12.0 - 18.0 SANDY GRAVEL; 80% gravel, 18% fine to coarse sand, <2% silt; 10YR3/1 very dark gray; moist very poorly sorted; gravels subangular to subrounded, sands angular to subangular; 85% basalt, 15% quartzite, feldspar and others; reaction to acid strong. 50% gravel, 50% fine to coarse sand; 10YR4/1 dark gray; moist poorly sorted;

GENERAL REMARKS:

Depths provided in feet beneath the existing ground surface; elevations in feet above mean sea level. All sample numbers prefixed with B00-. All samples were collected for soil moisture content determination.

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
				17.8					angularity as above; 85% basalt, 15% others; strong reaction to acid.
									18.0 - 37.5 SILTY SANDY GRAVEL; 50% gravel, 45% fine to medium sand, 5% silt; 10YR5/3 brown; moist; poorly sorted; gravels subangular to rounded, sands subangular to angular; 70% basalt, 30% quartzite, feldspar and others; reaction to acid strong.
360	20	Z00	8.0	18.8 21.1	75	20.0 - 30.5 (8-20)Bentonite crumbles			Reaction to acid @ 20.0 ft slight.
									40% gravel, 35% sand, 25% silt; moderately sorted; non-plastic.
355	25	Z01	8.0	24.0 26.5	75				40% gravel, 55% sand, 5% silt; 10YR5/2 grayish brown; poorly sorted.
350	30	Z02	8.0	29.5 30.2	100				60% gravel, 35% medium sand, 5% silt; 10YR5/2 grayish brown; wet; moderately sorted; 40% basalt, 60% quartzite and others; reaction to acid slight.
						30.5 - 80.5 Pure Gold Bentonite grout			75% quartzite and others, 25% basalt.
345	35								Hanford fm/Ringold fm contact based on mineralogy change in gravels.
									37.5 - 54.0 SANDY GRAVEL; 50% gravel, 50% fine to coarse sand; 10YR5/3 brown; wet; poorly sorted; gravels rounded to subangular, sands angular to subangular; 80% quartzite and others, 20% basalt; reaction to acid slight.
340	40								30% gravel, 70% sand; 10YR5/3 brown.

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SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT / CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
335	45								45% gravel, 55% sand.
									55% gravel, 43% sand, <2% silt.
330	50								70% gravel, 28% sand, <2% silt.
									54.0 - 77.1 ASH; 100% minus #200 sieve; 5YR8/1 white; moist; very well sorted; angularity indeterminate; 95% silica assumed; no reaction to acid.
325	55								Isolated stringers of fine sand and very isolated, rounded fine gravels @ 56.0-57.0 ft. Stringers 1/8 inch maximum thickness with no preferred orientation. Minor fine sand and silt stringers to 1/32 inch thickness @ 57.0-58.0 ft, isolated 1/32 inch diameter pebbles within stringers.
320	60								Medium to fine sand and silt stringers to 1/16 inch thickness @ 61.0-61.5 ft.
315	65					Bottom of 10-inch diameter casing. 8-inch casing beyond.			10YR7/2 light gray; color has been very gradually darkening from the top of the ash deposit. 10YR6/2 light brownish gray. Ash appears to be saturated although no free water noted. When squeeezed,

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SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
310	70								color noticably lightens then darkens again when pressure is released.
									Color change in material becoming more dramatic with increasing depth.
305	75								Moisture content appears to be increasing; core consistancy is decreasing. Ash has a jello-like consistancy when it is removed from the core barrel.
									77.1 - 77.5 SILT; 90% silt and ash, 10% fine sand; 2.5Y7/4 pale yellow; wet; well sorted; sands angular; no reaction to acid.
									77.5 - 80.5 SILT; 100% silt; 2.5Y5/3 light olive brown; moist; no reaction to acid; hard consistancy; non-plastic.
300	80								2.5Y7/3 pale yellow; moderately sorted; beginning to see isolated rounded gravels.
						80.5 - 81.2 40-100 Colorado sand			80.5 - 84.5 SILTY GRAVEL; 55% gravel, 10% sand, 35% silt; color - jade green (not on Munsell color chart); moist; very poorly sorted; gravels rounded to subrounded, sands subangular; gravels 95% quartzite feldspars and others, 5% basalt; sands micaceous; no reaction to acid; material has an oily appearance; core has small inclusions of charcoal appearing substance.
						81.2 - 98.5 20-40 Colorado sand			60% gravel, 20% sand, 20% silt; very poorly sorted; jade green; wet; gravels rounded to subangular.
295	85								84.5 - 85.5 SILTY SANDY GRAVEL; 60% gravel, 30% sand, 10% silt; jade green; wet; very poorly sorted; gravels rounded to subangular, sands subangular; 95% quartzite and others, 5% basalt; no reaction to acid; color intensity varying irregularly. 85.2 ft silt is occurring in pockets; color remaining jade green; sand color now 5Y4/2 olive gray.
									85.5 - 86.0 SAND; <2% gravel, 98% medium sand; 5Y4/2 olive gray; well sorted; subangular; no reaction to acid.
						88.5 - 98.5 .010" slot, stainless steel continuous wound screen			86.0 - 98.5 SILTY SANDY GRAVEL; 70% gravel, 20% sand, 10% silt; color dark green (not in Munsell charts); wet; poorly sorted; gravels rounded to subangular, sands subangular to angular; no reaction to acid; very similar to 84.5-85.5 except darker in color. 5Y4/2 olive gray, green tint less intense. Green tint returning.
290	90								55% gravel, 33% sand, 10% silt; dark green with pockets of jade green; wet; poorly sorted; greener color seems concentrated in wetter zones having less sand and more gravel.
									50% gravel, 45% sand, 5% silt.
285	95								5Y4/2 olive gray; estimate green color is from Fe reduction within the confined aquifer.

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Site 1100-EM-1 Boring No. MW-21 Desig. MW-21 Page 5 of 5 Pages

SCALES		CORE/SAMPLE			BLOWS PER FT	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
ELEV.	DEPTH	NO. SYMBOL	SIZE	DEPTH RANGE	CORE REC'VY				
									Bottom of Boring MW-21 @ 98.5 ft.

BORING No. MW-21

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Site 1100-EM-1 Page 1 of 3 Pages

Boring No. MW-22 Desig. MW-22 Diam.(Casing 8 inches"

Co-ordinates N 374531.8 E 1946933.4

TEST BORING FIELD LOG

Elevation Top of Boring	385.1	M.S.L	Hammer Wt.	Boring Started	MAY 31 91
Total Overburden Drilled	63.0	Feet	Hammer Drop		
Elevation Top of Rock		M.S.L	Casing Left	Boring Completed	JUN 6 91
Total Rock Drilled	0.0	Feet	Subsurface Water Data ▽ 37.4 ▼	Page	
Elev. Bottom of Boring	322.1	M.S.L	Obs. Well		
Total Depth of Boring	63.0	Feet	Drilled By:	Gary Lydin	
Core Recovered ____ %	Boxes ____	No.	Mfg. Des. Drill:		
Core Recovered ____ Ft: ____	Diam. ____	In.	Inspected By:	K. Singleton (WHC)	
Soil Samples ____ In. Diam.		No.	Classification By:	K. Singleton (WHC)	
Soil Samples ____ In. Diam.		No.	Classification By:	R.S. Edrington (WHC)	

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
385						0.0 - 1.0 Neat cement 1.0 - 19.0 Portland cement			0.0 - 2.0 GRAVELLY SAND; 2.5Y4/4 olive brown; 82% sand, 15% gravel, 3% silt; dry at the surface, moist with depth; poorly sorted; sands - 60% MS, 20% CS, 20% others, angular to subangular; gravels - 80% MP, 20% others, rounded; reaction to acid none at surface, weak with increasing depth; 85% quartz, 15% basalt.
		Z04	8.0	4.5 5.0	100				2.0 - 7.0 SANDY GRAVEL; 2.5Y5/2 grayish brown; 54% gravel, 43% sand, <3% silt; poorly sorted;moist; moderate to strong reaction to acid; sands - 80% MS & CS, 20% others, subrounded to subangular; gravels - 70% VCP & CP, 10% MP, 20% others, rounded; 75-85% basalt, 15-25% others; occasional small cobbles; increase in VFS and silt at 7 ft.
380	5								
		Z05	8.0	9.0 10.0	100				7.0 - 13.5 SANDY GRAVEL; 2.5Y5/2 grayish brown; 54% sand, 40% gravel, 6% silt; poorly sorted; slightly moist; moderate to strong reaction to acid; sands - 70% MS & CS, 10% VFS, 20% others, subangular to subrounded; gravels - 60% MP, 20% FP, 20% others, rounded; 85% basalt, 15% others.
375	10								
									13.5 - 20.0 SANDY GRAVEL; 2.5Y4/2 dark grayish brown; poorly sorted; slightly moist to moist; moderate to strong reaction to acid; 66% sand, 25% gravel, 7% silt; sands - 20% VCS, 15%

GENERAL REMARKS:

All depths are in feet below the existing land surface; elevations are in feet above mean sea level. All sample numbers prefixed with B00-. All samples collected for soil moisture content determination.

Site 1100-EM-1 Boring No. MW-22 Desig. MW-22

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	SIZE	DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
370		Z06	8.0	15.0 16.0	100				CS, 15% MS, 10% VFS, subrounded; gravels - 20% CP & VCP, 5% others, rounded; 95% basalt, 5% others; occasional small cobble. 16.5 - 16.9 ft highly cemented layer; strong reaction to acid; lithified; some iron oxide staining.
		Z07	8.0	19.0 20.0	100	19.0 - 24.4 (8-20)Bentonite crumbles			
365	20	Z08	8.0	20.0 21.0	100				20.0 - 21.2 SANDY GRAVEL; 2.5Y3/2 very dark grayish brown; poorly sorted; very moist; strong reaction to acid; 60% gravel, 37% sand; <3% silt; gravels - 20% VFP, 20% FP & MP, 15% CP, 5% others, subrounded to rounded; sands - 20% VCS, 10% CS, 7% others, subrounded; 95% basalt, 5% others. 21.2 - 26.5 SANDY GRAVEL; 2.5Y4/2 dark grayish brown; poorly sorted; moist; moderate reaction to acid; 55% sand, 40% gravel, <5% silt; sands - 20% VCS, 15% CS, 15% MS, 10% VFS, subrounded; gravels - 20% VCP & CP, 10% MP-VFP, 10% others; rounded; 95% basalt, 5% others.
360	25	Z09	8.0	25.0 26.0	100	24.4 - 27.0 (1/2 inch)Bentonite pellets			
						27.0 - 60.0 (10-40)Colorado sand			26.6 - 33.0 SANDY GRAVEL; 2.5Y5/2 grayish brown; poorly sorted; moist; moderate to strong reaction to acid; 45% sand, 50% gravel, <5% silt; sands - 15% VCS, 15% CS, 15% others, subrounded to subangular; gravels - 20% CP, 15% others, rounded; 80% basalt, 20% quartz and feldspars.
355	30					30.0 - 50.4 0.010 slot, continuous wound stainless steel screen			
		Z10	8.0	31.0 32.5	100				
									33.0 - 36.5 SILTY SANDY GRAVEL; 2.5Y4/3 olive brown; poorly sorted; moist; 55% sand, 36% gravel, 9% silt; sands - 20%CS, 15% MS-FS, 10% VCS, 10% VFS, subangular to angular; gravels - 20% MP-CP, 11% FP, 5% others, rounded; 9% non-plastic silt; 60-70% basalt, 30-40% quartz and feldspar.
350	35	Z11	8.0	35.0 36.0	100				
									36.5 - 39.0 SILTY SANDY GRAVEL; 2.5Y4/3 olive brown; poorly sorted; moist; strong to moderater reaction to acid; 40% sand, 50% gravel, 10% silt; sands - 20% MS to CS, 10% VCS, 10% others, angular to subrounded; gravels - 30% VCP to CP, 10% MP to VFP, 10% others, rounded; 70% quartz and feldspar, 30% others, 10% non-plastic silt, <2% mica.
345	40								39.0 - 42.5 SANDY GRAVEL; 2.5YR6/2-2.5Y5/3 light brownish gray to light olive brown; wet; poorly sorted; well graded; no reaction to acid; 50% sand, 47% gravel, 3% silt; sands - 30% MS-CS, 10% VCS, 8% others, <2% mica, angular to subangular; gravels - 30% MP, 10% VFP-FP, 7% others, rounded;

Site 1100-EM-1 Boring No. MW-22 Desig. MW-22 Page 3 of 3 Pages

SCALES ELEV.	SCALES DEPTH	CORE/SAMPLE NO. SYMBOL	CORE/SAMPLE SIZE	CORE/SAMPLE DEPTH RANGE	BLOWS PER FT CORE REC'VY	SAMPLING & CORING OPERATIONS	WELL	MATL	CLASSIFICATION OF MATERIALS
									90% quartz, 10% others;
340	45								42.5 - 48.0 SILTY SANDY GRAVEL; 50% gravel, 40% sand, 10% silt; sands - 5% VCS, 15% CS, 15% MS, 5% FS-VFS, 15% mafic, 30% felsic; gravels - 30% mafic, 70% felsic, 5% mica; 2.5Y5/2 grayish brown; wet; well rounded to subrounded; moderately sorted; slight reaction to acid.
335	50								48.0 - 51.5 SANDY GRAVEL; 30% gravel, 65% sand, 5% silt; 10% VCS, 25% CS, 15% MS, 10% FS, 5% VFS; 85% felsic, 15% mafic; 2.5Y5/2 grayish brown; wet; well rounded to subrounded; moderately sorted; slight reaction to acid.
330	55								51.5 - 58.0 SANDY GRAVEL; 45% gravel, 50% sand, 5% silt; 5% FP, 40% VFP, 5% VCS, 25% CS, 10% MS, 5% FS, 5% VFS; 2.5Y5/3 light olive brown; wet; 85% felsic, 15% mafic; gravels subrounded, sands subangular; poorly sorted; slight reaction to acid.
325	60					60.0 - 63.0 Hole caved			58.0 - 61.1 SILT; ash-like; 95% silt, 5% VFS to MS; <2% mica; 2.5Y7/3 dark pale yellow; very well sorted; tuffaceous 85%, 15% mafics; no reaction to acid.
		Z12	8.0	62.0 63.0	100				61.1 - 63.0 ASH; 90% silt, <10% VFS; 7.5YR8/1 white; wet; very well sorted; non-reactive with acid.
									Bottom of Boring MW-22 @ 63.0 ft.

BORING No. MW-22

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1100-EM-1 PHASE II RI
HORN RAPIDS LANDFILL TRENCHING LOGS

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HTW DRILLING LOG

HOLE NO. TRENCH #1

1. COMPANY NAME: CENPW	2. DRILLING SUBCONTRACTOR: WESTINGHOUSE–HANFORD CO.	SHEET 1 OF 2
3. PROJECT: 1100–EM–1 OPERABLE UNIT	4. LOCATION: HORN RAPIDS LANDFILL	
5. NAME OF DRILLER: C. LARSON / M. FOSS	6. MANUFACTURER'S DESIGNATION OF DRILL: CASE #780 BACKHOE / FMC BACKHOE	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: SAMPLED WITH SPOON FROM BACKHOE BUCKET	8. HOLE LOCATION: N374,282.98, E1,944,459.57	
	9. SURFACE ELEVATION: N/A	
	10. DATE STARTED: SEPT 1991	11. DATE COMPLETED: 22 OCT 1991
12. OVERBURDEN THICKNESS: N/A	15. DEPTH GROUNDWATER ENCOUNTERED: N/A	
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER/ELAPSED TIME AFTER DRILLING: N/A	
14. TOTAL DEPTH OF HOLE: 11.0 FEET	17. OTHER WATER LEVEL MEASUREMENTS: N/A	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	0	0	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER	OTHER	OTHER	21. TOTAL CORE RECOVERY
	2	0	SCREENING 4			N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITOR. WELL	OTHER	23. INSPECTOR
	22 OCT 1991			V. M. JOHNSON, WHC / J. A. MCBANE, CENPW

ELEV. (ft) a	DEPTH (ft) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING NUMBER d	GEOTECH SAMPLE NUMBER e	ANALYITCAL SAMPLE NUMBER f	REMARKS g
	0	0–11 FEET				
		SANDY GRAVEL: sand 43%, gravel 52%, silt 5%; 10YR 6/2, light brownish gray; poorly sorted; sands subangular, gravels rounded to subrounded; 55% felsic, 45% mafic; no reaction to acid.				
	1	0.5–11 feet: Abundant stainless steel lathe shavings, piping, cable, tires, and coke bottles.				
	2	2 feet: paint can and paint residue.				Paint can and paint residue drummed.
	3		HRL0101			Screening – negative
	4				B00T0	Chemical sample
	5					
	6		HRL0102			Screening – negative

9312320644

HTW DRILLING LOG

HOLE NO. TRENCH #1

PROJECT: 1100-EM-1 O.U. – HORN RAPIDS LANDFILL

INSPECTOR: V. M. JOHNSON / J. A. MCBANE

SHEET 2 OF 2

ELEV. (ft) a	DEPTH (ft) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING NUMBER d	GEOTECH SAMPLE NUMBER e	ANALYTICAL SAMPLE NUMBER f	REMARKS g
	6	SOIL, as above.	HRL0102			Screening – negative
		6–10 feet: Tires, one rusted drum with no visible contents; labelled "certified".				
	7	7 feet: Cloth, rags, coffee can, fiberglas insulation.				
	8					
		8.5 feet: Solidified paint residue, OVM reading of 262ppm, suspect asbestos,				Paint residue drummed.
	9	scrap metal.	HRL0103			Screening – negative
					B00T1	Chemical sample
	10					
	11		HRL0104			Screening – negative
		Approx. 320 cubic yards excavated.				
		Approx. Landfill Composition:				
		soil – 90%				
		debris – 10%				

FORM MRK JUN 89 55-2

PROJECT: 1100-EM-1 HORN RAPIDS LANDFILL

HOLE NUMBER: TRENCH #1

9312230645

HTW DRILLING LOG

HOLE NO. TRENCH #3A

1. COMPANY NAME: CENPW	2. DRILLING SUBCONTRACTOR: WESTINGHOUSE–HANFORD CO.	SHEET 1 OF 3
3. PROJECT: 1100–EM–1 OPERABLE UNIT	4. LOCATION: HORN RAPIDS LANDFILL	
5. NAME OF DRILLER: M. FOSS	6. MANUFACTURER'S DESIGNATION OF DRILL: FMC BACKHOE #HO–17–5669	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: SAMPLED WITH SPOON FROM BACKHOE BUCKET	8. HOLE LOCATION: N374,095.74, E1,944,557.45	
	9. SURFACE ELEVATION: N/A	
	10. DATE STARTED: 23 OCT 1991	11. DATE COMPLETED: 24 OCT 1991
12. OVERBURDEN THICKNESS: N/A	15. DEPTH GROUNDWATER ENCOUNTERED: N/A	
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER/ELAPSED TIME AFTER DRILLING: N/A	
14. TOTAL DEPTH OF HOLE: 21.0 FEET	17. OTHER WATER LEVEL MEASUREMENTS: N/A	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	0	0	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER SCREENING	OTHER ASBESTOS	OTHER UNKNOWNS	21. TOTAL CORE RECOVERY
	4	0	5	2	2	N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITOR. WELL	OTHER	23. INSPECTOR
	23 OCT 1991			J. A. MCBANE, CENPW

ELEV. (ft) a	DEPTH (ft) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING NUMBER d	GEOTECH SAMPLE NUMBER e	ANALYTICAL SAMPLE NUMBER f	REMARKS g
	1	0–13 FEET SANDY GRAVEL: sand 40%, gravel 55%, silt <5%; 10YR 4/2, light gray; dry; poorly sorted; sands subangular to angular, gravels rounded to subangular; 60% basalt, 40% quartzite, feldspars and others; reaction to acid – slight to none. 1.5 feet: layer of stainless steel lathe shavings, slopes downward approx. 5 degrees toward the west.				
	3	3–5 feet: accumulation of tires, inner tubes, and misc. automotive debris including mufflers and lengths of tail pipe.	HRL3A01			Screening – negative Mufflers/tailpipe possible GPR targets.
	5	5.5 feet: Empty 5–gallon paint can; 0.0 ppm with OVM screening	HRL3A02		B00ZT7	Screening – negative Chemical sample

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HTW DRILLING LOG

HOLE NO. TRENCH #3A

PROJECT 1100–EM–1 O.U. – HORN RAPIDS LANDFILL

INSPECTOR J. A. MCBANE

SHEET 2 OF 3

ELEV. (ft) a	DEPTH (ft) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING NUMBER d	GEOTECH SAMPLE NUMBER e	ANALYTICAL SAMPLE NUMBER f	REMARKS g
	6	6 feet: Encountered white crystaline material partially wrapped in plastic bag, sample obtained.				
	7	7 feet: Flat lying fragment of sheet metal, approx. 1/16 inch thick and 4 feet long by 3 feet wide.				Sheet metal possible GPR target.
	8	8–10 feet: Abundant tires and inner tubes.	HRL3A03 HRL3A04			White crystaline material Screening – negative
	9					
	10	10 feet: Another bag of white crystaline material. Substance enclosed in a plastic lined paper bag. Pocket of bright purple stained soil. Suspect asbestos.	HRL3A05 HRL3A06		B00ZT8	Purple stained soil Asbestos sample Chemical sample
	11	11–13 feet: very scattered stainless steel lathe shavings.				
	12					
	13	13 – 21 FEET SAND; 100% med to coarse sand; 10YR 7/1 light gray; moist; very well sorted; angular to subangular; 90% quartzite and feldspar, 10% mica; no reaction to acid.	HRL3A07			Screening – negative
	14	No debris below 13 feet depth.				
	15					
	16		HRL3A08			Screening – negative

9 3 1 2 3 2 0 6 1 7

HTW DRILLING LOG

HOLE NO. TRENCH #3A

PROJECT 1100-EM-1 O.U. - HORN RAPIDS LANDFILL

INSPECTOR J. A. MCBANE

SHEET 3 OF 3

ELEV. (ft) a	DEPTH (ft) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING NUMBER d	GEOTECH SAMPLE NUMBER e	ANALYTICAL SAMPLE NUMBER f	REMARKS g
	16	SOIL, as above - no debris.	HRL3A08			Screening - negative
	17					
	18					
	19		HRL3A09			Asbestos sample
					B00ZT9	Chemical sample
	20					
					B00ZV0	Chemical sample
	21					
		Approx. 108 cubic yards excavated. Approx. Landfill Composition: soil - 97% debris - 3%				

FORM MRK JUN 89 55-2

PROJECT 1100-EM-1 HORN RAPIDS LANDFILL

HOLE NUMBER TRENCH #3A

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HTW DRILLING LOG

HOLE NO. TRENCH #3B

1. COMPANY NAME: CENPW	2. DRILLING SUBCONTRACTOR: WESTINGHOUSE-HANFORD CO.
SHEET 1 OF 2	
3. PROJECT: 1100-EM-1 OPERABLE UNIT	4. LOCATION: HORN RAPIDS LANDFILL
5. NAME OF DRILLER: C. LARSON / M. FOSS	6. MANUFACTURER'S DESIGNATION OF DRILL: CASE 780/FMC BACKHOE #HO-17-5669
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: SAMPLED WITH SPOON FROM BACKHOE BUCKET	8. HOLE LOCATION: N374,095.74, E1,944,546.81
	9. SURFACE ELEVATION: N/A
	10. DATE STARTED: 18 SEPT 1991 / 11. DATE COMPLETED: 23 OCT 1991
12. OVERBURDEN THICKNESS: N/A	15. DEPTH GROUNDWATER ENCOUNTERED: N/A
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER/ELAPSED TIME AFTER DRILLING: N/A
14. TOTAL DEPTH OF HOLE: 8.0 FEET	17. OTHER WATER LEVEL MEASUREMENTS: N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	0	0	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER	OTHER	OTHER	21. TOTAL CORE RECOVERY
			SCREENING	ASBESTOS		
	3	0	2	1		N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITOR. WELL	OTHER	23. INSPECTOR
	23 OCT 1991			V. M. JOHNSON, WHC / J. A. MCBANE, CENPW

ELEV. (ft) a	DEPTH (ft) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING NUMBER d	GEOTECH SAMPLE NUMBER e	ANALYTICAL SAMPLE NUMBER f	REMARKS g
		0-8 FEET				
		SANDY GRAVEL: sand 52%, gravel 44%, silt 4%; 10YR 4/2, light gray; dry; poorly to very poorly sorted; sands subangular, gravels rounded to subrounded; 60% mafic, 40% felsic; no reaction to acid. Scattered boulders 3 feet max. diameter.				
	1					
	2	2-3 feet: Accumulation of tires and inner tubes.				
	3	3-4 feet: Accumulation of stainless steel lathe shavings and building flashing. Sheetrock still attached to flashing in places.	HRL3B01			Screening - negative
	4	4.5 feet: Unlabeled, rusted 5 gallon paint can. No contents observed. 0.0 ppm with OVM.				
	5	5-6 feet: Accumulation of tires and inner tubes.				
	6		HRL3B02 HRL3B03			Screening - negative Asbestos sample

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HTW DRILLING LOG

HOLE NO. TRENCH #3B

PROJECT: 1100–EM–1 O.U. – HORN RAPIDS LANDFILL

INSPECTOR: V. M. JOHNSON / J. A. MCBANE

SHEET 2 OF 2

ELEV. (ft) a	DEPTH (ft) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING NUMBER d	GEOTECH SAMPLE NUMBER e	ANALYTICAL SAMPLE NUMBER f	REMARKS g
	6	SOIL as above; debris amount and character as above.	HRL3B02 HRL3B03			Screening – negative Asbestos sample Appears that GPR returns caused by metal flashing and ss shavings.
	7				B00ZT3 B00ZT4 B00ZT5	Chemical sample Duplicate Split
	8	Approx. 19 cubic yards excavated. Approx. Landfill Composition: soil – 97% debris – 3%				ss – stainless steel

9312350

FORM MRK JUN 89 55–2

PROJECT: 1100–EM–1 HORN RAPIDS LANDFILL

HOLE NUMBER: TRENCH #3B

HTW DRILLING LOG

HOLE NO. TRENCH #4/5

1. COMPANY NAME: CENPW	2. DRILLING SUBCONTRACTOR: WESTINGHOUSE–HANFORD CO.	SHEET 1 OF 2
3. PROJECT: 1100–EM–1 OPERABLE UNIT	4. LOCATION: HORN RAPIDS LANDFILL	
5. NAME OF DRILLER: C. LARSON	6. MANUFACTURER'S DESIGNATION OF DRILL: FMC BACKHOE #HO–17–5669	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: SAMPLED WITH SPOON FROM BACKHOE BUCKET	8. HOLE LOCATION: N374,068.09, E1,944,459.57	
	9. SURFACE ELEVATION: N/A	
	10. DATE STARTED: 25 OCT 1991	11. DATE COMPLETED: 25 OCT 1991
12. OVERBURDEN THICKNESS: N/A	15. DEPTH GROUNDWATER ENCOUNTERED: N/A	
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER/ELAPSED TIME AFTER DRILLING: N/A	
14. TOTAL DEPTH OF HOLE: 12.0 FEET	17. OTHER WATER LEVEL MEASUREMENTS: N/A	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	0	0	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER	OTHER	OTHER	21. TOTAL CORE RECOVERY
	2	0	SCREENING 2			N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITOR. WELL	OTHER	23. INSPECTOR
	25 OCT 1991			J. A. MCBANE, CENPW

ELEV. (ft) a	DEPTH (ft) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING NUMBER d	GEOTECH SAMPLE NUMBER e	ANALYTICAL SAMPLE NUMBER f	REMARKS g
	1	0–0.5 FEET SILTY SANDY GRAVEL; 60% gravel, 35% sand (fine to med), 5% silt; 10YR 7/3 very pale brown; dry; very poorly sorted; gravels rounded to subrounded, sands angular; 65% basalt, 35% others; no reaction to acid.				
	2	0.5–12 FEET SANDY GRAVEL; 55% gravel, 45% sand (med to coarse), <3% silt; 10YR 6/1 gray; dry; poorly sorted; gravels rounded to subrounded, sands angular to subangular; 70% basalt, 30% others; no reaction to acid; rare cobbles and boulders to 14 inch max. diameter.				
	3		HRL4/501			Screening – negative
	4	No debris observed above 5 feet depth.				
					B00ZV1	Chemical sample
	5	5 feet: 3–1/2 foot long wooden 4x4 embedded in a concrete mass.				
	6	6 feet: Tires, tail pipe, 12 in. dia. gear wheel.				Possible GPR targets.

7312306

HTW DRILLING LOG

HOLE NO. TRENCH #4/5

PROJECT: 1100-EM-1 O.U. – HORN RAPIDS LANDFILL

INSPECTOR: J. A. MCBANE

SHEET 2 OF 2

ELEV. (ft) a	DEPTH (ft) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING NUMBER d	GEOTECH SAMPLE NUMBER e	ANALYTICAL SAMPLE NUMBER f	REMARKS g
	6	6 feet: Tires, tail pipe, 12 in. dia. gear wheel.				Possible GPR targets.
		SOIL as above.				
	7		HRL4/502			Screening – negative
	8	8 feet: Tires (5 or 6), long pieces (5–6 feet) of flat lying metal building flashing.				Possible GPR targets.
	9	9 feet: Large piece of sheet metal (4x4 feet) exposed in eastern wall. Approx. 1/32 in. thick. Flat lying relative to ground surface.				Possible GPR target.
	10	10 feet: Rotted timbers in trench sidewalls. Little observed in trench floor.				
	11	11 feet: Rotted timbers, metal flashing strips, fiberglas insulation, street drain grate, copper wire pieces.			B00ZV2	Chemical sample
	12	Approx. 90 cubic yards excavated. Approx. Landfill Composition: soil – 99.5% debris – 0.5%				

FORM MRK JUN 89 55-2

PROJECT: 1100-EM-1 HORN RAPIDS LANDFILL

HOLE NUMBER: TRENCH #4/5

9131320532

HTW DRILLING LOG

HOLE NO. TRENCH #6

1. COMPANY NAME: CENPW	2. DRILLING SUBCONTRACTOR: WESTINGHOUSE-HANFORD CO.	SHEET 1 OF 2
3. PROJECT: 1100-EM-1 OPERABLE UNIT	4. LOCATION: HORN RAPIDS LANDFILL	
5. NAME OF DRILLER: M. FOSS	6. MANUFACTURER'S DESIGNATION OF DRILL: FMC BACKHOE #HO-17-5669	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: SAMPLED WITH SPOON FROM BACKHOE BUCKET	8. HOLE LOCATION: N374,006.38, E1,944,448.94	
	9. SURFACE ELEVATION: N/A	
	10. DATE STARTED: 28 OCT 1991	11. DATE COMPLETED: 30 OCT 1991
12. OVERBURDEN THICKNESS: N/A	15. DEPTH GROUNDWATER ENCOUNTERED: N/A	
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER/ELAPSED TIME AFTER DRILLING: N/A	
14. TOTAL DEPTH OF HOLE: 6.5 FEET	17. OTHER WATER LEVEL MEASUREMENTS: N/A	

18. GEOTECHNICAL SAMPLES	DISTURBED: 0	UNDISTURBED: 0	19. TOTAL NUMBER OF CORE BOXES: N/A			
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC: 0	METALS: 0	OTHER SCREENING: 0	OTHER	OTHER	21. TOTAL CORE RECOVERY: N/A %
22. DISPOSITION OF HOLE	BACKFILLED: 30 OCT 1991	MONITOR. WELL	OTHER	23. INSPECTOR: J. A. MCBANE, CENPW		

ELEV. (ft) a	DEPTH (ft) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING NUMBER d	GEOTECH SAMPLE NUMBER e	ANALYTICAL SAMPLE NUMBER f	REMARKS g
	0	0-6.5 FEET				
		SANDY GRAVEL; gravel 65%, sand (med to coarse) 35%, silt <2%; 10YR 6/1 gray; dry; poorly sorted; gravels rounded to				
	1	subrounded, sands angular to subangular; 70% basalt, 30% others; no reaction to acid. 1.5 feet: Sheet of 1/8 in. rubber approx. 3x4 ft., misc. #8 rebar lengths, fragments of 1/4-1/2 in. dia. steel cable, metal flashing,				
	2	plasterboard, and wood.	HRL0601			Screening sample
		2 feet: Flat lying piece of approx. 1/16 in. thick by 2 foot square sheet metal. Flat lying relative to the ground surface.				Possible GPR target.
	3					
	4	4-6.5 feet: Wood debris mixed with rufuse previously described.				
			HRL0602			Screening sample
	5		HRL0603			Asbestos sample
					B00ZB3*	Chemical sample
	6	6 feet: Scattered tires.				

FORM MRK JUN 89 55

PROJECT: 1100-EM-1 HORN RAPIDS LANDFILL

HOLE NO. TRENCH #6

9512230633

HTW DRILLING LOG

HOLE NO. TRENCH #6

PROJECT: 1100-EM-1 O.U. - HORN RAPIDS LANDFILL

INSPECTOR: J. A. MCBANE

SHEET 2 OF 2

ELEV. (ft) a	DEPTH (ft) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING NUMBER d	GEOTECH SAMPLE NUMBER e	ANALYTICAL SAMPLE NUMBER f	REMARKS g
	6	SOIL as above, debris as above.				
		6.5 feet: Suspect asbestos, medical waste.	HRL0604			Asbestos sample
	7	Trench terminated at 6.5 feet due to unknown hazards associated with medical debris. Approx. 30-40 medical vials containing a milky-white liquid plus one plastic IV bag were uncovered. All samples collected were placed within an ice chest and reburied in the trench.				
		HRL0000 - Sample obtained and subsequently reburied.				
		B00ZB3* - Chemical sample was reburied and sample number was reused for next trench.				
		Approx. 20 cubic yards excavated.				
		Approx. Landfill Composition:				
		soil - 95%				
		debris - 5%				

FORM MRK JUN 89 55-2

PROJECT: 1100-EM-1 HORN RAPIDS LANDFILL

HOLE NUMBER: TRENCH #6

HTW DRILLING LOG

HOLE NO.	TRENCH #7
1. COMPANY NAME	CENPW
2. DRILLING SUBCONTRACTOR	WESTINGHOUSE-HANFORD CO.
SHEET	1 OF 1
3. PROJECT	1100-EM-1 OPERABLE UNIT
4. LOCATION	HORN RAPIDS LANDFILL
5. NAME OF DRILLER	C. LARSON / M. FOSS
6. MANUFACTURER'S DESIGNATION OF DRILL	CASE #780 BACKHOE / FMC BACKHOE
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	SAMPLED WITH SPOON FROM BACKHOE BUCKET
8. HOLE LOCATION	N373,863.83, E1,944,461.70
9. SURFACE ELEVATION	N/A
10. DATE STARTED	17 SEPT 1991
11. DATE COMPLETED	17 OCT 1991
12. OVERBURDEN THICKNESS	N/A
15. DEPTH GROUNDWATER ENCOUNTERED	N/A
13. DEPTH DRILLED INTO ROCK	N/A
16. DEPTH TO WATER/ELAPSED TIME AFTER DRILLING	N/A
14. TOTAL DEPTH OF HOLE	6.0 FEET
17. OTHER WATER LEVEL MEASUREMENTS	N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	0	0	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER SCREENING	OTHER	OTHER	21. TOTAL CORE RECOVERY
	1	0	3			N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITOR. WELL	OTHER	23. INSPECTOR
	17 OCT 1991			V. M. JOHNSON, WHC / J. A. MCBANE, CENPW

ELEV. (ft) a	DEPTH (ft) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING NUMBER d	GEOTECH SAMPLE NUMBER e	ANALYITCAL SAMPLE NUMBER f	REMARKS g
		0-6 FEET				
		SANDY GRAVEL: sand 52%, gravel 43%, silt 5%; 10YR 6/2 light brownish gray; dry; poorly to very poorly sorted; sand subangular, gravel subrounded to rounded; 60% mafics, 40% felsics (gravel); no reaction to acid.				
	1					
		Debris consists of intermixed glass bottles, black tile, metal flashing strips, plasterboard fragments, roofing paper, crushed culverts, rebar, and rotten building timbers.				
	2		HRL0701			Screening - negative Crushed culverts and flashing strips likely GPR targets.
	3	SOIL and debris uniform throughout excavation.	HRL0702			Screening - negative
	4					
					B00ZT2	Chemical sample
	5		HRL0703			Screening - negative
		Approx. 50 cubic yards excavated.				
		Approx. Landfill Composition: soil - 85% debris - 15%				
	6					

FORM MRK JUN 89 55

PROJECT: 1100-EM-1 HORN RAPIDS LANDFILL

HOLE NO.: TRENCH #7

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HTW DRILLING LOG

HOLE NO. TRENCH #8

1. COMPANY NAME	CENPW
2. DRILLING SUBCONTRACTOR	WESTINGHOUSE–HANFORD CO.
SHEET	1 OF 1
3. PROJECT	1100–EM–1 OPERABLE UNIT
4. LOCATION	HORN RAPIDS LANDFILL
5. NAME OF DRILLER	M. FOSS
6. MANUFACTURER'S DESIGNATION OF DRILL	FMC BACKHOE #HO–17–5669
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	SAMPLED WITH SPOON FROM BACKHOE BUCKET
8. HOLE LOCATION	N374,127.66, E1,944,223.40
9. SURFACE ELEVATION	N/A
10. DATE STARTED	30 OCT 1991
11. DATE COMPLETED	30 OCT 1991
12. OVERBURDEN THICKNESS	N/A
15. DEPTH GROUNDWATER ENCOUNTERED	N/A
13. DEPTH DRILLED INTO ROCK	N/A
16. DEPTH TO WATER/ELAPSED TIME AFTER DRILLING	N/A
14. TOTAL DEPTH OF HOLE	5.0 FEET
17. OTHER WATER LEVEL MEASUREMENTS	N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	0	0	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER SCREENING	OTHER ASBESTOS	OTHER	21. TOTAL CORE RECOVERY
	1	0	1	1		N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITOR. WELL	OTHER	23. INSPECTOR
	30 OCT 1991			J. A. MCBANE, CENPW

ELEV. (ft) a	DEPTH (ft) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING NUMBER d	GEOTECH SAMPLE NUMBER e	ANALYITCAL SAMPLE NUMBER f	REMARKS g
		0–5 FEET				
		SANDY GRAVEL: sand 30%, gravel 65%, silt <5%; 10YR 7/1 light gray; dry; poorly sorted; sand angular to subangular, gravel subrounded to rounded; 60% basalt, 40% others; no reaction to acid.				
	1					
	2	No debris above 3 feet depth.				
	3	3 feet: A single tire and misc. rotten wood debris.	HRL0801 HRL0802			Screening –negative Asbestos sample
	4	4–5 feet: pieces of electrical wire, short lengths of 1/4 in. dia. steel cable.				
		5 feet: Sheet metal (1/16"x2'x3'), suspect asbestos, sponge fragments, copper rod.			B00ZV3	Chemical sample Sheet metal possible GPR target.
	5					
		Approx. 5 cubic yards excavated. Approx. Landfill Composition: soil – 98% debris – 2%				
	6					

FORM MRK JUN 89 55

PROJECT 1100–EM–1 HORN RAPIDS LANDFILL

HOLE NO. TRENCH #8

9 3 1 2 3 . 2 0 6 5 6

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HTW DRILLING LOG

HOLE NO. TRENCH #11

1. COMPANY NAME: CENPW	2. DRILLING SUBCONTRACTOR: WESTINGHOUSE–HANFORD CO.	SHEET 1 OF 1
3. PROJECT: 1100–EM–1 OPERABLE UNIT	4. LOCATION: HORN RAPIDS LANDFILL	
5. NAME OF DRILLER: C. LARSON	6. MANUFACTURER'S DESIGNATION OF DRILL: CASE 780 BACKHOE #HO–62–5531	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: SAMPLED WITH SPOON FROM BACKHOE BUCKET	8. HOLE LOCATION: N374,985.11, E1,944,689.36	
	9. SURFACE ELEVATION: N/A	
	10. DATE STARTED: 20 SEPT 1991	11. DATE COMPLETED: 20 SEPT 1991
12. OVERBURDEN THICKNESS: N/A	15. DEPTH GROUNDWATER ENCOUNTERED: N/A	
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER/ELAPSED TIME AFTER DRILLING: N/A	
14. TOTAL DEPTH OF HOLE: 5.0 FEET	17. OTHER WATER LEVEL MEASUREMENTS: N/A	

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
	0	0	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER	OTHER	OTHER	21. TOTAL CORE RECOVERY
	1					N/A %

22. DISPOSITION OF HOLE	BACKFILLED	MONITOR. WELL	OTHER	23. INSPECTOR
	20 SEPT '91			V. M. JOHNSON, WHC

ELEV. (ft) a	DEPTH (ft) b	DESCRIPTION OF MATERIALS c	FIELD SCREENING NUMBER d	GEOTECH SAMPLE NUMBER e	ANALYTICAL SAMPLE NUMBER f	REMARKS g
	1	0–5 FEET SANDY GRAVEL: sand 54%, gravel 40%, silt 6%; 10YR 6/2 light brownish gray; dry; moderately to poorly sorted; gravel subrounded to rounded; 70% mafics, 30% felsics; no reaction to acid. 0–2.5 feet: debris consists of coke bottles, large amount of wood, cigarette butts, 3–ft. pocket of light gray to black ash, wire, plastic bags, and minor amounts of metal. 2.5–5 feet: Large amount of metal, wood, rebar, and fragments of asphalt.				
	2					
	3					
	4				B00ZS9	Chemical sample
	5	Approx. 30 cubic yards excavated.				
	6					

FORM MRK JUN 89 55

PROJECT: 1100–EM–1 HORN RAPIDS LANDFILL

HOLE NO.: TRENCH #11

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APPENDIX B

GROUNDWATER SURFACE MAPS AND AQUIFER PROPERTIES

9 3 1 2 3 2 0 6 3

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9 3 1 2 3 5 2 0 5 5 1

TABLE B-1: LITERATURE SURVEY COMPILATION (1 of 2)

Vadose Zone

Reference Document	Ave. Annual Precip (cm/yr)	Precipitation Range (cm/yr) max	Precipitation Range (cm/yr) min	Water % Retained by Capilarity max	Water % Retained by Capilarity min	Annual Infiltration (inches/yr) max	Annual Infiltration (inches/yr) min	Annual Evapotranspiration (inches) Pan	Lake	Potential	Actual	Kv (cm/sec) Bulk Sample high	Kv (cm/sec) Bulk Sample low	Kv (cm/sec) <2mm size high	Kv (cm/sec) <2mm size low
1	16	8	28	4	5										
2	16	8	28			1.97	3.94								
3															
4															
5												1.10E-02	3.40E-04	1.40E-02	4.20E-05
6															
7						0	4	55	40	29	7				
8						0	4.33								
9															
10						0	4.5								
11															
12															
Average	16.00	8.00	28.00	4.00	5.00	0.49	4.19	55.00	40.00	29.00	7.00	1.10E-02	3.40E-04	1.40E-02	4.20E-05
Max	16.00	8.00	28.00	4.00	5.00	1.97	4.50	55.00	40.00	29.00	7.00	1.10E-02	3.40E-04	1.40E-02	4.20E-05
Min	16.00	8.00	28.00	4.00	5.00	0.00	3.94	55.00	40.00	29.00	7.00	1.10E-02	3.40E-04	1.40E-02	4.20E-05
Std Dev	0.00	0.00	0.00	0.00	0.00	0.85	0.23	0.00	0.00	0.00	0.00	2.71E-11	ERR	1.12E-10	3.17E-13

1. Soil Moisture Transport in Arid Site Vadose Zones
   ARH-2983
   Oct 1974

2. Arid Site Water Balance: Evapotranspiration Modeling and Measurements
   PNL-5177
   September 1984

3. A Study of Soil-Water Potential and Temperature in Hanford Soils
   BNWL-1712
   1973

4. Natural Groundwater Recharge and Water Balance at the Hanford Site
   PNL-7215
   January 1990

5. Moisture and Textural Variations in Unsaturated Soils/Sediments Near the Hanford Wye Barricade
   PNL-5377
   March 1985

6. RI/FS Work PLan for the 300-FF-5 Operable Unit, Hanford Site, Richland Washington
   DOE/RL 89-14
   June 1990

TABLE B-1: LITERATURE SURVEY COMPILATION (2 of 2)

7. RI/FS Work PLan for the 300-FF-1 Operable Unit, Hanford Site, Richland Washington
   DOE/RL 88-31
   June 1990

8. Phase I RI Report for the Hanford Site 1100-EM-1 Operable Unit
   DOE/RL 90-18
   August 1990

9. Geology and Ground Water Characteristics of the Hanford Reservation of the US Atomic Energy Commission, Washington
   USGS Professional Paper 717
   1972

10. Geology and Hydrology of the Hanford Site: A Standardized Text for use in WHC Documents and Reports
    15 February 1991

11. Groundwater Quality and Flow Characteristics in the Vicinity of Exxon Nuclear Company, Inc. Fuel Fabrication Facility, Richland Washington
    JUB-82-86
    October 1982

12. Geology and Hydrology of the 300 Area and Vicinity, Hanford Site, South-Central Washington
    WHC-EP-0500
    October 1991

TABLE B-2: LITERATURE SURVEY COMPILATION (1 of 2)

Unconfined Aquifer

Reference Document	Seepage Discharge To Columbia River (cf/sec)	Transmissivity (sq ft/day) Hanford fm. low	Hanford fm. high	Ringold fm. low	Ringold fm. high	(g/d/ft) Average	flow velocity (ft/yr) max	min	Hanford Effective Porosity	Ringold Effective Porosity	K (g/day/sq ft) Along Flow Path	Perpendicular To Flow Path	Average	Hydraulic Conductivity (ft/d) Hanford fm. low	Hanford fm. high	Ringold fm. low	Ringold fm. high
1																	
2																	
3																	
4																	
5																	
6	3.00	40,000.00	200,000.00	10,000.00	1,000,000.00									11,000.000	50,000.000	1.900	10,000.000
7		40,000.00	200,000.00	10,000.00	1,000,000.00					0.11				11,000.000	50,000.000	1.900	10,000.000
8														100.000	1,000.000	0.003	5.000
9																10.000	1,000.000
10									0.22	0.11							
11						77,567.00	170	56			4728	3029	3900	2,000.000	10,000.000	610.000	3,050.000
12																	
Average	3.00E+00	4.00E+04	2.00E+05	1.00E+04	1.00E+06	7.76E+04	1.70E+02	5.60E+01	2.20E-01	1.10E-01	4.73E+03	3.03E+03	3.90E+03	6.03E+03	2.78E+04	1.25E+02	4.81E+03
Min	3.00E+00	4.00E+04	2.00E+05	1.00E+04	1.00E+06	7.76E+04	1.70E+02	5.60E+01	2.20E-01	1.10E-01	4.73E+03	3.03E+03	3.90E+03	1.00E+02	1.00E+03	3.00E-03	5.00E+00
Max	3.00E+00	4.00E+04	2.00E+05	1.00E+04	1.00E+06	7.76E+04	1.70E+02	5.60E+01	2.20E-01	1.10E-01	4.73E+03	3.03E+03	3.90E+03	1.10E+04	5.00E+04	6.10E+02	1.00E+04
Std Dev	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	ERR	ERR	0.00E+00	0.00E+00	0.00E+00	5.02E+03	2.25E+04	2.43E+02	4.35E+03

	Storage Coefficient Hanford fm. low	high	Slug Test Hydraulic Conductivity (ft/d) Hanford fm. low	high	Ringold fm. low	high	Pump Test Hydraulic Conductivity (ft/d) Richland Well Field
1							
2							
3							
4							
5							
6							
7	0.03	0.20					
8			3.00	140.00	0.20	113.00	1500.00
9							
10							
11							
12							
Average	3.00E-02	2.00E-01	3.00E+00	1.40E+02	2.00E-01	1.13E+02	1.50E+03
Min	3.00E-02	2.00E-01	3.00E+00	1.40E+02	2.00E-01	1.13E+02	1.50E+03
Max	3.00E-02	2.00E-01	3.00E+00	1.40E+02	2.00E-01	1.13E+02	1.50E+03
Std Dev	2.05E-10	1.82E-09	0.00E+00	0.00E+00	1.82E-09	0.00E+00	0.00E+00

TABLE B-2: LITERATURE SURVEY COMPILATION (2 of 2)

1. Soil Moisture Transport in Arid Site Vadose Zones
   ARH-2983
   Oct 1974

2. Arid Site Water Balance: Evapotranspiration Modeling and Measurements
   PNL-5177
   September 1984

3. A Study of Soil-Water Potential and Temperature in Hanford Soils
   BNWL-1712
   1973

4. Natural Groundwater Recharge and Water Balance at the Hanford Site
   PNL-7215
   January 1990

5. Moisture and Textural Variations in Unsaturated Soils/Sediments Near the Hanford Wye Barricade
   PNL-5377
   March 1985

6. RI/FS Work PLan for the 300-FF-5 Operable Unit, Hanford Site, Richland Washington
   DOE/RL 89-14
   June 1990

7. RI/FS Work PLan for the 300-FF-1 Operable Unit, Hanford Site, Richland Washington
   DOE/RL 88-31
   June 1990

8. Phase I RI Report for the Hanford Site 1100-EM-1 Operable Unit
   DOE/RL 90-18
   August 1990

9. Geology and Ground Water Characteristics of the Hanford Reservation of the US Atomic Energy Commission, Washington
   USGS Professional Paper 717
   1972

10. Geology and Hydrology of the Hanford Site: A Standardized Text for use in WHC Documents and Reports
    15 February 1991

11. Groundwater Quality and Flow Characteristics in the Vicinity of Exxon Nuclear Company, Inc. Fuel Fabrication Facility, Richland Washington
    JUB-82-86
    October 1982

12. Geology and Hydrology of the 300 Area and Vicinity, Hanford Site, South-Central Washington
    WHC-EP-0500
    October 1991

TABLE B-3: LITERATURE SURVEY COMPILATION (1 of 2)

Reference Document	M1 Silt Aquitard Vertical Hydraulic Conductivity ft/day high	low
1		
2		
3		
4		
5		
6		
7		
8		
9		
10	1.00E-01	8.00E-04
11		
12		
Average	1.00E-01	8.00E-04
Min	1.00E-01	8.00E-04
Max	1.00E-01	8.00E-04
Std Dev	9.12E-10	9.12E-10

1. Soil Moisture Transport in Arid Site Vadose Zones
   ARH-2983
   Oct 1974

2. Arid Site Water Balance: Evapotranspiration Modeling and Measurements
   PNL-5177
   September 1984

3. A Study of Soil-Water Potential and Temperature in Hanford Soils
   BNWL-1712
   1973

4. Natural Groundwater Recharge and Water Balance at the Hanford Site
   PNL-7215
   January 1990

TABLE B-3: LITERATURE SURVEY COMPILATION (2 of 2)

5. Moisture and Textural Variations in Unsaturated Soils/Sediments Near the Hanford Wye Barricade
PNL-5377
March 1985

6. RI/FS Work PLan for the 300-FF-5 Operable Unit, Hanford Site, Richland Washington
DOE/RL 89-14
June 1990

7. RI/FS Work PLan for the 300-FF-1 Operable Unit, Hanford Site, Richland Washington
DOE/RL 88-31
June 1990

8. Phase I RI Report for the Hanford Site 1100-EM-1 Operable Unit
DOE/RL 90-18
August 1990

9. Geology and Ground Water Characteristics of the Hanford Reservation of the US Atomic Energy Commission, Washington
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1972

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15 February 1991

11. Groundwater Quality and Flow Characteristics in the Vicinity of Exxon Nuclear Company, Inc. Fuel Fabrication Facility, Richland Washington
JUB-82-86
October 1982

12. Geology and Hydrology of the 300 Area and Vicinity, Hanford Site, South-Central Washington
WHC-EP-0500
October 1991

TABLE B-4: LITERATURE SURVEY COMPILATION (1 of 2)

Confined Aquifer

Reference Document	Transmissivity Ringold fm. (sq ft/day) low	high	Hydraulic Conductivity (ft/day) low	high	average	Storage Coefficient low	high	average
1								
2								
3								
4								
5								
6								8.00E-03
7	8.00E+00	2.00E+02				2.00E-04	5.00E-02	
8					5.00E+00	1.00E+00	1.00E+02	
					3.00E-01	1.00E-01	1.00E+00	
9								3.00E-02
								2.00E-01
								2.00E-04
10			3.00E-03	5.00E+00				
11								
12								
Average	8.00E+00	2.00E+02	3.00E-03	5.00E+00	2.65E+00	3.67E-01	3.37E+01	5.96E-02
Min	8.00E+00	2.00E+02	3.00E-03	5.00E+00	3.00E-01	2.00E-04	5.00E-02	2.00E-04
Max	8.00E+00	2.00E+02	3.00E-03	5.00E+00	5.00E+00	1.00E+00	1.00E+02	2.00E-01
Std Dev	0.00E+00	0.00E+00	ERR	0.00E+00	2.35E+00	4.50E-01	4.69E+01	8.18E-02

1. Soil Moisture Transport in Arid Site Vadose Zones
   ARH-2983
   Oct 1974

2. Arid Site Water Balance: Evapotranspiration Modeling and Measurements
   PNL-5177
   September 1984

3. A Study of Soil-Water Potential and Temperature in Hanford Soils
   BNWL-1712
   1973

TABLE B-4: LITERATURE SURVEY COMPILATION (2 of 2)

4. Natural Groundwater Recharge and Water Balance at the Hanford Site
PNL-7215
January 1990

5. Moisture and Textural Variations in Unsaturated Soils/Sediments Near the Hanford Wye Barricade
PNL-5377
March 1985

6. RI/FS Work PLan for the 300-FF-5 Operable Unit, Hanford Site, Richland Washington
DOE/RL 89-14
June 1990

7. RI/FS Work PLan for the 300-FF-1 Operable Unit, Hanford Site, Richland Washington
DOE/RL 88-31
June 1990

8. Phase I RI Report for the Hanford Site 1100-EM-1 Operable Unit
DOE/RL 90-18
August 1990

9. Geology and Ground Water Characteristics of the Hanford Reservation of the US Atomic Energy Commission, Washington
USGS Professional Paper 717
1972

10. Geology and Hydrology of the Hanford Site: A Standardized Text for use in WHC Documents and Reports
15 February 1991

11. Groundwater Quality and Flow Characteristics in the Vicinity of Exxon Nuclear Company, Inc. Fuel Fabrication Facility, Richland Washington
JUB-82-86
October 1982

12. Geology and Hydrology of the 300 Area and Vicinity, Hanford Site, South-Central Washington
WHC-EP-0500
October 1991

TABLE B-5: LITERATURE SURVEY COMPILATION (1 of 2)

Reference Document	M3 Silt: Hydraulic Head Difference Basalt vs. Soil Aquifers (feet) low	high	Hydraulic Conductivity (cm/sec)	Specific Yield
1				
2				
3				
4				
5				
6	20.00	35.00		
7				
8			1.00E-06	
9				
10			3.53E-07	
11				
12				2.51E-01
				2.08E-01
				2.45E-01
Average	20.00	35.00	6.77E-07	2.35E-01
Min	20.00	35.00	3.53E-07	2.08E-01
Max	20.00	35.00	1.00E-06	2.51E-01
Std Dev	0.00E+00	0.00E+00	3.24E-07	1.90E-02

1. Soil Moisture Transport in Arid Site Vadose Zones
   ARH-2983
   Oct 1974

2. Arid Site Water Balance: Evapotranspiration Modeling and Measurements
   PNL-5177
   September 1984

3. A Study of Soil-Water Potential and Temperature in Hanford Soils
   BNWL-1712
   1973

4. Natural Groundwater Recharge and Water Balance at the Hanford Site
   PNL-7215
   January 1990

TABLE B-5: LITERATURE SURVEY COMPILATION (2 of 2)

5. Moisture and Textural Variations in Unsaturated Soils/Sediments Near the Hanford Wye Barricade
PNL-5377
March 1985

6. RI/FS Work PLan for the 300-FF-5 Operable Unit, Hanford Site, Richland Washington
DOE/RL 89-14
June 1990

7. RI/FS Work PLan for the 300-FF-1 Operable Unit, Hanford Site, Richland Washington
DOE/RL 88-31
June 1990

8. Phase I RI Report for the Hanford Site 1100-EM-1 Operable Unit
DOE/RL 90-18
August 1990

9. Geology and Ground Water Characteristics of the Hanford Reservation of the US Atomic Energy Commission, Washington
USGS Professional Paper 717
1972

10. Geology and Hydrology of the Hanford Site: A Standardized Text for use in WHC Documents and Reports
15 February 1991

11. Groundwater Quality and Flow Characteristics in the Vicinity of Exxon Nuclear Company, Inc. Fuel Fabrication Facility, Richland Washington
JUB-82-86
October 1982

12. Geology and Hydrology of the 300 Area and Vicinity, Hanford Site, South-Central Washington
WHC-EP-0500
October 1991

TABLE B-6: LITERATURE SURVEY COMPILATION (1 of 2)

Upper Basalt Aquifer

Reference Document	Transmissivity (sq ft/day) Low	Transmissivity (sq ft/day) High	Hydraulic Conductivities (ft/day) Low	Hydraulic Conductivities (ft/day) High	Specific Storage (ft) Low	Specific Storage (ft) High
1						
2						
3						
4						
5						
6	125.00	1300.00	6.00	260.00	1.00E-06	1.00E-08
	0.01	1000.00			1.60E+00	2.00E+02
7						
8						
9						
10						
11						
12						
Average	62.51	1150.00	6.00	260.00	8.00E-01	1.00E+02
Min	0.01	1000.00	6.00	260.00	1.00E-06	1.00E-08
Max	125.00	1300.00	6.00	260.00	1.60E+00	2.00E+02
Std Dev	62.50	150.00	0.00	0.00	8.00E-01	1.00E+02

1. Soil Moisture Transport in Arid Site Vadose Zones
   ARH-2983
   Oct 1974

2. Arid Site Water Balance: Evapotranspiration Modeling and Measurements
   PNL-5177
   September 1984

3. A Study of Soil-Water Potential and Temperature in Hanford Soils
   BNWL-1712
   1973

4. Natural Groundwater Recharge and Water Balance at the Hanford Site
   PNL-7215
   January 1990

TABLE B-6: LITERATURE SURVEY COMPILATION (2 of 2)

5. Moisture and Textural Variations in Unsaturated Soils/Sediments Near the Hanford Wye Barricade
PNL-5377
March 1985

6. RI/FS Work PLan for the 300-FF-5 Operable Unit, Hanford Site, Richland Washington
DOE/RL 89-14
June 1990

7. RI/FS Work PLan for the 300-FF-1 Operable Unit, Hanford Site, Richland Washington
DOE/RL 88-31
June 1990

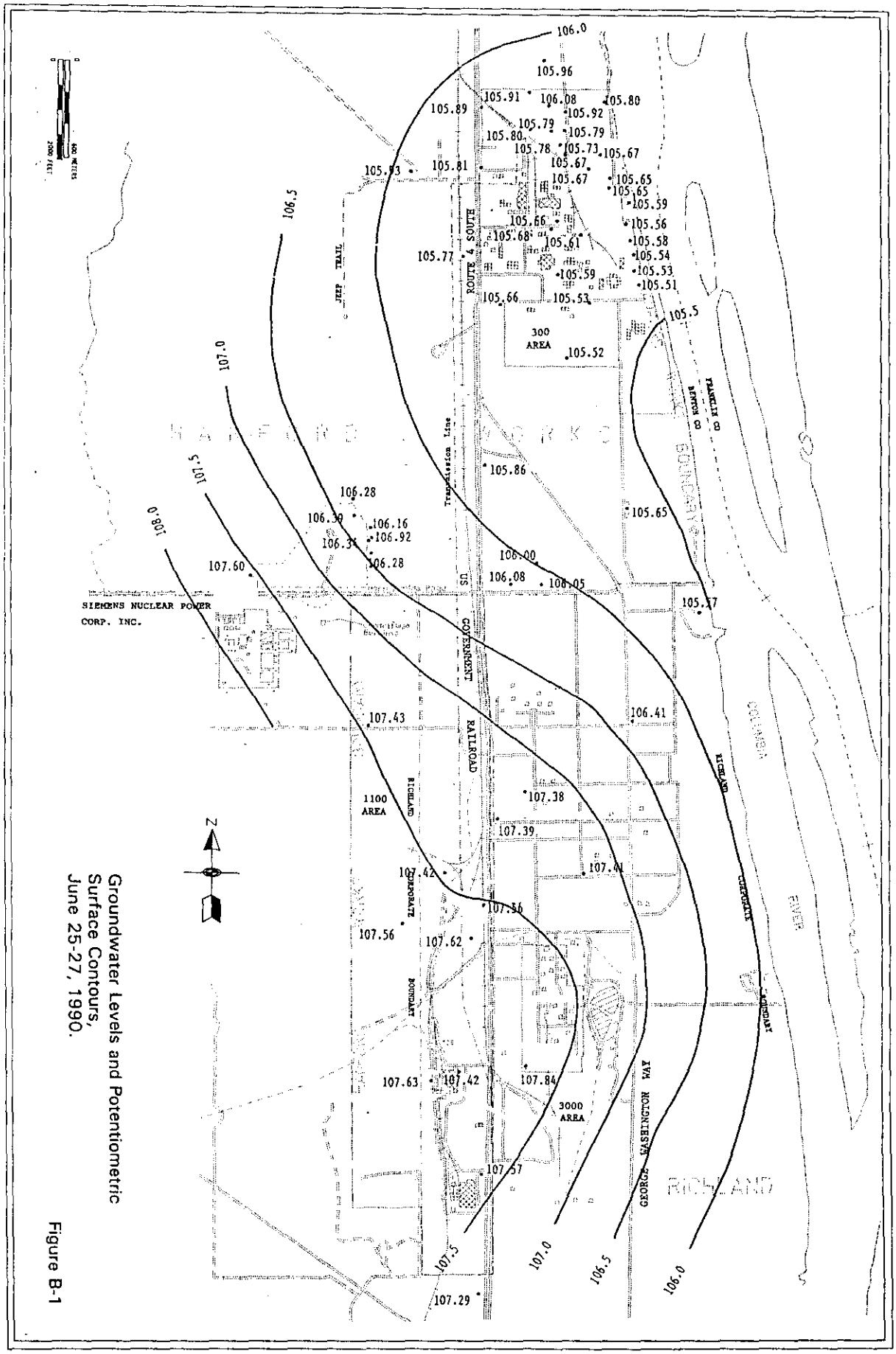
8. Phase I RI Report for the Hanford Site 1100-EM-1 Operable Unit
DOE/RL 90-18
August 1990

9. Geology and Ground Water Characteristics of the Hanford Reservation of the US Atomic Energy Commission, Washington
USGS Professional Paper 717
1972

10. Geology and Hydrology of the Hanford Site: A Standardized Text for use in WHC Documents and Reports
15 February 1991

11. Groundwater Quality and Flow Characteristics in the Vicinity of Exxon Nuclear Company, Inc. Fuel Fabrication Facility, Richland Washington
JUB-82-86
October 1982

12. Geology and Hydrology of the 300 Area and Vicinity, Hanford Site, South-Central Washington
WHC-EP-0500
October 1991



Groundwater Levels and Potentiometric Surface Contours, June 25-27, 1990.

Figure B-1

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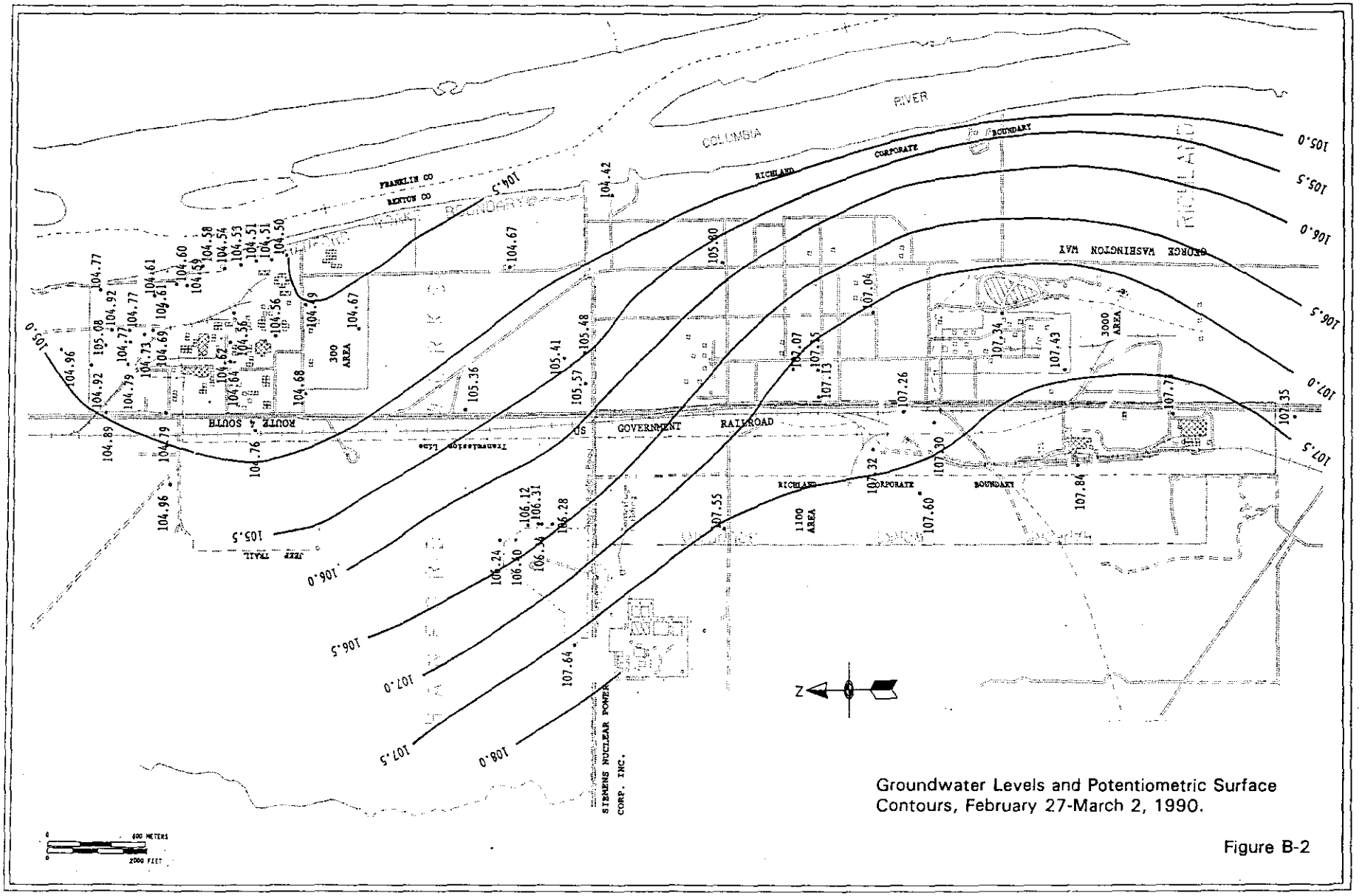

Groundwater Levels and Potentiometric Surface Contours, February 27-March 2, 1990.

Figure B-2

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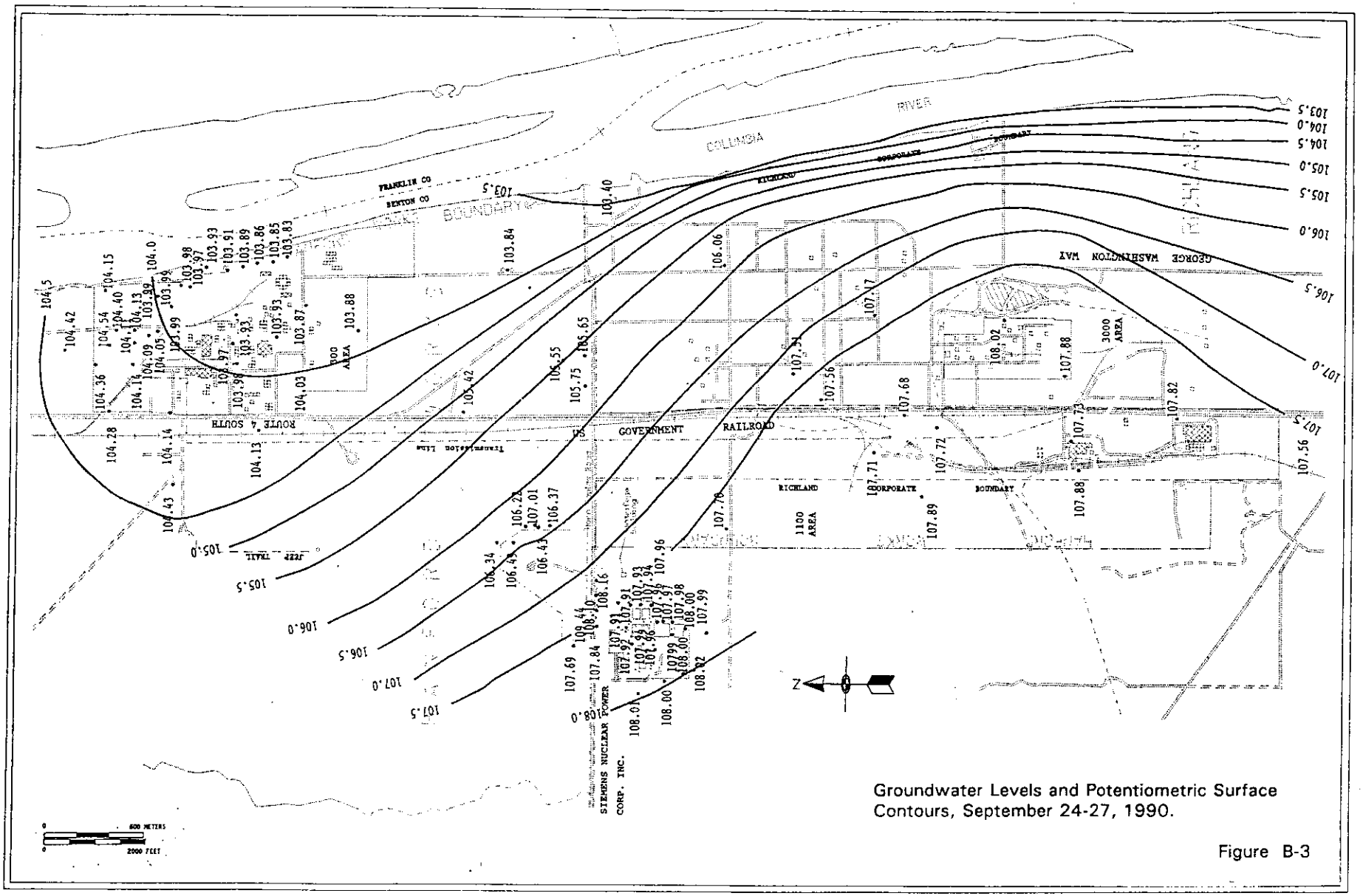

Groundwater Levels and Potentiometric Surface Contours, September 24-27, 1990.

Figure B-3

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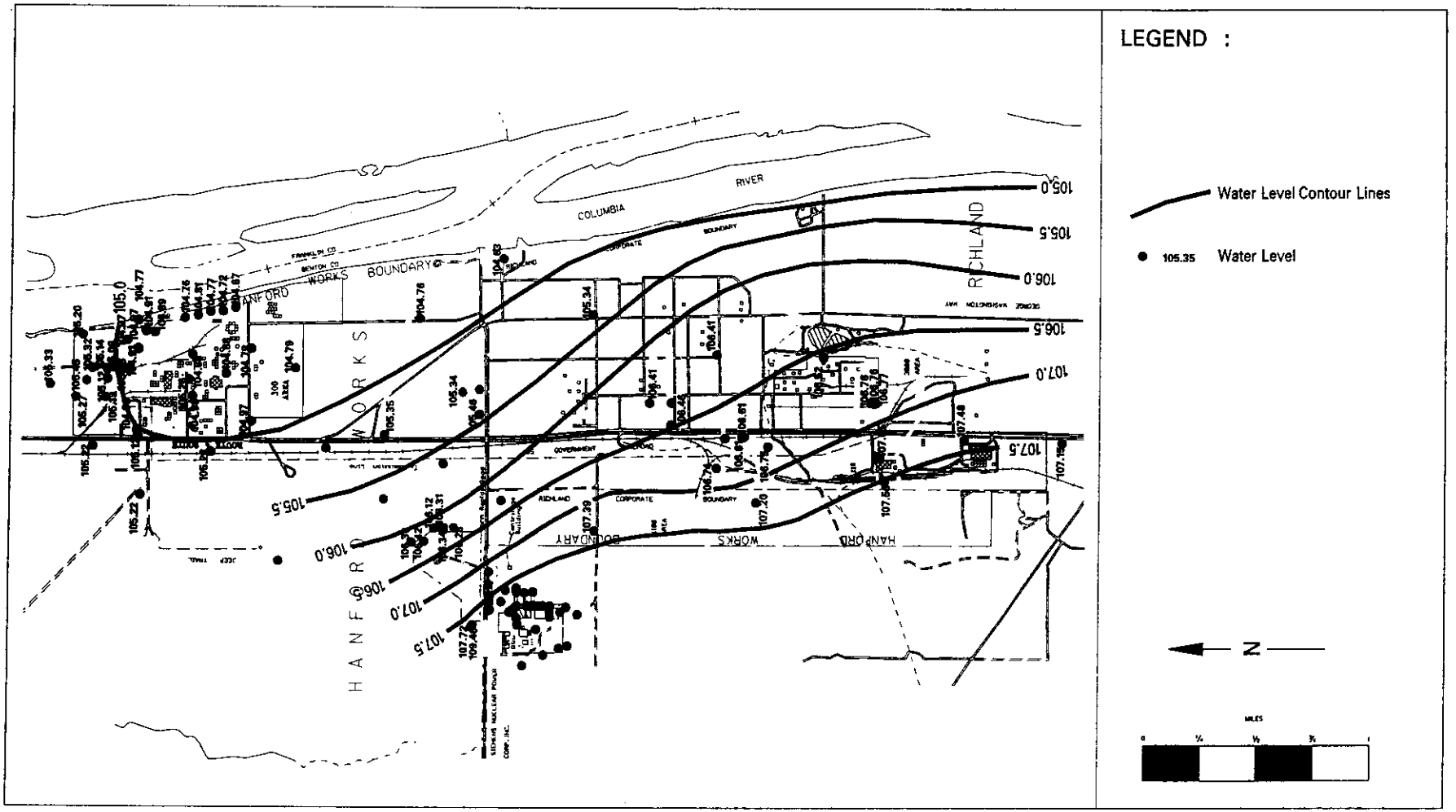

Groundwater Potentiometric Surface
for the Unconfined Aquifer– March 91

Fig. B-4

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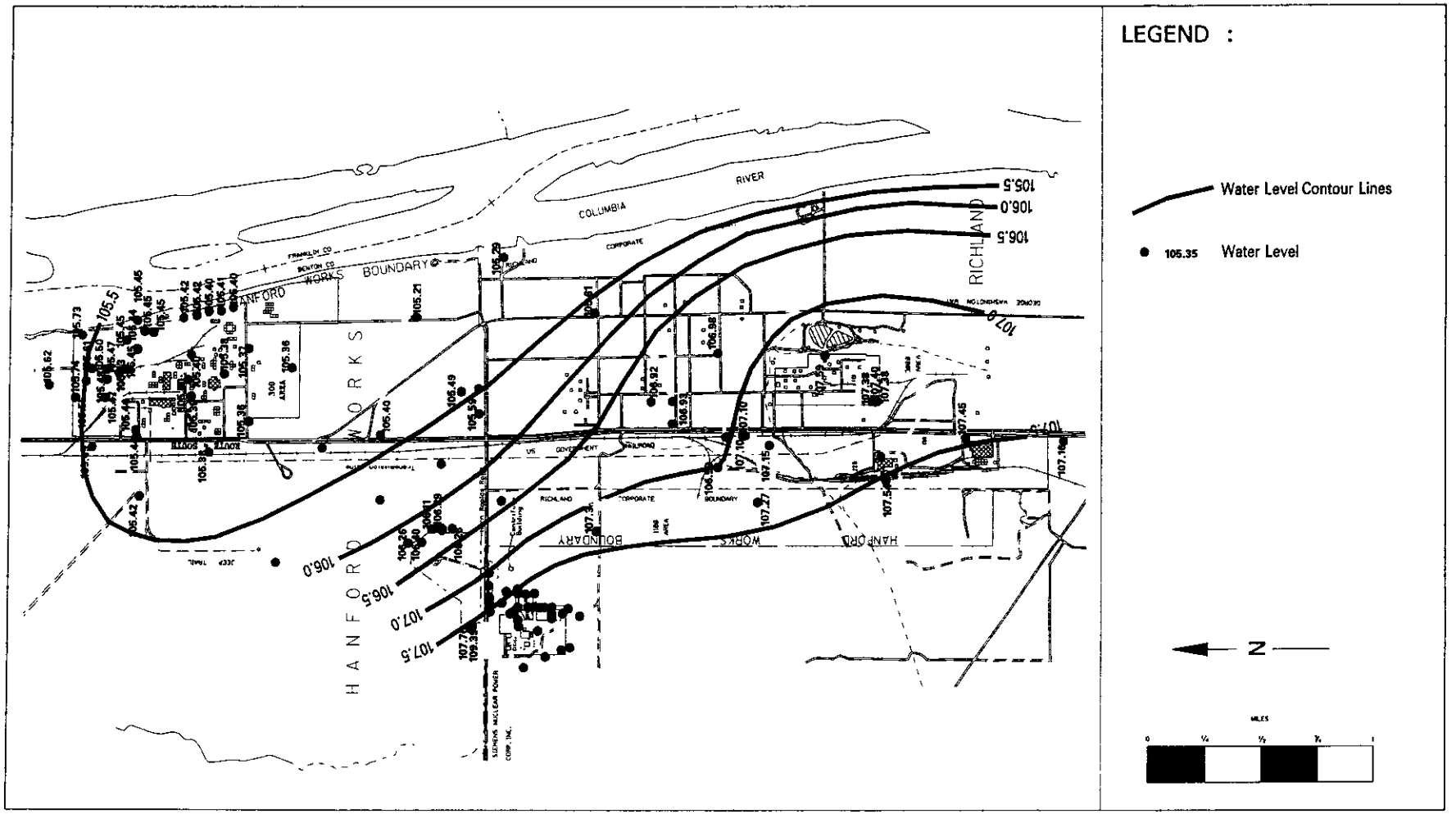

Groundwater Potentiometric Surface
for the Unconfined Aquifer– April 91

Fig. B–5

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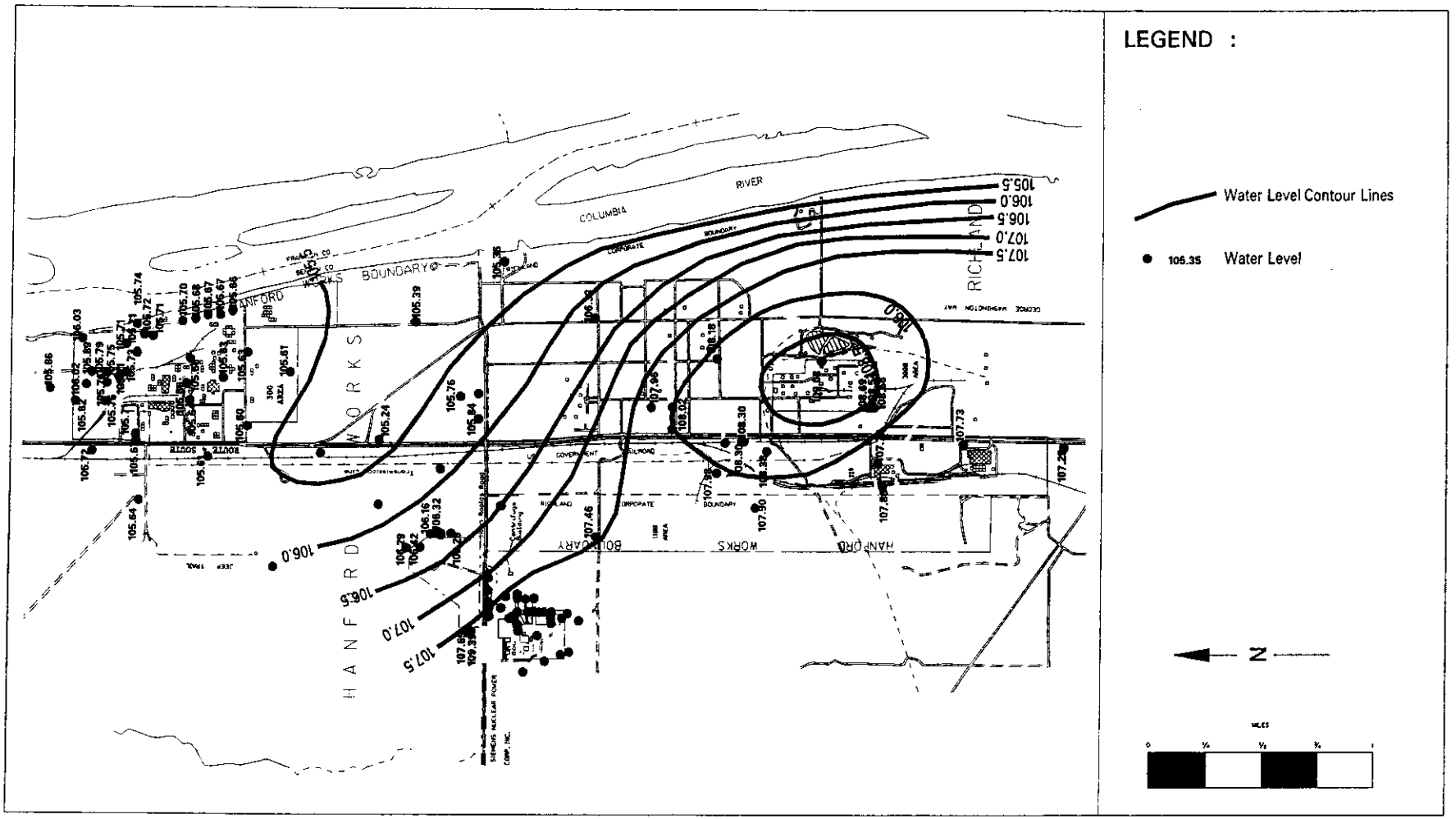

Groundwater Potentiometric Surface
for the Unconfined Aquifer- May 91

Fig. B-6

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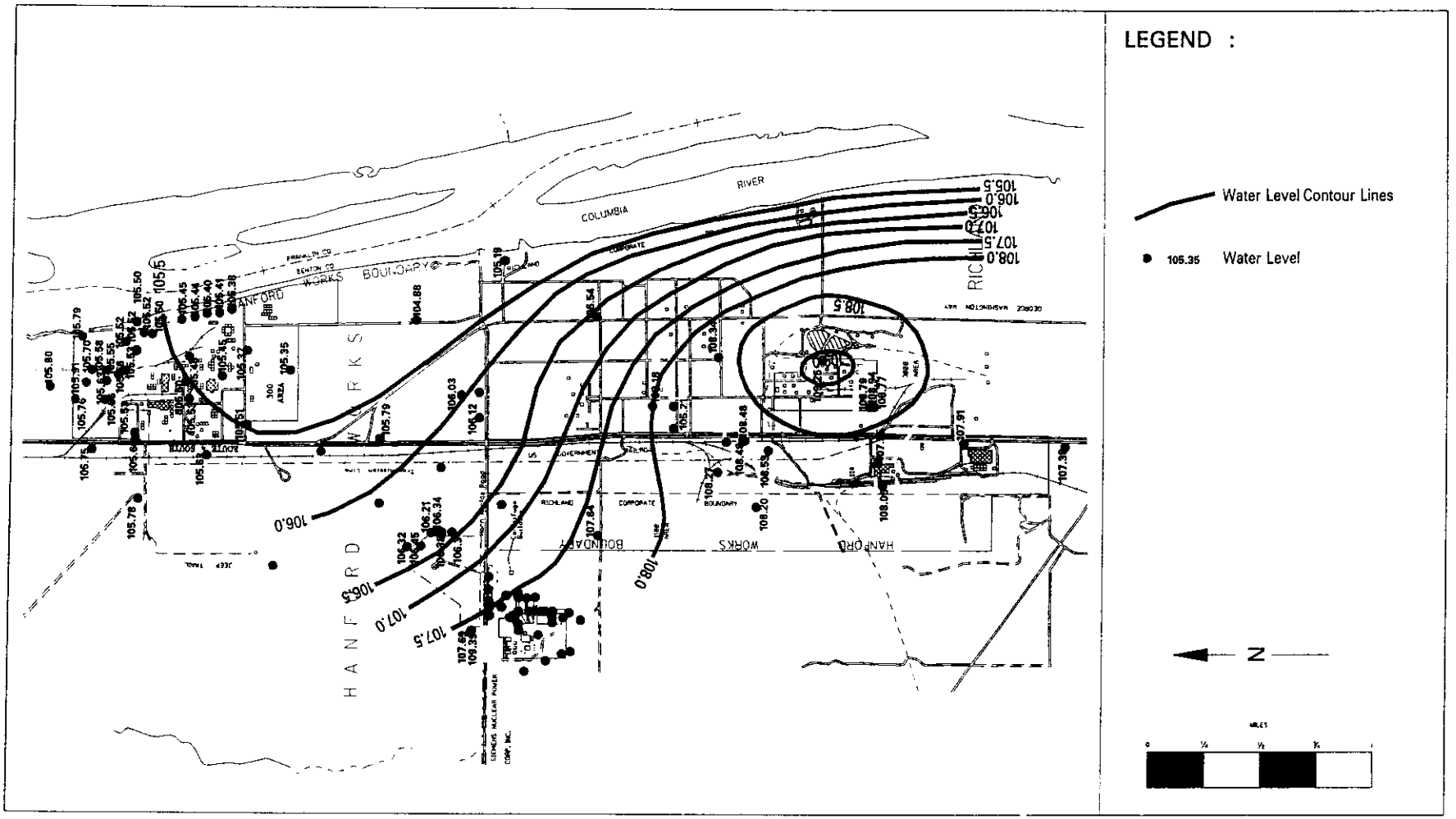

Groundwater Potentiometric Surface
for the Unconfined Aquifer–June 91

Fig. B–7

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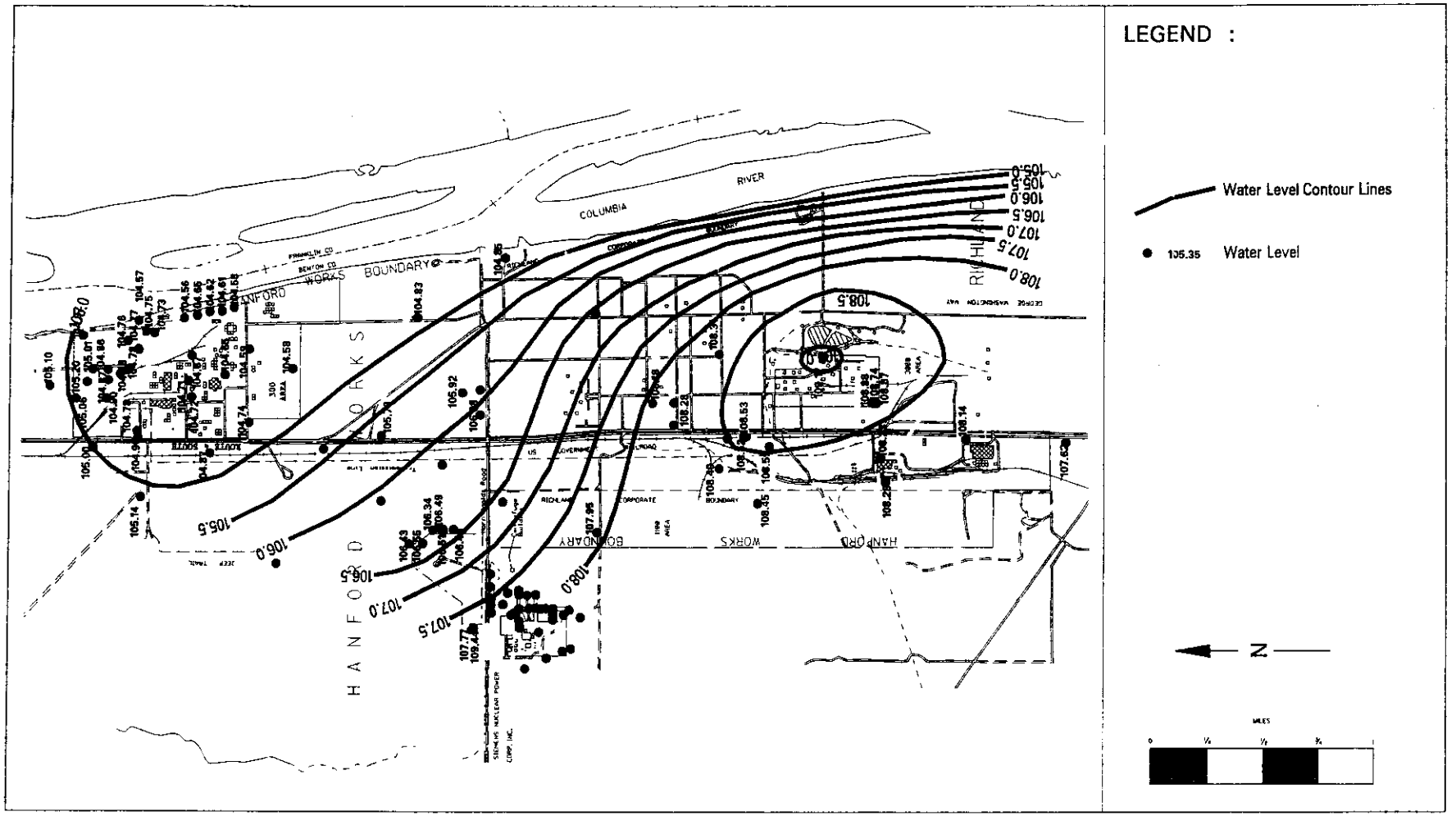

Groundwater Potentiometric Surface
for the Unconfined Aquifer–July 91

Fig. B-6

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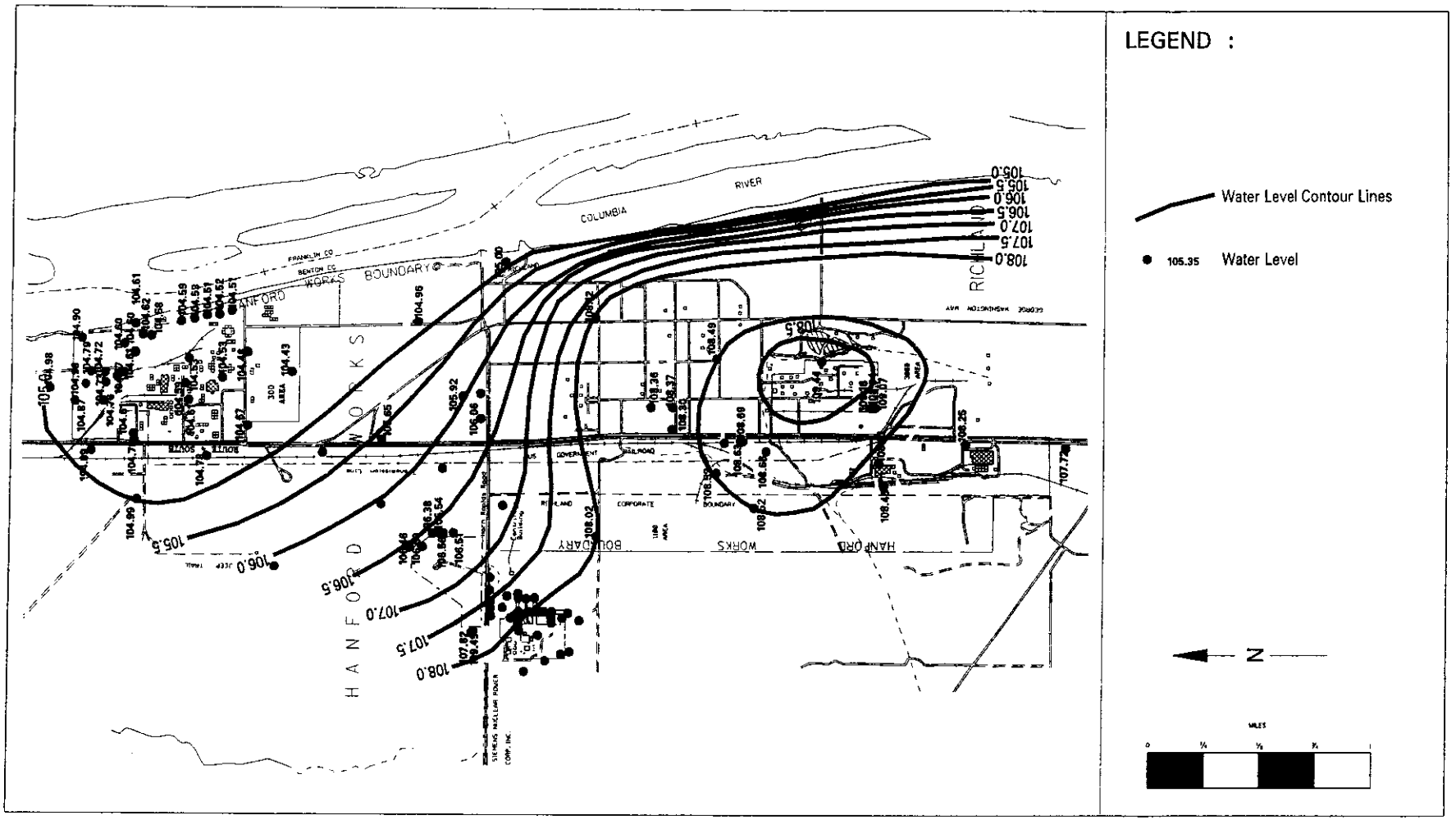

Groundwater Potentiometric Surface
for the Unconfined Aquifer–August 91

Fig. B-9

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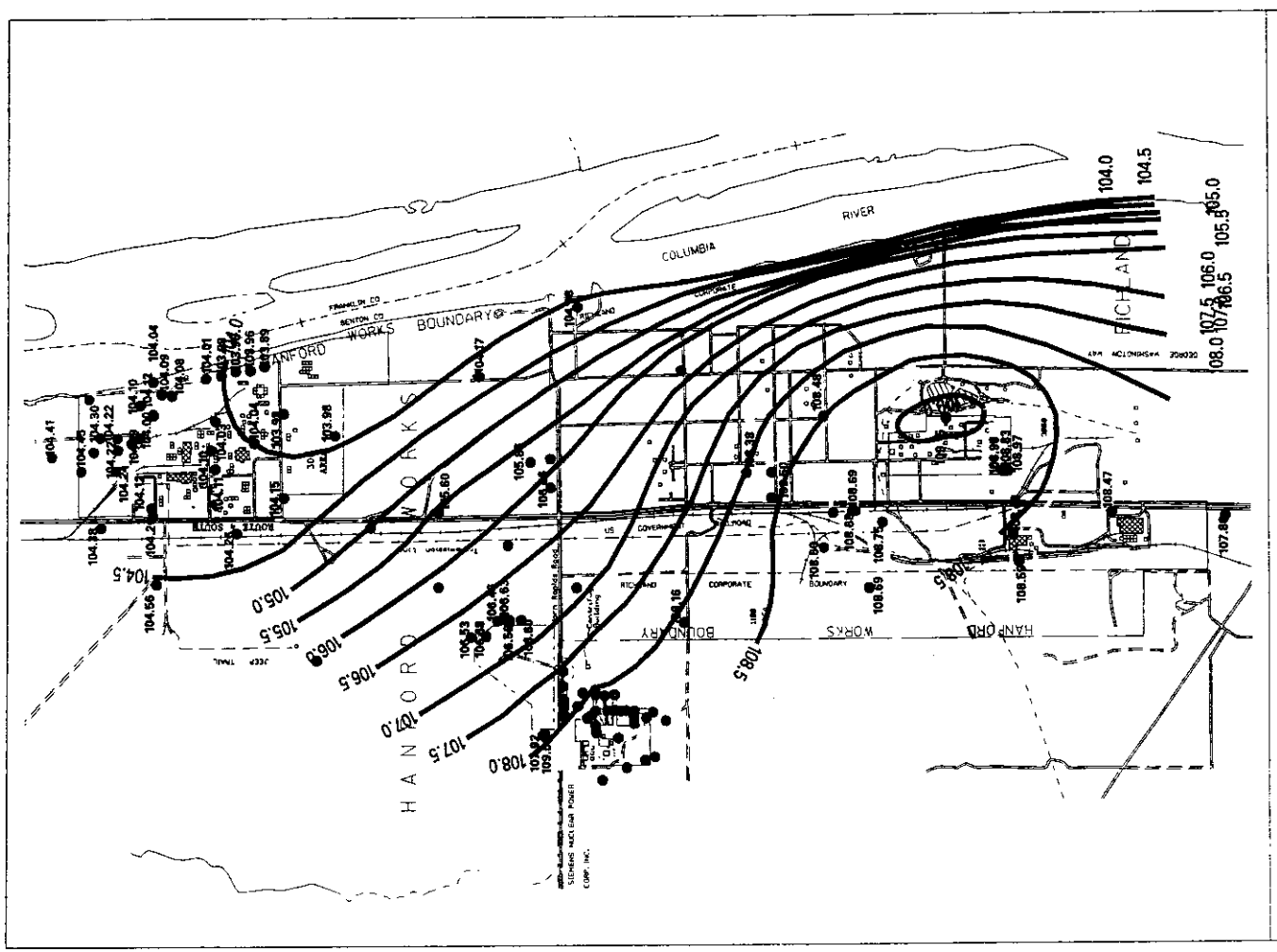

Groundwater Potentiometric Surface
for the Unconfined Aquifer– September 91

Fig. B–10

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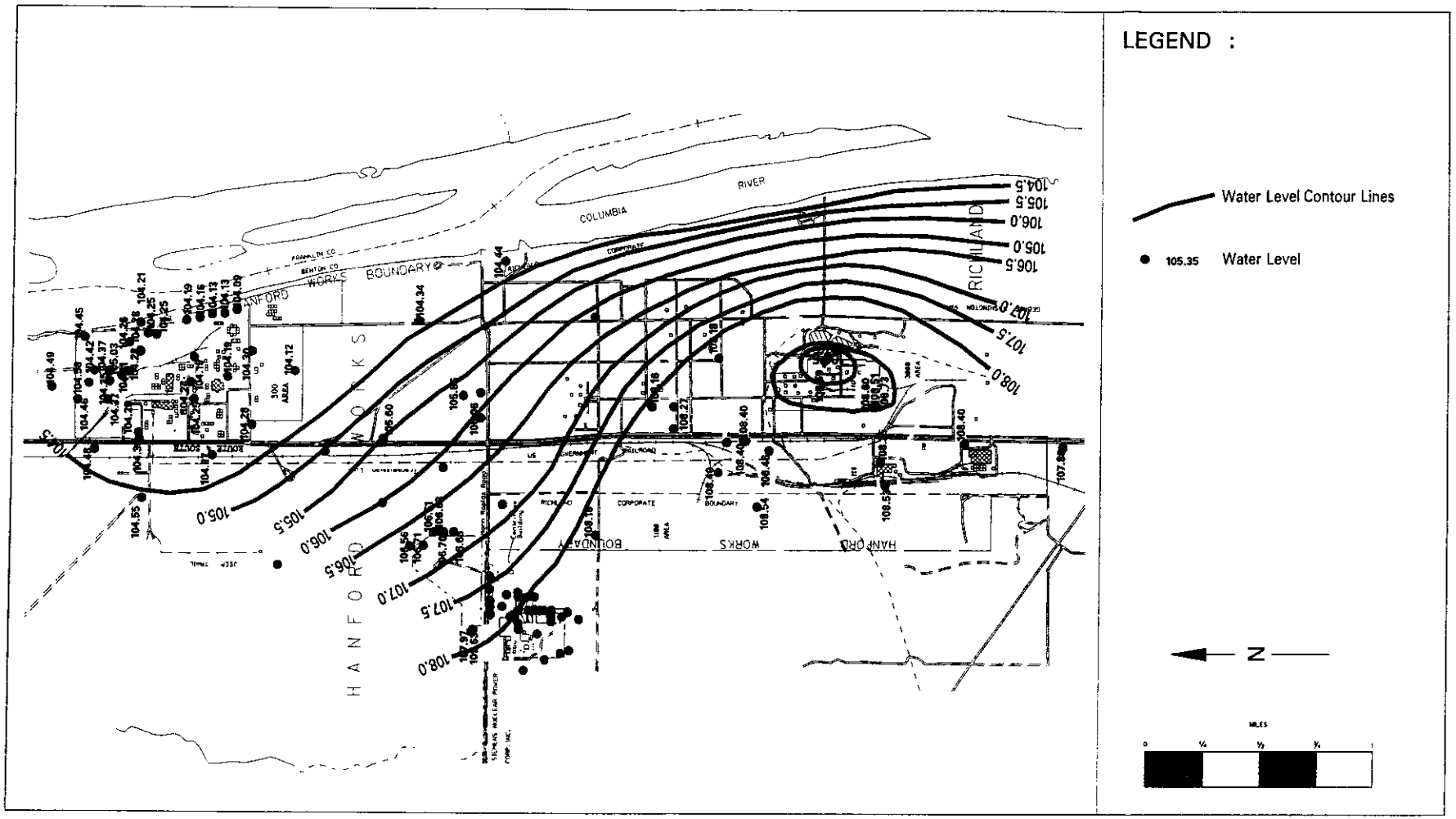

Groundwater Potentiometric Surface
for the Unconfined Aquifer-October 91

Fig. B-11

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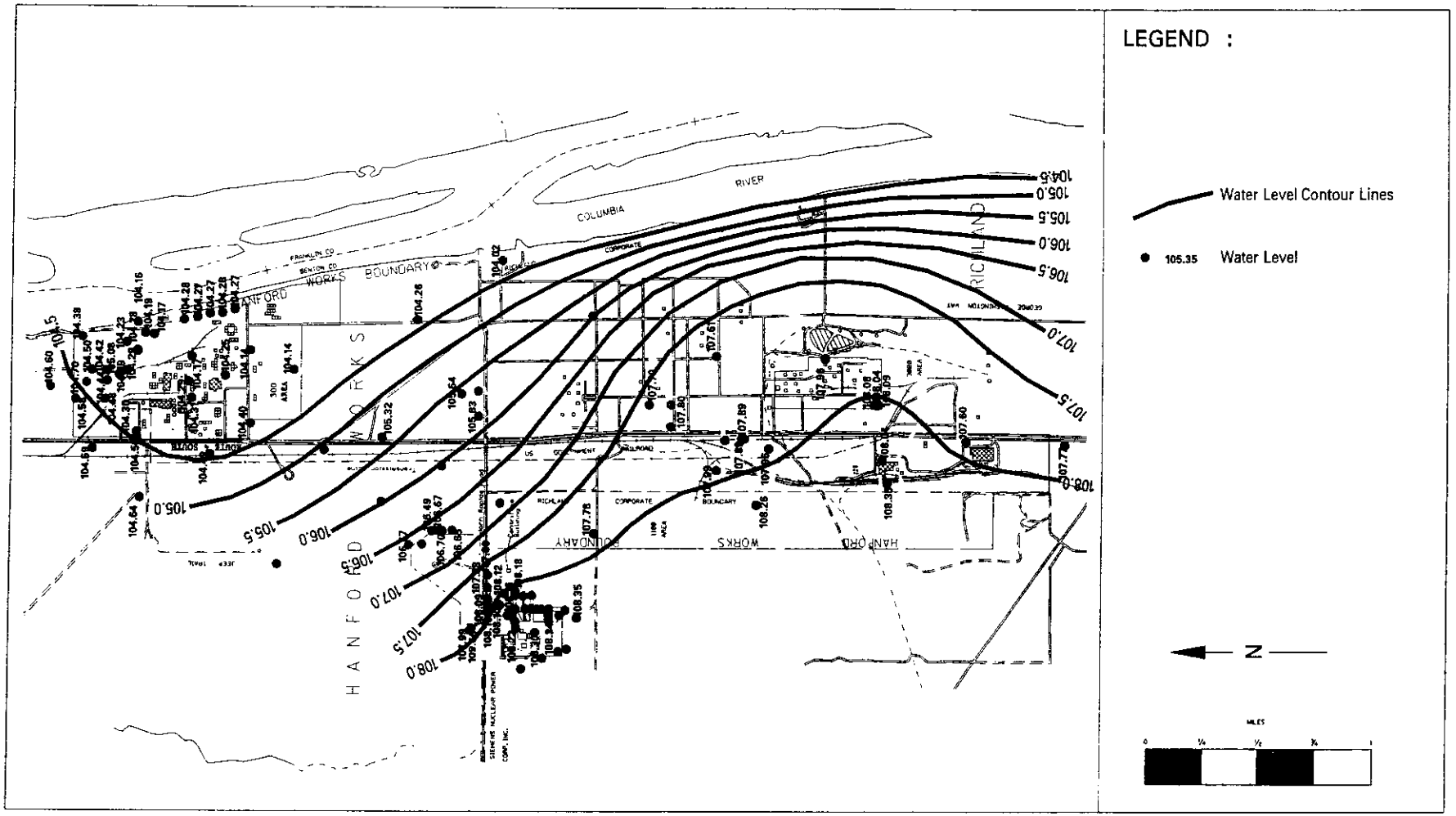
9 3 1 2 3 2 3 3 5



Groundwater Potentiometric Surface
for the Unconfined Aquifer–November 91

Fig. B–12

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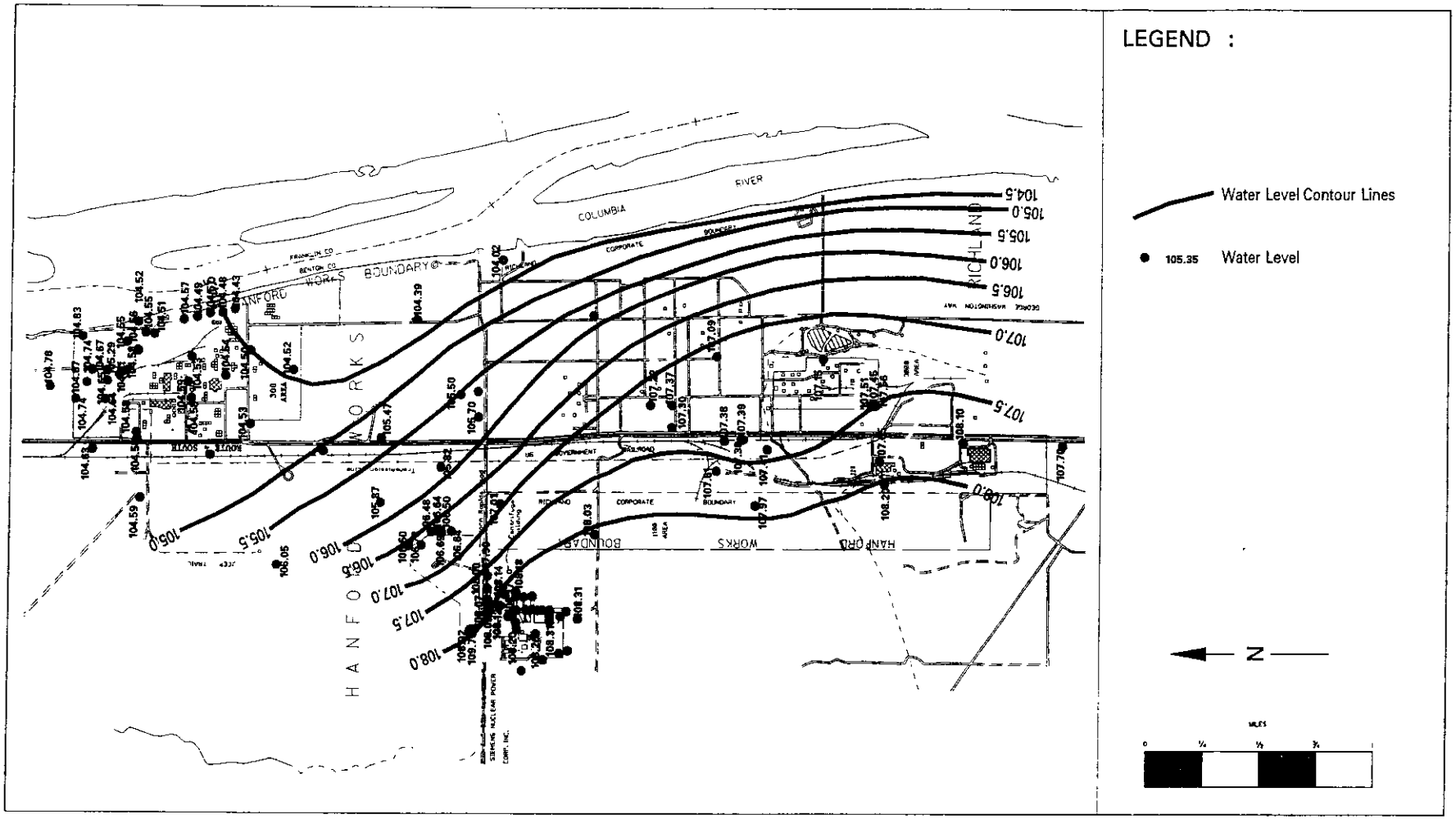

Groundwater Potentiometric Surface
for the Unconfined Aquifer-December 91

Fig. 8-13

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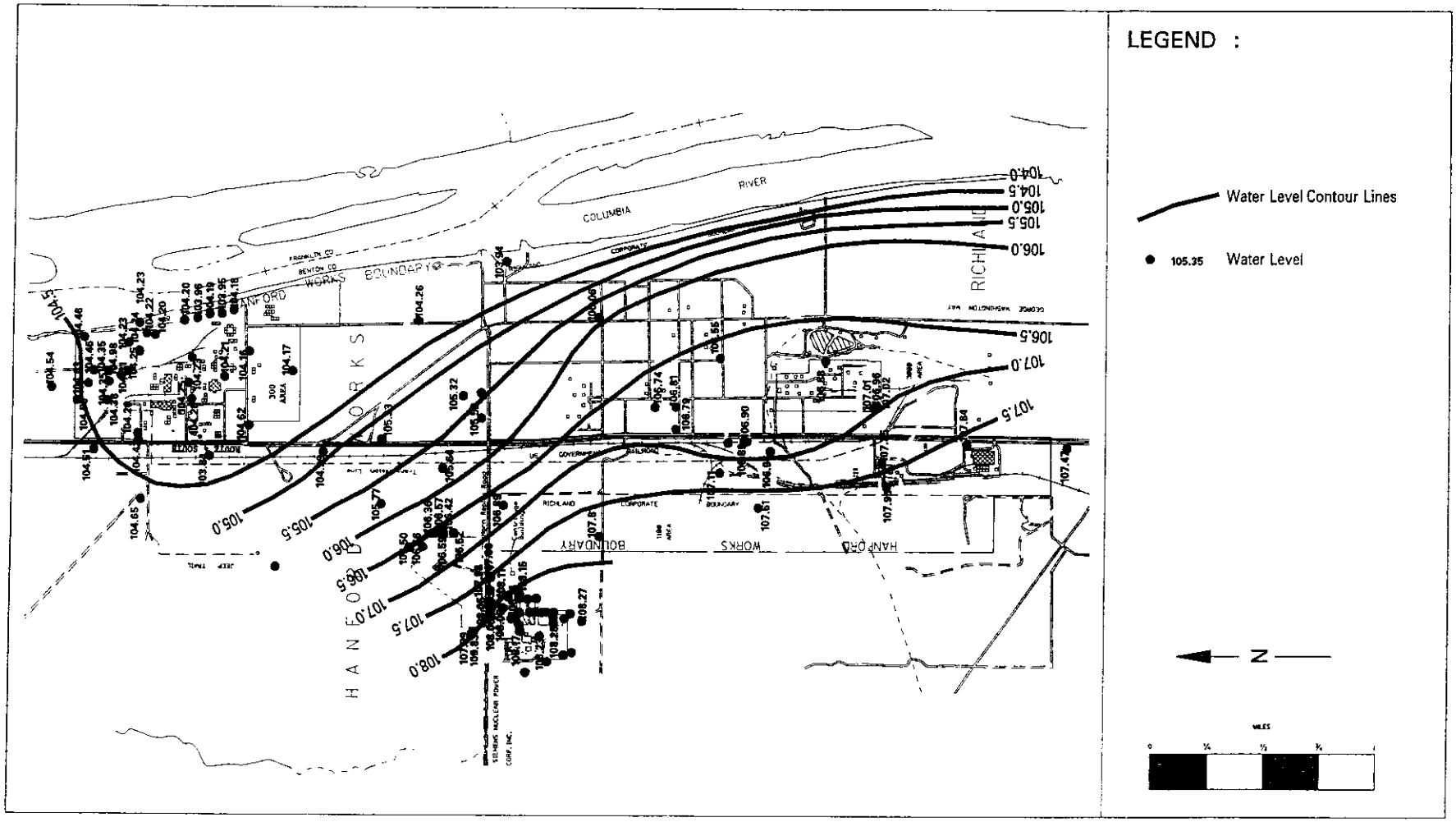

Groundwater Potentiometric Surface
for the Unconfined Aquifer-January 92

Fig. B-14

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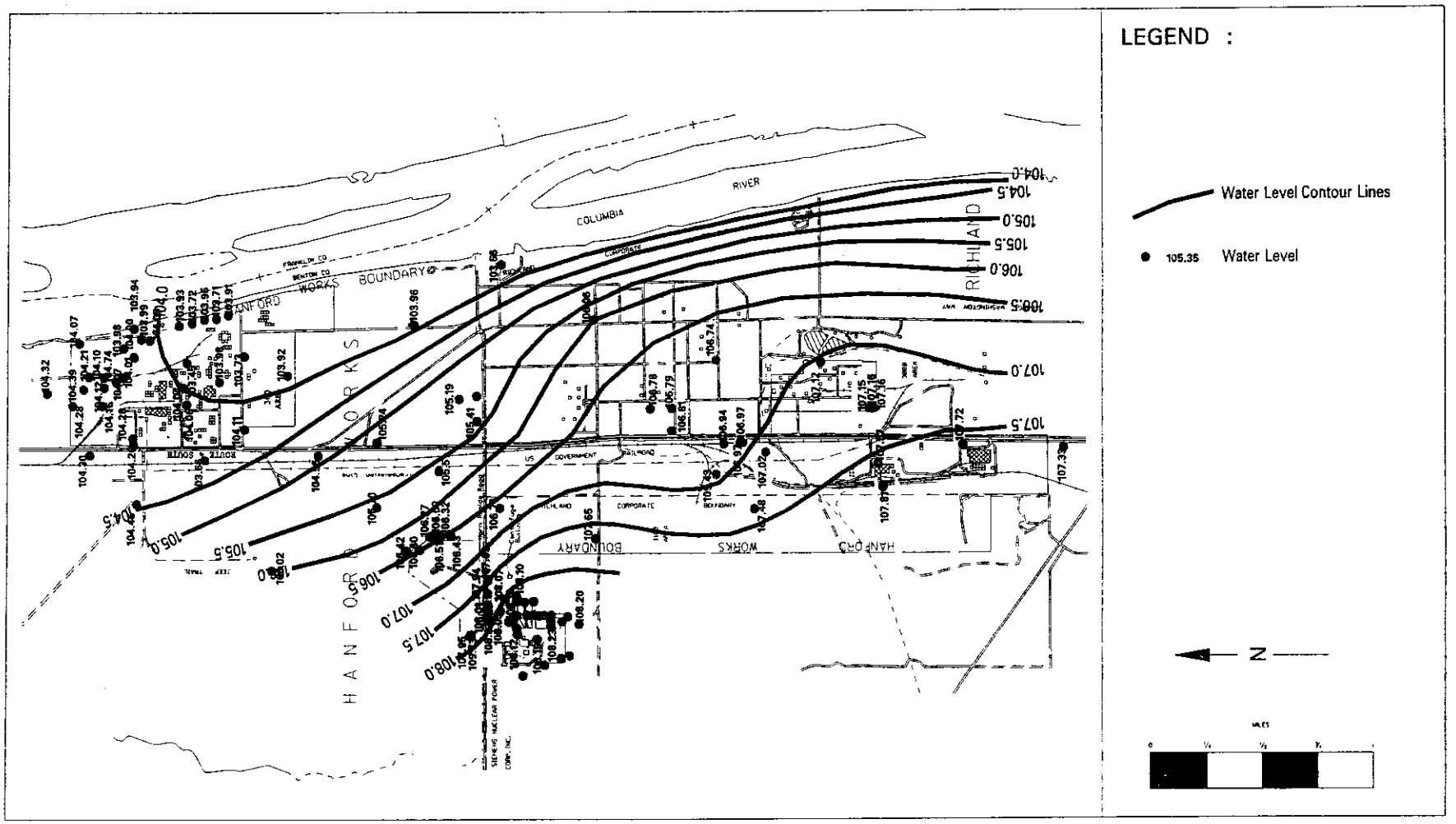

Groundwater Potentiometric Surface
for the Unconfined Aquifer–February 92

Fig. B-15

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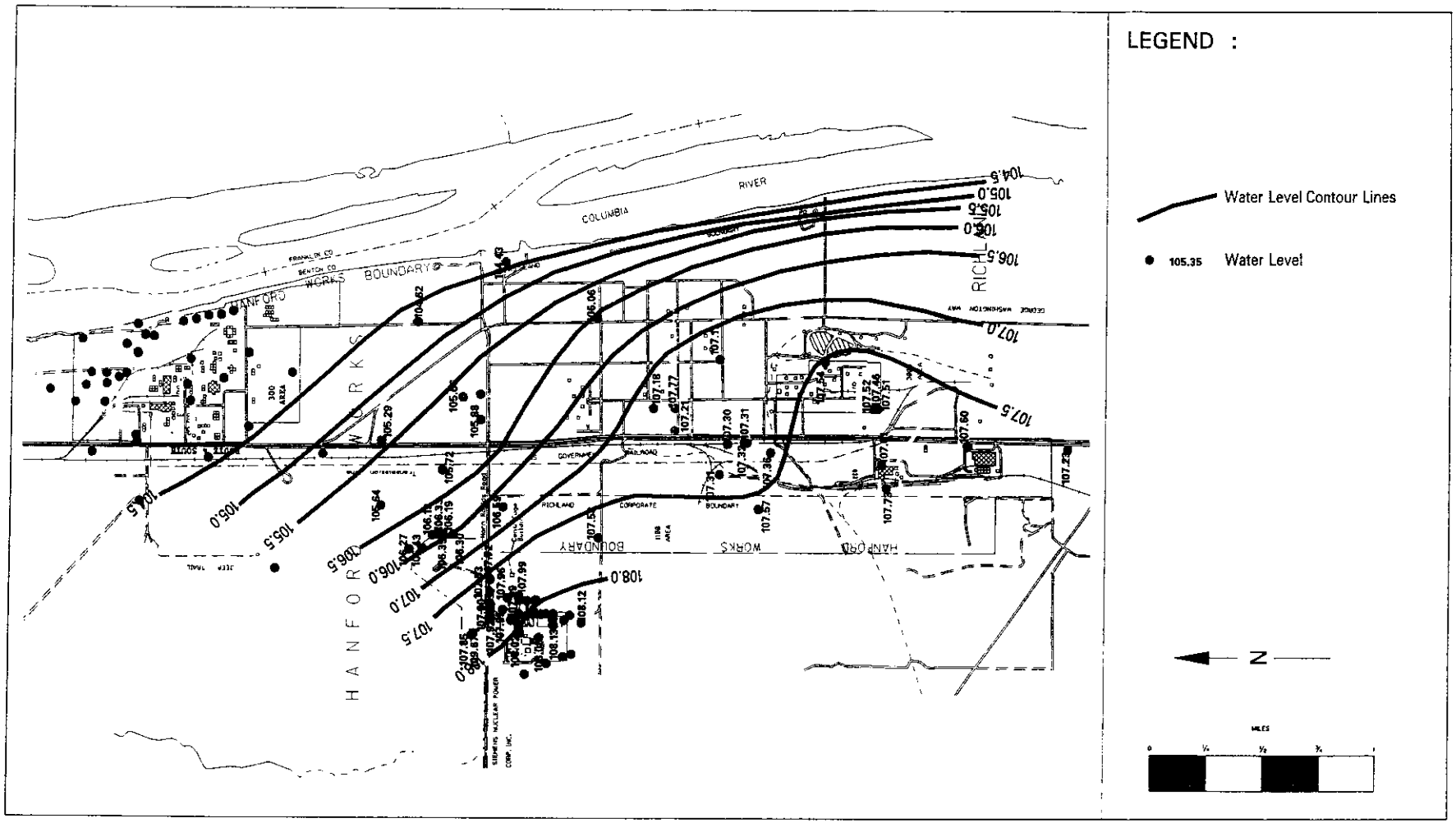

Groundwater Potentiometric Surface
for the Unconfined Aquifer–May 92

Fig. B–18

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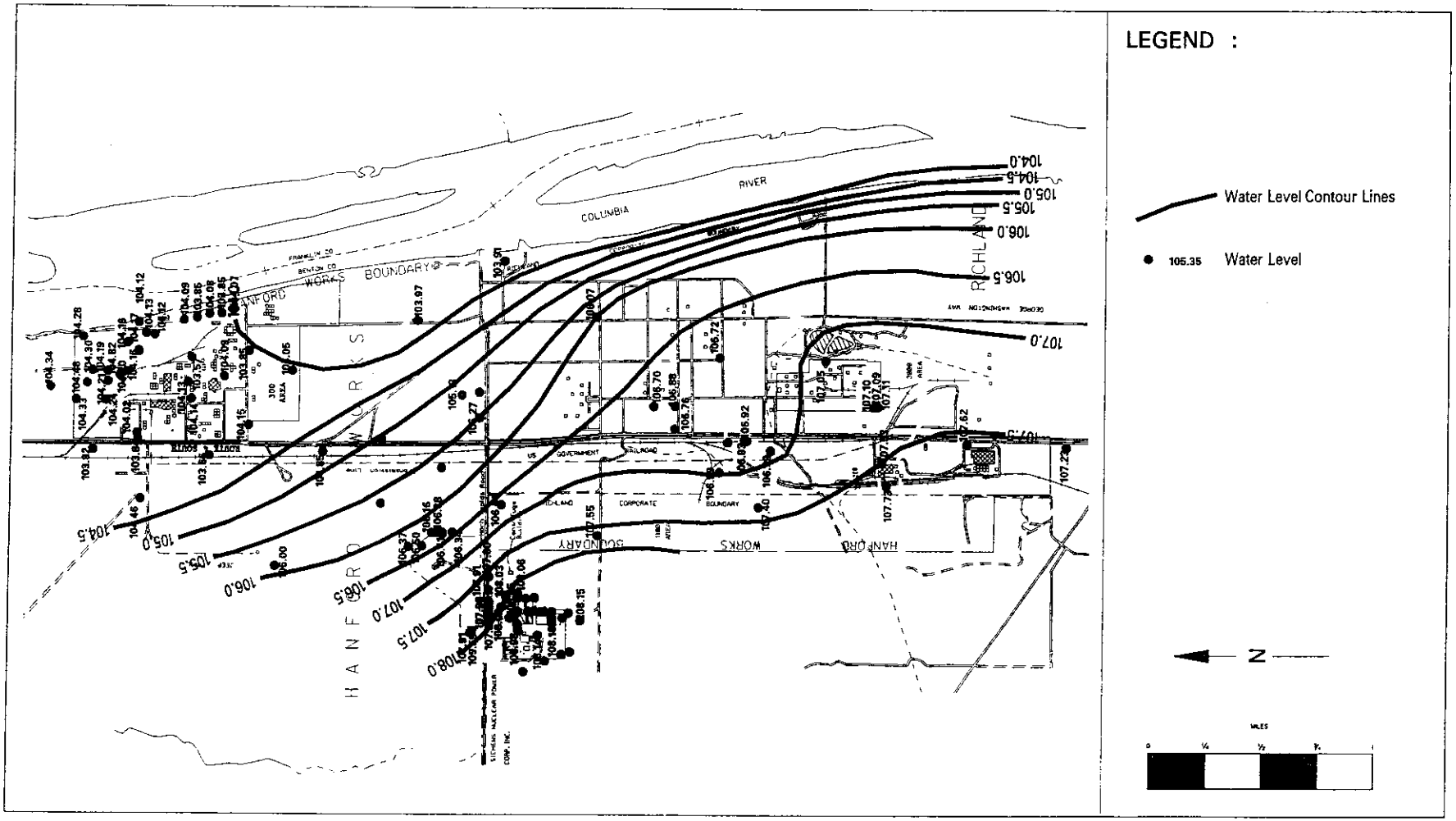
9 3 1 2 3 2 0 3 9



Groundwater Potentiometric Surface
for the Unconfined Aquifer– March 92

Fig 8–16

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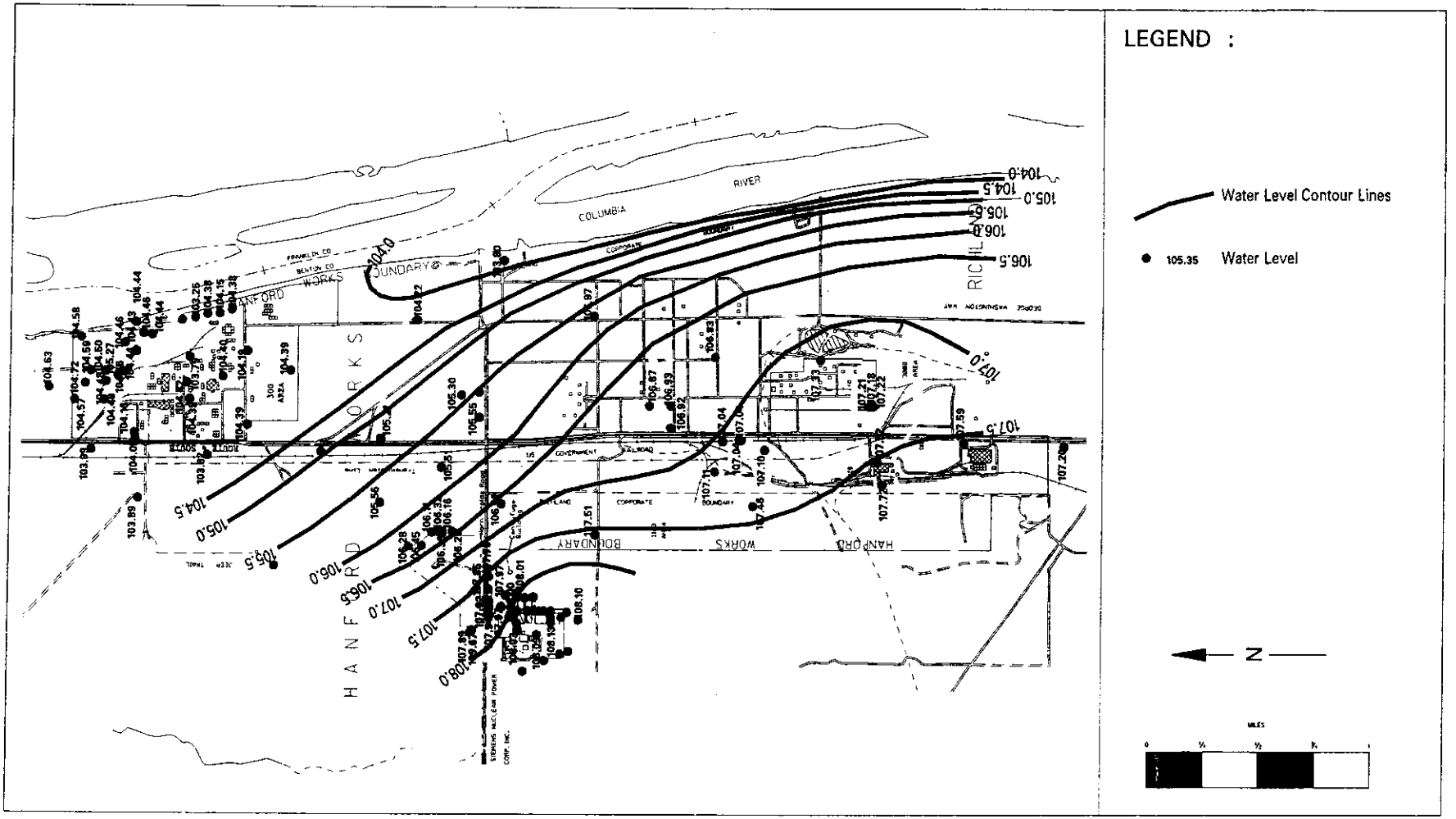

Groundwater Potentiometric Surface
for the Unconfined Aquifer–April 92

Fig B-17

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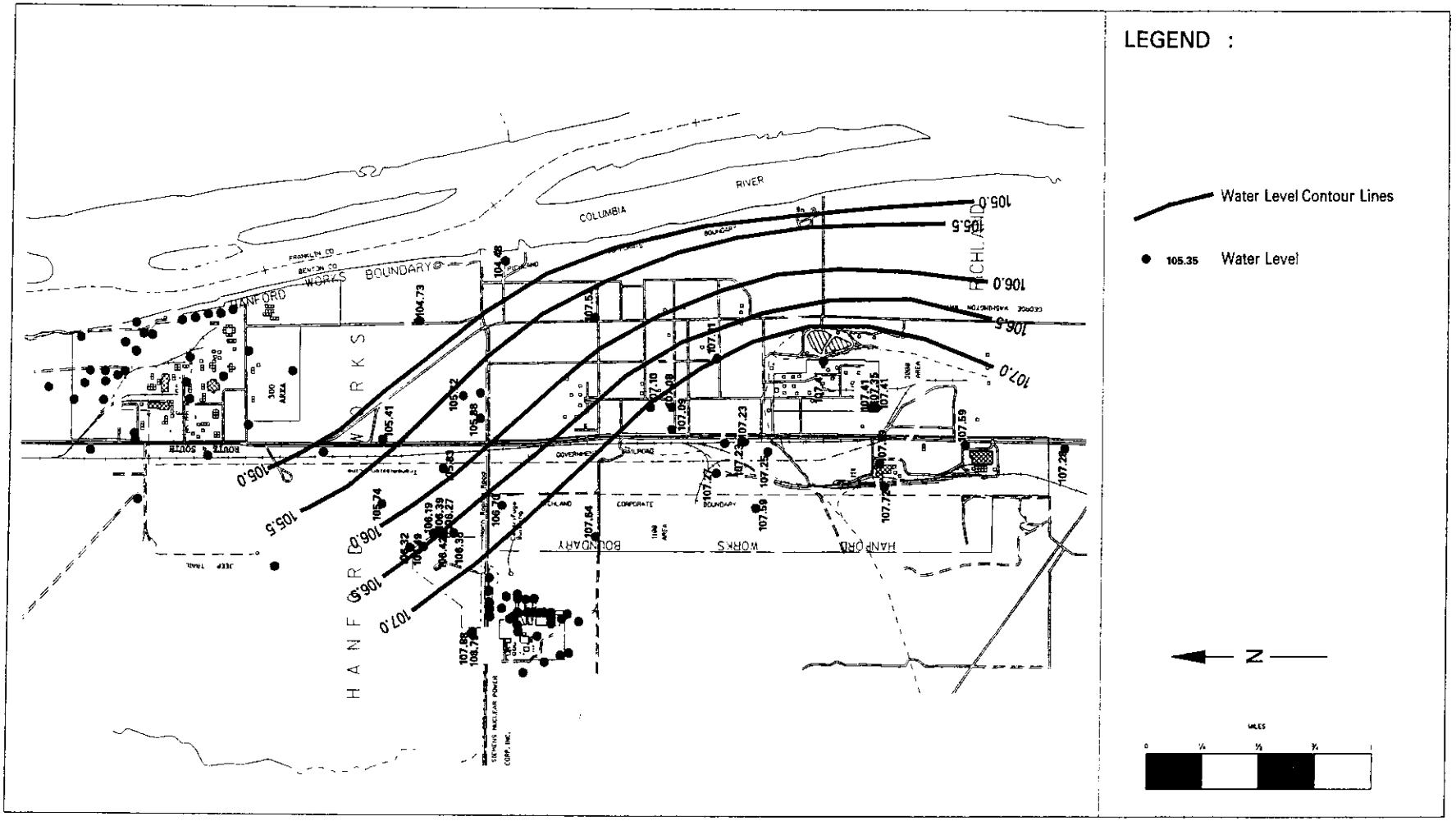
9 3 1 2 3 3 0 6 2 2



Groundwater Potentiometric Surface
for the Unconfined Aquifer–June 92

Fig. 8–19

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APPENDIX C

STRATIGRAPHIC MAPS FOR USE IN GROUNDWATER MODEL DEVELOPMENT

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APPENDIX C CONTENTS

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Stratigraphic Maps for Use in Groundwater Model Development

INTRODUCTION

This appendix contains seven maps presenting an interpretation of the subsurface geology beneath and near the 1100-EM-1 Operable Unit and a summary of the stratigraphic data for the groundwater model (table C-1). All maps were developed from exploratory borings advanced within the 1100 Area, the 300-FF-5 Operable Unit, on property owned by Siemens Power Corporation, and miscellaneous water well borings on private property south and east of the study area. Documents regarding past geologic studies within and adjacent to the 1100 Area were also consulted.

All following geologic maps should be used with the realization that they were compiled from very scattered and often unreliable data points. Approximately 70 percent of the borings were logged by drillers untrained in the geologic classification of soil and rock materials. In some cases, these classifications were changed during data interpretation to more closely match nearby borings classified by trained geologists. Often, even in borings logged by geologists, significant changes in material were reported only to the nearest 5 feet. Also, due to the highly complex depositional history of this area, soil horizons were very difficult to reliably project from one boring to the next. Very few laterally continuous soil units were recognizable. Borings are generally clustered throughout the study area into widely separated groups. Between the clusters exist a few isolated borings, at best. Distances separating the boring clusters, and between isolated wells, range from many hundreds to many thousands of feet. The wider the gaps, the greater the uncertainties in the geologic interpretation.

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TABLE C-1. STRATIGRAPHIC DATA COMPILATION FOR 1100 AREA GROUNDWATER MODEL

Well Number	Well Location		Top of Well	Hanford/Ringold fm Contact		Top of Ash Layer		Top of Ringold Upper Silt Layer (M1)		Bottom of M1 Layer		M1 Layer	Top of Ringold Lower Silt Layer (M3)		M3 Layer	Depth to
	Northing	Easting	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation	Thickness	Depth	Elevation	Thickness	Bedrock
MW-1	364,086.15	1,946,554.37	398.00	54.00	344.00			88.50	309.50							
MW-2	370,878.50	1,945,364.80	379.36	35.00	344.36			46.50	332.86							
MW-3	364,301.11	1,947,081.08	402.63	60.50	342.13			78.80	323.83							
MW-4	367,412.22	1,947,590.40	401.10	56.00	345.10											
MW-5	367,389.36	1,947,590.40	401.30	52.00	349.30			87.00	314.30							
MW-6	358,019.00	1,946,848.30	396.90	57.50	338.50			85.00	311.90							
MW-7	367,097.70	1,946,037.40	395.20	49.40	345.80			85.50	309.70							
MW-7A	378,386.40	1,944,622.63	388.00	45.00	343.00											
MW-8	373,797.00	1,943,078.70	371.62	26.00	345.62											
MW-8A	377,299.59	1,947,303.74	386.19	45.00	341.19											
MW-9	373,760.30	1,943,118.40	371.86	28.40	343.46			35.30	336.56	68.40	303.46	33.10				
MW-10	375,260.80	1,945,079.30	389.09	35.00	354.09	64.00	325.09									
MW-11	374,949.10	1,945,105.10	388.69	43.00	345.69											
MW-12	374,720.80	1,945,415.80	381.14	25.00	356.14	57.00	324.14									
MW-13	374,504.60	1,945,399.90	379.85	25.00	354.85											
MW-14	374,522.80	1,945,423.90	380.01	22.00	358.01	53.60	326.41									
MW-15	374,230.80	1,945,425.40	377.43	22.00	355.43	51.90	325.53									
MW-17	364,291.50	1,948,390.79	407.10	54.00	353.10			90.50	316.60	108.50	298.60	18.00				
MW-18	367,795.92	1,947,500.90	399.74	49.50	350.24											
MW-19	373,112.58	1,946,073.62	384.56	28.00	356.56			52.00	332.56							
MW-20	375,056.34	1,946,115.36	383.45	28.00	355.45	66.00	317.45									
MW-21	374,482.62	1,945,427.52	379.45	33.50	345.95	54.00	325.45	77.50	301.95	80.50	298.95	3.00				
MW-22	374,531.84	1,946,933.36	385.07	36.50	348.57	61.10	323.97									
ANF-1					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-2					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-3					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-4					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-5					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-6					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-7					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-8					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-9					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-10					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-11					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-12					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-13					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-14	373,393.80	1,943,512.60			0.00		0.00		0.00		0.00	0.00		0.00		
ANF-15	373,389.70	1,943,652.10			0.00		0.00		0.00		0.00	0.00		0.00		
ANF-16	373,393.20	1,943,816.80			0.00		0.00		0.00		0.00	0.00		0.00		
ANF-17					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-18					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-23					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-24					0.00		0.00		0.00		0.00	0.00		0.00		
ANF-25					0.00		0.00		0.00		0.00	0.00		0.00		
GM-1			374.04	35.00	339.04											
GM-2			368.49	25.00	343.49			32.50	335.99	35.00	333.49	2.50				
GM-3			371.15	33.00	338.15											
GM-4			368.36	24.00	344.36											
GM-5			365.80	20.00	345.80											
GM-6			379.47	23.00	356.47											
GM-7			379.61	30.00	349.61											

TABLE C-1. STRATIGRAPHIC DATA COMPILATION FOR 1100 AREA GROUNDWATER MODEL

Well Number	Well Location Northing	Well Location Easting	Top of Well Elevation	Hanford/Ringold fm Contact Depth	Hanford/Ringold fm Contact Elevation	Top of Ash Layer Depth	Top of Ash Layer Elevation	Top of Ringold Upper Silt Layer (M1) Depth	Top of Ringold Upper Silt Layer (M1) Elevation	Bottom of M1 Layer Depth	Bottom of M1 Layer Elevation	M1 Layer Thickness	Top of Ringold Lower Silt Layer (M3) Depth	Top of Ringold Lower Silt Layer (M3) Elevation	M3 Layer Thickness	Depth to Bedrock
GM-12			387.23	30.00	357.23											
GM-8			370.92	25.00	345.92											
GM-9			369.34	25.00	344.34											
GM-10			374.82	30.00	344.82											
GM-11			380.19	30.00	350.19											
6-S27-E14	377,994.34	1,949,190.09	372.00					43.00	337.19							
								65.00	307.00	75.00	297.00	10.00	92.00	280.00		
								81.00	291.00	92.00	280.00	11.00	125.00	247.00		
6-S29-E12	375,884.02	1,947,588.48	387.97					50.00	337.97	75.00	312.97	25.00				
6-S30-E14	3540 ft. deep		401.00					120.00	281.00	130.00	271.00	10.00	160.00	241.00	45.00	205.00
6-S30-E15A	375,027.66	1,950,360.62	398.00													
6-S30-E15B	No log															
6-S30-E15C	3540 ft. deep		401.74	60.00	341.74			125.00	276.74	140.00	261.74	15.00	165.00	236.74	35.00	210.00
6-S31-E13			393.00					70.00	323.00	82.00	311.00	12.00				
6-S31-E13A	No drill log is available.															
6-S32-E13A			389.00					75.00	314.00	86.00	303.00	11.00				
6-S32-E13B			394.00					68.00	326.00	76.00	318.00	8.00				
6-S36-E12A	102 ft. deep		402.00					80.00	322.00	94.00	308.00	14.00				
6-S36-E12B	375,027.66	1,950,360.62	398.00					82.00	316.00	99.00	299.00	17.00				
6-S36-E13A	100 ft. deep - Poor drill log		398.00													
6-S36-E13B	100 ft. deep		396.73			(tan clay ------>)		75.00	323.73	90.00	308.73	15.00				
6-S37-E14	368,061.40	2,309,401.00	405.38	49.00	356.38											
6-S41-E13B	364,364.30	2,308,243.70	407.25	65.00	342.25											
6-S43-E12	362,273.00	2,307,422.00	402.83													
6-S40-E14	365,592.80	2,309,354.00	399.84	52.00	347.84											
11-37-19					0.00		0.00		0.00		0.00	0.00		0.00		
11-38-16	59 ft. deep		365.40			(brown silt ---->)		50.00	315.40							
11-38-16B					0.00		0.00		0.00		0.00	0.00		0.00		
11-39-10A	100 ft. deep		367.00						367.00		367.00	0.00	84.00	283.00	(<-- blue slate)	
11-39-10B	54 ft. deep		362.00			(yellow clay --->)		44.00	318.00							
11-39-15	71 ft. deep		392.00	(no silt or clay included in drillers log)												
11-39-16A	61.8 ft. deep		367.80			(clay ------->)		56.80	311.00							
11-39-16B	110 ft. deep		369.00			(yellow clay --->)		63.00	306.00							
11-39-16C	75.3 ft. deep		384.77	(no silt or clay included in drillers log)												
11-39-16D	64 ft. deep		371.77					60.27	311.50							
11-39-16E	83 ft. deep		397.10					68.00	329.10							
11-40-15	88 ft. deep		393.00					64.93	328.07	78.93	314.07	14.00				
11-40-16B	87 ft. deep		390.00			(M1 or M3 ?? --->)		82.00	308.00							
11-40-16C	56 ft. deep		380.00	(no silt or clay included in drillers log)												
11-41-15	76.5 ft. deep		397.00					74.00	323.00							
30-41-14	65 ft. deep		398.00	55.00	343.00			60.00	338.00							
30-41-14B	63 ft. deep		403.00					none								
30-42-16	134 ft. deep		407.50										128.00	279.50	(blue shale)	
3000-F	373,046.90	1,951,757.53	373.00	No drill log is available.												
F-2	371,015.96	1,950,488.19	405.20	No drill log is available.												

TABLE C-1. STRATIGRAPHIC DATA COMPILATION FOR 1100 AREA GROUNDWATER MODEL

Well Number	Well Location Northing	Well Location Easting	Top of Well Elevation	Hanford/Ringold fm Contact Depth	Hanford/Ringold fm Contact Elevation	Top of Ash Layer Depth	Top of Ash Layer Elevation	Top of Ringold Upper Silt Layer (M1) Depth	Top of Ringold Upper Silt Layer (M1) Elevation	Bottom of M1 Layer Depth	Bottom of M1 Layer Elevation	M1 Layer Thickness	Top of Ringold Lower Silt Layer (M3) Depth	Top of Ringold Lower Silt Layer (M3) Elevation	M3 Layer Thickness	Depth to Bedrock
10/28-10G1 (399-5-2)	462,157.00	1,191,733.00	389.00					69.00 122.00	320.00 267.00	86.00 132.00	303.00 257.00	17.00 10.00	176.00	213.00	26.00	202.00
Allied Nuclear				0.00	0.00				0.00		0.00	0.00		0.00		
J. Felton				0.00	0.00				0.00		0.00	0.00		0.00		
D. Schelike	60 ft. deep		375.00	(no silt or clay included in drillers log)												
Wiser Co. Inc.	Well #1 - 85 ft. deep		358.00					34.00	324.00	59.00	299.00	25.00	59.00 (59-105', blue clay)	299.00	46.00	
Wiser Co. Inc.	Well #2 - 43 ft. deep		358.00					32.00	326.00							
H. Pederson				0.00	0.00				0.00		0.00	0.00		0.00		
GTE	201.8 ft. deep		405.00					89.00	316.00	103.00	302.00	14.00				
1C			375.00	55.00	320.00								115.00	260.00	50.00	207.00
399-4-7			372.00										112.00	260.00		
399-4-8			380.00					52.00	328.00							
7C			390.00	390.00				77.00	313.00	102.00	288.00	25.00	175.00	215.00	26.00	189.00
399-6-1			385.48													
399-8-2			394.87													
11-41-13C			404.30					84.00	320.30							
11-34-13			389.00					75.00	314.00	85.00	304.00	10.00				
11-41-13A			403.00	No silt or clay to 338 ft. elevation.												
11-41-13B			402.00					63.00	339.00							
11-34-13			389.00					75.00	314.00							

Figure C-1. Hanford fm./Ringold fm. Contact Elevations

Contours along the Hanford fm./Ringold fm. contact were based on data from subsurface borings advanced in the 1100-EM-1 Operable Unit, the 300-FF-5 Operable Unit, and during the summer of 1991 on property owned by Siemens Power Corporation. Elevation data is lacking to the west of the 345-foot contour interval due to a complete absence of subsurface explorations. Uncertainties exist in the eastern portion of the map area in the region bounded by Stevens Drive extending to just west of the western bank of the Columbia River because of poor quality drilling logs.

Data points used for developing the contour plot were obtained from the following borings:

1100-EM-1	300-FF-5	SIEMENS POWER CORPORATION
MW-2	1C	GM-1
MW-6	7C	GM-2
MW-7	399-4-5	GM-3
MW-7A	399-4-7	GM-4
MW-8	399-4-8	GM-5
MW-8A	399-5-1	GM-6
MW-8A	399-5-2	GM-7
MW-9		GM-8
MW-10		GM-9
MW-11		GM-11
MW-12		GM-12
MW-13		
MW-14		
MW-15		
MW-17		
MW-18		
MW-19		
MW-20		
MW-21		
MW-22		
699-S27-E14		
699-S30-15C		

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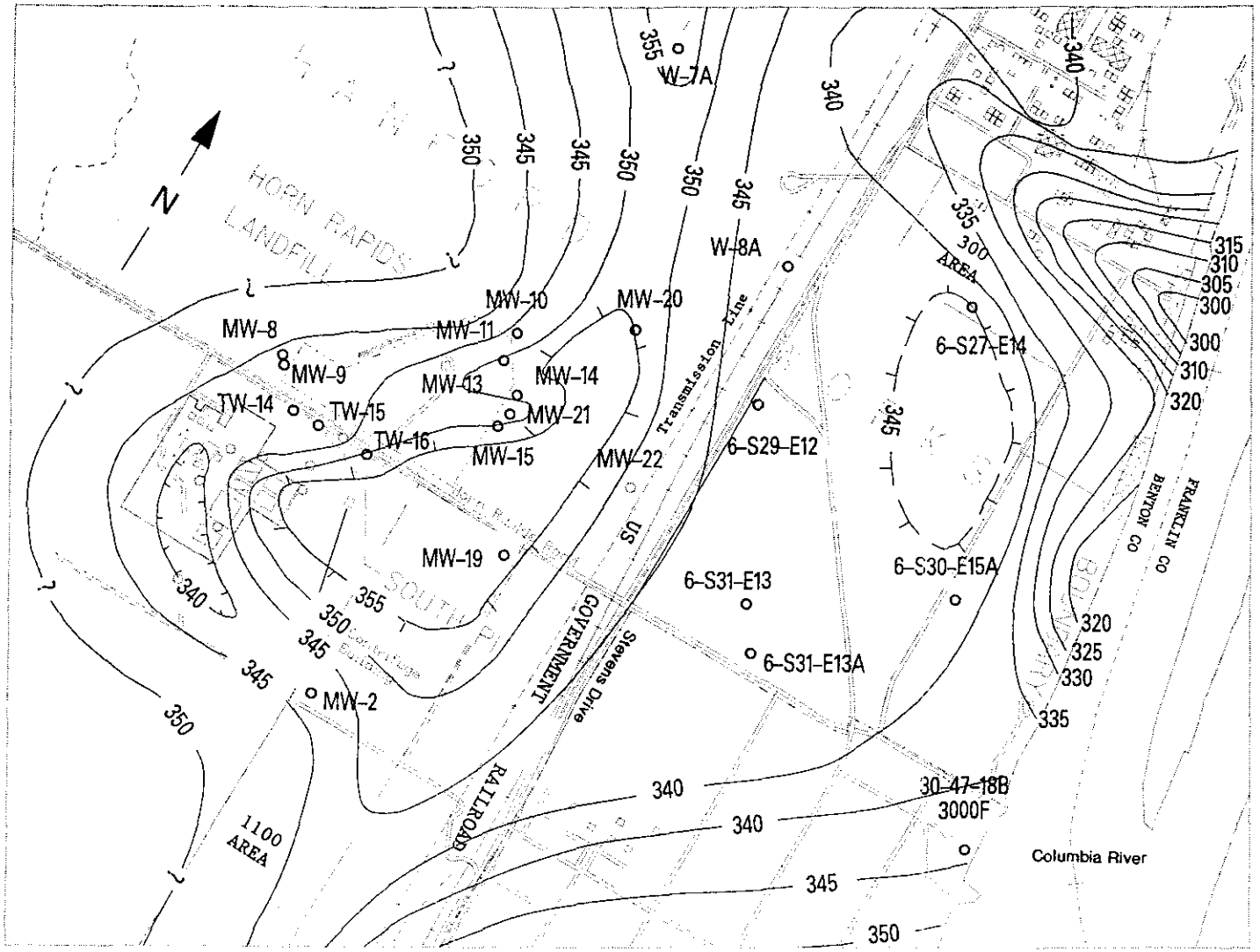

HANFORD fm. / RINGOLD fm.
CONTACT ELEVATIONS

Fig. C-1

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Figure C-2. Top of Silt Elevations

Contours along the top of silt beneath the groundwater modeling area were based on data from subsurface borings advanced in the 1100-EM-1 Operable Unit, the 300-FF-5 Operable Unit, and during the summer of 1991 on property owned by Siemens Power Corporation. Elevation data is lacking to the west of the final solid 335-foot contour interval due to a complete absence of subsurface explorations. The final western 335-foot contour line is based on the assumption that the top of silt decreased in elevation from a high in the vicinity of the Siemens Power Corporation complex, to a broad low, and will thereafter continue a gradual rise westward. The eastern portion of the map area, adjacent to the Columbia River, has areas lacking the silt horizon.

The contoured silt horizon is fairly continuous in a north-south orientation throughout the 1100-EM-1 Operable Unit. Discontinuities become conspicuous toward the eastern boundary of the area; adjacent to the Columbia River. This horizon corresponds to the "B" silt as mapped in the 300-FF-5 Operable Unit project. The "A" silt horizon of the 300-FF-5 project is the first silt unit encountered by borings along the Columbia in areas devoid of the "B" unit.

Data points used for developing the contour plot of the top of silt were obtained from the following borings:

1100-EM-1	300-FF-5	SIEMENS POWER CORPORATION
MW-2	7C	GM-2
MW-6	399-4-5	GM-11
MW-7	399-4-7	
MW-9	399-4-8	
MW-19	399-5-2	
MW-21		
699-S27-E14		
699-S29-E12		
699-S30-E15C		
699-S30-E14		
699-S31-E13		
699-S36-E12A		
699-S36-E12B		
699-S36-E13B		

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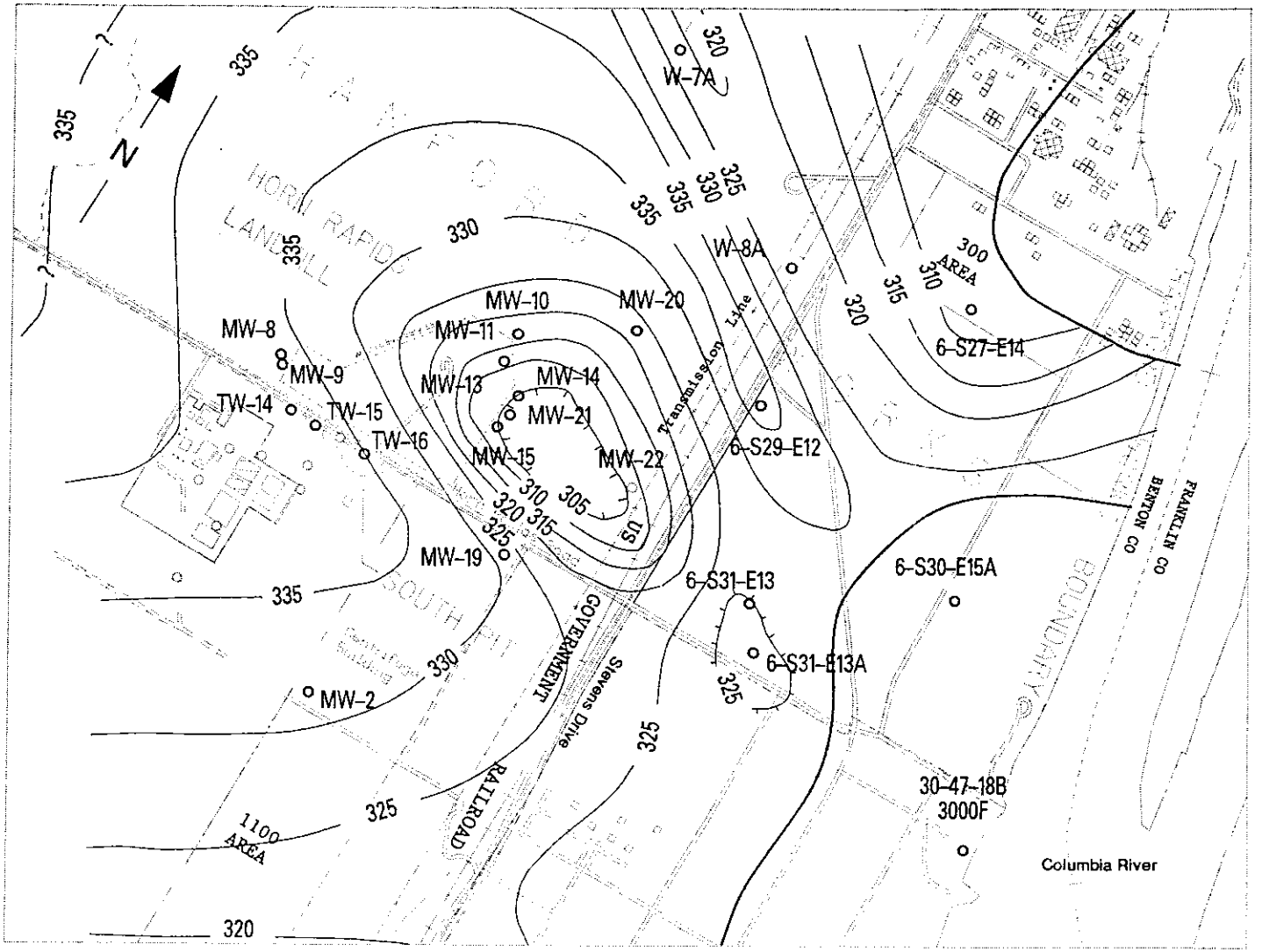

TOP of SILT ELEVATIONS

Fig. C-2

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Figure C-3. Contours on Top of Volcanic Ash
Figure C-4. Isopach Map of Volcanic Ash

Contours on the top and mapped thicknesses of the volcanic ash deposit noted in the Horn Rapids Landfill area were based on data from subsurface borings advanced in the 1100-EM-1 Operable Unit. The ash is theorized to be a water lain deposit within an eroded low on the top of the upper silt unit of the middle Ringold Formation (see paragraph 2.2.2.2). Contours on the top of the deposit are fairly certain, based on the number of subsurface borings that intercepted the ash surface. The thickness of the deposit is less certain, based on data from only a single boring that fully penetrated the unit.

Data points used for developing the contour plot and isopach map were obtained from the following borings:

1100-EM-1
MW-10
MW-12
MW-14
MW-15
MW-20
MW-21*
MW-22

* Boring fully penetrated the ash deposit.

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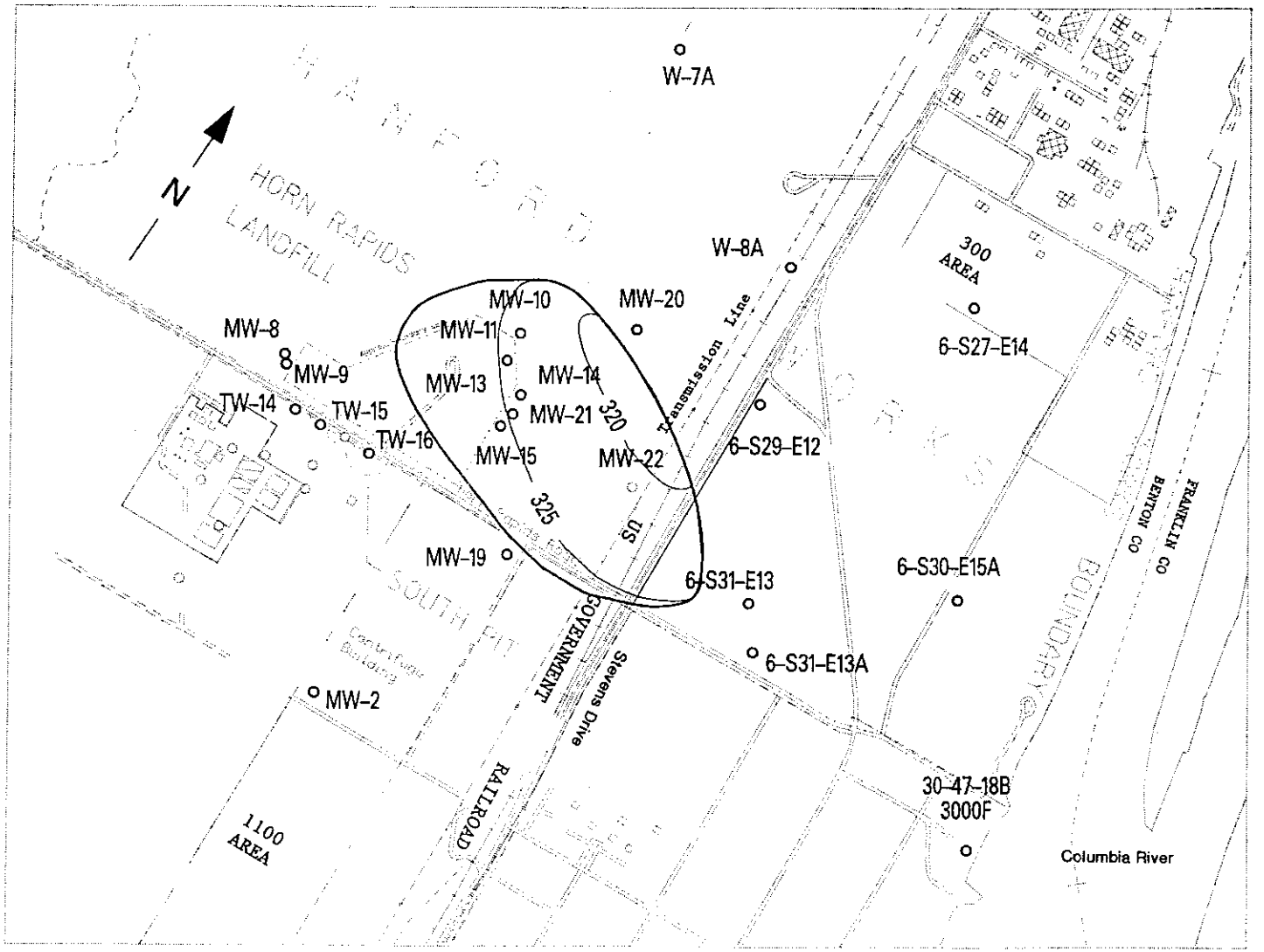

CONTOURS on top of VOLCANIC ASH

Fig. C-3

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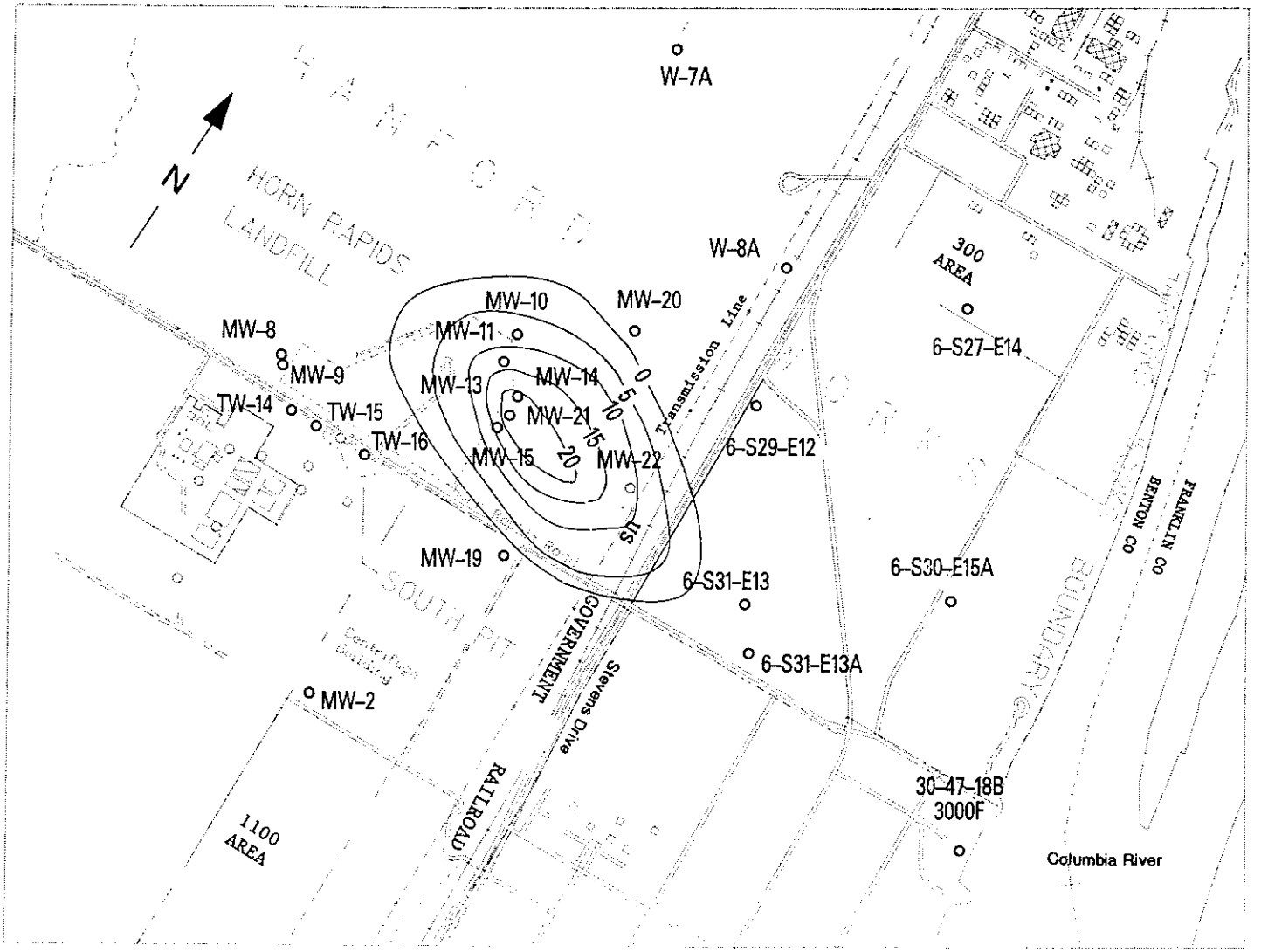

ISOPACH MAP of VOLCANIC ASH

Fig. C-4

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Figure C-5. Bottom of Silt Elevations

Contours on the bottom of the silt unit were based on data from subsurface borings advanced in the 1100-EM-1 Operable Unit and the 300-FF-5 Operable Unit. Elevation data is lacking to the west of the 300-foot contour due to an absence of subsurface explorations. Uncertainties exist throughout the map area because of sparse data. Few borings penetrated the entire thickness of this silt deposit.

Data points used for developing the contour plot were obtained from the following borings:

1100-EM-1	300-FF-5
MW-9	7C
MW-21	399-4-8
699-S27-E14	399-5-2
699-S29-E12	
699-S31-E13	
699-S32-E13B	
699-S36-E12A	
699-S36-E12B	
699-S36-E13B	

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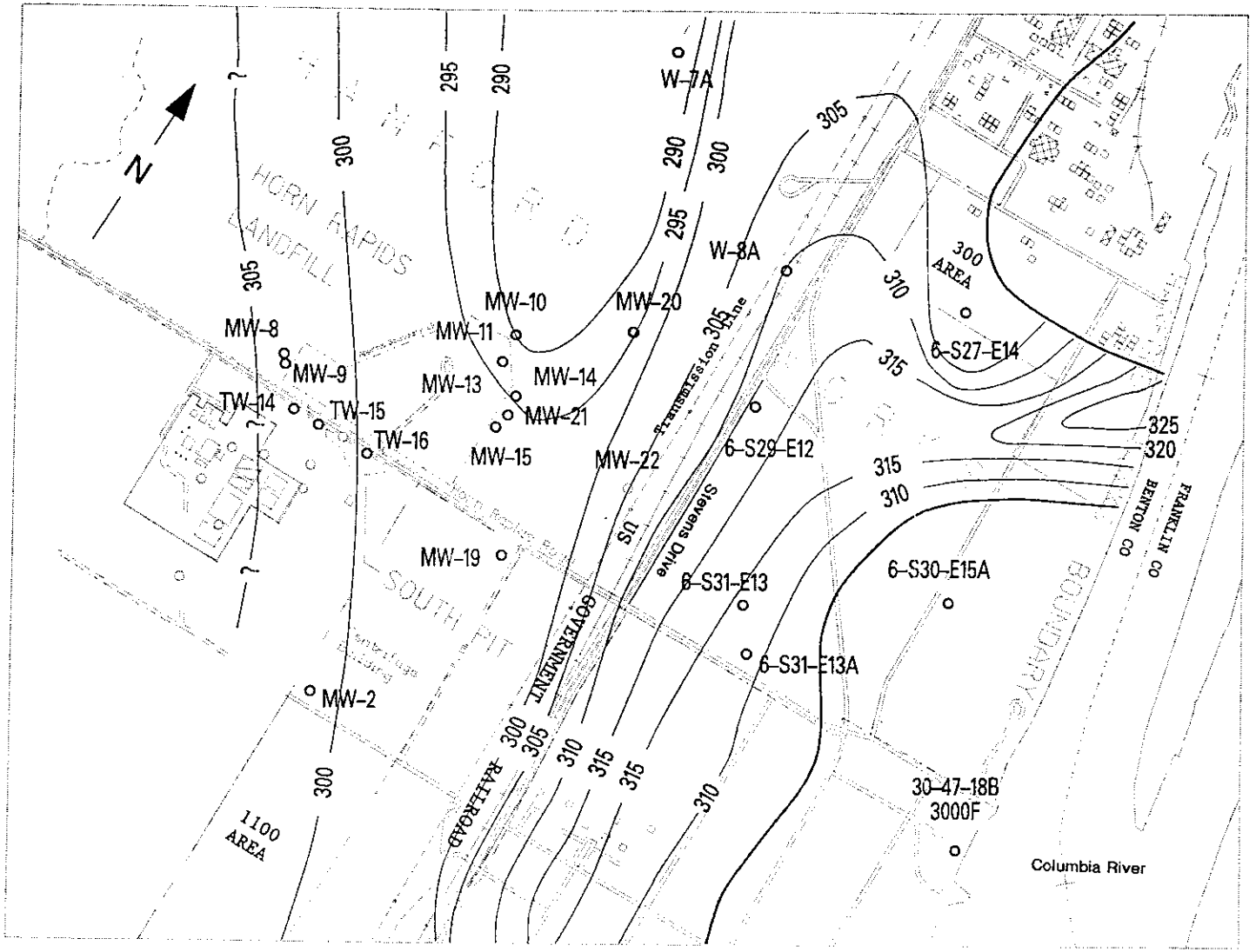

BOTTOM of SILT ELEVATIONS

Fig. C-5

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Figure C-6. Isopach Map of Silt Horizon

The isopach map delineating the thickness of the silt unit was developed directly from the contour maps containing the top and bottom elevations of the silt unit. The zero thickness isopleth along the eastern edge of the map area indicates the silt does not occur east of the line. Silt unit "A," using nomenclature from the 300-FF-5 project, is the first silt layer encountered by subsurface borings advanced east of the zero line. The area south and west of the Siemens Power Corporation complex is lacking reliable subsurface data with which to infer the thickness of the silt unit. Contour lines drawn in this vicinity on both the top of silt and bottom of silt maps are too unreliable, again due to the lack of data, to develop isopleths for the silt.

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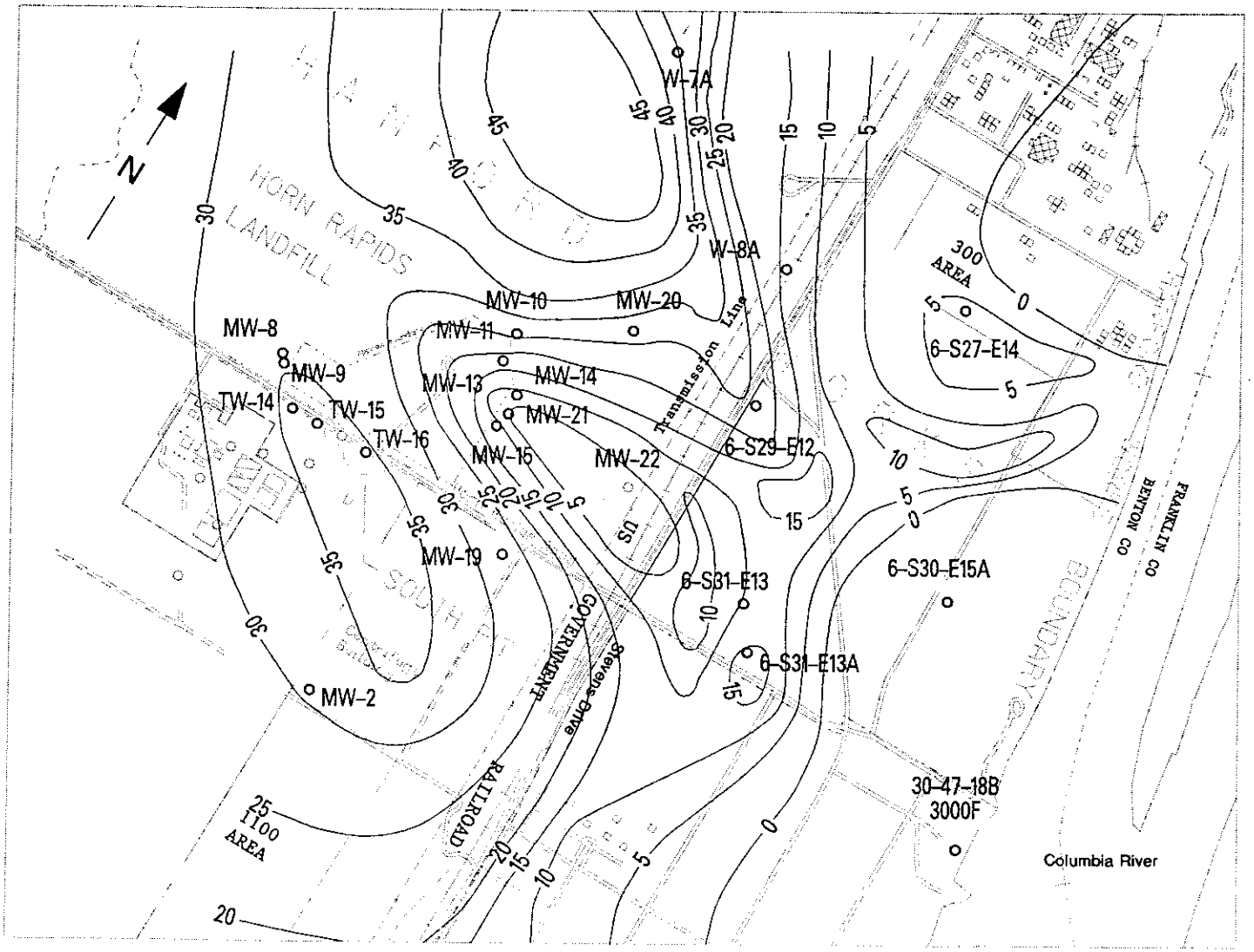

ISOPACH MAP of SILT HORIZON

Fig. C-6

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Figure C-7. Top of Basal Ringold Silt

Contours on the top of the basal Ringold silt deposit were derived exclusively from the Westinghouse-Hanford Company document "Geologic Summary of the 300 Area - Hanford Site, South-Central Washington" (K.A. Lindsey and S. Consort, authors). Elevations away from the data points is highly speculative due to the lack of deep, subsurface borings within this area. Deep borings located to the south are too far removed to be reliably projected. No data is available for the western portion of the groundwater modeling area. It is not reasonable to assume that the surface elevation of the lower silt unit continues to drop in this direction. Because of the high probability of some sort of undetermined structure in the silt surface toward the west, no attempt was made to extend the surface contours in this direction.

Data points used for developing the contour plot were obtained from the following borings:

1100-EM-1	300-FF-5
699-S27-E14	399-3-3
699-S30-E14	399-4-5
699-S30-E15C	399-4-7
	399-4-2
	1C
	7C

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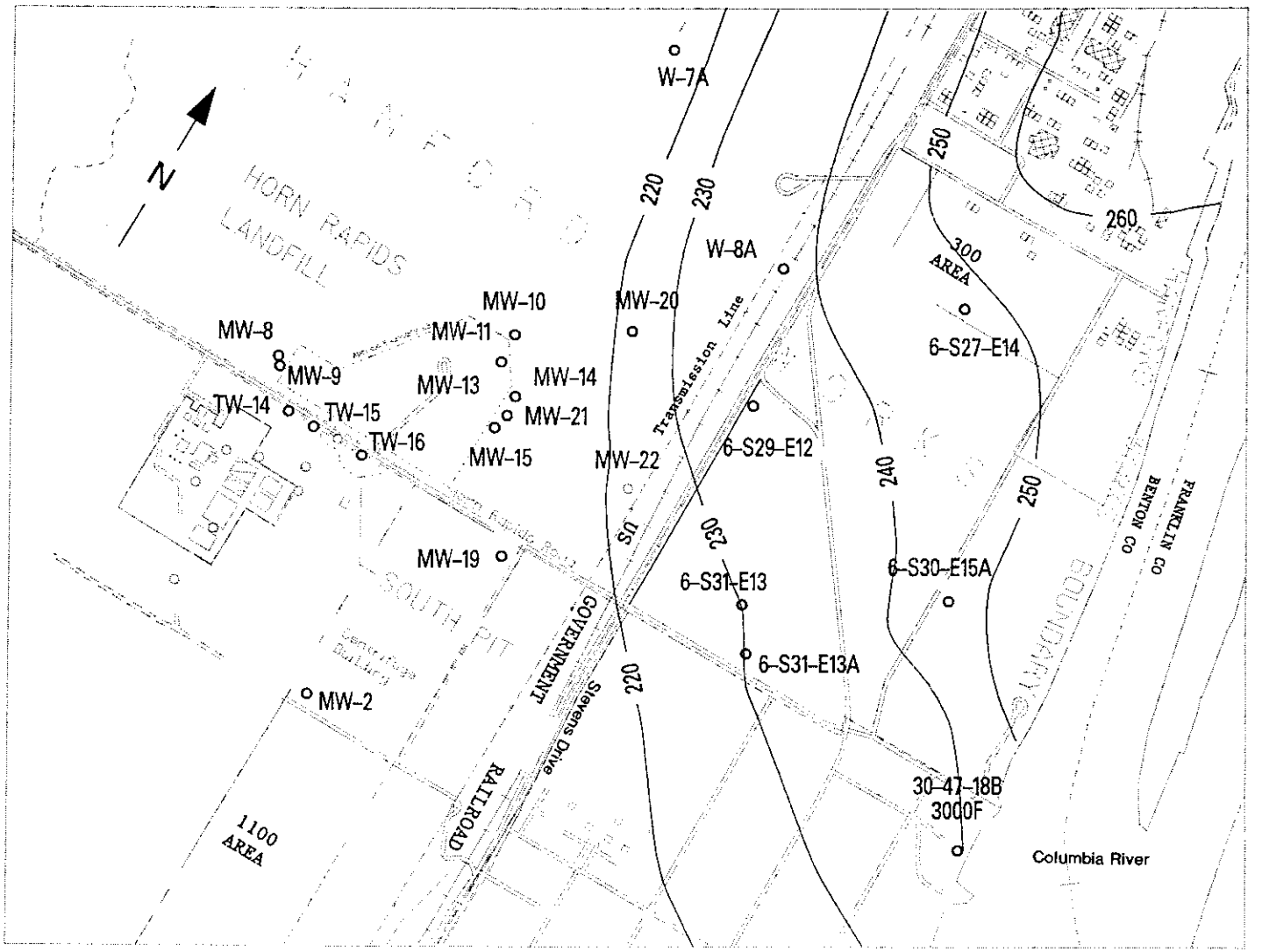
9 3 1 2 3 3 2 2 7 1 3

9 3 1 2 3 2 3 7 1 9



TOP of BASAL RINGOLD SILT

Fig. C-7

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APPENDIX D

SUMMARY OF PHASE II SOIL SAMPLING ANALYTICAL RESULTS

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APPENDIX D CONTENTS

1.0 DISCUSSION OF PHASE II SOIL SAMPLING ANALYTICAL RESULTS . . D-1

2.0 LABORATORY AND VALIDATION QUALIFIER DEFINITIONS (FOR REFERENCE TO TABLE D-1) D-2

3.0 REFERENCES D-3

TABLE

Table D-1 Summary of Phase II Soil Sampling Analytical Results D-4

ATTACHMENT

Attachment D-1 ARDL Report D-21

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1.0 DISCUSSION OF PHASE II SOIL SAMPLING ANALYTICAL RESULTS

Analytical results of the Phase II Remedial Investigation soil sampling performed at Horn Rapids Landfill (HRL) and the Ephemeral Pool are shown in table D-1. Analytical methods from the Environmental Protection Agency (EPA) Contract Laboratory Program (CLP) Statement of Work for Inorganic Analysis EPA ILM02.0 (EPA, 1991a) were used to detect inorganic contaminants from the CLP target analyte list (TAL). Methods from EPA CLP Statement of Work for Organic Analysis EPA OLM01.1 (EPA, 1991b) were used to detect organic, pesticide, and polychlorinated biphenyl (PCB) contaminants from the CLP target compound list (TCL). Inorganic analyses for sample delivery groups (SDG) Westinghouse Hanford Company (WHC) 27 and WHC 28, and all of SDG WHC 29 were validated by the Office of Sample Management using Westinghouse Sample Management Administration Manual WHC-CM-5-3 (WHC, 1990). The remaining analyses were validated by the U.S. Army Corps of Engineers using EPA Functional Guidelines for Evaluating Inorganic and Organic Analyses.

During the trenching activities at HRL, 26 samples (all at depths greater than or equal to 4 feet) were taken from seven locations. Soil samples shown in table D-1, taken from the trenches, are TP-1, TP-3A, TP-3B, TP-4/5, TP-7, TP-8, and TP-11. All samples from the trenches except TP-1 were analyzed for TAL inorganic contaminants, TCL organic contaminants, and TCL pesticides and PCB's. The two samples from TP-1 were analyzed for TCL organics and TCL pesticides and PCB's.

Two samples of material taken from the HRL trenches were sent to U.S. Army Corps of Engineers, North Pacific Division Laboratory in Troutdale, Oregon. The nature of these samples, including field screening methods are presented in paragraph 3.7.4.2.6.

For sample locations B4-1 and B5-1 to B5-3, soil samples that were taken from 0 to 1 foot were analyzed for TAL and TCL contaminants. Samples from these locations that were taken from 1 to 2 feet were analyzed for all TAL and TCL contaminants except pesticides and PCB's. Samples were validated by U.S. Army Corps of Engineers using EPA Functional Guidelines.

Nineteen soil samples were taken at various depths (from 0 to 2 feet) from locations PCB-1 to PCB-4 and PCB-1A to PCB-4A. These samples were analyzed for TCL pesticides and PCB's. Samples were validated by U.S. Army Corps of Engineers using EPA Functional Guidelines.

At the Ephemeral Pool, seven surface samples were taken from the locations E1 to E6. Analysis was performed for TCL pesticides and PCB's at this site.

2.0 LABORATORY AND VALIDATION QUALIFIER DEFINITIONS (FOR REFERENCE TO TABLE D-1)

B - The reported value is < the contract required quantitation limit, but > the instrument detection limit for inorganic chemical analysis, or the analyte was found in the associated blank as well as the sample for organic analysis.

D - The compound was identified in an analysis at a secondary dilution factor.

E - Concentration exceeds calibration range of gas chromatography/mass spectroscopy instrument.

J - The analyte was analyzed for and was positively identified, but the associated numerical value may not be consistent with the amount actually present in the environmental sample. The associated numerical value is an estimated quantity.

A subscript may be appended to J indicating which of the following quality control (QC) criteria were not met:

1 - Blank contamination: indicates possible high bias and/or false positives.

2 - Calibration range exceeded: indicates possible low bias.

3 - Holding times not met: indicates low bias for most analytes with the exception of common laboratory contaminants and chlorinated ethenes.

4 - Other QC outside control limits: bias not readily determined.

N - The analysis indicates that an analyte is present and there are strong indications that the identity is correct.

NJ - The analysis indicates that the analyte is tentatively identified and the associated numerical value may not be consistent with the amount actually present in the sample.

A subscript may be appended to NJ indicating which of the following situations apply:

1 - DDT/Endrin breakdown evident.

2 - Interference from other sample components.

3 - Non-TCL compounds.

4 - A confirmation analysis was missing or QC criteria were not met for the confirmation analysis.

R - The data are unusable for all purposes. The analyte was analyzed for, but the presence or absence of the analyte has not been verified.

U - The analyte was analyzed for, and is not present above, the level of the associated sample quantitation limit.

UJ - The analyte was analyzed for, and was not present above, the level of the associated value. The associated numerical value may not accurately or precisely represent the concentration necessary to detect the analyte in this sample.

W - Post digestion spike for furnace Atomic Absorption analysis is out of control limits, while sample absorbance is < 50 percent of spike absorbance.

X - Additional flags defined separately, consult case narrative.

* - The duplicate analysis was not within control limits

+ - The correlation coefficient for the Method of Standard Additions was <0.995.

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3.0 REFERENCES

EPA, 1991a, *Contract Laboratory Program Statement of Work for Inorganic Analysis*, EPA ILMO2.0.

EPA, 1991b, *Contract Laboratory Program Statement of Work for Organic Analysis*, EPA OLMO1.1.

Westinghouse Hanford Company, 1990, *Westinghouse Sample Management Administration Manual WHC-CM-5-3.*

Table D-1 Summary of Phase II Soil Sampling Analytical Results

SDG (WHC)	23	28					
Sample No	B00Z59	B00ZT3	B00ZT4	B00ZT7	B00ZT8	B00ZT9	B00ZV0
Sample Location	TP-11	TP-3B	TP-3B	TP-3A	TP-3A	TP-3A	TP-3A
Sample Depth, ft	4	7-7.5	7-7.5	5	10	19	21-22
INORGANICS, ug/kg							
Aluminum	17800 J	5760 J	4900	5460 J	4770 J	7060 J	3820 J
Antimony	10.5 UJ	5.2 R	5.1 R	5.2 R	5.2 R	7.9 R	5.1 R
Arsenic	4.1 U	0.21 R	0.2 R	0.21 R	0.21 R	0.21 R	1 R
Barium	511 *	72.5	57.9	70.6	65.6	72.1	29.2 R
Beryllium	0.23 U	0.21 R	0.2 R	0.21 R	0.21 R	0.21 R	0.2 R
Cadmium	2.4 J	0.62 R	0.61 R	0.63 R	0.62 R	0.76 R	0.61 R
Calcium	44800	6270	5770	6170	5960	5340	13900
Chromium	85.7 J	4.9 J	4.3 J	3.7 J	9.9 J	102 J	8 J
Cobalt	18.9 J	16.2	16.2	14.8	11.5	13.3	2.9 R
Copper	1280 J	17.1	14.5	16.9	39.4	57.2	6.2
Cyanide	2.8 U	2.6 U	2.5 U	2.6 U	2.6 U	2.7 U	2.5 U
Iron	31900 *	29300 J	29700 J	25500 J	23700 J	23400 J	7390 J
Lead	854 J	2.1	2.2 S	2.2 S	9.8	13	2.4
Magnesium	7640	5050	4700	4100	3760	4040	3130
Manganese	501	414 J	337 J	317 J	262 J	287 J	97.1 J
Mercury	0.11 UJ	0.1 U	0.1 U	0.1 U	0.1 U	0.11 U	0.1 R
Molybdenum	NA	NR	NR	NR	NR	NR	NR
Nickel	31.6 J	15.4	8.5	7 R	9.2	81.8	8.2
Potassium	3820 J	706 R	501 R	630 R	659 R	959 R	901 R
Selenium	0.23 UJ	0.21 R	0.2 R	0.21 R	0.21 R	0.21 R	0.2 R
Silver	1.1 U	0.62 R	0.61 R	0.63 R	0.62 R	0.64 R	0.61 R
Sodium	2360	494 R	413 R	511 R	402 R	433 R	125 R
Thallium	0.24 U	0.21 R	0.2 R	0.21 R	0.21 R	0.21 R	0.2 R
Titanium	NA	2870 J	3180 J	2860 J	1950 J	1930 J	244 J
Vanadium	49.7	77.1	84.9	69.8	53.2	52.2	9.8 R
Zinc	3160 *	50.1	49.9	50	52.6	115	14.1
Zirconium	NA	28	28.6	27.9	26.1	22	2.2 R

Table D – 1 Summary of Phase II Soil Sampling Analytical Results (Continued)

SDG (WHC)	23	28					
Sample No	B00Z59	B00ZT3	B00ZT4	B00ZT7	B00ZT8	B00ZT9	B00ZV0
Sample Location	TP–11	TP–3B	TP–3B	TP–3A	TP–3A	TP–3A	TP–3A
Sample Depth, ft	4	7–7.5	7–7.5	5	10	19	21–22
VOLATILE ORGANICS,ug/kg							
Methylene Chloride	6 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	26 J1	10 U	10 U	11 U	7 J	11 U	10 U
2–Butanone	11 U	10 U	10 U	11 U	11 U	11 U	10 U
Benzene	6 U	0.3 J	5 U	5 U	5 U	5 U	5 U
Tetrachloroethene	4 UJ	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	6 U	5 U	5 U	5 U	5 U	5 U	5 U
SEMI VOLATILE ORG, ug/kg							
Benzoic Acid	160 J1	NA	NA	NA	NA	NA	NA
BEHP	100 J1	1400 U	1400 U	1400 U	1400 U	1400 U	1300 U
Pyrene	750 U	270 J	1400 U	1400 U	1400 U	220 J	1300 U
1,2,4–Trichlorobenzene	750 U	230 J	1400 U	1400 U	1400 U	1400 U	1300 U
Acenaphthene	750 U	180 J	1400 U	1400 U	1400 U	320 J	1300 U
Phenol	750 U	1400 U	1400 U	1400 U	1400 U	330 J	1300 U
2–Chlorophenol	750 U	1400 U	1400 U	1400 U	1400 U	240 J	1300 U
Di–n–Octylphthlalate	750 U	1400 U	1400 U	1400 U	1400 U	1400 U	1300 U
2–Methylnaphthalene	750 U	1400 U	1400 U	1400 U	1400 U	1400 U	1300 U
Naphthalene	750 U	1400 U	1400 U	1400 U	1400 U	1400 U	1300 U
Pentachlorophenol	3600 U	6700 U	6700 U	6700 U	6800 U	6800 U	6500 U
Di–n–Butyl	750 U	1400 U	1400 U	1400 U	1400 U	1400 U	1300 U
Fluoranthrene	750 U	1400 U	1400 U	1400 U	1400 U	1400 U	1300 U
Phenanthrene	750 U	1400 U	1400 U	1400 U	1400 U	1400 U	1300 U
Anthracene	750 U	1400 U	1400 U	1400 U	1400 U	1400 U	1300 U
Benzo(a)anthracene	750 U	1400 U	1400 U	1400 U	1400 U	1400 U	1300 U
Chrysene	750 U	1400 U	1400 U	1400 U	1400 U	1400 U	1300 U
2,6–Dinitrotoluene	750 U	1400 U	1400 U	1400 U	1400 U	1400 U	1300 U

Table D-1 Summary of Phase II Soil Sampling Analytical Results(Continued)

SDG (WHC)	23	28					
Sample No	B00Z59	B00ZT3	B00ZT4	B00ZT7	B00ZT8	B00ZT9	B00ZV0
Sample Location	TP-11	TP-3B	TP-3B	TP-3A	TP-3A	TP-3A	TP-3A
Sample Depth, ft	4	7-7.5	7-7.5	5	10	19	21-22
PEST/PCB's, ug/kg							
Dieldrin	3.9 NJ2	17 U	16 U	17 U	17 U	17 U	16 U
Aroclor 1248	90 U	83 U	82 U	84 U	85 U	85 U	85 U
Aroclor 1254	94 NJ2	170 U	160 U	170 U	17 R	48 R	160 U
Aroclor 1260	180 U	170 U	160 U	170 U	170 U	170 U	160 U
Endrin	6.7 NJ2	17 U	16 U	17 U	17 U	7.2 R	16 U
Aldrin	1 J	8.3 U	8.2 U	8.4 U	8.5 U	0.96 R	8.2 U
4,4'-DDD	18 U	17 U	16 U	17 U	17 U	17 U	16 U
Alpha Chlordane	90 U	83 U	82 U	84 U	1.3 R	85 U	82 U
Beta-BHC	9 U	8.3 U	8.2 U	8.4 U	8.5 U	8.5 U	8.2 U
Gamma Chlordane	90 U	83 U	82 U	84 U	85 U	85 U	82 U
4,4'-DDE	18 U	17 U	16 U	17 U	17 U	17 U	16 U
Endosulfan Sulfate	18 U	17 U	16 U	17 U	17 U	17 U	16 U
Endrin Ketone	18 U	17 U	16 U	17 U	17 U	17 U	16 U
Methoxychlor	90 U	83 U	82 U	84 U	85 U	85 U	82 U
4,4'-DDT	18 U	17 U	16 U	17 U	17 U	17 U	16 U
Endosulfan II	18 U	17 U	16 U	17 U	17 U	17 U	16 U

Table D-1 Summary of Phase II Soil Sampling Analytical Results (Continued)

SDG (WHC)	28		29	27	23		30
Sample No	B00ZV1	B00ZV2	B00ZV3	B00ZT2	B00ZT0	B00ZT1	B00ZX4
Sample Location	TP-4/5	TP-4/5	TP-8	TP-7	TP-1	TP-1	B5-1
Sample Depth, ft	5	12	5	5	5	9	S
INORGANICS, ug/kg							
Aluminum	4700 J	5750 J	12600	8390	5620	9470	NA
Antimony	5.2 R	5.2 R	7.3 UN*	11.3 J	5.1 U	5.3 UJ	NA
Arsenic	0.21 R	0.21 R	0.74 BN	2.9 J	0.96 U	25	NA
Barium	68.4	72.2	144	90.7	66.2	70.4	NA
Beryllium	0.21 R	0.21 R	0.55 B	0.23 U	0.2 U	0.31 U	NA
Cadmium	0.62 R	1 R	0.88 U	0.64 U	0.61 U	1 U	NA
Calcium	5540	5610	11600	11000	6290	5470	NA
Chromium	3.2 J	133 J	19.8 *	9.8	6.2 U	96 J1	NA
Cobalt	12.7	14.2	15.8	4.5 B	14.6 U	17.4 U	NA
Copper	13.5	25.3	523	9.9	22.9	1720 UJ	NA
Cyanide	2.6 U	2.6 U	3.7 U	2.7 U	2.6 U	2.6 U	NA
Iron	23400 J	22500 J	32700	7950	27000	47500	NA
Lead	2.5	43.4	18.1 +	19.4 J	2.9	293	NA
Magnesium	3790	3120	6390	1730	4590 U	4070 U	NA
Manganese	264 J	266 J	485	125	313	446	NA
Mercury	0.1 U	0.1 U	1.15 U	0.11 U	0.1 U	0.11 U	NA
Molybdenum	NR	NR	NR	0.42 U	NR	NR	NA
Nickel	5.9 R	71.6	14	57.3	8.2 UJ	145 UJ	NA
Potassium	613 R	567 R	1970	1270	704 U	698 U	NA
Selenium	0.21 R	0.21 R	0.29 U	0.21 UJ	0.2 U	0.21 U	NA
Silver	0.62 R	0.63 R	1.3 B	0.64 U	0.61 U	0.63 U	NA
Sodium	386 R	340 R	811 B	1240	313 U	252 U	NA
Thallium	0.21 R	0.21 R	0.31 B	0.21 U	0.2 U	0.21 U	NA
Titanium	2350 J	2180 J	NA	244 J	NR	NR	NA
Vanadium	63.6	59	85	45.1	71.8	68.9	NA
Zinc	41.6	239	103	34.4	55.2	1110 J1	NA
Zirconium	26.4	20.8	NA	11.7	NR	NR	NA

Table D-1 Summary of Phase II Soil Sampling Analytical Results (Continued)

SDG (WHC)	28		29	27	23		30
Sample No	B00ZV1	B00ZV2	B00ZV3	B00ZT2	B00ZT0	B00ZT1	B00ZX4
Sample Location	TP-4/5	TP-4/5	TP-8	TP-7	TP-1	TP-1	B5-1
Sample Depth, ft	5	12	5	5	5	9	S
VOLATILE ORGANICS,ug/kg							
Methylene Chloride	5 U	6 U	5 U	5 U	5 U	5 U	NA
Acetone	11 U	12 U	10 U	11 U	11 J1	11 U	NA
2-Butanone	11 U	12 U	10 U	11 U	10 U	11 U	NA
Benzene	5 U	6 U	5 U	5 U	5 U	5 U	NA
Tetrachloroethene	5 U	6 U	5 U	5 U	5 U	5 U	NA
Toluene	5 U	6 U	5 U	5 U	5 U	5 U	NA
SEMI VOLATILE ORG, ug/kg							
Benzoic Acid	NA	NA	6500 U	1800 U	3300 U	NA	NA
BEHP	92 J	76 J	110 J	360 U	670 U	220 J	NA
Pyrene	210 J	1600 U	240 J	130 J4	670 U	79 J	NA
1,2,4-Trichlorobenzene	1400 U	1600 U	1300 U	360 U	670 U	710 U	NA
Acenaphthene	1400 U	1600 U	1300 U	360 U	670 U	710 U	NA
Phenol	1400 U	1600 U	1300 U	360 U	670 U	710 U	NA
2-Chlorophenol	1400 U	1600 U	1300 U	360 U	670 U	710 U	NA
Di-n-Octylphthlalate	270 J1	1600 U	1300 U	360 U	670 U	710 U	NA
2-Methylnaphthalene	1400 U	1600 U	1300 U	360 U	670 U	710 U	NA
Naphthalene	1400 U	1600 U	1300 U	360 U	670 U	710 U	NA
Pentachlorophenol	6900 U	8000 U	6500 U	1800 U	3300 U	3400 U	NA
Di-n-Butyl	1400 U	1600 U	1300 U	360 U	670 U	710 U	NA
Fluoranthrene	1400 U	1600 U	1300 U	360 U	670 U	710 U	NA
Phenanthrene	1400 U	1600 U	1300 U	360 U	670 U	710 U	NA
Anthracene	1400 U	1600 U	1300 U	360 U	670 U	710 U	NA
Benzo(a)anthracene	1400 U	1600 U	1300 U	360 U	670 U	710 U	NA
Chrysene	1400 U	1600 U	1300 U	360 U	670 U	710 U	NA
2,6-Dinitrotoluene	1400 U	1600 U	1300 U	360 U	670 U	710 U	NA

Table D-1 Summary of Phase II Soil Sampling Analytical Results (Continued)

SDG (WHC)	28		29	27	23		30
Sample No	B00ZV1	B00ZV2	B00ZV3	B00ZT2	B00ZT0	B00ZT1	B00ZX4
Sample Location	TP-4/5	TP-4/5	TP-8	TP-7	TP-1	TP-1	B5-1
Sample Depth, ft	5	12	5	5	5	9	S
PEST/PCB's, ug/kg							
Dieldrin	8.5 U	1.5 R	21 X	17 U	16 U	90 NJ2	4.3 U
Aroclor 1248	43 U	50 U	82 U	87 U	82 U	86 U	9.6 U
Aroclor 1254	85 U	30 R	330	170 U	180 U	2000 NJ2	43 U
Aroclor 1260	85 U	100 U	160 U	170 U	160 U	170 U	43 U
Endrin	8.5 U	2.4 R	33 X	17 U	16 U	120 NJ2	4.3 U
Aldrin	4.3 U	0.22 R	8.2 U	8.7 U	8.2 U	5.5 NJ2	0.3 U
4,4'-DDD	8.5 U	0.64 R	16 U	17 U	16 U	6 NJ2	4.3 U
Alpha Chlordane	43 U	50 U	13 JX	87 U	82 U	86 U	21 U
Beta-BHC	4.3 U	5 U	1.2 J	8.7 U	8.2 U	8.6 U	2.1 U
Gamma Chlordane	43 U	50 U	82 U	87 U	82 U	86 U	21 U
4,4'-DDE	8.5 U	10 U	16 U	17 U	16 U	17 U	4.3 U
Endosulfan Sulfate	8.5 U	10 U	16 U	17 U	16 U	17 U	4.3 U
Endrin Ketone	8.5 U	10 U	16 U	17 U	16 U	17 U	4.3 U
Methoxychlor	43 U	50 U	82 U	87 U	82 U	86 U	21 U
4,4'-DDT	8.5 U	6.1 R	16 U	17 U	16 U	17 U	4.3 U
Endosulfan II	8.5 U	10 U	16 U	17 U	16 U	17 U	4.3 U

Table D-1 Summary of Phase II Soil Sampling Analytical Results (Continued)

SDG (WHC)	30	31		30		31	6
Sample No	B00ZX5	B00ZX7	B00ZY0	B00ZW6	B00ZW7	B00ZX9	B00GB0
Sample Location	B5-2	B5-3	B5-3	B4-1	B4-1	B5-3	B5-3
Sample Depth, ft	1	S	1'	S	1	S	0-1
INORGANICS, ug/kg							
Aluminum	NA	NA	NA	NA	NA	NA	5430
Antimony	NA	NA	NA	NA	NA	NA	5.9 NJ
Arsenic	NA	NA	NA	NA	NA	NA	1.2 NWJ
Barium	NA	NA	NA	NA	NA	NA	73.6
Beryllium	NA	NA	NA	NA	NA	NA	0.55 B
Cadmium	NA	NA	NA	NA	NA	NA	0.62 UN
Calcium	NA	NA	NA	NA	NA	NA	5200
Chromium	NA	NA	NA	NA	NA	NA	8.7
Cobalt	NA	NA	NA	NA	NA	NA	14.4
Copper	NA	NA	NA	NA	NA	NA	16.7
Cyanide	NA	NA	NA	NA	NA	NA	2.6 U
Iron	NA	NA	NA	NA	NA	NA	25400
Lead	NA	NA	NA	NA	NA	NA	5.7
Magnesium	NA	NA	NA	NA	NA	NA	4290
Manganese	NA	NA	NA	NA	NA	NA	303 JEN
Mercury	NA	NA	NA	NA	NA	NA	0.1 U
Molybdenum	NA	NA	NA	NA	NA	NA	NA
Nickel	NA	NA	NA	NA	NA	NA	7.6 B
Potassium	NA	NA	NA	NA	NA	NA	1050
Selenium	NA	NA	NA	NA	NA	NA	0.21 U
Silver	NA	NA	NA	NA	NA	NA	0.83 U
Sodium	NA	NA	NA	NA	NA	NA	241 B
Thallium	NA	NA	NA	NA	NA	NA	NR
Titanium	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	70.3 J
Zinc	NA	NA	NA	NA	NA	NA	49.9
Zirconium	NA	NA	NA	NA	NA	NA	NA

Table D-1 Summary of Phase II Soil Sampling Analytical Results (Continued)

SDG (WHC)	30	31	30			31	6
Sample No	B00ZX5	B00ZX7	B00ZY0	B00ZW6	B00ZW7	B00ZX9	B00GB0
Sample Location	B5-2	B5-3	B5-3	B4-1	B4-1	B5-3	B5-3
Sample Depth, ft	1	S	1'	S	1	S	0-1
VOLATILE ORGANICS,ug/kg							
Methylene Chloride	NA	NA	NA	NA	NA	NA	5 U
Acetone	NA	NA	NA	NA	NA	NA	10 U
2-Butanone	NA	NA	NA	NA	NA	NA	10 U
Benzene	NA	NA	NA	NA	NA	NA	5 U
Tetrachloroethene	NA	NA	NA	NA	NA	NA	5 U
Toluene	NA	NA	NA	NA	NA	NA	3 J
SEMI VOLATILE ORG, ug/kg							
Benzoic Acid	NA	NA	NA	NA	NA	NA	3300 U
BEHP	NA	NA	NA	NA	NA	NA	680 U
Pyrene	NA	NA	NA	NA	NA	NA	680 U
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	680 U
Acenaphthene	NA	NA	NA	NA	NA	NA	680 UJ
Phenol	NA	NA	NA	NA	NA	NA	680 U
2-Chlorophenol	NA	NA	NA	NA	NA	NA	680 U
Di-n-Octylphthlalate	NA	NA	NA	NA	NA	NA	680 UJ
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	680 U
Naphthalene	NA	NA	NA	NA	NA	NA	680 U
Pentachlorophenol	NA	NA	NA	NA	NA	NA	3300 U
Di-n-Butyl	NA	NA	NA	NA	NA	NA	680 U
Fluoranthrene	NA	NA	NA	NA	NA	NA	680 U
Phenanthrene	NA	NA	NA	NA	NA	NA	680 U
Anthracene	NA	NA	NA	NA	NA	NA	680 U
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	680 U
Chrysene	NA	NA	NA	NA	NA	NA	680 UJ
2,6-Dinitrotoluene	NA	NA	NA	NA	NA	NA	680 UJ

Table D-1 Summary of Phase II Soil Sampling Analytical Results (Continued)

SDG (WHC)	30	31		30		31	6
Sample No	B00ZX5	B00ZX7	B00ZY0	B00ZW6	B00ZW7	B00ZX9	B00GB0
Sample Location	B5-2	B5-3	B5-3	B4-1	B4-1	B5-3	B5-3
Sample Depth, ft	1	S	1'	S	1	S	0-1
PEST/PCB's, ug/kg							
Dieldrin	4.2 U	4.3 U	4.3 U	5.3 U	72 J4	4.2 U	NA
Aroclor 1248	14 U	22 U	21 U	26 U	23 U	21 U	NA
Aroclor 1254	42 U	43 U	42 U	53 U	45 U	42 U	NA
Aroclor 1260	42 U	43 U	42 U	53 U	45 U	42 U	NA
Endrin	4.2 U	4.3 U	4.3 U	5.3 U	4.5 U	4.2 U	NA
Aldrin	2.1 U	2.2 U	2.1 U	8.6 U	11 U	2.1 U	NA
4,4'-DDD	4.2 U	4.3 U	4.3 U	5.3 U	4.5 U	4.2 U	NA
Alpha Chlordane	0.75 U	22 U	21 U	4.3 U	5.8 U	21 U	NA
Beta-BHC	2.1 U	2.2 U	2.1 U	2.6 U	2.3 U	2.1 U	NA
Gamma Chlordane	2.5 J	22 U	21 U	13 U	21 U	21 U	NA
4,4'-DDE	4.2 U	4.3 U	4.3 U	75 J4	98 J4	0.32 U	NA
Endosulfan Sulfate	4.2 U	4.3 U	4.3 U	19 J4	4.5 U	4.2 U	NA
Endrin Ketone	4.2 U	4.3 U	4.3 U	13 U	4.5 U	4.2 U	NA
Methoxychlor	21 U	22 U	21 U	26 U	23 U	21 U	NA
4,4'-DDT	3.8 U	4.3 U	4.3 U	130 J4	240 J4	1 U	NA
Endosulfan II	4.2 U	4.3 U	4.3 U	5.3 U	4.5 U	4.2 U	NA

Table D-1 Summary of Phase II Soil Sampling Analytical Results (Continued)

SDG (WHC)	6						
Sample No	B00GB1	B00GB2	B00GB3	B00GB4	B00GB5	B00GB7	B00G92
Sample Location	B5-3	B5-2	B5-2	B4-1	B4-1	B4-1	PCB-1
Sample Depth, ft	1-2	0-1	1-2	0-1	0-1	1-2	0-1
INORGANICS, ug/kg							
Aluminum	5900	5750	4260	14200	15800	8170	NA
Antimony	5 UJN	5 UJN	5 UJN	6.5 UJN	15.6 NJ	6.8 NJ	NA
Arsenic	1.2 NWJ	0.86 NWJ	0.76 NWJ	1.8 NWJ	1.8 NWJ	1.2 NWJ	NA
Barium	65	93.7	68.7	426	427	206	NA
Beryllium	0.48 B	0.42 B	0.42 B	1 B	1.1 B	0.77 B	NA
Cadmium	0.62 UN	0.62 UN	0.62 UN	0.81 UN	0.82 UN	0.65 UN	NA
Calcium	5050	6820	5880	46600	42900	18100	NA
Chromium	5.4 U	7.3	4.2 U	12.5	12.9	6.9	NA
Cobalt	14.8	15.9	15.4	5.9 B	6.7 B	11.3	NA
Copper	16.7	15.4	15.6	31.5	25.3	17.8	NA
Cyanide	2.6 U	2.6 U	2.6 U	3.4 U	3.4 U	2.7 U	NA
Iron	28900	27100	28700	16400	18000	23200	NA
Lead	5.3	9.1	5	41	36.3	10.3	NA
Magnesium	4770	4770	4180	6380	6340	5430	NA
Manganese	343 JEN	336 JEN	324 JEN	131 JEN	153 JEN	246 JEN	NA
Mercury	0.1 U	0.1 U	0.1 U	0.15	0.14 U	0.11 U	NA
Molybdenum	NA	NA	NA	NA	NA	NA	NA
Nickel	6.3 B	10.5	8 B	6.4 B	7.4 B	4.6 B	NA
Potassium	791 B	1380	1140	954 B	1010 B	661 B	NA
Selenium	0.21 U	0.21 U	0.21 U	0.97 WJ	0.79 WJ	0.35 WJ	NA
Silver	0.83 U	0.83 U	0.83 U	1.1 U	1.1 U	0.87 U	NA
Sodium	277 B	378 B	258 B	4240	4450	1790	NA
Thallium	NR	NR	NR	NR	NR	NR	NA
Titanium	NA	NA	NA	NA	NA	NA	NA
Vanadium	75.7 J	76.8 J	79.1 J	27.5 J	30.5 J	59.1 J	NA
Zinc	54.7	63.2	52	47.4	44.2	45.3	NA
Zirconium	NA	NA	NA	NA	NA	NA	NA

Table D-1 Summary of Phase II Soil Sampling Analytical Results (Continued)

SDG (WHC)	6						
Sample No	B00GB1	B00GB2	B00GB3	B00GB4	B00GB5	B00GB7	B00G92
Sample Location	B5-3	B5-2	B5-2	B4-1	B4-1	B4-1	PCB-1
Sample Depth, ft	1-2	0-1	1-2	0-1	0-1	1-2	0-1
VOLATILE ORGANICS,ug/kg							
Methylene Chloride	5 U	5 U	5 U	2 J	7 U	6 U	NA
Acetone	10 U	10 U	10 U	14 U	14 U	12 U	NA
2-Butanone	10 U	10 U	10 U	35	20	18	NA
Benzene	5 U	5 U	5 U	7 U	7 U	6 U	NA
Tetrachloroethene	5 U	5 U	5 U	7 U	7 U	6 U	NA
Toluene	5 U	5 U	1 J	8	5 J	9	NA
SEMI VOLATILE ORG, ug/kg							
Benzoic Acid	3300 U	3300 U	3300 U	4400 U	4400 U	3800 U	NA
BEHP	690 UJ	680 UJ	680 UJ	1100 UJ	1100 UJ	790 UJ	NA
Pyrene	690 U	680 U	680 U	83 J	100 J	88 J	NA
1,2,4-Trichlorobenzene	690 U	680 U	680 U	900 UJ	900 UJ	790 U	NA
Acenaphthene	690 U	680 U	680 U	900 U	900 U	790 U	NA
Phenol	690 UJ	680 UJ	680 UJ	900 UJ	900 UJ	790 UJ	NA
2-Chlorophenol	690 U	680 U	680 U	680 U	900 U	790 UJ	NA
Di-n-Octylphthlalate	690 UJ	680 UJ	680 UJ	900 UJ	900 UJ	790 UJ	NA
2-Methylnaphthalene	690 U	680 U	680 U	400 J	390 J	180 J	NA
Naphthalene	690 U	680 U	680 U	150 J	150 J	790 U	NA
Pentachlorophenol	3300 U	3300 U	3300 U	980 J	620 J	380 U	NA
Di-n-Butyl	690 U	680 U	680 U	65 J	900 UJ	790 UJ	NA
Fluoranthrene	690 U	680 U	680 U	93 J	120 J	62 J	NA
Phenanthrene	690 U	680 U	680 U	900 UJ	250 J	380 J	NA
Anthracene	690 U	680 U	680 U	900 UJ	70 J	790 UJ	NA
Benzo(a)anthracene	690 U	680 U	680 U	900 UJ	93 J	790 UJ	NA
Chrysene	690 UJ	680 UJ	680 UJ	900 UJ	110 J	790 UJ	NA
2,6-Dinitrotoluene	690 UJ	680 UJ	680 UJ	900 UJ	900 UJ	210 J	NA

Table D-1 Summary of Phase II Soil Sampling Analytical Results(Continued)

SDG (WHC)	6						
Sample No	B00GB1	B00GB2	B00GB3	B00GB4	B00GB5	B00GB7	B00G92
Sample Location	B5-3	B5-2	B5-2	B4-1	B4-1	B4-1	PCB-1
Sample Depth, ft	1-2	0-1	1-2	0-1	0-1	1-2	0-1
PEST/PCB's, ug/kg							
Dieldrin	NA	NA	NA	NA	NA	NA	33 U
Aroclor 1248	NA	NA	NA	NA	NA	NA	49000 DJ
Aroclor 1254	NA	NA	NA	NA	NA	NA	330 UJ
Aroclor 1260	NA	NA	NA	NA	NA	NA	330 UJ
Endrin	NA	NA	NA	NA	NA	NA	33 U
Aldrin	NA	NA	NA	NA	NA	NA	16 U
4,4'-DDD	NA	NA	NA	NA	NA	NA	33 U
Alpha Chlordane	NA	NA	NA	NA	NA	NA	160 U
Beta-BHC	NA	NA	NA	NA	NA	NA	16 U
Gamma Chlordane	NA	NA	NA	NA	NA	NA	160 U
4,4'-DDE	NA	NA	NA	NA	NA	NA	33 U
Endosulfan Sulfate	NA	NA	NA	NA	NA	NA	33 U
Endrin Ketone	NA	NA	NA	NA	NA	NA	33 U
Methoxychlor	NA	NA	NA	NA	NA	NA	160 U
4,4'-DDT	NA	NA	NA	NA	NA	NA	33 U
Endosulfan II	NA	NA	NA	NA	NA	NA	33 U

Table D-1 Summary of Phase II Soil Sampling Analytical Results (Continued)

SDG (WHC)	6						
Sample No	B00G93	B00G94	B00G95	B00G96	B00G97	B00G98	B00G99
Sample Location	PCB-1	PCB-2	PCB-2	PCB-3	PCB-3	PCB-4	PCB-4
Sample Depth, ft	1-2	0-1	1-2	0-1	1-2	0-1	1-2
PEST/PCB's, ug/kg							
Dieldrin	33 U	33 U	33 U	33 U	33 U	33 U	33 U
Aroclor 1248	41000 DJ	80000 DJ	100000 DJ	6100 J	15000 DJ	21000 DJ	1500 J
Aroclor 1254	330 UJ	330 UJ	330 UJ	330 UJ	330 UJ	330 UJ	330 UJ
Aroclor 1260	330 UJ	330 UJ	330 UJ	330 UJ	330 UJ	330 UJ	330 UJ
Endrin	33 U	33 U	33 U	33 U	33 U	33 U	33 U
Aldrin	16 UJ	16 UJ	16 UJ	16 UJ	16 UJ	16 UJ	16 UJ
4,4'-DDD	33 U	33 U	33 U	33 U	33 U	33 U	33 U
Alpha Chlordane	160 U	160 U	160 U	160 U	160 U	160 U	160 U
Beta-BHC	16 U	16 U	16 U	16 U	16 U	16 U	16 U
Gamma Chlordane	160 U	160 U	160 U	160 U	160 U	160 U	160 U
4,4'-DDE	33 U	33 U	33 U	33 U	33 U	33 U	33 U
Endosulfan Sulfate	33 U	33 U	33 U	33 U	33 U	33 U	33 U
Endrin Ketone	33 U	33 U	33 U	33 U	33 U	33 U	33 UJ
Methoxychlor	160 U	160 U	160 U	160 U	160 U	160 U	18 J
4,4'-DDT	33 U	33 U	33 U	33 U	33 U	33 U	33 U
Endosulfan II	33 U	33 U	33 U	33 U	33 U	33 U	33 UJ

Table D-1 Summary of Phase II Soil Sampling Analytical Results (Continued)

SDG (WHC)	30						
Sample No	B00ZV4	B00ZV5	B00ZV6	B00ZV7	B00ZV8	B00ZV9	B00ZX6
Sample Location	PCB-2A	PCB-2A	PCB-3A	PCB-3A	PCB-3A	PCB-4A	PCB-2A
Sample Depth, ft	1	1.5	S	1	20"	S	1.5
PEST/PCB's, ug/kg							
Dieldrin	240 NJ2	410 NJ2	100 NJ2	770 NJ2	250 NJ2	4.1 U	4.2 U
Aroclor 1248	8500 J4	12000 J4	3500 J4	23000 J4	9700 J4	16000 J4	2300 J4
Aroclor 1254	42 U	42 U	41 U	42 U	42 U	41 U	42 U
Aroclor 1260	42 U	42 U	41 U	42 U	42 U	41 U	42 U
Endrin	61 NJ2	100 NJ2	28 NJ2	200 NJ2	61 NJ2	110 NJ2	39 NJ2
Aldrin	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 NJ2
4,4'-DDD	4.2 U	4.2 U	4.1 U	4.2 U	4.2 U	4.1 U	4.2 U
Alpha Chlordane	170 NJ2	280 NJ2	74 NJ2	520 NJ2	180 NJ2	290 NJ2	96 NJ2
Beta-BHC	13 NJ2	22 NJ2	2.1 U	2.1 U	2.1 U	2.1 U	5.5 NJ2
Gamma Chlordane	21 U	21 U	21 U	21 U	21 U	21 U	21 U
4,4'-DDE	4.2 U	4.2 U	4.1 U	4.2 U	4.2 U	4.1 U	4.2 U
Endosulfan Sulfate	4.2 U	4.2 U	4.1 U	4.2 U	4.2 U	4.1 U	4.2 U
Endrin Ketone	28 NJ2	45 NJ2	4.1 U	93 NJ2	23 NJ2	48 NJ2	14 U
Methoxychlor	28 NJ2	46 J4	9.7 J4	95 J4	21 U	48 NJ2	15 U
4,4'-DDT	120 NJ2	200 NJ2	4.1 U	4.2 U	120 NJ2	210 NJ2	4.2 U
Endosulfan II	20 NJ2	36 NJ2	9.6 NJ2	4.2 U	4.2 U	4.1 U	4.2 U

Table D – 1 Summary of Phase II Soil Sampling Analytical Results (Continued)

SDG (WHC)	30				
Sample No	B00ZW1	B00ZW2	B00ZW3	B00ZW4	B00ZW5
Sample Location	PCB–4A	PCB–4A	PCB–1A	PCB–1A	PCB–1A
Sample Depth, ft	S	1	S	1	1.5
PEST/PCB's, ug/kg					
Dieldrin	1100 NJ2	1200 NJ2	620 NJ2	820 NJ2	1200 NJ2
Aroclor 1248	36000 J4	39000 J4	20000 J4	29000 J4	43000 J4
Aroclor 1254	42 U	41 U	41 U	41 U	41 U
Aroclor 1260	42 U	41 U	41 U	41 U	41 U
Endrin	240 NJ2	270 NJ2	150 NJ2	180 NJ2	280 NJ2
Aldrin	2.1 U	2.1 U	2 U	2 U	2 NJ2
4,4'–DDD	4.2 U	4.1 U	4.1 U	4.1 U	4.1 U
Alpha Chlordane	680 NJ2	770 NJ2	410 NJ2	540 NJ2	780 NJ2
Beta–BHC	2.1 U	75 NJ2	24 NJ2	50 NJ2	94 NJ2
Gamma Chlordane	21 U	21 U	20 U	20 U	20 U
4,4'–DDE	4.2 U	4.1 U	4.1 U	4.1 U	4.1 U
Endosulfan Sulfate	4.2 U	4.1 U	4.1 U	4.1 U	4.1 U
Endrin Ketone	120 NJ2	140 NJ2	67 NJ2	82 NJ2	140 NJ2
Methoxychlor	120 NJ2	140 NJ2	66 NJ2	81 NJ2	140 NJ2
4,4'–DDT	520 NJ2	4.1 U	4.1 U	4.1 U	4.1 U
Endosulfan II	98 NJ2	110 NJ2	55 NJ2	66 NJ2	110 NJ2

Table D – 1 Summary of Phase II Soil Sampling Analytical Results(Continued)

SDG (WHC)	B00G51						
Sample No	B00G76	B00G51	B00G52	B00G53	B00G54	B00G77	B00G56
Sample Location	E1	E2	E3	E4	E4	E5	E6
Sample Depth, ft	S	S	S	S	S	S	S
PEST/PCB's, ug/kg							
Dieldrin	34 U	34 U	35 U	33 U	34 U	35 U	38 U
Aroclor 1248	170 U	170 U	180 U	170 U	170 U	180 U	190 U
Aroclor 1254	340 U	340 U	350 U	330 U	340 U	350 U	190 U
Aroclor 1260	340 U	42000	11000 XJ	330 U	340 U	350 U	380 U
Endrin	34 U	34 U	35 U	33 U	34 U	35 U	38 U
Aldrin	17 U	17 U	18 U	17 U	17 U	18 U	19 U
4,4'–DDD	34 U	34 U	35 U	33 U	34 U	35 U	38 U
Alpha Chlordane	1100	340	280	210	290	960 XJ	710
Beta–BHC	17 U	17 U	18 U	17 U	17 U	18 U	19 U
Gamma Chlordane	1700	610 XJ	420	330	440	1600 XJ	1000
4,4'–DDE	34 U	34 U	35 U	33 U	34 U	35 U	38 U
Endosulfan Sulfate	34 U	34 U	35 U	33 U	34 U	35 U	38 U
Endrin Ketone	34 U	34 U	35 U	33 U	34 U	35 U	38 U
Methoxychlor	170 U	170 U	180 U	170 U	170 U	180 U	190 U
4,4'–DDT	34 U	34 U	35 U	33 U	34 U	35 U	38 U
Endosulfan II	34 U	34 U	35 U	33 U	34 U	35 U	38 U

Values associated with U qualifier are the SQL
NA indicates analysis not performed or not available
SDG = Sample Delivery Group
WHC = Westinghouse Hanford Company

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DEPARTMENT OF THE ARMY
NORTH PACIFIC DIVISION MATERIALS LABORATORY
CORPS OF ENGINEERS
1491 N.W. GRAHAM AVENUE
TROUTDALE, OREGON 97060-9503

CENPD-PE-GT-L (1110-1-8100c) 5 Aug 92

MEMORANDUM FOR: Commander, Walla Walla District, ATTN: CENPW-PL-ER (McBane)

SUBJECT: W.O. 92-M-239, Results of Chemical Analyses

Project: HORN RAPIDS LANDFILL
Intended Use: Evaluate site
Source of Material: Reference Chain of Custody Records
Submitted by: CENPW-PL-ER
Date Sampled: 23 Oct 91 Date Received: 9 Jul 92
Methods of Test: Reference Enclosure 1
Reference: DD Form 448 currently being processed

1. Enclosed are results of two solids samples which were submitted to evaluate and confirm their suspected identity. Included are:

a. Enclosure 1, Report number 9158 from ARDL, Inc.

b. Enclosure 2, Chain of Custody and Cooler Receipt forms.

2. If you have any questions or comments regarding this report, please contact Dr. Ajmal Ilias at (503) 665-4166.

3. This completes all work requested to date.

TB

Enclosures

TIMOTHY J. SEEMAN
Director

seeman

ilias

Copy Furnished: CENPD-PE-GT
\W.O. 92-M-239
Review File
Reading File

MFR: Self explanatory. Complete copy in office files.

7312317.4

ARDL REPORT 9158
CORPS OF ENGINEERS - PORTLAND DISTRICT
HORN RAPIDS SITE

DATE SUBMITTED: 7/09/92

A R D L, Inc.

CHEMISTRY — BIOLOGY — PHYSIOLOGY — ENGINEERING
ENVIRONMENTAL ANALYSIS

P. O. BOX 1566
1001 FOREST STREET
MT. VERNON, ILLINOIS 62864
TELEPHONE (618) 244-3236

ARDL Inc. applied research & development laboratory

CHEMISTRY • BIOLOGY • PHYSIOLOGY
ENGINEERING • ENVIRONMENTAL ANALYSIS

TO: Pam Swan, CENPD

FROM: R. L. Curtin, ARDL

DATE: 7/15/92

SUBJECT: Analytical Results
COE Samples HRL3A03 and HRL3A05
Horn Rapids Site

93123207 46

INTRODUCTION

Two solid samples identified as noted above were received from CENPD. This laboratory was requested to evaluate the materials and confirm their suspected identity.

METHODS AND RESULTS

Sample HRL3A03 (ARDL 9158-1)

CENPD suspected that this sample was sodium bisulfate ($NaHSO_4$). Sodium bisulfate is water soluble (28.6 g/100 ml) and its solutions are acidic (pH 1.4 at 0.1 molar).

A quantity of the sample (25.8 g, as is) was dissolved in 100 ml of reagent water. The sample was incompletely soluble and the pH of the preparation was 0.3.

The preparation was filtered and the filtrate evaluated for sodium and sulfate concentration using Methods 7770 and 6010 for sodium and Method 9038 for sulfate. Based on sodium content, the sample contains 32% (w/w) sodium bisulfate. Based on sulfate content, the sample contains 42% sodium bisulfate.

The results observed suggest the following:

1) the sample contains approximately one-third sodium bisulfate; and

2) some free acid (probably sulfuric acid) is present.

P.O. Box 1566 • 1801 W. Forest Street • Mt. Vernon, Illinois 62864 • (618) 244-3235
"Test Everything - Keep The Good" 1 Thes. 5.21

Sample HRL3A05 (ARDL 9158-2)

CENPD suspected that the sample was potassium permanganate.

Potassium permanganate is a strong oxidant which is water soluble (6.4 g/100 ml). Its aqueous solutions are neutral and are characteristically purple in color.

Aqueous solutions of the sample were neutral and were the expected color. The material was incompletely soluble, however, and the depth of color observed suggested that permanganate was not a major constituent of the sample.

The solutions were evaluated for potassium and manganese concentration using Methods 7610 and 6010 for potassium and Methods 7460 and 6010 for manganese. The results obtained indicated that the permanganate concentration in the sample was considerably lower than expected.

Confirmation of these initial values was attempted by standardizing an aqueous solution of the sample against a sodium oxalate standard as described in Method 3500-Ca E (Standard Methods, 17th Edition). The results obtained indicated that, calculated as potassium permanganate, the oxidants present in the sample exceeded sample weight by a factor of approximately 4.

To resolve the contradictory results obtained, a weighed quantity of sample (100 g) was suspended in a known volume of water. After prolonged stirring, the preparation was filtered. The insolubles were recovered quantitatively (98.15%). The insolubles in the sample taken consisted of a considerable quantity of small pebbles and other soil constituents.

The filtrate was scanned over the visible range using a spectrophotometer. The scan obtained was compared with an aqueous solution of ACS grade potassium permanganate after diluting aliquots of the preparations so that their color intensities were approximately equivalent. Photocopies of the spectra obtained are attached. Similarities in the spectra conclusively show that the sample contains potassium permanganate. The spectra also show that another component (not identified) is also present in the sample.

A standard curve was prepared using aqueous solutions of reagent grade potassium permanganate of known concentration. A straight line with a correlation coefficient of 1.000 was obtained. The concentration of potassium permanganate in the sample extract described above was determined using this curve at 544.2 nm where it appeared that interference from other constituents would be minimal.

The results obtained indicate that the water soluble fraction of the sample contains 8.2% potassium permanganate.

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U.S. Army Corps of Engineers

Chain of Custody Record
(ER 1110-1-263)

Proj. No.: 1100-EM-1

Project Name: Horn Rapids Landfill Trenching

Sampler: (Signature) James A McBane

Date	Time	Pres.	Grab	Comp	Site Code/Sample Number	Number of Containers	Confirm compound, Sodium Bisulphate	Confirm Compound, Potassium Permanganate						Remarks:
10/23/91	1415		X		HRL3AØ3	1 baggie	X							See notes
10/23/91	1445		X		HRL 3AØ5	1 baggie		X						See notes

① Original chain-of-custody broken months ago.

② Samples kept at room temperature over period of 8 months; no special preservation techniques taken.

③ Should either sample fail the confirmation for the listed compound, please perform whatever testing is required to identify the substance.

④ 7-day turnaround time requested

Sampler Relinquished by:	Date/Time	Received by: (Sig.)	Date/Time	Hazards Associated with Samples
J McBane	6/29/92 1300	Lisa Snyder	6/30/92 1000	Unknown - cleared for radiation @ Hanford Site.
Relinquished by: (Sig.) Lisa Snyder	Date/Time 6/30/92 1500	Received by: (Sig.)	Date/Time	
Relinquished by: (Sig)	Date/Time	Received for Laboratory by: (Sig.) Donna Coldrum	Date/Time 07/01/92 0945	Remarks at time of receipt:
Custody Seal No.		Lab case No.: 9158		

ENG Form 5021-R, Oct 90

Proponent: CEMP-RT

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APPENDIX E

SUMMARY OF PHASE II GROUNDWATER ANALYTICAL RESULTS

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1.0 INTRODUCTION

This report summarizes six 1100-EM-1 operable unit groundwater monitoring events as follows:

Round 5 - 3/91	Round 7 - 8/91	Round 8 - 11/91
Round 6 - 6/91	Round 7.5 - 9/91	Round 9 - 3/92

The report summarizes all available groundwater chemical analytical results for the 1100-EM-1 area for rounds 5 through 9. The complete chemical analytical results are presented in tables E-1 through E-6 of this appendix following the written summary.

Groundwater samples were analyzed for primary and relevant secondary drinking water, Washington Administrative Code (WAC) 173-304, RCRA groundwater monitoring parameters, general chemistry parameters, Contract Laboratory Program (CLP) Target Compound List (TCL) parameters, CLP Target Analyte List (TAL) parameters, coliform bacteria, and radiochemical parameters. The results have been broken down into the categories of volatile organics, semivolatile organics, pesticides, metals, wet chemistry, radioactive isotopes, and coliform bacteria for ease of comparison. WHC Office of Sample Management provided validated results for Round 5 and partially validated results for sampling Round 6. The remaining analytical data was validated by the USACE using current EPA CLP guidelines.

Groundwater samples were obtained according to the Operable Unit Groundwater Sampling Schedule, table 4-1, from the Remedial Investigation (RI) Phase II Supplemental Work Plan for the Hanford Site 1100-EM-1 Operable Unit (DOE/RL-90-37).

2.0 GROUNDWATER CONTAMINATION

Groundwater data is tabulated according to monitoring well number, well identification tag, round number, and sample identifier. Upper tolerance limits (UTL's) are presented for ease of comparison.

2.1 VOLATILE ORGANICS

All data units for volatile organics are given in micrograms per liter(μg/l) unless specified otherwise. Monitoring well numbers 1, 3, 4, 9, 19, and S30-15A show no analyte compounds detected above the sample quantitation limit in Rounds 5 through 9.

Monitoring well numbers 6, 8, 10, 11, 13, 14, 15, 20, 21, S29-E12, and S32-E13A were found to contain the following positively identified and quantified analytes pertinent to quantitative risk assessment. Only values that exceeded site UTL's are noted in this summary, for complete information consult the attached tables. Compounds with the qualifier "D" were identified in an analysis at a secondary dilution factor.

Positively Identified and Quantified Analytes

Monitoring Well	Analytes
6	acetone and chloroform
8	1,1,1-trichloroethane
10(Sample B06196)	1,1,1-trichloroethane
11	acetone, trichloroethene, and 1,1,1-trichloroethane
12	trichloroethene(D)
13	methylene chloride and trichloroethane
14	trichloroethene
15	trichloroethene(D)
20	acetone, trichloroethene, and 1,1,1-trichloroethane
21	acetone
S29-E12	acetone
S32-E13A	acetone

Monitoring well numbers 5, 6, 7, 8/8A, 10, 11, 13, 14, 15, 17, 18, 20, 21, 22, and S30-15A were found to contain the following compounds. It should be noted that these compounds are listed with a "J" qualifier indicating that they are estimated values. They meet identification criteria but their concentration falls below the lowest concentration used in the calibration curve, yet is greater than zero. While their identity is known their concentration should be considered uncertain. A "B" qualifier(organics only) is associated with some listed compounds indicating that the analyte was also found in the blank, which should be interpreted as meaning that the concentration of the compound is suspect.

Identified Analytes

Monitoring Well	Analytes
5	1,1,1-trichloroethane
6	tetrachloroethane and acetone
7	acetone and C12 hydrocarbons
8/8A	acetone
10	1,1,1-trichloroethane and trichloroethene
11	trichloroethene
13	1,1,1-trichloroethane and
14	1,1,1-trichloroethane and trichloroethene
15	acetone(B)
17	tetrachloroethane and C12 hydrocarbons
18	acetone(B), chloroform, and tetrachloroethane
20	trichloroethene
21	acetone(B)
22	1,1,1-trichloroethane
S30-15A	chloroform

2.2 SEMIVOLATILE ORGANICS

All data units for semivolatile organics are given in micrograms per liter(μg/l) unless specified otherwise. Monitoring well numbers 1, 2, 3, 4, 6, 7, 8/8A, 9, 10, 11, 12, 14, 15, 17, 18, 19, 20, 21, 22, S30-15A, and S32-E13A show no analyte compounds detected above the sample quantitation limit in Rounds 5 through 9.

Monitoring well numbers 5, 13, and S29-E12 were found to contain the following positively identified and quantified analytes pertinent to quantitative risk assessment.

Positively Identified and Quantified Analytes

Monitoring Well	Analytes
5	diethylphathalate
13	diethylphathalate
S29-E12	diethylphathalate

2.3 PESTICIDE ORGANICS

All data units for pesticide organics are given in micrograms per liter(μg/l) unless specified otherwise. Monitoring well numbers 1, 2, 3, 4, 5, 6, 7, 8/8A, 9, 10, 11, 12, 13, 14, 15, 17, 22, S29-E12, S30-15A, and S32-E13A show no analyte compounds detected above the sample quantitation limit in Rounds 5 through 9.

In monitoring well numbers 18, 19, 20, and 21, the following analytes were identified. It should be noted that these compounds are listed with a "J" qualifier indicating that they are estimated values. They meet the identification criteria but their concentration falls below the lowest concentration used in the calibration curve, yet is greater than zero. While their identity is known their concentration may be uncertain.

Identified Analytes

Monitoring Well	Analytes
18	Aroclor-1260
19	Aroclor-1260
20	Aroclor-1260
21	Aroclor-1260

2.4 METALS AND CYANIDE

All data units for metals/cyanide are given in micrograms per liter(μg/l) unless specified otherwise. Only analytes that were positively identified and quantified that are above site UTL's are listed. In monitoring well numbers 1 through 15, 17 through 22, S29-E12, S30-15A, and S32-E13A, the following analytes were positively identified and quantified.

Positively Identified and Quantified Analytes

Monitoring Well	Compounds
1	Cu, Cr, Ni, K, Ca, Mg
2	Cr
3	Cr, Ni, K, Ca, Cu, Cr, Fe, Mg, Na
4	Cr
5	Ca, K, Zn
6	Cr, Cu
7	Cr, Zn
8	Cr, Cu, Zn
9	Cr, Zn
10	Ba, Ca, Cr, K, Na, Zn
11	Ba, Ca, Cr, Mg, K, Na, Zn
12	Ba, Ca, Mg, K, Na
13	Ca, Cr, Mg, K, Na
14	Ba, Ca, Mg, K, Na
15	Ba, Ca, Cr, K
17	Al, Cr, Ni
18	Al, Cr, Cu, Fe, Zn
19	Cr, Cu, Zn
20	Al, Ba, Ca, Cr, Cu, Fe, K, Na, Zn
21	Cr, Cu, Zn
22	Cr, Cu, K
S29-E12	Zn
S30-15A	Ca, Zn
S32-E13A	Ca, Mg, K, Zn

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In monitoring well numbers 1 through 15, 17 through 22, S29-E12, S30-15A, and S32-E13A, the following analytes were identified. The qualifiers for inorganic data are defined differently, thus the definitions for the qualifiers presented below have been included here for ease of interpretation. A "B" qualifier (inorganic compounds only) means that the reported value is less than the contract required detection limit (CRDL) but greater than the instrument detection limit (IDL).

An "*" qualifier means that duplicate analysis was not within control limits. The identity of the analyte is certain but the concentration is uncertain.

A "U" qualifier means that the compound was analyzed for but not detected.

A "W" qualifier means the post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is < 50 percent of spike absorbance. Therefore, the concentration is uncertain.

An "N" qualifier means that the spiked sample recovery was not within control limits making the analytes concentration uncertain.

Identified Analytes

Monitoring Well	Analytes
1	Ba(B), Cu(B), Tl(UW),Zn(B)
2	Sb(B), Be(B), Ni(B),
3	Sb(B), Ba(B), Ca(*), Mg(*), Ni(B), Na(*), Tl(UW), Zn(B), Cu(B)
4	Ba(B), Cr(B)
5	Al(B), Sb(B), Ba(B), Be(B), Cd(B), Cr(B & *), Cu(B), Ni(B), Zn(B)
6	As(BW), Cu(B), Cr(B & B*), Sb(B)
7	Be(B), Zn(B), Cr(B*), Cu(B)
8	Al(B), Ba(B), Be(B), Cr(*), Cu(B)
9	Ba(B), Cd(B), Cu(B)
10	Ba(B), Sb(B), Ni(B)
11	Al(B), Sb(B), Ba(B)
12	Sb(B), Ba(B), Cr(B), Cu(B)
13	Sb(B), Ba(B), Zn(B)
14	Sb(B), Ba(B)
15	Sb(B), Ba(B), Ca(B), Cr(B), Cu(B), Mg(B), Na(B), Zn(B)
17	Cu(B)
18	Al(B), Cr(B), Cu(B), Mg(B), Ni(B), Zn(B)
19	Al(B), Cu(B), Zn(B)
20	Ba(B), Be(B), Cr(B), Cu(B), Ni(B), Zn(B)
21	Be(B), Cd(B), Cu(B), Ni(B), Zn(B)
22	Cu(B), Zn(B)
S29-E12	Sb(B)
S30-15A	Ba(B)
S32-E13A	Sb(B)

2.5 WET CHEMISTRY

Data units vary more for wet chemistry, but is milligrams per liter(mg/l) unless specified otherwise, see tables data for details. In monitoring well numbers 1 through 3, 7 through 15, 17 through 22, S29-E12, S30-E15A, and S32-E13A, the following analytes were positively identified and quantified and found to be above site UTL's, except for nitrates, which have no site UTL.

Positively Identified and Quantified Analytes

Monitoring Well	Analytes
1	nitrates(no UTL) and alkalinity
2	nitrates(no UTL), fluoride, and sulfate
3	alkalinity, chloride, and sulfate
7	fluoride and chloride
8	TDS, sulfate, and fluoride
10	nitrates(no UTL), sulfate, fluoride, TDS, and chloride
11	nitrates(no UTL), fluoride, nitrite, sulfate, and TDS
12	nitrates(no UTL), sulfate, and TDS
13	nitrates(no UTL), sulfates, TDS, and fluoride
14	nitrates(no UTL), fluoride, sulfate, and TDS
15	nitrates(no UTL), fluoride, sulfate, and TDS
17	nitrate, fluoride
18	nitrates(no UTL), sulfate, TDS, and pH
19	fluoride
20	fluoride, sulfate, and TDS
21	fluoride and phosphate
22	fluoride and ammonia
S29-E12	fluoride
S30-E15A	alkalinity
S32-E13A	alkalinity

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2.6 RADIOACTIVE ISOTOPES

All data units are picoCurie per liter(pCi/l). In monitoring well numbers 2, 4 through 9, 17 through 19, 21 through 22, S29-E12, S30-15A, and S3213A, no α or β radiation was detected above the UTL's. The remaining wells, shown below, have α and β levels above the UTL's.

Wells with Radiation Levels Above UTL's

Well Number	Radiation
1	α and β
3	β
10	β
11	α and β
12	β
13	β
14	α and β
15	β
20	β

2.7 COLIFORM BACTERIA

Analytical tests for coliform bacteria were negative.

3.0 DATA QUALIFIER KEY FOR GROUNDWATER LABORATORY DATA[1]

3.1 ORGANICS

U - The analyte was analyzed for and is not detected above the given value.

J - The analyte was analyzed for and was positively identified, but the given numerical value may not be consistent with the amount actually present in the environmental sample.

R - Quality control indicates that the data are unusable. Re-sampling and/or re-analysis is necessary for verification.

Q - No analytical result.

N - Presumptive evidence of presence of material(tentative identification).

C - Pesticide results were confirmed by GC/MS.

[1] Source: Risk Assessment Guidance for Superfund, EPA, 540/1-89/0002

B - Analyte found in associated blank as well as in sample.

E - Concentration exceeds calibration range of GC/MS instrument.

D - Compound identified in and analysis at a secondary dilution factor.

A - The TIC is a suspected aldol condensation product.

X - Additional flags defined separately.

3.2 INORGANICS

U - The analyte was analyzed for and is not detected above the given value.

J - The analyte was analyzed for and was positively identified, but the given numerical value may not be consistent with the amount actually present in the environmental sample.

R - Quality control indicates that the data are unusable. Re-sampling and/or re-analysis is necessary for verification.

Z - No analytical result.

B - Reported value is less than the contract required detection limit(CRDL), but greater than the instrument detection limit(IDL).

E - Value is estimated due to matrix interferences.

M - Duplicate infection precision criteria not met.

N - Spiked sample recovery not within control limits.

S - Reported value was determined by the Method of Standard Additions(MSA).

W - Post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is $<50\%$ of spike absorbance.

* - Duplicate analysis was not within control limits.

+ - Correlation coefficient for MSA was <0.995.

3.3 RADIOACTIVE ISOTOPES

- - = Sample not taken or data not requested
* = Below error limit (for round 5)
LT = Less Than

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7 5 1 2 3 5 3 2 1 7 6 2

0 0 0 1 3 1 2 3 0 2 0 7 5 3

TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data

MONITORING WELL		1	1	1	1	1	1	2	2	2	2	3	3	3	3
Well ID	SITE UTL?	841-E11	841-E11	841-E11	841-E11	841-E11	841-E11	834-E10	834-E10	834-E10	834-E10	841-E12	841-E12	841-E12	841-E12
ROUND	UDL	6	7	7.5	8	8	9	6	7	7.5	8	8	7	7.5	9
SAMPLE ID#		B0G0C9		B0J0T3				B0G0B6	B0T0K3		B1B0K4	B0G0C0		B0T0T6	
PARAMETERS	(units ug/L)														
VOLATILE ORGANICS															
Chloromethane	2	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Trichlorofluoromethane	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	2	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Vinyl Chloride	2	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Chloroethane	2	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Methylene Chloride	1.9	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
Acetone	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Carbon Disulfide	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
1,1-Dichloroethene	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
1,1-Dichloroethane	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
cis-1,2-Dichloroethene	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trans-1,2-Dichloroethene	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethene (total)	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
Chloroform	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
1,2-Dichloroethane	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
2-Butanone	2	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Tetrahydrofuran	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	1.9	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
Carbon Tetrachloride	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
Vinyl Acetate	2	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Bromodichloromethane	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
1,2-Dichloropropane	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
cis-1,3-Dichloropropene	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
Trans-1,3-Dichloropropene	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
Trichloroethene	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
Dibromochloromethane	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
1,1,2-Trichloroethane	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
Benzene	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
Bromoform	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
4-Methyl-2-Pentanone	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
2-Hexanone	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Tetrachloroethene	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
1,1,2,2-Tetrachloroethane	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
Toluene	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
Chlorobenzene	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
Ethylbenzene	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
Styrene	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
m,p-Xylene	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
o-Xylene	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Xylenes	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
1,3-DICHLOROBENZENE	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethene	1	5 U	--	--	--	--	--	5 U	--	--	5 U	5 U	--	--	--
BNA - VOLATILE ORGANICS															
None	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
bis(2-Chloroethyl)Ether	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
2-Chlorophenol	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
1,3-Dichlorobenzene	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
1,4-Dichlorobenzene	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Benzyl Alcohol	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
1,2-Dichlorobenzene	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
2-Methylphenol	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
bis(2-Chloroisopropyl)Ether	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
4-Methylphenol	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
N-Nitroso-Di-n-Propylamine	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Hexachloroethane	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Nitrobenzene	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Isophorone	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
2-Nitrophenol	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
2,4-Dimethylphenol	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Benzoic Acid	50	50 U	--	--	--	--	--	50 U	--	--	50 U	50 U	--	--	--
bis(2-Chloroethoxy)Methane	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
2,4-Dichlorophenol	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
1,2,4-Trichlorobenzene	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Naphthalene	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
4-Chloroaniline	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Hexachlorobutadiene	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
4-Chloro-3-Methylphenol	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
2-Methylnaphthalene	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Hexachlorocyclopentadiene	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
2,4,6-Trichlorophenol	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
2,4,5-Trichlorophenol	50	50 U	--	--	--	--	--	50 U	--	--	50 U	50 U	--	--	--
2-Chloronaphthalene	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
2-Nitroaniline	50	50 U	--	--	--	--	--	50 U	--	--	50 U	50 U	--	--	--
Dimethyl Phthalate	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--
Acenaphthylene	10	10 U	--	--	--	--	--	10 U	--	--	10 U	10 U	--	--	--

9351232376 4

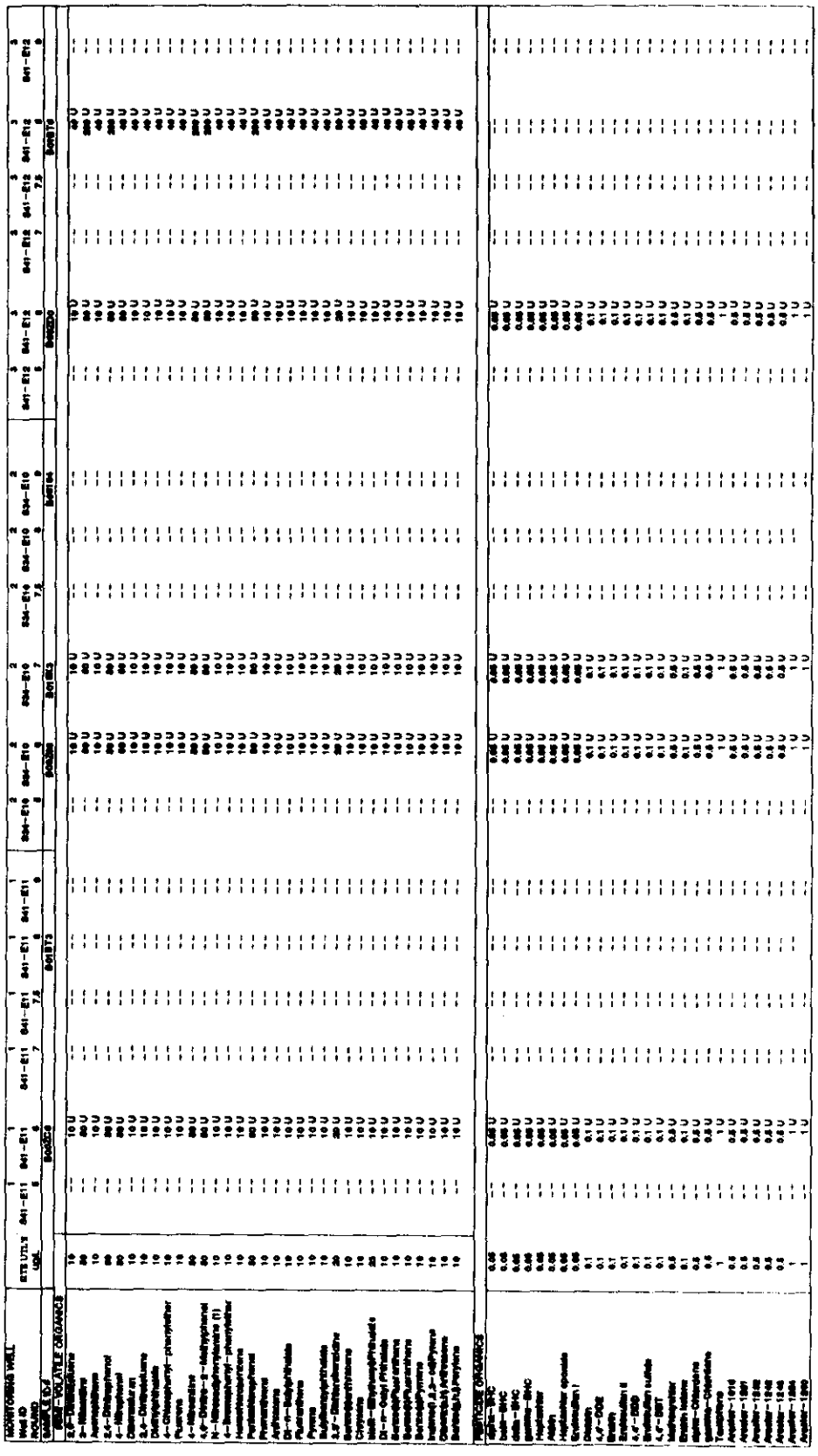

TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data

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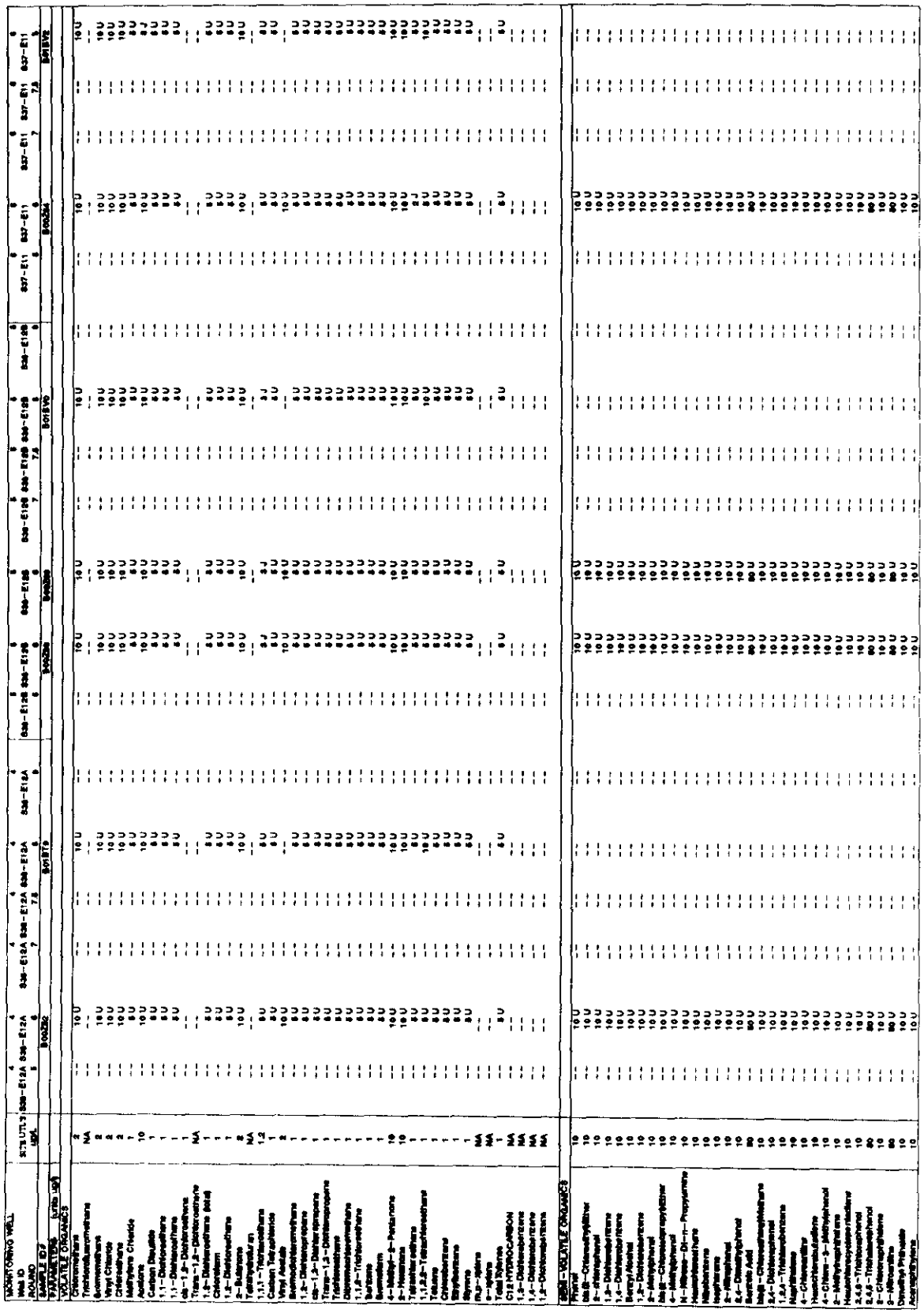


TABLE E-1 Volatile, Semivolatile, and Pesticide Organics Analytical Data

9 3 1 2 3 5 2 0 7 5 6

TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data

MONITORING WELL		4	4	4	4	4	4	5	5	5	5	5	5	5	6	6	6	6	6
Well ID	SITE UTL'S	S36-E12A	S36-E12A	S36-E12A	S36-E12A	S36-E12A	S36-E12A	S36-E12B	S36-E12B	S36-E12B	S36-E12B	S36-E12B	S36-E12B	S36-E12B	S37-E11	S37-E11	S37-E11	S37-E11	S37-E11
ROUND	ug/L	5	6	7	7.5	8	9	5	6	6	7	7.5	8	9	5	6	7	7.5	8
SAMPLE ID#			B00Z62			B01BT9			B00Z64	B00Z65			B01BV9			B00Z66			B01BV2
SEMI-VOLATILE ORGANICS																			
2,6-Dinitrotoluene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
3-Nitroaniline	50	--	50 U	--	--	--	--	--	50 U	50 U	--	--	--	--	--	50 U	--	--	--
Acenaphthene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
2,4-Dinitrophenol	50	--	50 U	--	--	--	--	--	50 U	50 U	--	--	--	--	--	50 U	--	--	--
4-Nitrophenol	50	--	50 U	--	--	--	--	--	50 U	50 U	--	--	--	--	--	50 U	--	--	--
Dibenzofuran	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
2,4-Dinitrotoluene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Diethylphthalate	10	--	10 U	--	--	--	--	--	10	10 U	--	--	--	--	--	10 U	--	--	--
4-Chlorophenyl-phenylether	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Fluorene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
4-Nitroaniline	50	--	50 U	--	--	--	--	--	50 U	50 U	--	--	--	--	--	50 U	--	--	--
4,6-Dinitro-2-Methylphenol	50	--	50 U	--	--	--	--	--	50 U	50 U	--	--	--	--	--	50 U	--	--	--
N-Nitrosodiphenylamine (1)	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
4-Bromophenyl-phenylether	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Hexachlorobenzene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Pentachlorophenol	50	--	50 U	--	--	--	--	--	50 U	50 U	--	--	--	--	--	50 U	--	--	--
Phenanthrene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Anthracene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Di-n-Butylphthalate	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Fluoranthene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Pyrene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Butylbenzylphthalate	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
3,3'-Dichlorobenzidine	20	--	20 U	--	--	--	--	--	20 U	20 U	--	--	--	--	--	20 U	--	--	--
Benzo(a)anthracene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Chrysene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
bis(2-Ethylhexyl)Phthalate	20	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Di-n-Octyl Phthalate	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Benzo(b)Fluoranthene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Benzo(k)Fluoranthene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Benzo(a)Pyrene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Indeno(1,2,3-cd)Pyrene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Dibenz(a,h)Anthracene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
Benzo(g,h,i)Perylene	10	--	10 U	--	--	--	--	--	10 U	10 U	--	--	--	--	--	10 U	--	--	--
PESTICIDE ORGANICS																			
alpha-BHC	0.05	--	0.05 U	--	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	--	--	--
beta-BHC	0.05	--	0.05 U	--	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	--	--	--
delta-BHC	0.05	--	0.05 U	--	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	--	--	--
gamma-BHC	0.05	--	0.05 U	--	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	--	--	--
Heptachlor	0.05	--	0.05 U	--	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	--	--	--
Aldrin	0.05	--	0.05 U	--	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	--	--	--
Heptachlor epoxide	0.05	--	0.05 U	--	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	--	--	--
Endosulfan I	0.05	--	0.05 U	--	--	--	--	--	0.05 U	--	--	--	--	--	--	0.05 U	--	--	--
Dieldrin	0.1	--	0.1 U	--	--	--	--	--	0.1 U	--	--	--	--	--	--	0.1 U	--	--	--
4,4'-DDE	0.1	--	0.1 U	--	--	--	--	--	0.1 U	--	--	--	--	--	--	0.1 U	--	--	--
Endrin	0.1	--	0.1 U	--	--	--	--	--	0.1 U	--	--	--	--	--	--	0.1 U	--	--	--
Endosulfan II	0.1	--	0.1 U	--	--	--	--	--	0.1 U	--	--	--	--	--	--	0.1 U	--	--	--
4,4'-DDD	0.1	--	0.1 U	--	--	--	--	--	0.1 U	--	--	--	--	--	--	0.1 U	--	--	--
Endosulfan sulfate	0.1	--	0.1 U	--	--	--	--	--	0.1 U	--	--	--	--	--	--	0.1 U	--	--	--
4,4'-DDT	0.1	--	0.1 U	--	--	--	--	--	0.1 U	--	--	--	--	--	--	0.1 U	--	--	--
Methoxychlor	0.5	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	--	0.5 U	--	--	--
Endrin ketone	0.1	--	0.1 U	--	--	--	--	--	0.1 U	--	--	--	--	--	--	0.1 U	--	--	--
alpha-Chlordane	0.5	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	--	0.5 U	--	--	--
gamma-Chlordane	0.5	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	--	0.5 U	--	--	--
Toxaphene	1	--	1 U	--	--	--	--	--	1 U	--	--	--	--	--	--	1 U	--	--	--
Aroclor-1016	0.5	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	--	0.5 U	--	--	--
Aroclor-1221	0.5	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	--	0.5 U	--	--	--
Aroclor-1232	0.5	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	--	0.5 U	--	--	--
Aroclor-1242	0.5	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	--	0.5 U	--	--	--
Aroclor-1248	0.5	--	0.5 U	--	--	--	--	--	0.5 U	--	--	--	--	--	--	0.5 U	--	--	--
Aroclor-1254	1	--	1 U	--	--	--	--	--	1 U	--	--	--	--	--	--	1 U	--	--	--
Aroclor-1260	1	--	1 U	--	--	--	--	--	1 U	--	--	--	--	--	--	1 U	--	--	--

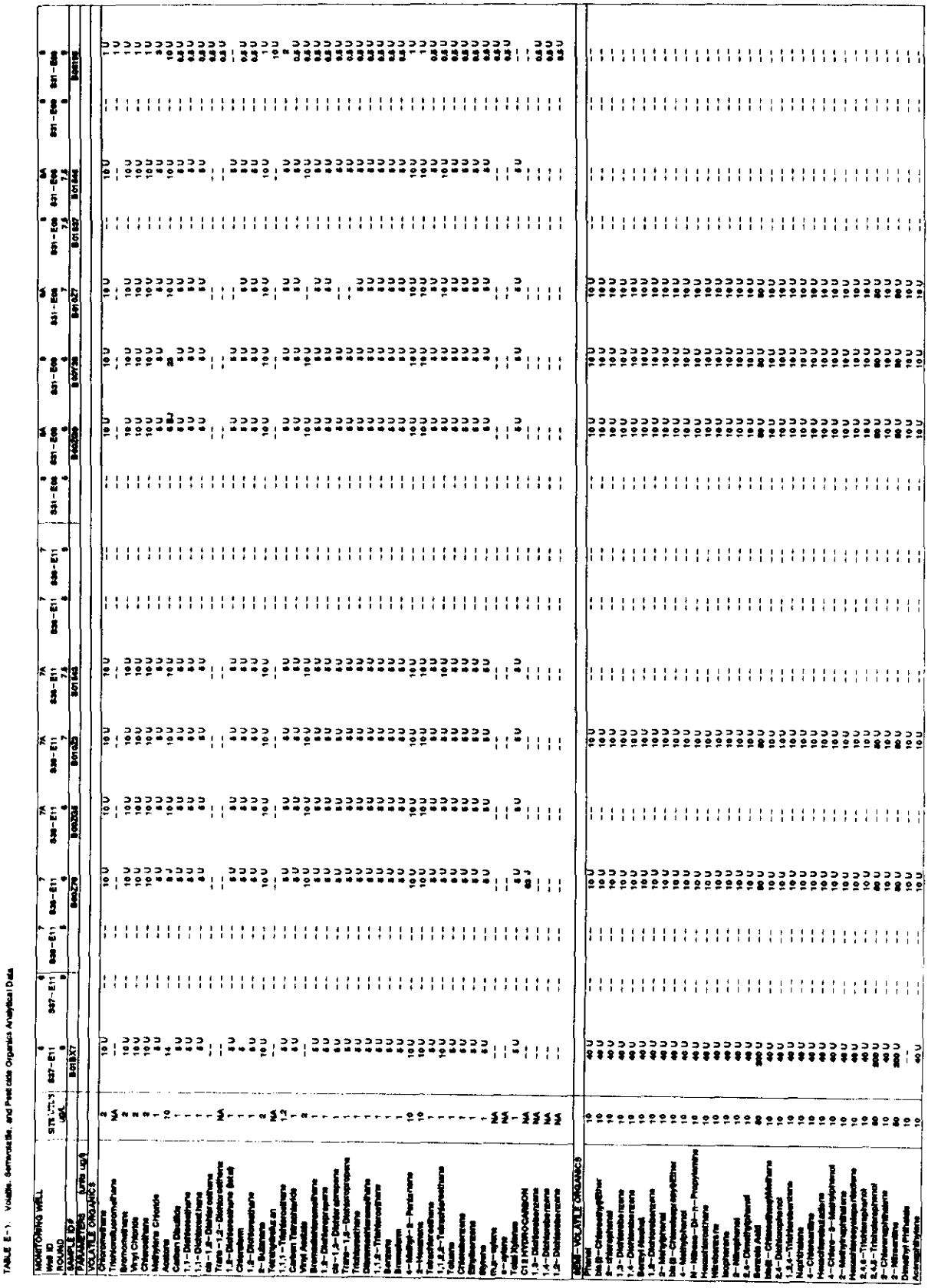


TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data

MONITORING WELL		6	6	7	7	7A	7A	7A	7	7	8	8A	9	8A	8	8A	9	9
Well ID	SITE VTLS	S37-E11	S37-E11	S38-E11	S38-E11	S38-E11	S38-E11	S38-E11	S38-E11	S38-E11	S31-E08	S31-E08	S31-E08	S31-E08	S31-E08	S31-E08	S31-E08	S31-E08
ROUND	ug/L	8	9	5	6	6	7	7.5	8	9	5	6	6	7	7.5	7.5	8	9
SAMPLE ID #		B01BX7			B00Z76	B00ZG5	B01023	B01543				B00Z30	B00Y36	B01027	B01537	B01546		B00195
PARAMETERS (units ug/l)																		
VOLATILE ORGANICS																		
Chloromethane	2	10 U	--	--	10 U	10 U	10 U	10 U	--	--	--	10 U	10 U	10 U	--	10 U	--	1 U
Trichlorofluoromethane	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1 U
Bromomethane	2	10 U	--	--	10 U	10 U	10 U	10 U	--	--	--	10 U	10 U	10 U	--	10 U	--	1 U
Vinyl Chloride	2	10 U	--	--	10 U	10 U	10 U	10 U	--	--	--	10 U	10 U	10 U	--	10 U	--	1 U
Chloroethane	2	10 U	--	--	10 U	10 U	10 U	10 U	--	--	--	10 U	10 U	10 U	--	10 U	--	1 U
Methylene Chloride	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	3 U
Acetone	10	14	--	--	5 J	10 U	10 U	10 U	--	--	--	6 BJ	25	10 U	--	10 U	--	10 U
Carbon Disulfide	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
1,1-Dichloroethene	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
1,1-Dichloroethane	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
cis-1,2-Dichloroethene	1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U
Trans-1,2-Dichloroethene	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U
1,2-Dichloroethane (total)	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	--	--	5 U	--	--
Chloroform	1	5	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
1,2-Dichloroethane	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
2-Butanone	2	10 U	--	--	10 U	10 U	10 U	10 U	--	--	--	10 U	10 U	10 U	--	10 U	--	1 U
Tetrahydrofuran	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10 U
1,1,1-Trichloroethane	1,2	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	2
Carbon Tetrachloride	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
Vinyl Acetate	2	--	--	--	10 U	10 U	10 U	10 U	--	--	--	10 U	10 U	--	--	10 U	--	0.5 U
Bromodichloromethane	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
1,2-Dichloropropane	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
cis-1,3-Dichloropropene	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	--	--	5 U	--	0.5 U
Trans-1,3-Dichloropropene	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	--	--	5 U	--	0.5 U
Trichloroethene	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
Dibromochloromethane	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
1,1,2-Trichloroethane	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
Benzene	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
Bromoform	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
4-Methyl-2-Pentanone	10	10 U	--	--	10 U	10 U	10 U	10 U	--	--	--	10 U	10 U	10 U	--	10 U	--	1 U
2-Hexanone	10	10 U	--	--	10 U	10 U	10 U	10 U	--	--	--	10 U	10 U	10 U	--	10 U	--	1 U
Tetrachloroethene	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
1,1,2,2-Tetrachloroethane	1	10 U	--	--	5 U	5 U	5 U	10 U	--	--	--	5 U	5 U	10 U	--	10 U	--	0.5 U
Toluene	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
Chlorobenzene	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
Ethylbenzene	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
Styrene	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	0.5 U
m,p-xylene	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U
o-xylene	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U
Total Xylenes	1	5 U	--	--	5 U	5 U	5 U	5 U	--	--	--	5 U	5 U	5 U	--	5 U	--	--
C12 HYDROCARBON	NA	--	--	--	63 J	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U
1,4-Dichlorobenzene	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U
1,2-Dichlorobenzene	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	0.5 U
SEMI-VOLATILE ORGANICS																		
Phenol	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
bis(2-Chloroethyl)Ether	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
2-chlorophenol	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
1,3-Dichlorobenzene	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
1,4-Dichlorobenzene	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
Benzyl Alcohol	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
1,2-Dichlorobenzene	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
2-Methylphenol	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
bis(2-Chloroisopropyl)Ether	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
4-Methylphenol	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
N-Nitroso-Di-n-Propylamine	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
Hexachloroethane	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
Nitrobenzene	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
Isophorone	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
2-Nitrophenol	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
2,4-Dimethylphenol	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
Benzoic Acid	50	200 U	--	--	50 U	--	50 U	--	--	--	--	50 U	50 U	50 U	--	--	--	--
bis(2-Chloroethoxy)Methane	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
2,4-Dichlorophenol	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
1,2,4-Trichlorobenzene	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
Naphthalene	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
4-Chloroaniline	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
Hexachlorobutadiene	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
4-Chloro-3-Methylphenol	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
2-Methylnaphthalene	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
Hexachlorocyclopentadiene	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
2,4,6-Trichlorophenol	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
2,4,5-Trichlorophenol	50	200 U	--	--	50 U	--	50 U	--	--	--	--	50 U	50 U	50 U	--	--	--	--
2-Chloronaphthalene	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
2-Nitroaniline	50	200 U	--	--	50 U	--	50 U	--	--	--	--	50 U	50 U	50 U	--	--	--	--
Dimethyl Phthalate	10	--	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--
Acenaphthylene	10	40 U	--	--	10 U	--	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--

9 3 1 2 3 5 2 0 7 5 3 8

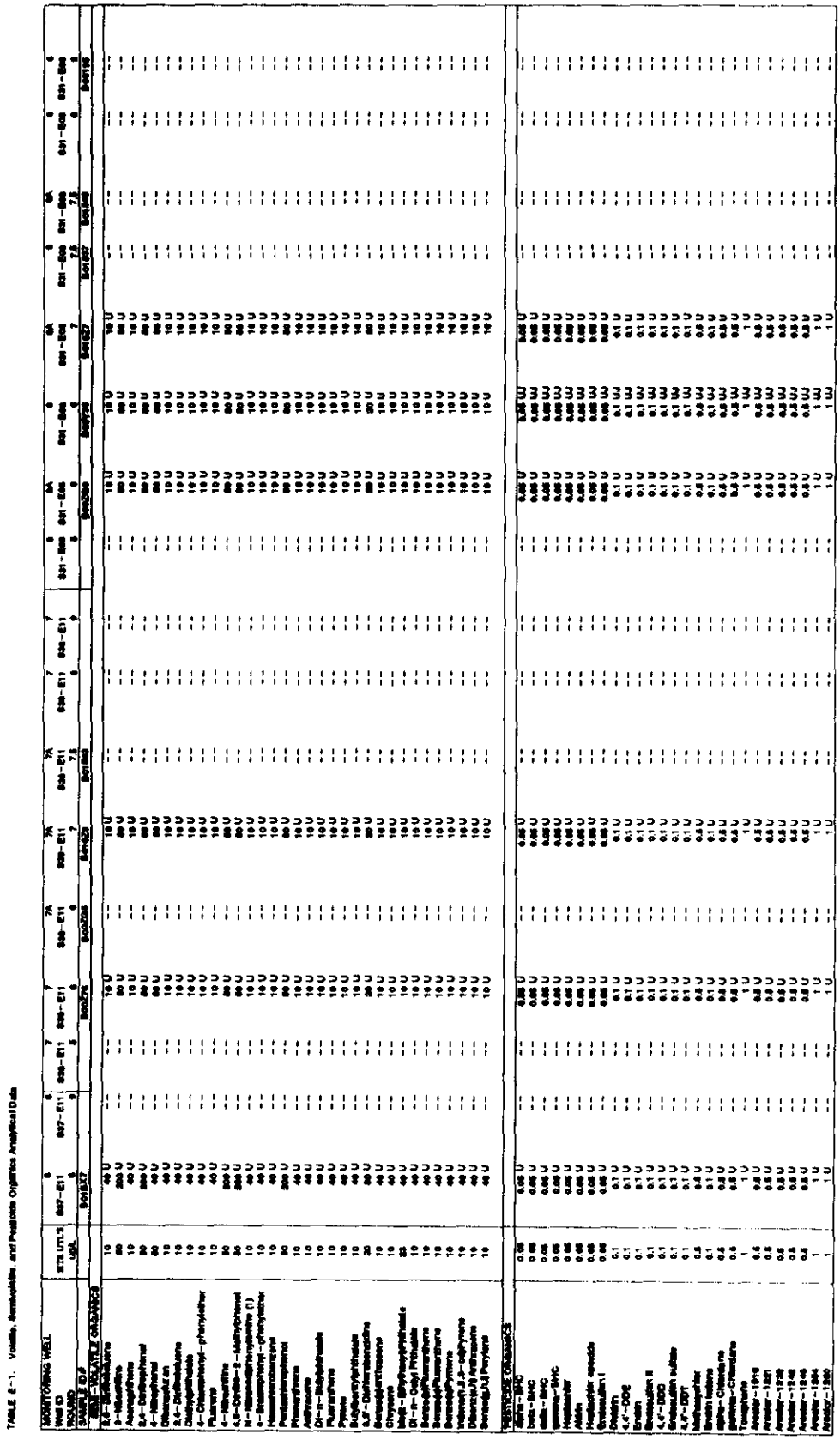


TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data

D 3 1 1 2 3 2 0 7 5 9

TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data

0 0 1 2 3 5 2 3 7 7 0

TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data

MONITORING WELL	STB UTL?	699-E29	699-E29	699-E29	699-E29	699-E29	699-E29	699-E104A	699-E104A	699-E104A	699-E104A	699-E104A	699-E104A	699-E198	699-E198	699-E198	699-E198
Well ID		6	6	7	7A	8	8	6	6	7	7A	8	8	6	6	8	8
ROUND		6	6	7	7A	8	8	6	6	7	7A	8	8	6	6	8	8
SAMPLE ID?		B4974G		B4974H		B4974I		B4974K		B4974L		B4974M		B4974N		B4974O	
SEMI-VOLATILE ORGANICS																	
2,6-Dichloroaniline	10	10 U						10 U									
3-Nitroaniline	50	50 U						50 U									
Acenaphthene	10	10 U						10 U									
2,4-Dinitrophenol	50	50 U						50 U									
4-Nitrophenol	50	50 U						50 U									
Dibenzofuran	10	10 U						10 U									
2,4-Dinitrotoluene	10	10 U						10 U									
Diethylphthalate	10	10 U						10 U									
4-Chlorophenyl-phenylether	10	10 U						10 U									
Fluorene	10	10 U						10 U									
4-Nitroaniline	50	50 U						50 U									
4,6-Dinitro-2-methylphenol	50	50 U						50 U									
N-Nitrosodiphenylamine (1)	10	10 U						10 U									
4-Bromophenyl-phenylether	10	10 U						10 U									
Hexachlorobenzene	10	10 U						10 U									
Pentachlorophenol	50	50 U						50 U									
Phenanthrene	10	10 U						10 U									
Anthracene	10	10 U						10 U									
Di-n-Butylphthalate	10	10 U						10 U									
Fluoranthene	10	10 U						10 U									
Pyrene	10	10 U						10 U									
Butylbenzylphthalate	10	10 U						10 U									
3,3'-Dichlorobenzidine	20	20 U						20 U									
Benzo(a)anthracene	10	10 U						10 U									
Chrysene	10	10 U						10 U									
Bis(2-Ethylhexyl)phthalate	10	10 U						10 U									
Di-n-Octyl Phthalate	10	10 U						10 U									
Benzo(b)fluoranthene	10	10 U						10 U									
Benzo(k)fluoranthene	10	10 U						10 U									
Benzo(a)pyrene	10	10 U						10 U									
Indeno(1,2,3-cd)Pyrene	10	10 U						10 U									
Dibenz(a,h)Anthracene	10	10 U						10 U									
Benzo(g,h,i)Perylene	10	10 U						10 U									
PESTICIDE ORGANICS																	
Alpha-BHC	0.05	0.05 U						0.05 U									
Beta-BHC	0.05	0.05 U						0.05 U									
Delta-BHC	0.05	0.05 U						0.05 U									
Gamma-BHC	0.05	0.05 U						0.05 U									
Aldrin	0.05	0.05 U						0.05 U									
Heptachlor epoxide	0.05	0.05 U						0.05 U									
Endosulfan I	0.05	0.05 U						0.05 U									
Dieldrin	0.1	0.1 U						0.1 U									
4,4'-DDE	0.1	0.1 U						0.1 U									
Endrin	0.1	0.1 U						0.1 U									
Endosulfan II	0.1	0.1 U						0.1 U									
4,4'-DDD	0.1	0.1 U						0.1 U									
Endosulfan sulfate	0.1	0.1 U						0.1 U									
4,4'-DDT	0.1	0.1 U						0.1 U									
Methoxychlor	0.5	0.5 U						0.5 U									
Endrin ketone	0.1	0.1 U						0.1 U									
Alpha-Chlordane	0.5	0.5 U						0.5 U									
gamma-Chlordane	0.5	0.5 U						0.5 U									
Toxaphene	5	1 U						1 U									
Aroclor-1016	0.5	0.5 U						0.5 U									
Aroclor-1221	0.5	0.5 U						0.5 U									
Aroclor-1232	0.5	0.5 U						0.5 U									
Aroclor-1242	0.5	0.5 U						0.5 U									
Aroclor-1248	0.5	1 U						1 U									
Aroclor-1254	1	1 U						1 U									
Aroclor-1260	1	1 U						1 U									

9 5 1 2 3 2 3 7 1

TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data

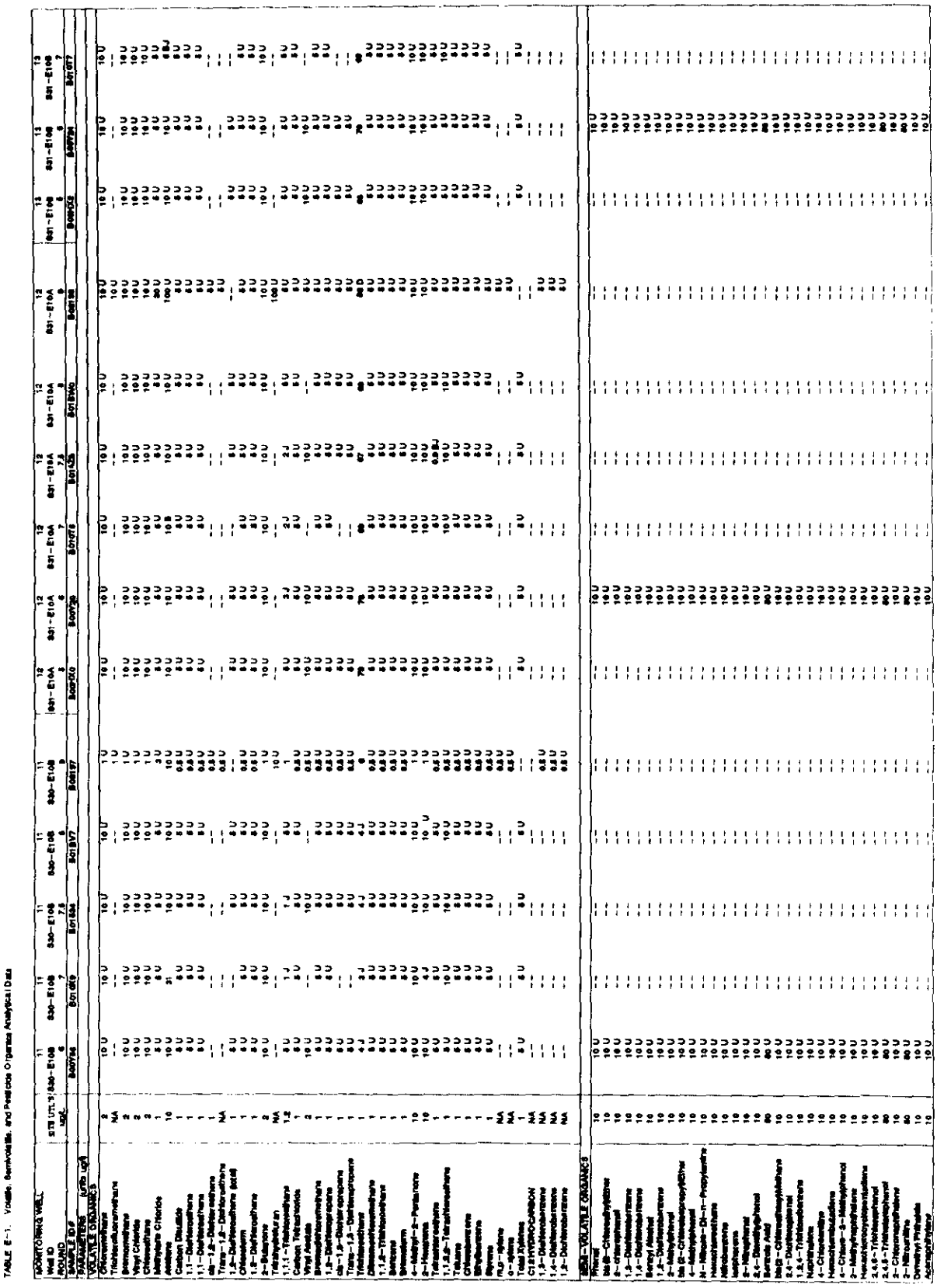


TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data

MONITORING WELL		11	11	11	11	11	12	12	12	12	12	13	13	13
Well ID	3720 177-Y	630-E10B	630-E10B	630-E10B	630-E10B	630-E10B	631-E10A	631-E10A	631-E10A	631-E10A	631-E10A	631-E10B	631-E10B	631-E10B
ROUND	USA	6	7	7.5	8	8	6	7	7.5	8	8	6	6	7
SAMPLE ID #	B4MY96	B4YBK9	B4YBN4	B4YBV7	B4W187	B4W2S0	B4W7P8	B4W8T5	B4W429	B4W8N5	B4W8S6	B4W8K2	B4W9Y4	B4W9F7
SEMI-VOLATILE ORGANICS														
2,4-Dinitrotoluene	10 U	10 U					10 U						10 U	
1-Nitrosoamine	80 U	80 U					80 U						80 U	
Acenaphthene	10 U	10 U					10 U						10 U	
2,4-Dinitrophenol	80 U	80 U					80 U						80 U	
4-Nitrophenol	80 U	80 U					80 U						80 U	
Dibenzofuran	10 U	10 U					10 U						10 U	
2,4-Dinitrotoluene	10 U	10 U					10 U						10 U	
Diethylphthalate	10 U	10 U					10 U						10 U	
4-Chlorophenyl-phenylether	10 U	10 U					10 U						10 U	
Fluorene	10 U	10 U					10 U						10 U	
4-Nitroaniline	80 U	80 U					80 U						80 U	
4,6-Dinitro-2-methylphenol	80 U	80 U					80 U						80 U	
N-Nitrosodiphenylamine (1)	10 U	10 U					10 U						10 U	
4-Bromophenyl-phenylether	10 U	10 U					10 U						10 U	
Hexachlorobenzene	10 U	10 U					10 U						10 U	
Pentachlorophenol	80 U	80 U					80 U						80 U	
Phenanthrene	10 U	10 U					10 U						10 U	
Anthracene	10 U	10 U					10 U						10 U	
Di-n-Butylphthalate	10 U	10 U					10 U						10 U	
Fluoranthene	10 U	10 U					10 U						10 U	
Pyrene	10 U	10 U					10 U						10 U	
Butylbenzylphthalate	10 U	10 U					10 U						10 U	
3,3'-Dichlorobenzidine	20 U	20 U					20 U						20 U	
Benzo(a)anthracene	10 U	10 U					10 U						10 U	
Chrysene	10 U	10 U					10 U						10 U	
Bis(2-Ethylhexyl)phthalate	10 U	10 U					10 U						10 U	
Di-n-Octyl Phthalate	10 U	10 U					10 U						10 U	
Benzo(b)fluoranthene	10 U	10 U					10 U						10 U	
Benzo(k)fluoranthene	10 U	10 U					10 U						10 U	
Benzo(a)pyrene	10 U	10 U					10 U						10 U	
Indeno(1,2,3-cd)Pyrene	10 U	10 U					10 U						10 U	
Dibenz(a,h)Anthracene	10 U	10 U					10 U						10 U	
Benzo(g,h,i)Perylene	10 U	10 U					10 U						10 U	
PESTICIDE ORGANICS														
Alpha-BHC	0.05	0.05 U					0.05 U						0.05 U	
Beta-BHC	0.05	0.05 U					0.05 U						0.05 U	
Delta-BHC	0.05	0.05 U					0.05 U						0.05 U	
Heptachlor	0.05	0.05 U					0.05 U						0.05 U	
Aldrin	0.05	0.05 U					0.05 U						0.05 U	
Heptachlor epoxide	0.05	0.05 U					0.05 U						0.05 U	
Endosulfan I	0.1	0.1 U					0.1 U						0.1 U	
Dieldrin	0.1	0.1 U					0.1 U						0.1 U	
4,4'-DDE	0.1	0.1 U					0.1 U						0.1 U	
Endrin	0.1	0.1 U					0.1 U						0.1 U	
Endosulfan II	0.1	0.1 U					0.1 U						0.1 U	
4,4'-DDD	0.1	0.1 U					0.1 U						0.1 U	
Endosulfan sulfate	0.1	0.1 U					0.1 U						0.1 U	
4,4'-DDT	0.1	0.1 U					0.1 U						0.1 U	
Methoxychlor	0.5	0.5 U					0.5 U						0.5 U	
Endrin Ketone	0.1	0.1 U					0.1 U						0.1 U	
Alpha-Chlordane	0.5	0.5 U					0.5 U						0.5 U	
gamma-Chlordane	0.5	0.5 U					0.5 U						0.5 U	
Toxaphene	5	5 U					5 U						5 U	
Aroclor-1016	0.5	0.5 U					0.5 U						0.5 U	
Aroclor-1221	0.5	0.5 U					0.5 U						0.5 U	
Aroclor-1232	0.5	0.5 U					0.5 U						0.5 U	
Aroclor-1242	0.5	0.5 U					0.5 U						0.5 U	
Aroclor-1248	0.5	0.5 U					0.5 U						0.5 U	
Aroclor-1254	1	1 U					1 U						1 U	
Aroclor-1260	1	1 U					1 U						1 U	

0 3 1 2 3 0 2 7 7 3

TABLE E-1 Volatile, Semivolatile, and Pesticide Organics Analytical Data.

MONITORING WELL		STB UTL-1	13	13	14	14	14	14	14	15	15	15	15	15
Well ID			631-E10B	631-E10S	631-E10C	631-E10C	631-E10C	631-E10C	631-E10C	631-E10D	631-E10D	631-E10D	631-E10D	631-E10D
ROUND			7,8	8	6	7	7,8	8	8	6	6	7	7,8	8
SAMPLE ID#			B0160I	B0160J	B0160C	B0160S	B0160W	B0160X	B0160Z	B0160G	B0160H	B0160Y	B0160W	B0160X
PARAMETERS	Units (ug/L)													
VOLATILE ORGANICS														
Chloromethane	2		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Trichlorofluoromethane	NA													
Bromomethane	2		10 U	10 U	10 U	10 U	10 U	10 U	10 U					
Vinyl Chloride	2		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Chloroethane	2		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Methylene Chloride	5		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Carbon Disulfide	10		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethene	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene	NA													
Trans-1,2-Dichloroethene	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethene (total)	NA													
Chloroform	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloroethane	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Butanone	10		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrahydrofuran	NA													
1,1,1-Trichloroethane	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Carbon Tetrachloride	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Vinyl Acetate	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromodichloromethane	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,2-Dichloropropane	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
cis-1,3-Dichloropropene	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Trichloroethene	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Dibromochloromethane	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Bromoform	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone	10		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
2-Hexanone	10		10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U	10 U
Tetrachloroethene	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Toluene	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Chlorobenzene	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Ethylbenzene	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Styrene	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
m,p-Xylene	NA													
o-Xylene	NA													
Total Xylenes	5		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
C1B HYDROCARBON	NA													
1,3-Dichlorobenzene	NA													
1,4-Dichlorobenzene	NA													
1,2-Dichlorobenzene	NA													
BNA - VOLATILE ORGANICS														
Phenol	10				10 U					10 U				
bis(2-Chloroethyl)Ether	10				10 U					10 U				
2-Chlorophenol	10				10 U					10 U				
1,3-Dichlorobenzene	10				10 U					10 U				
1,4-Dichlorobenzene	10				10 U					10 U				
Benzyl Alcohol	10				10 U					10 U				
1,2-Dichlorobenzene	10				10 U					10 U				
2-Methylphenol	10				10 U					10 U				
bis(2-Chloroisopropyl)Ether	10				10 U					10 U				
4-Methylphenol	10				10 U					10 U				
N-Nitroso-Di-n-Propylamine	10				10 U					10 U				
Hexachloroethane	10				10 U					10 U				
Nitrobenzene	10				10 U					10 U				
Isophorone	10				10 U					10 U				
2-Nitrophenol	10				10 U					10 U				
2,4-Dimethylphenol	10				10 U					10 U				
Benzoic Acid	50				50 U					50 U				
bis(2-Chloroethoxy)Methane	10				10 U					10 U				
2,4-Dichlorophenol	10				10 U					10 U				
1,2,4-Trichlorobenzene	10				10 U					10 U				
Naphthalene	10				10 U					10 U				
4-Chloroaniline	10				10 U					10 U				
4-Chloro-3-Cresol	10				10 U					10 U				
2-Methylnaphthalene	10				10 U					10 U				
Hexachlorocyclopentadiene	10				10 U					10 U				
2,4,6-Trichlorophenol	10				10 U					10 U				
2,4,5-Trichlorophenol	50				50 U					50 U				
2-Chloronaphthalene	10				10 U					10 U				
2-Nitroaniline	50				50 U					50 U				
Dimethyl Phthalate	10				10 U					10 U				
Acenaphthylene	10				10 U					10 U				

9 5 1 2 3 0 2 1 7 7 4

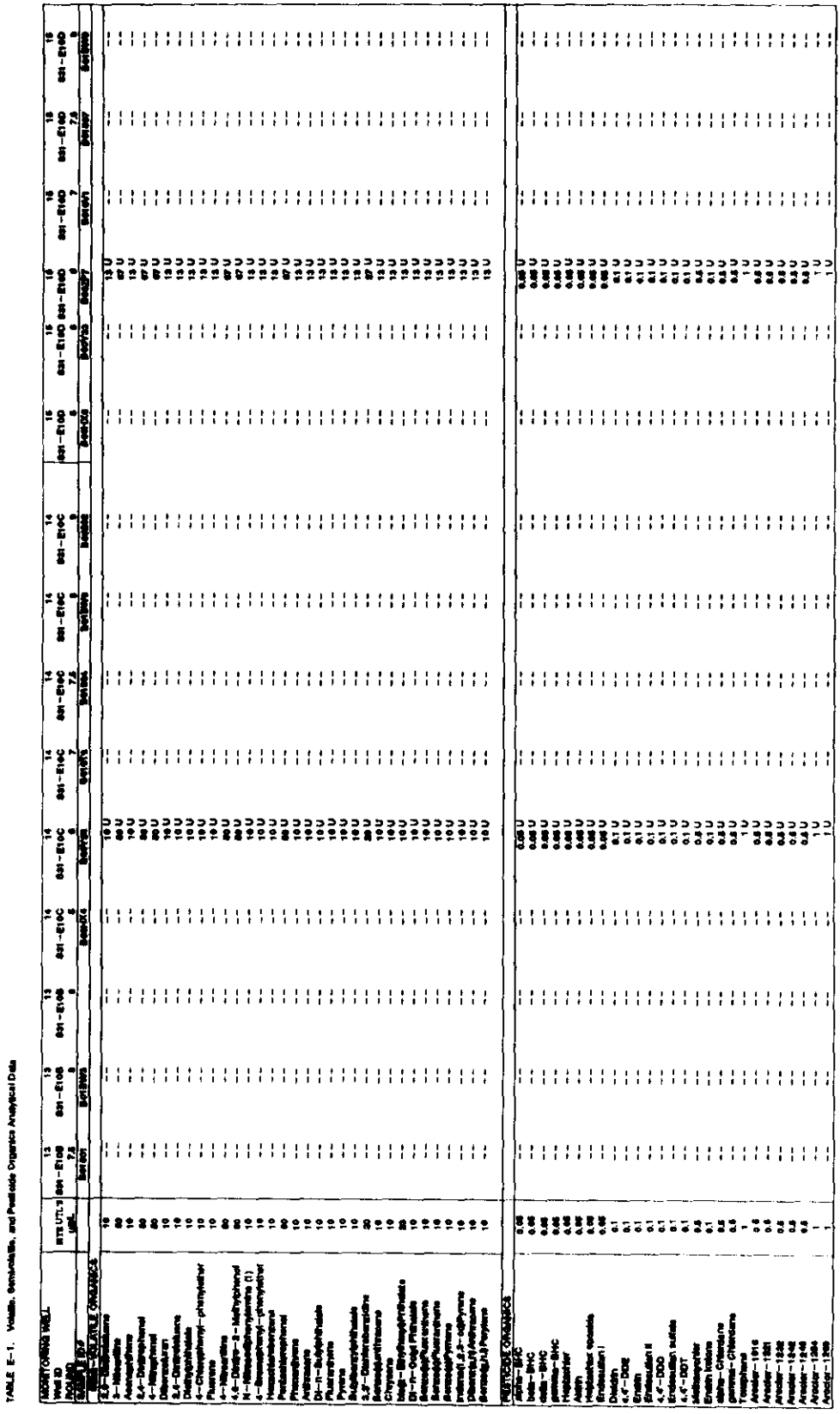
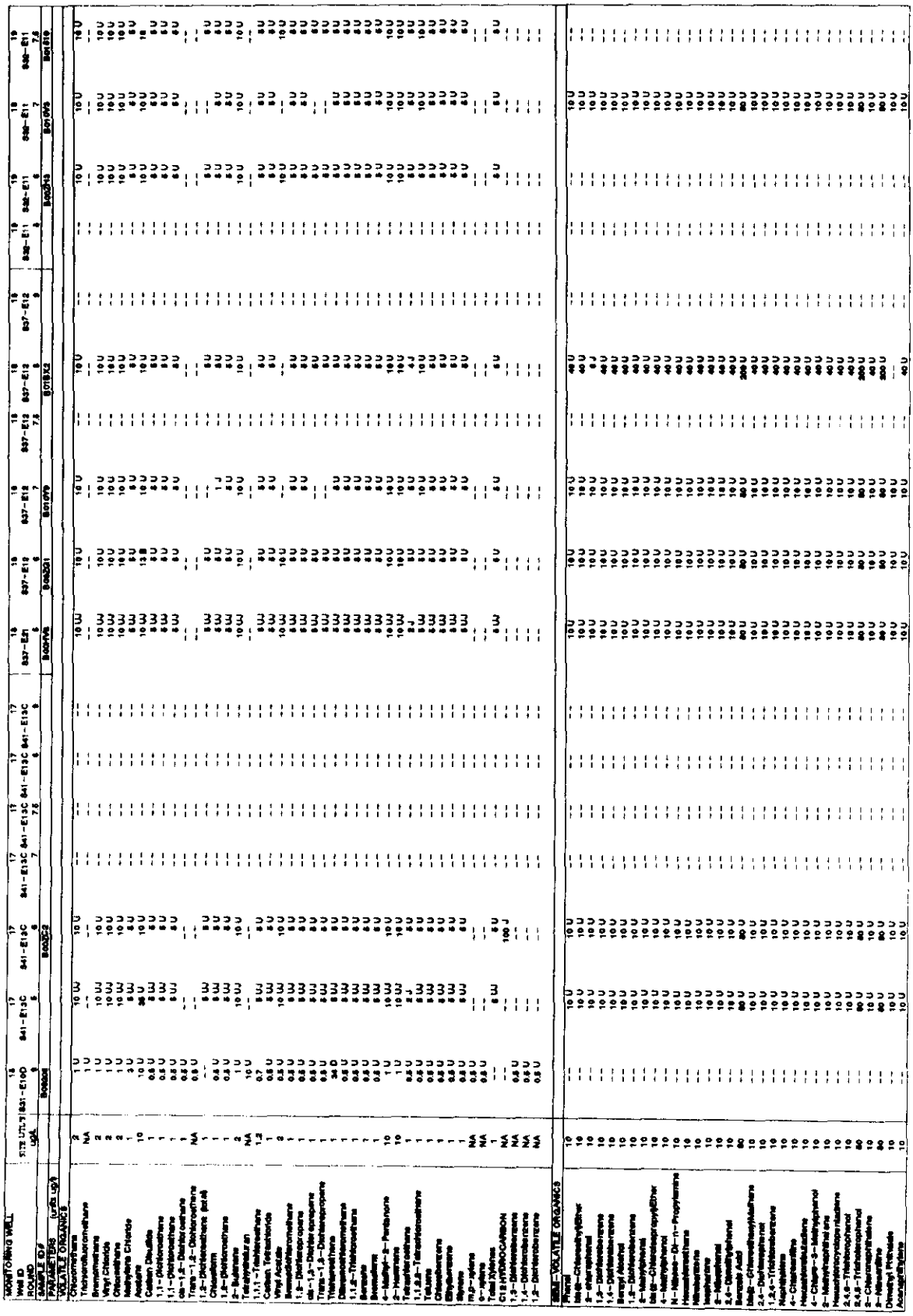


TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data

TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data



MONITORING WELL		18	17	17	17	17	17	17	18	18	18	18	18	18	19	19	19	19
Well ID	SITE UTL'S	S31-E10D	S41-E13C	S41-E13C	S41-E13C	S41-E13C	S41-E13C	S41-E13C	S37-E21	S37-E12	S37-E12	S37-E12	S37-E12	S37-E12	S32-E11	S32-E11	S32-E11	S32-E11
ROUND	ug/L	9	5	6	7	7.5	8	9	5	6	7	7.5	8	9	5	6	7	7.5
SAMPLE ID#		B00206		B00ZC2					B00HV8	B00ZG1	B010V9		B01BX2			B00ZH3	B010V3	B01810
PARAMETERS (units ug/l)																		
VOLATILE ORGANICS																		
Chloromethane	2	1 U	10 UJ	10 U	--	--	--	--	10 UJ	10 U	10 U	--	10 U	--	--	10 U	10 U	10 U
Trichlorofluoromethane	NA	1 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bromomethane	2	1 U	10 UJ	10 U	--	--	--	--	10 UJ	10 U	10 U	--	10 U	--	--	10 U	10 U	10 U
Vinyl Chloride	2	1 U	10 UJ	10 U	--	--	--	--	10 UJ	10 U	10 U	--	10 U	--	--	10 U	10 U	10 U
Chloroethane	2	1 U	10 UJ	10 U	--	--	--	--	10 UJ	10 U	10 U	--	10 U	--	--	10 U	10 U	10 U
Methylene Chloride	1	3 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
Acetone	10	10 U	35 U	10 U	--	--	--	--	10 UJ	13 B	10 U	--	10 U	--	--	10 U	10 U	10
Carbon Disulfide	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
1,1-Dichloroethene	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
1,1-Dichloroethane	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
cis-1,2-Dichloroethane	1	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Trans-1,2-Dichloroethene	NA	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichloroethene (total)	1	--	5 UJ	5 U	--	--	--	--	5 UJ	5 U	--	--	5 U	--	--	5 U	--	5 U
Chloroform	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	1 J	--	5 U	--	--	5 U	5 U	5 U
1,2-Dichloroethane	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
2-Butanone	2	1 U	10 UJ	10 U	--	--	--	--	10 UJ	10 U	10 U	--	10 U	--	--	10 U	10 U	10 U
Tetrahydrofuran	NA	10 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	1,2	0.7	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
Carbon Tetrachloride	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
Vinyl Acetate	2	0.5 U	10 UJ	10 U	--	--	--	--	10 UJ	10 U	--	--	--	--	--	10 U	--	10 U
Bromodichloromethane	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
1,2-Dichloropropane	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
cis-1,3-Dichloropropene	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	--	--	5 U	--	--	5 U	--	5 U
Trans-1,3-Dichloropropene	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	--	--	5 U	--	--	5 U	--	5 U
Trichloroethene	1	34 D	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
Dibromochloromethane	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
1,1,2-Trichloroethane	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
Benzene	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
Bromoform	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
4-Methyl-2-Pentanone	10	1 U	10 UJ	10 U	--	--	--	--	10 UJ	10 U	10 U	--	10 U	--	--	10 U	10 U	10 U
2-Hexanone	10	1 U	10 UJ	10 U	--	--	--	--	10 UJ	10 U	10 U	--	10 U	--	--	10 U	10 U	10 U
Tetrachloroethene	1	0.5 U	2 J	5 U	--	--	--	--	2 J	5 U	5 U	--	4 J	--	--	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	10 U	--	10 U	--	--	5 U	10 U	10 U
Toluene	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
Chlorobenzene	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
Ethylbenzene	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
Styrene	1	0.5 U	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
m,p-xylene	NA	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
o-xylene	NA	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total Xylenes	1	--	5 UJ	5 U	--	--	--	--	5 UJ	5 U	5 U	--	5 U	--	--	5 U	5 U	5 U
C12 HYDROCARBON	NA	--	--	100 J	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,3-Dichlorobenzene	NA	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,4-Dichlorobenzene	NA	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
1,2-Dichlorobenzene	NA	0.5 U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SEMI-VOLATILE ORGANICS																		
Phenol	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
bis(2-Chloroethyl)Ether	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
2-chlorophenol	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	6 J	--	--	--	10 U	--
1,3-Dichlorobenzene	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
1,4-Dichlorobenzene	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
Benzyl Alcohol	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
1,2-Dichlorobenzene	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
2-Methylphenol	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
bis(2-Chloroisopropyl)Ether	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
4-Methylphenol	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
N-Nitroso-Di-n-Propylamine	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
Hexachloroethane	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
Nitrobenzene	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
Isophorone	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
2-Nitrophenol	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
2,4-Dimethylphenol	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
Benzoic Acid	50	--	50 U	50 U	--	--	--	--	50 U	50 U	50 U	--	200 U	--	--	--	50 U	--
bis(2-Chloroethoxy)Methane	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
2,4-Dichlorophenol	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
1,2,4-Trichlorobenzene	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
Naphthalene	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
4-Chloroaniline	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
Hexachlorobutadiene	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
4-Chloro-3-Methylphenol	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
2-Methylnaphthalene	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
Hexachlorocyclopentadiene	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
2,4,6-Trichlorophenol	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
2,4,5-Trichlorophenol	50	--	50 U	50 U	--	--	--	--	50 U	50 U	50 U	--	200 U	--	--	--	50 U	--
2-Chloronaphthalene	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--
2-Nitroaniline	50	--	50 U	50 U	--	--	--	--	50 U	50 U	50 U	--	200 U	--	--	--	50 U	--
Dimethyl Phthalate	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	--	--	--	--	10 U	--
Acenaphthylene	10	--	10 U	10 U	--	--	--	--	10 U	10 U	10 U	--	40 U	--	--	--	10 U	--

0 0 1 2 3 3 2 3 7 7 6

TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data.

9 3 1 2 3 2 0 7 7 7

TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data.

TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data

MONITORING WELL		19	19	20	20	20	20	20	20	21	21	21	21	21	21	22	22
Well ID	SITE UTL'S	S29-E11	S29-E11	S30-E11	S30-E11	S30-E11	S30-E11	S30-E11	S30-E11	S31-E10E	S31-E10E	S31-E10E	S31-E10E	S31-E10E	S31-E10E	S31-E11	S31-E11
ROUND	ug/L	8	9	5	6	7	7.5	8	9	5	6	7	7.5	8	9	5	6
SAMPLE ID#		B01C07	B06807		B03ZH4	B01[illegible]V7	B01S13	B01C12	[illegible]		B03ZH6	[illegible]	B01S10	B01C17			B03D46
SEMI-VOLATILE ORGANICS																	
2,6-Dinitrotoluene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
3-Nitroaniline	50	200 U	--	--	--	50 U	--	200 U	--	--	--	50 U	--	200 U	--	--	--
Acenaphthene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
2,4-Dinitrophenol	50	200 U	--	--	--	50 U	--	200 U	--	--	--	50 U	--	200 U	--	--	--
4-Nitrophenol	50	40 U	--	--	--	50 U	--	40 U	--	--	--	50 U	--	40 U	--	--	--
Dibenzofuran	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
2,4-Dinitrotoluene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Diethylphthalate	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
4-Chlorophenyl-phenylether	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Fluorene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
4-Nitroaniline	50	200 U	--	--	--	50 U	--	200 U	--	--	--	50 U	--	200 U	--	--	--
4,6-Dinitro-2-Methylphenol	50	200 U	--	--	--	50 U	--	200 U	--	--	--	50 U	--	200 U	--	--	--
N-Nitrosodiphenylamine (1)	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
4-Bromophenyl-phenylether	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Hexachlorobenzene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Pentachlorophenol	50	200 U	--	--	--	50 U	--	200 U	--	--	--	50 U	--	200 U	--	--	--
Phenanthrene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Anthracene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Di-n-Butylphthalate	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Fluoranthene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Pyrene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Butylbenzylphthalate	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
3,3'-Dichlorobenzidine	20	80 U	--	--	--	20 U	--	80 U	--	--	--	20 U	--	80 U	--	--	--
Benzo(a)anthracene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Chrysene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
bis(2-Ethylhexyl)Phthalate	20	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Di-n-Octyl Phthalate	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Benzo(b)Fluoranthene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Benzo(k)Fluoranthene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Benzo(a)Pyrene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Indeno(1,2,3-cd)Pyrene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Dibenz(a,h)Anthracene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
Benzo(g,h,i)Perylene	10	40 U	--	--	--	10 U	--	40 U	--	--	--	10 U	--	40 U	--	--	--
PESTICIDE ORGANICS																	
alpha-BHC	0.05	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--
beta-BHC	0.05	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--
delta-BHC	0.05	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--
gamma-BHC	0.05	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--
Heptachlor	0.05	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--
Aldrin	0.05	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--
Heptachlor epoxide	0.05	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--
Endosulfan I	0.05	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--	0.05 U	--	0.05 U	--	--	--
Dieldrin	0.1	0.018 JX	--	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--
4,4'-DDE	0.1	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--
Endrin	0.1	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--
Endosulfan II	0.1	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--
4,4'-DDD	0.1	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--
Endosulfan sulfate	0.1	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--
4,4'-DDT	0.1	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--
Methoxychlor	0.5	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--
Endrin ketone	0.1	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--	0.1 U	--	0.1 U	--	--	--
alpha-Chlordane	0.5	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--
gamma-Chlordane	0.5	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--
Toxaphene	1	1 U	--	--	--	1 U	--	1 U	--	--	--	1 U	--	1 U	--	--	--
Aroclor-1016	0.5	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--
Aroclor-1221	0.5	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--
Aroclor-1232	0.5	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--
Aroclor-1242	0.5	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--
Aroclor-1248	0.5	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--	0.5 U	--	0.5 U	--	--	--
Aroclor-1254	1	1 U	--	--	--	1 U	--	1 U	--	--	--	1 U	--	1 U	--	--	--
Aroclor-1260	1	0.88 J	--	--	--	1 U	--	1 J	--	--	--	1 U	--	1 J	--	--	--

9 3 1 2 3 5 2 0 7 7 8

9 3 5 1 2 3 2 0 7 7 9

TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data

MONITORING WELL		22	22	22	22	22
Well ID	93 B UTL-3	831-E11	831-E11	831-E11	831-E11	831-E11
ROUND	ug/L	7	7,8	6	6	8
SAMPLE ID #		8610846	9101819	B0C242	B0C242	B4B889
PARAMETERS	(unit: ug/L)					
VOLATILE ORGANICS						
Chloromethane	2	10 U	10 U	10 U		10 U
Trichlorofluoromethane	NA	--	--	--		--
Bromomethane	8	10 U	10 U	10 U		10 U
Vinyl Chloride	2	10 U	10 U	10 U		10 U
Chloroethane	8	10 U	10 U	10 U		10 U
Methylene Chloride	1	5 U	5 U	5 U		3 J
Acetone	10	10 U	10 U	9 J		10 U
Carbon Disulfide	--	5 U	5 U	5 U		5 U
1,1-Dichloroethene	--	5 U	5 U	5 U		5 U
1,1-Dichloroethane	--	--	--	--		5 U
cis-1,2-Dichloroethene	--	--	--	--		5 U
Trans-1,2-Dichloroethene	NA	--	--	--		--
1,2-Dichloroethane (total	--	--	--	--		--
Chloroform	--	5 U	5 U	5 U		5 U
1,2-Dichloroethane	5	5 U	5 U	5 U		5 U
2-Butanone	8	10 U	10 U	10 U		10 U
Tetrahydrofuran	NA	--	--	--		10 U
1,1,1-Trichloroethane	1.2	5 U	5 U	5 U		5 U
Carbon Tetrachloride	1.2	--	--	--		5 U
Vinyl Acetate	9	10 U	10 U	10 U		5 U
Bromodichloromethane	--	5 U	5 U	5 U		5 U
1,2-Dichloropropane	--	--	--	--		5 U
cis-1,3-Dichloropropene	--	--	--	--		5 U
Trans-1,3-Dichloropropene	--	5 U	5 U	5 U		5 U
Trichloroethene	--	5 U	5 U	5 U		5 U
Dibromochloromethane	--	5 U	5 U	5 U		5 U
1,1,2-Trichloroethane	--	5 U	5 U	5 U		5 U
Benzene	--	5 U	5 U	5 U		5 U
4-Methyl-2-Pentanone	10	10 U	10 U	10 U		10 U
2-Hexanone	10	10 U	10 U	10 U		10 U
Tetrachloroethene	--	5 U	5 U	5 U		5 U
1,1,2,2-Tetrachloroethane	--	5 U	5 U	5 U		5 U
Toluene	--	5 U	5 U	5 U		5 U
Chlorobenzene	--	5 U	5 U	5 U		5 U
Ethylbenzene	--	5 U	5 U	5 U		5 U
Styrene	--	5 U	5 U	5 U		5 U
m,p-xylene	NA	--	--	--		5 U
o-xylene	NA	--	--	--		--
Total Xylenes	1	5 U	--	--		--
C1-8 HYDROCARBON	NA	--	--	--		5 U
1,3-Dichlorobenzene	NA	--	--	--		5 U
1,4-Dichlorobenzene	NA	--	--	--		5 U
1,2-Dichlorobenzene	NA	--	--	--		5 U
BNAs - VOLATILE ORGANICS						
Phenol	10	10 U	--	40 U		--
bis (2-Chloroethyl)Ether	10	10 U	--	40 U		--
2-Chlorophenol	10	10 U	--	40 U		--
1,3-Dichlorobenzene	10	10 U	--	40 U		--
1,4-Dichlorobenzene	10	10 U	--	40 U		--
Benzyl Alcohol	10	10 U	--	40 U		--
1,2-Dichlorobenzene	10	10 U	--	40 U		--
bis (2-Chloroisopropyl)Ether	10	10 U	--	40 U		--
4-Methylphenol	10	10 U	--	40 U		--
N-Nitroso-Di-n-Propylamine	10	10 U	--	40 U		--
Hexachloroethane	10	10 U	--	40 U		--
Nitrobenzene	10	10 U	--	40 U		--
Isophorone	10	10 U	--	40 U		--
2-Nitrophenol	10	10 U	--	40 U		--
2,4-Dimethylphenol	10	10 U	--	40 U		--
Benzoic Acid	50	50 U	--	200 U		--
bis (2-Chloroethoxy)Methane	10	10 U	--	40 U		--
2,4-Dichlorophenol	10	10 U	--	40 U		--
1,2,4-Trichlorobenzene	10	10 U	--	40 U		--
Naphthalene	10	10 U	--	40 U		--
4-Chloroaniline	10	10 U	--	40 U		--
Hexachlorobutadiene	10	10 U	--	40 U		--
4-Chloro-3-Methylphenol	10	10 U	--	40 U		--
2-Methylnaphthalene	10	10 U	--	40 U		--
Hexachlorocyclopentadiene	10	10 U	--	40 U		--
2,4,6-Trichlorophenol	10	10 U	--	40 U		--
2,4,5-Trichlorophenol	50	50 U	--	200 U		--
2-Chloronaphthalene	10	10 U	--	40 U		--
2-Nitroaniline	50	50 U	--	200 U		--
Dimethyl Phthalate	10	10 U	--	--		--
Acenaphthylene	10	10 U	--	40 U		--

9 3 1 2 3 3 2 3 7 3 0

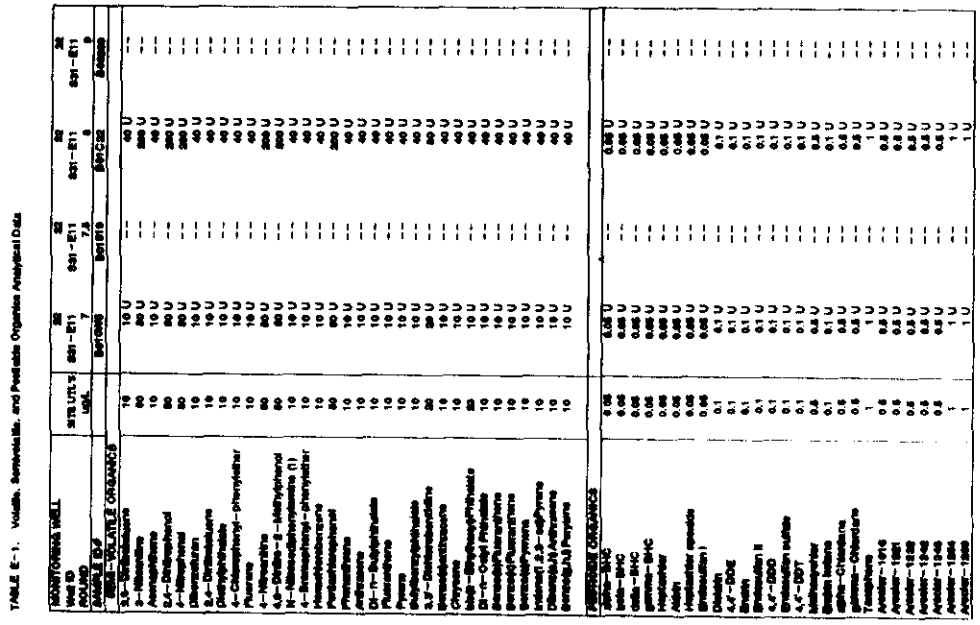


TABLE E-1. Volatile, Semivolatile, and Pesticide Organics Analytical Data

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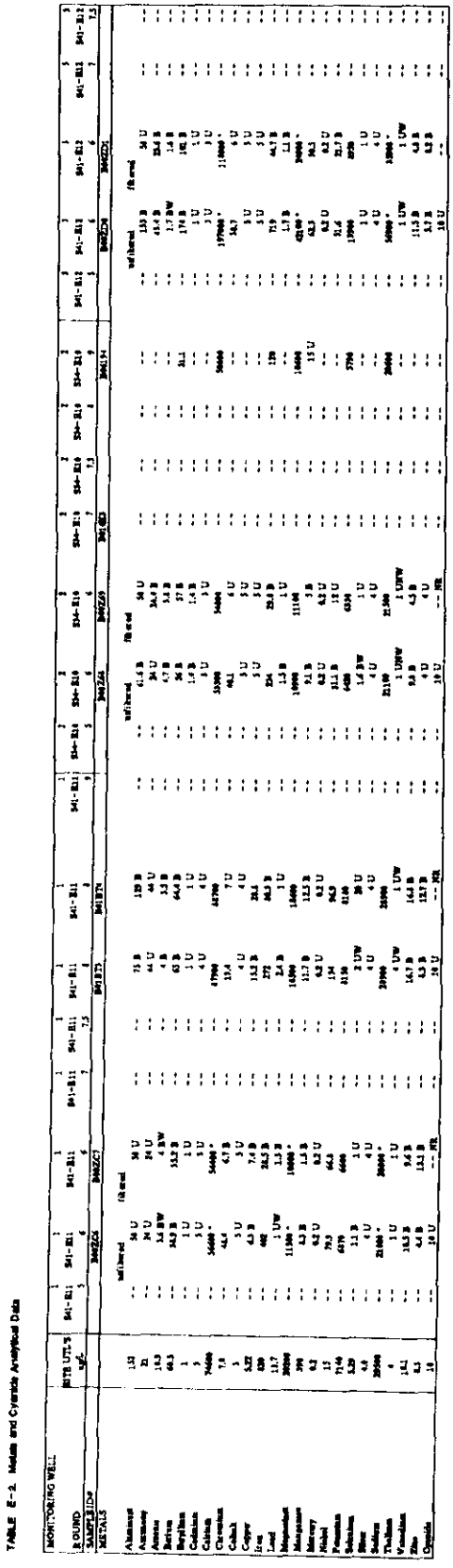

TABLE E-2. Metals and Cyanide Analytical Data

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TABLE E-2. Metals and Cyanide Analytical Data

MONITORING WELL		241-B12	241-B12	241-B12	299-B13A	299-B12A	299-B12A	299-B12A	299-B12A	299-B12A	299-B12A	299-B12A	299-B12A	299-B12A	299-B12A	299-B12A
ROUND	RCRA UTLS mg/L	4	4	4	5	6	6	7	13	4	4	5	5	5	5	5
SAMPLE ID#		B41826	B41877			B44232	B44233			B41975		B44226	B44227	B44228	B44229	B44230
METALS																
						unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered	filtered	unfiltered
Aluminum	132	139 B	86.4 B			34 U	34 U					34 U	34 U	34 U	34 U	34 U
Antimony	21	60.8 B	47.8 B			34 U	34 U					34 U	34 U	34 U	34 U	34 U
Arsenic	14.9	3.2 B	1.3 B			4.3 B	4.7 B					4.9 B	5.2 B	4.7 B	5.6 B	5.2 B
Barium	47.3	140 B	134 B			43.3 B	41 B					44.7 B	44.4 B	44.8 B	47.2 B	45.1 B
Beryllium	1	1 U	1 U			1 U	1 U					1 U	1 U	1 U	1 U	1 U
Cadmium	1	4 U	4 U			5 U	5 U					5 U	4 U	5 U	5 U	5 U
Calcium	76600	140000	142000			4300	4200					43000	41000	43000	38200	41000
Chromium	3.3	176	7 U			10.4	9.8					22.5	5 U	26.2	6 U	5 U
Cobalt	1	4 U	4 U			5 U	5 U					5 U	5 U	5 U	5 U	5 U
Copper	5.33	36.4	15.8 B			10.3 B	11.8 B					13 B	5 U	12 B	6.3 B	5 U
Iron	439	260	492 B			4	22 B					444	13.4	125	42.3 B	33 B
Magnesium	2688	2220	2.5 BHW			2790	1800					1.5	1.5	1.2 B	1.5	1.5
Manganese	399	25.2	3140			1 U	1.4 B					1.4 B	1.4 B	1.4 B	1 U	1 U
Mercury	0.2	0.2 U	0.2 U			0.2 U	0.2 U					0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Nickel	15	1.6	1.6			12 U	12 U					30.7 B	15.4 B	12 U	12 U	12 U
Potassium	7140	1680	1680			456 B	436					3680	2710	3980	4470	4080 B
Selenium	5.8	11 UHW	1 UHW			1 UHW	1 UHW					1 UHW	1 UHW	1 UHW	1 UHW	1 UHW
Silver	4.8	4 U	4 U			4 U	4 U					4 U	4 U	4 U	4 U	4 U
Sodium	25500	49400	4480			1800	1600					29700	30400	22200	17200	18500
Thallium	4	14 UHW	10 UHW			1 UHW	1 UR					1 UR	1 UR	1 UHW	1 UHW	1 UHW
Vanadium	141	12.6 B	12.7 B			3.9 B	3.7 B					11.7 B	6.8 B	6.8 B	5.8 B	5.8 B
Zinc	43	16.6 B	5 U			4 U	14					4 U	4 U	4 U	14.9 B	8.4
Cyanide	10	10 U	-- HR			10 U	-- HR					10 U	-- HR	10 U	-- HR	10 U

9 3 1 2 3 2 0 7 3 3

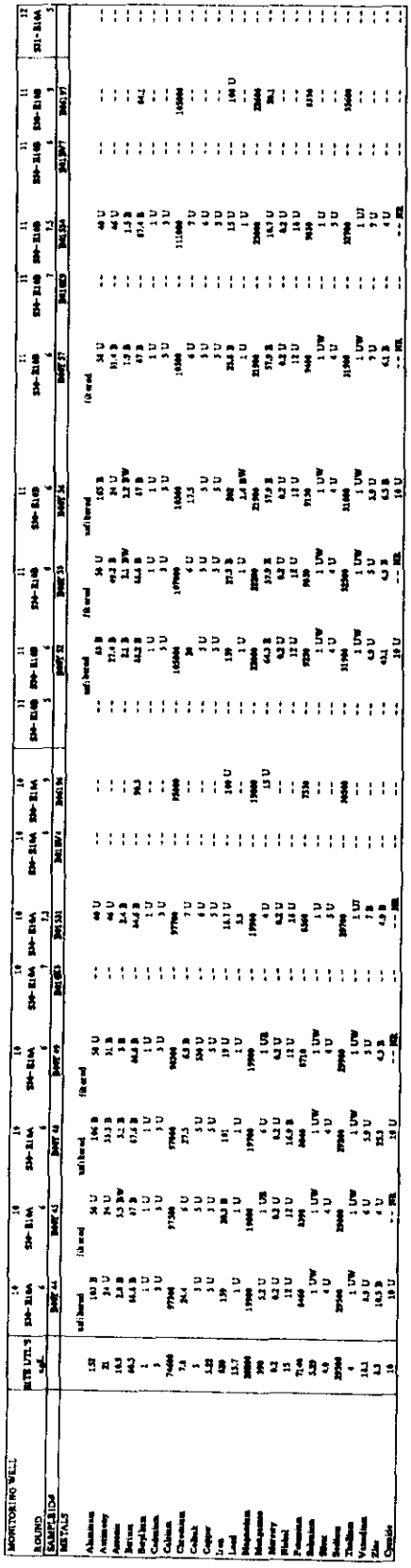
TABLE E-2. Metals and Cyanide Analytical Data

9 3 1 2 3 0 2 0 7 3 4

TABLE E-2. Metals and Cyanide Analytical Data

9 3 1 2 3 2 0 7 3 5

TABLE E-2. Metals and Cyanide Analytical Data



9 3 1 2 3 5 2 0 7 3 3 6

TABLE E-2. Metals and Cyanide Analytical Data

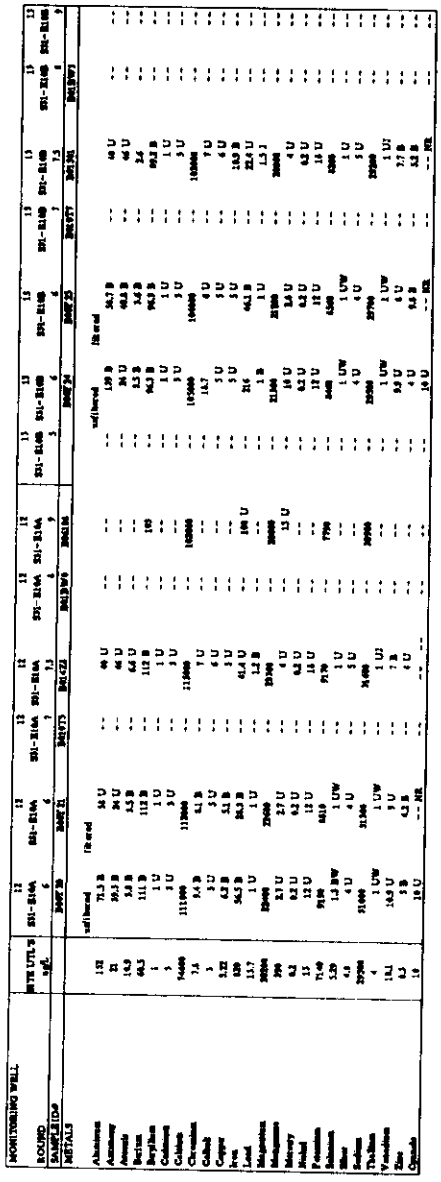


TABLE E-2. Metals and Cyanide Analytical Data

MONITORING WELL	14	14	14	14	14	14	14	15	15	15	15	15	15	15	15	17	17	17	17	17	
WELL ID	31-B16C	31-B16C	31-B16C	31-B16C	31-B16C	31-B16C	31-B16C	31-B16D	31-B16D	31-B16D	31-B16D	31-B16D	31-B16D	31-B16D	31-B16D	31-B13C	31-B13C	31-B13C	31-B13C	31-B13C	
ROUND	5	6	6	7	7.3	8	9	5	6	6	6	7	7.3	8	9	5	5	6	6	7	
SAMPLE ID#		B46F35	B46F29	B61879	B61564	B61BW6	B46382		B462F7	B462F8	B46F33	B61971	B61307	B61BP7	B46384	B46J8P	B46HT9	B462C2	B462C0		
PARAMETERS																					
METALS																					
		unfiltered	filtered						unfiltered	filtered						unfiltered	filtered	unfiltered	filtered		
Aluminum	--	62.6 B	86 U	--	86.8 B	--	--	--	86 U	114 B	86 U	--	40 U	--	--	39.4 B	85 U	467	86 U	--	
Antimony	--	24 U	26.8 B	--	46 U	--	--	--	24 U	26.8 B	24 U	--	46 U	--	--	37 U	37 U	24 U	24 U	--	
Arsenic	--	1.8 B	1.7 B	--	8.2 B	--	--	--	3.6 BW	3.9 BW	4.8 B	--	3.6 B	--	--	4.6 B	3.9 B	4.4 B	4.9 B	--	
Barium	--	84.8 B	86.4 B	--	91.4 B	--	83.2	--	71.7 B	129 B	76.3 B	--	82.3 B	--	69.5	39.6 B	39.6 B	26.7 B	19.4 B	--	
Beryllium	--	1 U	1 U	--	1 U	--	--	--	1 U	1 U	1 U	--	1 U	--	--	2 U	2 U	1 U	1 U	--	
Cadmium	--	3 U	3 U	--	3 U	--	--	--	3 U	3 U	3 U	--	3 U	--	--	4 U	4 U	3 U	3 U	--	
Calcium	--	107000	108000	--	108000	--	108000	--	87000 *	108000 *	88400	--	93500	--	76000	50800	51800	28800	28800	--	
Chromium	--	18	8.2 B	--	7 U	--	--	--	10.9	6 U	6.7 B	--	7 U	--	--	4.7 B	4 U	87.5	6 U	--	
Cobalt	--	5 U	5 U	--	6 U	--	--	--	5 U	6 U	6 U	--	6 U	--	--	2 U	5 U	5 U	5 U	--	
Copper	--	5 U	5 U	--	6 U	--	--	--	5 U	16.8 B	6 U	--	6 U	--	--	4 U	4 U	7.4 B	5 U	--	
Iron	--	70.4 B	88.3 B	--	15 U	--	100 U	--	49.3 B	39.8 B	84.8 B	--	35.9 U	--	100 U	89.3 B	39.3 B	739	35.2 B	--	
Lead	--	1 U	1 U	--	1.2 J	--	--	--	2.9 B	1 U	1.1 B	--	1 U	--	--	3 U	3 U	4.9	1.3 B	--	
Magnesium	--	281000	28400	--	28100	--	21800	--	17100 *	21800 *	17800	--	19800	--	14800	10800	10800	8430	8480	--	
Manganese	--	7 U	6.1 U	--	4.8 B	--	15 U	--	1 U	1 U	1.4 U	--	4 U	--	15 U	2 U	2 U	114	92.8	--	
Mercury	--	0.2 U	0.2 U	--	0.2 U	--	--	--	0.2 U	0.2 U	0.2 U	--	0.2 U	--	--	0.2 U	0.2 U	0.2 U	0.2 U	--	
Nickel	--	12 U	12 U	--	16 U	--	--	--	12 U	12 U	12 U	--	18 U	--	--	20 U	20 U	60.3	13.8 B	--	
Potassium	--	8010	8880	--	8880	--	7880	--	7700	12800	7910	--	8480	--	6180	8480	4670 B	4080 B	3800 B	--	
Selenium	--	1 U	1 UW	--	1 U	--	--	--	1 U	1 U	1 UW	--	1 U	--	--	4 UJ W	4 UJ W	1 U	1 U	--	
Silver	--	4 U	4 U	--	6 U	--	--	--	4 U	4 U	4 U	--	6 U	--	--	5 U	5 U	4 U	4 U	--	
Sodium	--	38800	31100	--	38400	--	30800	--	24400 *	40800 *	30800	--	27400	--	22400	8880	8880	16800	16700	--	
Thallium	--	1 UW	1 UW	--	1 UJ	--	--	--	1 U	1 U	1 UW	--	1 UJ	--	--	6 U	6 U	1 UNW	1 UNW	--	
Vanadium	--	7 U	4 U	--	7 U	--	--	--	7.7 B	17.3 B	8 U	--	9.8 B	--	--	6.8 B	7.8 B	4 U	4 U	--	
Zinc	--	4.7 B	4 U	--	6.1 B	--	--	--	4 U	14.8 B	6.4 B	--	4 U	--	--	4 U	4 U	4 U	8.2 B	--	
Cyanide	--	10 U	-- NR	--	-- NR	--	--	--	10 U	-- NR	-- NR	--	-- NR	--	--	10 U	-- NR	10 U	-- NR	--	

9 3 1 2 3 3 2 3 7 3 3

TABLE E-2. Metals and Cyanide Analytical Data

9 3 1 2 3 2 0 7 3 9

TABLE E-2. Metals and Cyanide Analytical Data.

9 3 1 2 3 3 2 0 7 9 3

TABLE E-2. Metals and Cyanide Analytical Data

TABLE E-2. Metals and Cyanide Analytical Data

MONITORING WELL	S30-13A	S32-E13A	S32-E13A	S32-E13A	S32-E13A	S32-E13A	S32-E13A
WELL ID	S30-13A	S32-E13A	S32-E13A	S32-E13A	S32-E13A	S32-E13A	S32-E13A
ROUND	9	5	6	7	7.3	8	9
SAMPLE ID#	[illegible]						
PARAMETERS							
METALS							
Aluminum	--	--	50 U	--	--	--	--
Antimony	--	--	46.7 B	--	--	--	--
Arsenic	--	--	2.5 B	--	--	--	--
Barium	--	--	117 B	--	--	--	--
Beryllium	--	--	1 U	--	--	--	--
Cadmium	--	--	3 U	--	--	--	--
Calcium	--	--	123000	--	--	--	--
Chromium	--	--	6 U	--	--	--	--
Cobalt	--	--	5 U	--	--	--	--
Copper	--	--	5 U	--	--	--	--
Iron	--	--	375	--	--	--	--
Lead	--	--	2.6 B	--	--	--	--
Magnesium	--	--	22100	--	--	--	--
Manganese	--	--	3.6 B	--	--	--	--
Mercury	--	--	0.2 U	--	--	--	--
Nickel	--	--	12 U	--	--	--	--
Potassium	--	--	9130	--	--	--	--
Selenium	--	--	1.5 BNW	--	--	--	--
Silver	--	--	4 U	--	--	--	--
Sodium	--	--	19000	--	--	--	--
Thallium	--	--	1 UNW	--	--	--	--
Vanadium	--	--	11.7 B	--	--	--	--
Zinc	--	--	22.5	--	--	--	--
Cyanide	--	--	10 U	--	--	--	--

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TABLE E-3 Wet Chemistry Analytical Data

MONITORING WELL	1	1	1	1	1	1	2	2	2	2	2	2	3	3	3	3	3	3
WELL I.D.	S41-E11	S41-E11	S41-E11	S34-E10	S41-E11	S41-E11	S34-E10	S34-E10	S34-E10	S34-E10	S34-E10	S34-E10	S41-E12	S41-E12	S41-E12	S41-E12	S41-E12	S41-E12
ROUND	5	6	7	7.5	8	9	5	6	7	7.5	8	9	5	6	7	7.5	8	9
SAMPLE ID#		B00ZC6			B01BT3			B00Z68				B06194		B00ZD0			B01BT6	
PARAMETERS																		
PARAMETERS																		
WET CHEMISTRY (units = mg/L)																		
TOX (ug/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	--	0.02	--	--	--	--	--	0.06	--	--	--	0.05 U	--	0.1	--	--	--	--
Nitrates	--	4.4	--	--	--	--	--	6.5	--	--	--	--	--	2.2	--	--	--	--
COD	--	10 ND	--	--	--	--	--	10 ND	--	--	--	--	--	10 ND	--	--	--	--
Turbidity (units = NTU)	--	0.3	--	--	--	--	--	0.6	--	--	--	--	--	0.9	--	--	--	--
Alkalinity (CaCO3)	--	170	--	--	240	--	--	140	--	--	--	154	--	310	--	--	--	--
Fluoride (F)	--	0.5	--	--	--	--	--	0.7	--	--	--	0.3	--	0.8	--	--	--	--
Chloride (Cl)	--	14	--	--	--	--	--	13	--	--	--	13.8	--	110	--	--	--	--
Bromide (Br)	--	0.2 ND	--	--	--	--	--	0.2 ND	--	--	--	--	--	0.2	--	--	--	--
Phosphate (PO4-P)	--	0.2 ND	--	--	--	--	--	0.1 ND	--	--	--	0.03 B	--	0.2 ND	--	--	--	--
Nitrate (NO3-N)	--	18	--	--	--	--	--	6	--	--	--	5.01	--	10.6	--	--	--	--
Nitrite (NO2-N)	--	0.07 ND	--	--	--	--	--	0.06 ND	--	--	--	0.1 U	--	0.07 ND	--	--	--	--
Sulfate (SO4)	--	31	--	--	--	--	--	41	--	--	--	45.5	--	23	--	--	--	--
TDS	--	310	--	--	--	--	--	300	--	--	--	--	--	590	--	--	--	--
pH	--	7.8	--	--	--	--	--	7.7	--	--	--	7.88	--	7.5	--	--	--	--
Conductivity (units = umhos/cm)	--	480	--	--	720	--	--	470	--	--	--	--	--	940	--	--	--	--

TABLE E-3 Wet Chemistry Analytical Data

MONITORING WELL	4	4	4	4	4	4	5	5	5	5	5	5	5	6	6	6	6	6
WELL I.D.	S38-E12A	S38-E12A	S38-E12A	S38-E12A	S38-E12A	S38-E12A	S38-E12B	S38-E12B	S38-E12B/DUPL	S38-E12B	S38-E12B	S38-E12B	S38-E12	S37-E11	S37-E11	S37-E11	S37-E11	S37-E11
ROUND	5	6	7	7.5	8	9	5	6	6	7	7.5	8	9	5	6	7	7.5	8
SAMPLE ID#	B00Z52				B01HY9		B00Z56		B00Z69			B01BV0		B00Z64				B01BV2
PARAMETERS																		
PARAMETERS																		
WET CHEMISTRY (units = mg/L)																		
TOX (ug/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	--	0.02 ND	--	--	--	--	--	0.02 ND	0.02	--	--	--	--	--	0.02 ND	--	--	--
Nitrates	--	2	--	--	--	--	--	1.7	1.7	--	--	--	--	--	2.4	--	--	--
COD	--	10 ND	--	--	--	--	--	10 ND	10 ND	--	--	--	--	--	10 ND	--	--	--
Turbidity (units = NTU)	--	0.2	--	--	--	--	--	0.4	0.4	--	--	--	--	--	0.4	--	--	--
Alkalinity (CaCO3)	--	130	--	--	--	--	--	120	120	--	--	--	--	--	140	--	--	--
Fluoride (F)	--	0.6	--	--	--	--	--	0.6	0.6	--	--	--	--	--	0.6	--	--	--
Chloride (Cl)	--	8.5	--	--	--	--	--	6.5	6.5	--	--	--	--	--	9.2	--	--	--
Bromide (Br)	--	0.2 ND	--	--	--	--	--	0.2 ND	0.2 ND	--	--	--	--	--	0.2 ND	--	--	--
Phosphate (PO4-P)	--	0.1 ND	--	--	--	--	--	0.1 ND	0.1 ND	--	--	--	--	--	0.1 ND	--	--	--
Nitrate (NO3-N)	--	1.8	--	--	--	--	--	1.5	1.8	--	--	--	--	--	2.4	--	--	--
Nitrite (NO2-N)	--	0.06 ND	--	--	--	--	--	0.06 ND	0.06 ND	--	--	--	--	--	0.06 ND	--	--	--
Sulfate (SO4)	--	17	--	--	--	--	--	17	17	--	--	--	--	--	23	--	--	--
TDS	--	220	--	--	--	--	--	210	220	--	--	--	--	--	250	--	--	--
pH	--	7.8	--	--	--	--	--	7.9	7.9	--	--	--	--	--	7.9	--	--	--
Conductivity (units = umhos/cm)	--	350	--	--	--	--	--	330	330	--	--	--	--	--	360	--	--	--

TABLE E-3 Wet Chemistry Analytical Data

MONITORING WELL	6	7	7	7	7A	7A	7A	7	7	8	8A	8A	8A	8	8A
WELL I.D.	S37-E11	S38-E11	S38-E11	S38-E11/SPLIT	S38-E11	S38-E11	S38-E11	S38-E11	S38-E11	S31-E8	S31-E8	S31-E8	S38-E11	S31-E8	S31-E8
ROUND	9	5	6	6	6	7	7.5	8	9	5	6	6	7	7.5	7.5
SAMPLE ID#			B00Z72	B00Z76	B00XY0	B010Z3	B01543				B00ZC9	B00Y36	B010Z7	B01537	B01546
PARAMETERS															
PARAMETERS															
WET CHEMISTRY (units = mg/L)															
TOX (ug/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	--	--	0.04	0.02 ND	120	0.02 ND	0.03	--	--	--	0.05	0.54	0.05 ND	0.05	0.29
Nitrates	--	--	3.8	3.6	7.5	6.9	7.8	--	--	--	17	7.3	17	7.1	17
COD	--	--	10 ND	10 ND	10 ND	10 ND	10 ND	--	--	--	10 ND	10 ND	10 ND	10 ND	10 ND
Turbidity (units = NTU)	--	--	0.7	0.6	0.7	1.7	--	--	--	--	2.3	0.2 ND	0.4	--	--
Alkalinity (CaCO3)	--	--	160	150	110	130	--	--	--	--	140	160	150	--	--
Fluoride (F)	--	--	0.7	0.6	0.9	0.6	0.5	--	--	--	0.8	0.4	0.8	0.5	0.6
Chloride (Cl)	--	--	13	13	24	23	25	--	--	--	12	15	13	17	14
Bromide (Br)	--	--	0.2 ND	0.2 ND	0.2	0.2	0.3	--	--	--	0.2 ND	0.2 ND	0.2 ND	0.2 ND	0.2 ND
Phosphate (PO4-P)	--	--	0.1 ND	0.1 ND	0.2 ND	0.2 ND	0.2 ND	--	--	--	0.2 ND	0.7 ND	0.2 ND	0.2 ND	0.2 ND
Nitrate (NO3-N)	--	--	3.5	3.6	8	7.6	7.6	--	--	--	18	6.7	17	6.8	17
Nitrite (NO2-N)	--	--	0.06 ND	0.06 ND	0.06 ND	0.07 ND	0.07 ND	--	--	--	0.07 ND	0.06 ND	0.07	0.07 ND	0.07 ND
Sulfate (SO4)	--	--	38	39	49	47	47	--	--	--	68	31	61	30	61
TDS	--	--	280	280	340	350	--	--	--	--	400	330	500	--	--
pH	--	--	7.7	7.8	7.7	7.7	7.9	--	--	--	7.8	7.8	7.8	7.8	7.8
Conductivity (units = umhos/cm)	--	--	470	460	520	440	510	--	--	--	670	460	590	490	610

TABLE E-3 Wet Chemistry Analytical Data

MONITORING WELL	8	8	9	MW-9	9	9	9	9	10	10	10	10	10	10	10
WELL I.D.	S31-E08	S31-E08	S32-E8	S32-E8	S32-E08	S32-E8	S32-E08	S32-E08	S30-E10A	S30-E10A	S30-E10A/DUPL.	S30-E10A	S30-E10A	S30-E10A	S3GE10A
ROUND	8	9	5	6	7	7.5	8	9	5	6	6	7	7.5	8	9
SAMPLE ID#		B06195		B00Y40		B01540			B00HW2	B00Y44	B00Y48	B010K3	B01S81	B01BV4	B06196
PARAMETERS															
PARAMETERS															
WET CHEMISTRY (units = mg/L)															
TOX (ug/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	--	0.05 U	--	0.17	--	0.03	--	--	0.03 U	0.11	0.06	0.08	0.03	--	0.05 U
Nitrates	--	--	--	0.17	--	10 ND	--	--	36	41	43	46	41	--	--
COD	--	--	--	10 ND	--	10 ND	--	--	10 U	10	10 ND	10 ND	10 ND	--	--
Turbidity (units = NTU)	--	--	--	0.2 ND	--	--	--	--	0.4	0.3	0.6	0.6	--	--	--
Alkalinity (CaCO3)	--	161	--	90	--	--	--	--	150	150	150	150	--	--	159
Fluoride (F)	--	0.3	--	0.4	--	0.4	--	--	1 U	0.8	0.8	0.9	0.9	--	0.3
Chloride (Cl)	--	16.2	--	2	--	2.1	--	--	23	22	22	22	23	--	26
Bromide (Br)	--	--	--	0.2 ND	--	0.2 ND	--	--	0.2 U	0.2 ND	0.2 ND	0.2 ND	0.2 ND	--	--
Phosphate (PO4-P)	--	0.04 B	--	0.7 ND	--	0.2 ND	--	--	0.7 U	0.7 ND	0.7 ND	0.2 ND	0.4 ND	--	0.03 U
Nitrate (NO3-N)	--	6.5	--	0.05 ND	--	0.05 ND	--	--	39	38	38	47	38	--	43
Nitrite (NO2-N)	--	0.1 U	--	0.06 ND	--	0.07 ND	--	--	0.06 U	0.06 ND	0.06 ND	0.07 ND	0.07 ND	--	0.1 U
Sulfate (SO4)	--	29.8	--	11	--	11	--	--	75	69	69	75	63	--	68.7
TDS	--	--	--	160	--	--	--	--	540	590	590	780	--	--	--
pH	--	7.8	--	7.8	--	8	--	--	7.8	7.7	7.8	7.8	7.8	--	7.67
Conductivity (units = umhos/cm)	--	--	--	220	--	220	--	--	940	820	800	930	850	--	--

TABLE E-3 Wet Chemistry Analytical Data

MONITORING WELL	11	11	11	11	11	11	11	11	11	11	12	12	12	12
WELL I.D.	S30-E10B	S30-E10B	S30-E10B	S30-E10B	S30-E10B/DUPLS30-E10B/SPLIT		S30-E10B	S30-E10B	S30-E10B	S30-E10B	S31-E10A	S31-E10A	S31-E10A	S31-E10A
ROUND	5	5	6	6	7	7	7	7.5	8	9	5	6	7	7.5
SAMPLE ID#	B00HW4	B00HW6	B00Y52	B00Y56	B010X5	B010X7	B010X9	B01534	B01BV7	B06197	B00HX0	B00Y20	B010T5	B014Z8
PARAMETERS														
PARAMETERS														
WET CHEMISTRY (units = mg/L)														
TOX (ug/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOC	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	0.2 U	0.2 U	0.16	0.21	0.05	0.05	0.05 ND	0.12	--	0.05 U	0.2 U	0.04	0.87	0.03
Nitrates	42	42	49	51	45	45	38	53	--	--	49	55	49	58
COD	10 U	10 U	10 ND	10 ND	10 ND	10 ND	10 ND	10 ND	--	--	10 U	10 ND	10 ND	10 ND
Turbidity (units = NTU)	0.5	0.5	0.7	0.4	2.7	0.9	1	--	--	--	0.2	0.2 ND	0.2 ND	--
Alkalinity (CaCO3)	150	150	150	150	150	150	160	--	--	161	160	170	170	--
Fluoride (F)	1 U	1 U	0.8	0.8	1.5	0.9	0.9	0.9	--	0.3	1.1 U	0.8	0.9	1
Chloride (Cl)	22	22	23	23	23	23	21	24	--	26.2	21	17	18	18
Bromide (Br)	0.2 U	0.2 U	0.2 ND	0.2 ND	0.2 ND	0.2 ND	0.2 ND	0.2 ND	--	--	0.2 U	0.2 ND	0.2 ND	0.2 ND
Phosphate (PO4-P)	0.7 U	0.7 U	0.7 ND	0.7 ND	0.2 ND	0.2 ND	0.2 ND	0.4 ND	--	0.03 U	0.7 U	0.7 ND	0.2 ND	0.4 ND
Nitrate (NO3-N)	40	42	46	46	46	47	39	48	--	48.8	50	49	51	52
Nitrite (NO2-N)	1.8	1.5	0.71	0.75	0.07 ND	0.07 ND	0.07 ND	0.07 ND	--	0.1 U	0.06 U	0.06 ND	0.07 ND	0.07 ND
Sulfate (SO4)	79	81	76	75	74	75	65	70	--	75.4	78	71	71	67
TDS	580	580	640	650	690	700	650	--	--	--	610	700	720	--
pH	7.8	7.8	7.6	7.8	7.7	7.8	7.8	7.8	--	7.65	7.8	7.7	7.6	7.7
Conductivity (units = umhos/cm)	820	940	910	920	950	930	850	920	--	--	940	940	880	970

TABLE E-3 Wet Chemistry Analytical Data

MONITORING WELL	12	12	13	13	13	13	13	13	14	14	14	14	14	14	15
WELL I.D.	S31-E10A	S31-E10A	S31-E10B	S31-E10B	S31-E10B	S31-E10B	S31-E10B	S31-E10B	S31-E10C	S31-E10C	S31-E10C	S31-E10C	S31-E10C	S31-E10C	S31-E10D
ROUND	8	9	5	6	7	7.5	8	9	5	6	7	7.5	8	9	5
SAMPLE ID#	B01BW0	B06198	B00HX2	B00Y24	B010T7	B01501	B01BW3		B00HX4	B00Y26	B010T9	B01504	B01BW6	B06202	B00HX6
PARAMETERS															
PARAMETERS															
WET CHEMISTRY (units = mg/L)															
TOX (ug/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	--	0.05 U	0.2 U	0.32	0.1	0.04	--	--	0.2 U	1	0.07	0.05	--	0.05 U	0.2 U
Nitrates	--	--	45	53	44	52	--	--	49	52	46	54	--	--	30
COD	--	--	10 U	10 ND	10 ND	10 ND	--	--	10 U	10 ND	10 ND	10 ND	--	--	10 U
Turbidity (units = NTU)	--	--	0.2 U	0.6	0.2 ND	--	--	--	0.2 U	0.2	0.2 ND	--	--	--	0.2 U
Alkalinity (CaCO3)	--	171	160	160	170	--	--	--	170	170	170	--	--	172	150
Fluoride (F)	--	0.4	1.3 U	1	1.1	1	--	--	1.1 U	0.9	1	0.9	--	0.4	1.1 U
Chloride (Cl)	--	17.7	20	16	15	17	--	--	21	17	16	16	--	17.4	19
Bromide (Br)	--	--	0.2 U	0.2 ND	0.2 ND	0.2 ND	--	--	0.2 U	0.2 ND	0.2 ND	0.2 ND	--	--	0.2 U
Phosphate (PO4-P)	--	0.03 B	0.7 U	0.7	0.2 ND	0.4 ND	--	--	0.7 U	0.7 ND	0.2 ND	0.4 ND	--	0.03 B	0.7 U
Nitrate (NO3-N)	--	51.6	45	46	45	43	--	--	47	47	47	48	--	50.7	30
Nitrite (NO2-N)	--	0.1 U	0.06 U	0.6 ND	0.07 ND	0.07 ND	--	--	0.06 U	0.06 ND	0.07 ND	0.07 ND	--	0.1 U	0.06 U
Sulfate (SO4)	--	70.7	68	65	63	59	--	--	76	72	69	65	--	70.3	55
TDS	--	--	600	630	640	--	--	--	640	630	660	--	--	--	450
pH	--	7.57	7.8	7.6	7.8	7.7	--	--	7.8	7.6	7.8	7.8	--	7.64	7.9
Conductivity (units = umhos/cm)	--	--	820	820	800	870	--	--	940	940	820	920	--	--	690

TABLE E-3 Wet Chemistry Analytical Data

MONITORING WELL	15	15	15	15	15	17	17	17	17	17	17	18	18	18	18	18
WELL I.D.	S31-E10D	S31-E10D	S31-E10D	S31-E10D	S31-E10A	S41-E13A	S41-E13C	S41-E13C	S41-E13C	S31-E13A	S41-E13A	S37-E12	S37-E12	S37-E12	S37-E12	S37-E12
ROUND	6	7	7.5	8	9	5	6	7	7	8	9	5	6	7	7	8
SAMPLE ID#	B00ZP7	B010V1	B01507	B01BW9	B06206	B00HS9	B00ZC2					B00HV8	B00ZG1	B010Y9		B01E0C2
PARAMETERS																
PARAMETERS																
WET CHEMISTRY (units = mg/L)																
TOX (ug/L)	--	--	--	--	--	10 U	--	--	--	--	--	10 U	--	--	--	--
TOC	--	--	--	--	--	0.5	--	--	--	--	--	0.5	--	--	--	--
Ammonia	0.22	0.05	0.02 ND	--	0.05 U	0.2 U	0.02 ND	--	--	--	--	0.3	0.1	0.05 ND	--	--
Nitrates	33	36	40	--	--	0.73	0.05	--	--	--	--	2.3	1.9	1.6	--	--
COD	10 ND	10 ND	10 ND	--	--	10 U	10 ND	--	--	--	--	10 U	10 ND	10 ND	--	--
Turbidity (units = NTU)	0.3	0.2 ND	--	--	--	0.6	2.9	--	--	--	--	1.2	2	2	--	--
Alkalinity (CaCO3)	160	170	--	--	159	160	110	--	--	--	--	10 U	120	120	--	--
Fluoride (F)	1	1	1	--	0.6	0.8 U	0.4	--	--	--	--	0.9 U	0.3	0.7	--	--
Chloride (Cl)	14	14	15	--	14.3	4.8	2.7	--	--	--	--	7.1	11	7	--	--
Bromide (Br)	0.2 ND	0.2 ND	0.2 ND	--	--	0.2 U	0.2 ND	--	--	--	--	0.2 U	0.2 ND	0.2 ND	--	--
Phosphate (PO4-P)	0.2 ND	0.2 ND	0.4 ND	--	0.04 B	0.07 U	0.2 ND	--	--	--	--	0.07 U	0.2 ND	0.2 ND	--	--
Nitrate (NO3-N)	33	30	36	--	23.6	0.96	0.05 ND	--	--	--	--	2.2	1.9	1.6	--	--
Nitrite (NO2-N)	0.07 ND	0.07 ND	0.07 ND	--	0.1 U	0.06 U	0.07 ND	--	--	--	--	0.06 U	0.07 ND	0.07 ND	--	--
Sulfate (SO4)	57	58	55	--	46.3	9.9	14	--	--	--	--	3300	16	14	--	--
TDS	500	570	--	--	--	220	160	--	--	--	--	570	190	280	--	--
pH	7.7	7.9	7.8	--	7.73	8	8	--	--	--	--	1.6	7.8	7.7	--	--
Conductivity (units = umhos/cm)	770	730	780	--	--	350	260	--	--	--	--	--	360	310	--	--

TABLE E-3 Wet Chemistry Analytical Data

MONITORING WELL	18	19	19	19	19	19	19	20	20	20	20	20	20	21	21	21
WELL I.D.	S37-E12	S32-E11	S32-E11	S32-E11	S32-E11	S32-E11	S32-E11	S29-E11	S29-E11	S29-E11	S29-E11	S29-E11	S29-E11	S31-E10E	S31-E10E	S31-E10E
ROUND	9	5	6	7	7	8	9	5	6	7	7.5	8	9	5	6	7
SAMPLE ID#			B00ZH3	B010V3	B01510	B01C07	B06207		B00ZH4	B010V7	B01513	B01C12	B06208		B00ZH5	B010W1
PARAMETERS																
PARAMETERS																
WET CHEMISTRY (units = mg/L)																
TOX (ug/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Nitrates	--	--	--	0.05 ND	0.02 ND	--	0.05 U	--	--	0.23	0.2	0.07	0.05 U	--	--	--
COD	--	--	--	3.2	3.8	--	--	--	--	31	32	31	--	--	--	0.07
Turbidity (units = NTU)	--	--	--	10 ND	10 ND	--	--	--	--	10	10 ND	10 ND	--	--	--	10 ND
Alkalinity (CaCO3)	--	--	--	0.5	--	--	--	--	--	2.2	--	9.9	--	--	--	10 ND
Fluoride (F)	--	--	--	140	--	--	142	--	--	160	--	160	162	--	--	0.9
Chloride (Cl)	--	--	--	0.8	0.8	--	0.3	--	--	1	0.9	0.8	0.3	--	--	120
Bromide (Br)	--	--	--	11	12	--	12.1	--	--	13	13	14	14.5	--	--	0.9
Phosphate (PO4-P)	--	--	--	0.2 ND	0.2 ND	--	--	--	--	0.2	0.2 ND	0.2 ND	--	--	--	2.9
Nitrate (NO3-N)	--	--	--	0.2 ND	0.4 ND	--	0.04 B	--	--	0.2	0.4 ND	ND	0.03 B	--	--	0.2 ND
Nitrite (NO2-N)	--	--	--	3.4	3.4	--	3.6	--	--	31	31	28	35	--	--	1.9
Sulfate (SO4)	--	--	--	0.07 ND	0.07 ND	--	0.1 U	--	--	0.07	0.07 ND	0.07 ND	0.1 U	--	--	0.05 ND
TDS	--	--	--	35	34	--	35.3	--	--	65	80	73	89.6	--	--	0.07 ND
pH	--	--	--	350	--	--	--	--	--	600	--	510	--	--	--	12
Conductivity (units = umhos/cm)	--	--	--	7.8	8	--	7.87	--	--	7.8	7.8	8	7.86	--	--	250
	--	--	--	420	440	--	--	--	--	770	730	730	--	--	--	8
																280

TABLE E-3 Wet Chemistry Analytical Data

MONITORING WELL	21	21	21	22	22	22	22	22	22	22	22	S29-E12	S29-E12	S29-E12	S29-E12	S29-E12
WELL I.D.	S31-E10E	S31-E10E	S31-E10E	S31-E11	S31-E11	S31-E11	S31-E11	S31-E11/DUP.	S31-E11/SPLIT	S31-E11	S31-E11	S29-E12	S29-E12	S29-E12	S29-E12	S29-E12
ROUND	7.5	8	9	5	6	7	7.5	7.5	7.5	8	9	5	6	7	7.5	8
SAMPLE ID#	B01516	B01CI7			B00ZH6	B010W5	B01519	B01522	B01525	B01C22	B06209		B00Y72		B01C29	
PARAMETERS																
PARAMETERS																
WET CHEMISTRY (units = mg/L)																
TOX (ug/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TOC	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Ammonia	0.14	0.07	--	--	--	0.05	0.16	0.09	0.1	--	0.05 U	--	--	--	--	--
Nitrates	0.1	0.01 ND	--	--	--	3.2	4	0.03	0.18	--	--	--	5	--	--	--
COD	10 ND	10 ND	--	--	--	80	10 ND	10 ND	10 ND	--	--	--	--	--	--	--
Turbidity (units = NTU)	--	1.2	--	--	--	0.5	--	--	--	--	--	--	--	--	--	--
Alkalinity (CaCO3)	--	120	--	--	--	140	--	--	--	--	--	--	--	--	--	--
Fluoride (F)	1.1	1	--	--	--	0.6	0.8	1	1.1	--	142	--	140	--	--	--
Chloride (Cl)	2.9	3	--	--	--	12	11	2.9	2.9	--	0.3	--	0.7	--	--	--
Bromide (Br)	0.2 ND	0.2 ND	--	--	--	0.2 ND	0.2 ND	0.2 ND	0.2 ND	--	13.2	--	13	--	--	--
Phosphate (PO4-P)	1	1.1	--	--	--	0.05	0.4 ND	1	1.1	--	--	--	--	--	--	--
Nitrate (NO3-N)	0.05 ND	0.05 ND	--	--	--	3.3 ND	3.7	0.05 ND	0.05 ND	--	0.04 B	--	--	--	--	--
Nitrite (NO2-N)	0.07 ND	0.07 ND	--	--	--	0.07	0.07 ND	0.07 ND	0.07 ND	--	4.2	--	4.5	--	--	--
Sulfate (SO4)	13	12	--	--	--	31	32	13	13	--	0.1 U	--	--	--	--	--
TDS	--	180	--	--	--	320	--	--	--	--	35.1	--	33	--	--	--
pH	8	8	--	--	--	8	7.9	8	8	--	7.9	--	300	--	--	--
Conductivity (units = umhos/cm)	280	270	--	--	--	400	410	270	280	--	--	--	7.6	--	--	--
													530	--	--	--

TABLE E-3 Wet Chemistry Analytical Data

MONITORING WELL	S29-E12	S30-15A	S30-15A	S30-E15A	S30-15A	S30-15A	S30-15A	S32-E13A	S32-E13A	S32-E13A	S32-E13A	S32-E13A	S32-E13A
WELL I.D.	S29-E12	S30-15A	S30-E15A	S30-E15A	S30-15A	S30-15A	S30-15A	S32-E13A	S32-E13A	S32-E13A	S32-E13A	S32-E13A	S32-E13A
ROUND	9	5	6	7	7.5	8	9	5	6	7	7.5	8	9
SAMPLE ID#	B06210	B00Y56						B00Y90					
PARAMETERS													
PARAMETERS													
WET CHEMISTRY (units = ug/L)													
TOX (ug/L)	--	--	10	--	--	--	--	--	--	--	--	--	--
TOC	--	--	--	--	--	--	--	--	1.1	--	--	--	--
Ammonia	0.05 U	--	0.35	--	--	--	--	--	--	--	--	--	--
Nitrates	--	--	2.7	--	--	--	--	--	3.7	--	--	--	--
COD	--	--	--	--	--	--	--	--	--	--	--	--	--
Turbidity (units = NTU)	--	--	0.4	--	--	--	--	--	0.4	--	--	--	--
Alkalinity (CaCO3)	144	--	220	--	--	--	--	--	250	--	--	--	--
Fluoride (F)	0.3	--	0.5	--	--	--	--	--	0.6	--	--	--	--
Chloride (Cl)	13.2	--	7.3	--	--	--	--	--	8.5	--	--	--	--
Bromide (Br)	--	--	--	--	--	--	--	--	--	--	--	--	--
Phosphate (PO4-P)	0.03 B	--	--	--	--	--	--	--	--	--	--	--	--
Nitrate (NO3-N)	6.2	--	2.8	--	--	--	--	--	3.4	--	--	--	--
Nitrite (NO2-N)	0.1 U	--	--	--	--	--	--	--	--	--	--	--	--
Sulfate (SO4)	37.2	--	18	--	--	--	--	--	19	--	--	--	--
TDS	--	--	330	--	--	--	--	--	350	--	--	--	--
pH	7.67	--	7.6	--	--	--	--	--	7.4	--	--	--	--
Conductivity (units = umhos/cm)	--	--	510	--	--	--	--	--	540	--	--	--	--

Table E-4. Gross Alpha Analytical Data

UTL: 8.2 pCi/L	Gross Alpha, pCi/L				
Round:	5th	6th	7th	7-1/2	8th
Date:	3/91	6/91	8/91	9/91	11/91
Well Number					
MW-1	--	LT 3	--	--	11±5
MW-2	--	LT 4	--	--	--
MW-3	--	LT 4	--	--	LT 2
MW-4	--	LT 3	--	--	--
MW-5	--	LT 3	--	--	--
MW-6	--	LT 3	--	--	LT 1
MW-7	--	LT 3	--	LT 2	--
MW-8	--	LT 2	--	LT 1	--
MW-9	--	LT 2	--	2.9±2.	--
MW-10	*	LT 3	LT 2	0	LT 2
MW-11	*	LT 3	LT 1	LT 2	9.6±7.1
MW-12	*	5.5±4.1	LT 3	3.6±2.	LT 2
MW-13	6.4	LT 5	LT 2	5	2.9±2.4
MW-14	*	8.4±4.4	2.2±1.9	3.5±2.	5.3±2.9
MW-15	*	LT 4	2.1±2.0	4	3.5±1.9
MW-17	--	LT 3	--	LT 2	--
MW-18	6.6	LT 3	LT 1	2.2±1.	LT 2
MW-19	--	--	LT 2	9	2.2±1.7
MW-20	--	--	LT 2	--	6.3±3.2
MW-21	--	--	LT 2	--	LT 1
MW-22	--	--	LT 2	LT 1	*
S29-E12	--	LT 3	--	LT 2	LT 2
S30-E15A	--	LT 4	--	LT 1	--
S32-E13A	--	LT 3	--	LT 1	--

-- = Sample not taken or data not requested
* = Below error limit (for round 5)
LT = Less Than

Radionuclide Maximum Contaminant Levels (MCL),
40 CFR 141, EPA 1986a:

Gross Alpha . . . . 15 pCi/l

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Table E-5. Gross Beta Analytical Data

UTL: 18 pCi/L	Gross Beta, pCi/L				
Round:	5th	6th	7th	7-1/2	8
Date:	3/91	6/91	8/91	9/91	11/91
Well Number					
MW-1	--	8.6±2.9	--	--	24±2.0
MW-2	--	13±3	--	--	--
MW-3	--	11±3.0	--	--	18±2.0
MW-4	--	6.9±2.7	--	--	--
MW-5	--	7.4±2.7	--	--	--
MW-6	--	8.1±2.9	--	--	2.9±1.0
MW-7	--	9.5±3.0	--	--	--
MW-8	--	--	--	7.6±1.4	--
MW-9	--	5±2.6	--	6.9±1.2	--
MW-10	63.0	62±6	18±2.0	43±3.0	48±3.0
MW-11	60.0	61±6	20±2.0	49±3.0	60±3.0
MW-12	61.0	66±6	20±3.0	53±3.0	58±3.0
MW-13	61.0	60±5	23±2.0	48±3.0	51±3.0
MW-14	70.0	61±5	38±3.0	46±3.0	56±3.0
MW-15	46.0	50±5	21±2.0	41±3.0	43±4.0
MW-17	--	6.2±2.7	--	--	--
MW-18	13.0	9.7±2.9	5.5±1.2	--	6.3±1.3
MW-19	--	--	9.2±1.5	9.5±1.5	9.6±1.5
MW-20	--	--	71±4.0	53±3.0	87±6.0
MW-21	--	--	7.3±1.3	8.6±1.4	6.3±1.3
MW-22	--	--	10±2.0	9.3±1.5	5.1
S29-E12	--	12±3	--	--	8.0±1.4
S30-E15A	--	9.8±3.1	--	--	--
S32-E13A	--	5.3±2.9	--	--	--

-- Sample not taken or data not requested
LT = Less Than

Radionuclide Maximum Contaminant Levels (MCL),
40 CFR 141, EPA 1986a:

Gross Beta . . . . 50 pCi/l

9 3 1 2 1 0 2 0 8 0 5

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APPENDIX F

SIEMENS POWER CORPORATION
ANALYTICAL RESULTS

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APPENDIX F CONTENTS

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1.0 INTRODUCTION

The Siemens Power Corporation (SPC) is the current corporate entity that owns the fuels fabrication facility in Richland, Washington. Several chemical waste storage lagoons are maintained onsite. The lagoons received wastes from the fabrication process that contained dissolved ammonia, sulfate, fluoride, and nitrate. Trichloroethene (TCE), nitrate, ammonia, fluoride, and radionuclides (gross-alpha and gross-beta radiation) were found to be present in the groundwater at the SPC facility. All of these analytes can be attributed to the lagoons except TCE, which was not used in process applications. Subsequent groundwater sampling and analyses have shown TCE and nitrates to be the major contaminants of concern.

2.0 SPC DATA COLLECTION ACTIVITIES

SPC monitored as many as 25 wells between 1973 and 1991 to determine contaminant impact from leaking lagoons on groundwater quality. Selected wells were analyzed for nitrate, ammonium, fluoride, and gross-alpha and gross-beta radiation on a quarterly basis since 1973 to fulfill requirements for the State Waste Discharge Permit and NRC license Number SNM-1227. After a spill of waste containing ammonium hydroxide in July 1989, samples have been collected on a weekly basis starting March 1990 at wells TW-9 and TW-26 and analyzed for ammonium to determine the degree of groundwater contamination. Additionally, four rounds of samples were collected from selected SPC wells between February 1990 and June 1991 in conjunction with quarterly sampling by the U.S. Department of Energy at the Horn Rapids Landfill site and analyzed for TCE, nitrate, and gross-alpha and gross-beta radiation.

In August 1991, samples were collected from 25 existing wells and analyzed for TCE, dichloroethene, and vinyl chloride (breakdown products of TCE), nitrate, ammonia, fluoride, and gross-alpha and -beta radiation.

Since November 1991, sample collection activities and associated investigations are consistent with the remedial investigation (RI) requirements of an independent action under the State of Washington Model-Toxics Control Act (MTCA). The data collected supports the RI and feasibility study (FS) by providing further characterization of the distribution of contaminants and further delineation of the groundwater flow system (also, see section 6.0) in the unconfined aquifer. Water level values are presented in appendix B. Detailed descriptions of the water level measurement and groundwater sampling and analysis procedures are provided in appendix A of the *Work Plan, Phase I Groundwater Study* (Geraghty & Miller, 1991).

3.0 SPC DATA QUALITY

Data for wells was obtained from SPC by personal communication and previous reports (Exxon, 1982, and Geraghty & Miller, 1991). Initially, there were concerns for some uncertainty in reported concentrations due to well construction techniques and sampling

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techniques for samples collected prior to November 1991. All TW wells, except TW-17 and TW-18, are constructed of carbon steel which, due to corrosion and the presence of iron oxides, may impact water quality results. Wells TW-17 and TW-18 raised some issues questioning the absolute accuracy of this data. Wells constructed in November 1991 as part of the SPC RI and sample collection protocol for those wells (labeled GM versus earlier-constructed wells designated TW) are constructed of PVC and are smaller (3-inch diameter) than the other wells (6-inch diameter). These factors and others, including uncertainty regarding well depths, screened intervals, and other construction information, suggest that the data should not be assumed to be accurate.

It seems unlikely, however, that the well material would interfere with the analytes of concern (TCE and nitrates) as there are no known interferences from carbon steel for these compounds. The following tables provide the data available from SPC to date.

Well construction and sample collection methods for sampling activities in November 1991 and later are consistent with current EPA guidelines for CLP data. The GM wells show no significant data quality concerns, data quality is comparable to 1100-EM-1 results.

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4.0 REFERENCES

Exxon Nuclear Company, Inc., October 1982, *Groundwater Quality and Flow Characteristics in the Vicinity of the Exxon Nuclear Company, Inc. fuel Fabrication Facility, Richland, Washington*, Report number XN-JUB-82-86.

Geraghty & Miller, Inc.; September 19, 1991; *Work Plan, Phase I Groundwater Study*; prepared for Siemens Nuclear Power Corporation; Richland, Washington.

TABLE F-1 TCE Concentrations, Siemens Power Corporation
UNITS: ug/L

Date	9/87	12/87	4/90	4/90 *	6/90	9/90	10/90	8/91	11/91	3/92
Well #										
TW-1	8.9	230	40	40	--	--	--	11	--	--
TW-2	--	--	59	56	--	--	--	27	--	--
TW-3	--	--	--	--	--	32	--	12	--	--
TW-4	--	--	--	--	--	26	--	11	--	--
TW-5	--	--	--	--	--	23	--	9.6	--	--
TW-6	--	--	--	--	--	12	--	5.5	--	--
TW-7	--	--	--	--	--	ND	--	5.5	--	--
TW-8	--	ND	--	--	--	--	--	ND	--	--
TW-9	--	420	51	22	--	--	--	11	--	--
TW-11	--	--	--	--	--	--	20	10	--	--
TW-12	--	--	--	--	--	--	24	16	--	--
TW-13	--	--	ND	ND	--	--	ND	ND	--	--
TW-14	--	--	39	33	22	14	--	12	--	10
TW-15	--	--	76	72	58	44	--	25	--	--
TW-16	--	--	73	30	53	33	--	12	--	--
TW-17	--	--	--	--	--	--	--	36	--	--
TW-18	--	--	--	--	--	--	--	36	--	--
TW-19	--	--	--	--	--	--	11	7.9	--	--
TW-20	--	--	--	--	--	--	5	4.1	--	--
TW-21	--	--	--	--	--	--	2 J	1.6	--	--
TW-22	--	--	--	--	--	--	ND	ND	--	--
TW-23	--	--	--	--	--	--	ND	ND	--	--
TW-24	--	--	--	--	--	--	ND	ND	--	--
TW-25	--	--	--	--	--	--	--	ND	--	--
TW-26	--	--	--	--	--	--	--	12	--	--
TW-27(1)	--	--	--	--	--	--	--	13	--	--
TW-30(2)	--	--	--	--	--	--	--	ND	--	--
GM-1	--	--	--	--	--	--	--	--	ND	ND
GM-2	--	--	--	--	--	--	--	--	ND	ND
GM-3	--	--	--	--	--	--	--	--	22 B	15
GM-4	--	--	--	--	--	--	--	--	2 BJ	ND
GM-5	--	--	--	--	--	--	--	--	22 B	14
GM-6	--	--	--	--	--	--	--	--	12 B	18
GM-7	--	--	--	--	--	--	--	--	13 B	15
GM-8	--	--	--	--	--	--	--	--	13 B	22
GM-9	--	--	--	--	--	--	--	--	10 B	9
GM-10	--	--	--	--	--	--	--	--	21 B	18
GM-11	--	--	--	--	--	--	--	--	23 B	17
GM-12	--	--	--	--	--	--	--	--	35 B	29

* = Indicates duplicate samples ND = Not detected -- = Data not Available

9 3 1 2 3 5 2 0 3 1 2

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TABLE F-2 Nitrate (as Nitrogen) for Siemens Power Corp.

	(YEAR/QUARTER)															
	81/1	81/2	81/3	81/4	82/1	82/2	82/3	82/4	83/1	83/2	83/3	83/4	84/1	84/2	84/3	84/4
UNITS: mg/L																
Well #																
TW-1	68	79	38	27	72	63	49	81	99	81	60	52	52	--	53	--
TW-2	34	65	42	18	34	37	33	39	65	57	18	6	44	--	43	--
TW-9	75	75	40	37	47	64	53	56	58	67	48	11	21	--	86	--
TW-13	2.6	3.2	2.1	1.4	2.5	3.1	1.4	0.8	3.5	4.4	1.6	1.3	2.8	--	2.7	--
TW-14	53	77	34	21	40	37	51	65	68	68	52	41	75	--	64	--
TW-15	80	65	39	22	46	61	41	31	54	51	11	39	64	--	53	--
TW-16	--	--	--	--	--	--	24	13	41	0.9	1.2	1.5	1.4	--	1.4	--
TW-23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TW-24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

-- = Data Not Availble * Indicates Duplicate Samples

9 3 1 2 3 6 2 0 8 1 5

TABLE F-2 Nitrate (as Nitrogen) for Siemens Power Corp.

	(YEAR/QUARTER)															
	85/1	85/2	85/3	85/4	86/1	86/2	86/3	86/4	87/1	87/2	87/3	87/4	88/1	88/2	88/3	88/4
UNITS: mg/L																
Well #																
TW-1	71	--	64	--	46	--	42	--	--	51.3	25.6	39.6	52	--	54.4	--
TW-2	57	--	69	--	38	--	34	--	--	44.7	37.7	--	25.8	--	57.5	--
TW-9	94	--	75	--	59	--	86	--	--	--	77.9	--	41.8	--	61.8	--
TW-13	10.2	--	5.6	--	5.6	--	3.4	--	--	--	--	--	--	--	--	--
TW-14	46	--	49	--	52	--	49	--	--	--	64.2	--	42	--	46.9	--
TW-15	85	--	49	--	56	--	33.9	--	--	--	59.4	--	58.9	--	38.4	--
TW-16	1.8	--	--	--	1.4	--	1.4	--	--	--	2.3	--	1.1	--	1.8	--
TW-23	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TW-24	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-4	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-6	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-8	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-9	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-11	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
GM-12	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

-- = Data Not Availble * Indicates Duplicate Samples

TABLE F-2 Nitrate (as Nitrogen) for Siemens Power Corp.

	(YEAR/QUARTER)													
	89/1	89/2	89/3	89/4	2/90	5/90	8/90	11/90	3/91	6/91	8/91	9/91	11/91	3/92
UNITS: mg/L														
Well #														
TW-1	46.6	--	38.9	--	--	--	--	--	--	--	--	--	--	--
TW-2	62.5	--	60.8	--	--	--	--	--	--	--	--	--	--	--
TW-9	20.3	--	83.1	--	--	--	--	--	--	--	--	35	--	--
TW-13	--	--	--	--	--	--	--	--	--	--	--	--	--	--
TW-14	56.5	--	63.9	--	--	79.5	--	--	--	--	--	44	--	--
TW-15	64.2	--	63.9	--	--	61.4	--	--	--	--	--	36	--	--
TW-16	5.7	--	2.5	--	--	42.7	--	--	--	--	--	22	--	--
TW-23	--	--	--	--	--	--	--	--	--	--	--	4.4	--	--
TW-24	--	--	--	--	--	--	--	--	--	--	--	4.7	--	--
GM-1	--	--	--	--	--	--	--	--	--	--	--	--	4.26	4.45
GM-2	--	--	--	--	--	--	--	--	--	--	--	--	3.87	6.52
GM-3	--	--	--	--	--	--	--	--	--	--	--	--	11.4	8.71
GM-4	--	--	--	--	--	--	--	--	--	--	--	--	19	22.1
GM-5	--	--	--	--	--	--	--	--	--	--	--	--	26 *	37.1 *
GM-6	--	--	--	--	--	--	--	--	--	--	--	--	6.43	6.46
GM-7	--	--	--	--	--	--	--	--	--	--	--	--	5.46	8.66
GM-8	--	--	--	--	--	--	--	--	--	--	--	--	15.5	19.9
GM-9	--	--	--	--	--	--	--	--	--	--	--	--	45.7	5.07
GM-10	--	--	--	--	--	--	--	--	--	--	--	--	21.4	24.4
GM-11	--	--	--	--	--	--	--	--	--	--	--	--	9.56	10.2
GM-12	--	--	--	--	--	--	--	--	--	--	--	--	8.22	24.1

-- = Data Not Availble * Indicates Duplicate Samples

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APPENDIX G

SIEMENS POWER CORPORATION
PUMP TEST RESULTS

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This appendix is reserved for the pump test results which will be provided by Siemens Power Corporation. These results are anticipated to be received by December 18, 1992, and will be incorporated into this report at that time.

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APPENDIX H

SATURATED ZONE FLOW AND CONTAMINANT TRANSPORT MODELING

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9 3 1 2 1 3 2 3 8 2 1

APPENDIX H CONTENTS

SATURATED ZONE FLOW AND CONTAMINANT TRANSPORT MODELING . . H-1

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Figure H-2 Groundwater Model Hydrofacies Zone Designation, Layer 2 . . . . . H-3
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9 3 1 2 3 1 6 2 0 3 2 3

SATURATED ZONE FLOW AND CONTAMINANT TRANSPORT MODELING

Hydrofacies zone designation for model layers 1 through 15 are shown in figures H-1 through H-15. A hydrofacies zone is an area with distinct hydrogeological characteristics. The properties of the zones were listed in table 4-6. Most of the zone boundaries followed the stratigraphic map boundaries presented in appendix C. The exceptions were the boundaries between the three hydrofacies in the Hanford Formation that were determined by changes in the groundwater surface gradient.

Figures H-16 through H-18 show simulation results with input values exceeding the ranges found during model calibration. The simulations with high retardation and porosity values show that the model was not extremely sensitive to these parameters. The simulation with no dispersivity showed the model results did not match well with observed results for this case, which is expected since contaminant dispersion is a significant element in the transport process.

9312308224

Model input information and results for the nitrate simulation are shown in figures H-19 and H-20. The same calibrated hydraulic and contaminant transport parameters used for the trichloroethene (TCE) analysis were used to estimate the baseline fate of the nitrate plume. The only change was that the retardation value for nitrate was set at 1.0 (no retardation, conservative transport). For the nitrate source, the total nitrogen data from well TW-2 was used as a guide, with the amount of nitrate assumed to be 80 percent of the observed total nitrogen values shown in figure H-19. The observed nitrate values for 1990 and 1992 are shown in figure 4-26. A simulation was run that resulted in predicted values roughly matching these two data sets. This simulation, shown in figure H-20, predicts that nitrate values will attenuate to below the maximum contaminant level (MCL) of 10 ppm before the year 2005. This simulation assumed that the nitrate sources above 10 ppm do not exist beyond 1993. Although these results were not refined through further analysis, they are consistent with the contaminant transport theory that indicates a conservative solute, such as nitrate, attenuates faster than a nonconservative substance, such as TCE. These results also support the modeling analysis approach for this site of focusing on the TCE, and assuming the nitrate attenuates to its MCL sooner than the TCE.

Model input and output files for the conservative simulation are provided. Input and output files for other simulations were basically the same with the appropriate input changes as described in the main report.

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9 3 1 2 3 2 0 3 2 6

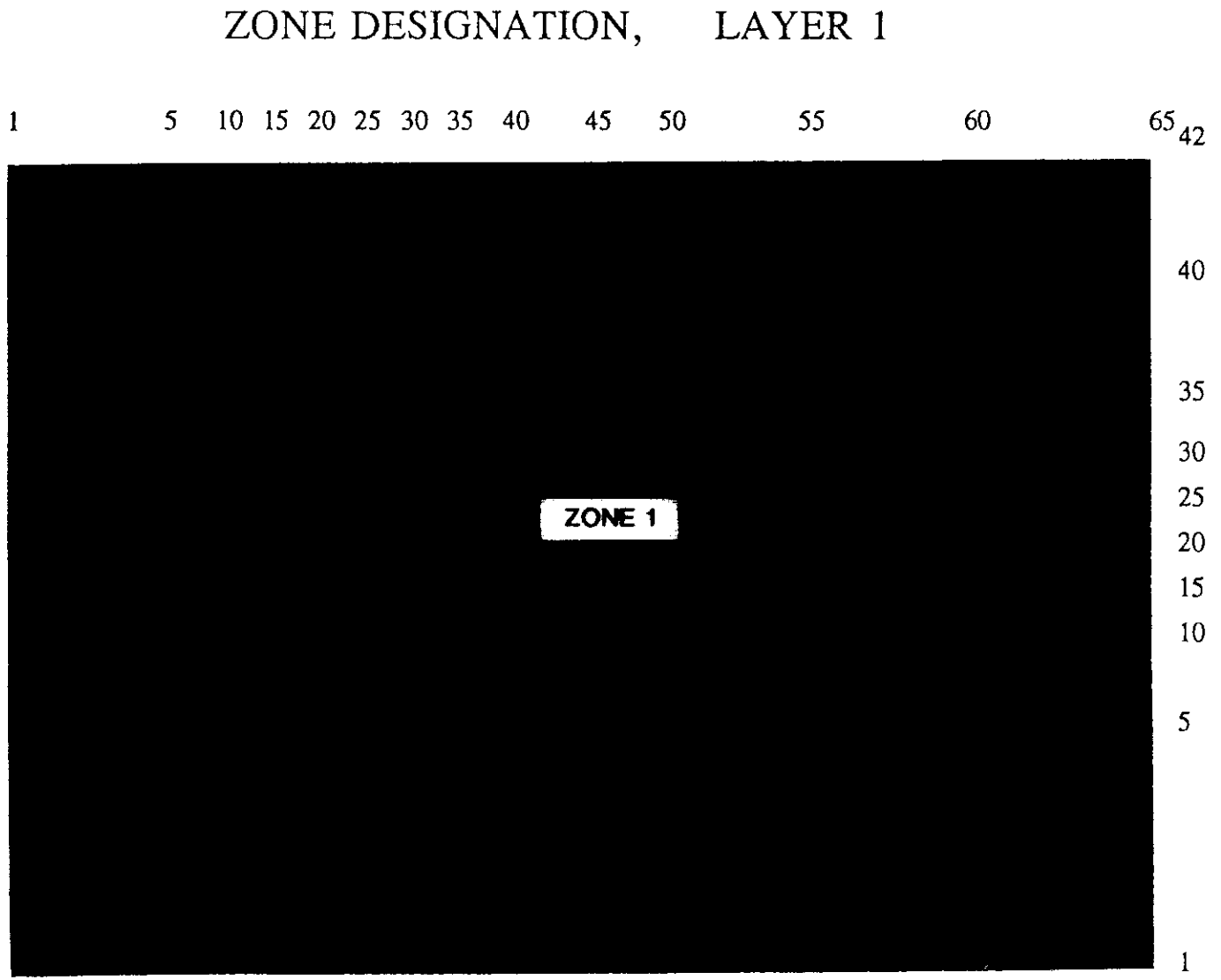

Figure H-1 Groundwater Model Hydrofacies Zone Designation, Layer 1.

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ZONE DESIGNATION, LAYER 2

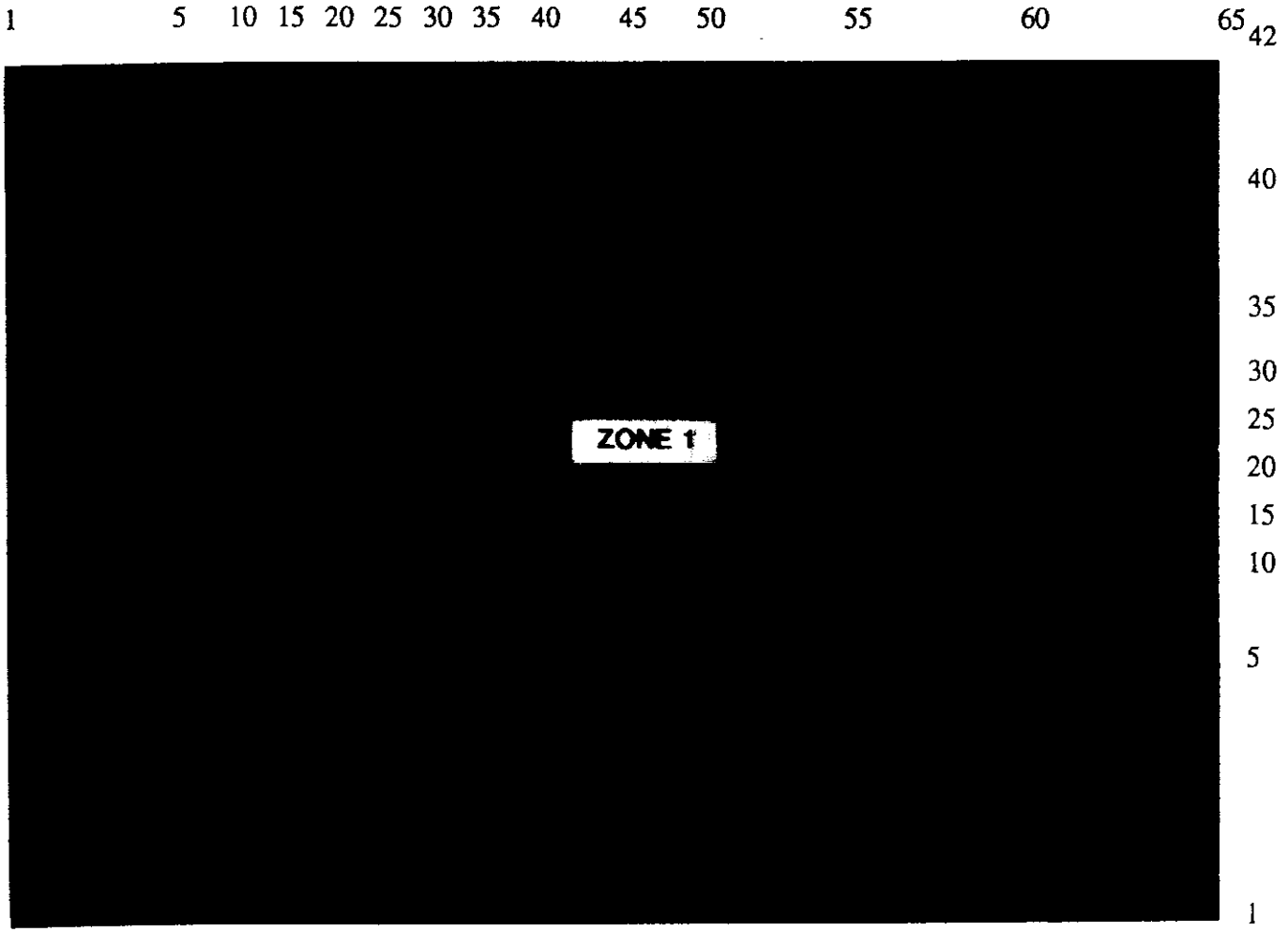

Figure H-2 Groundwater Model Hydrofacies Zone Designation, Layer 2.

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9 3 1 2 3 5 2 0 8 2 9

9 3 1 2 3 2 0 8 3 0

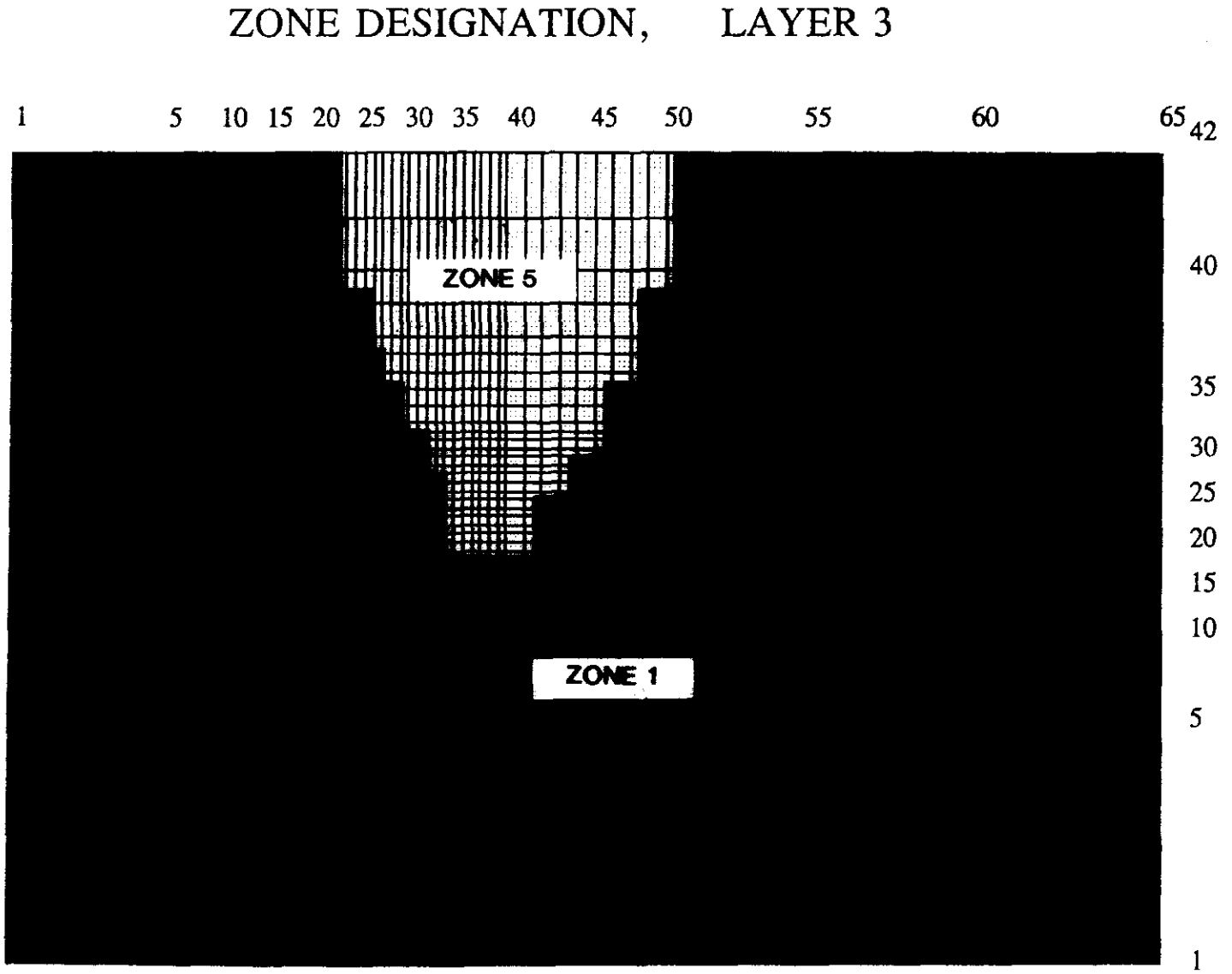

Figure H-3 Groundwater Model Hydrofacies Zone Designation, Layer 3.

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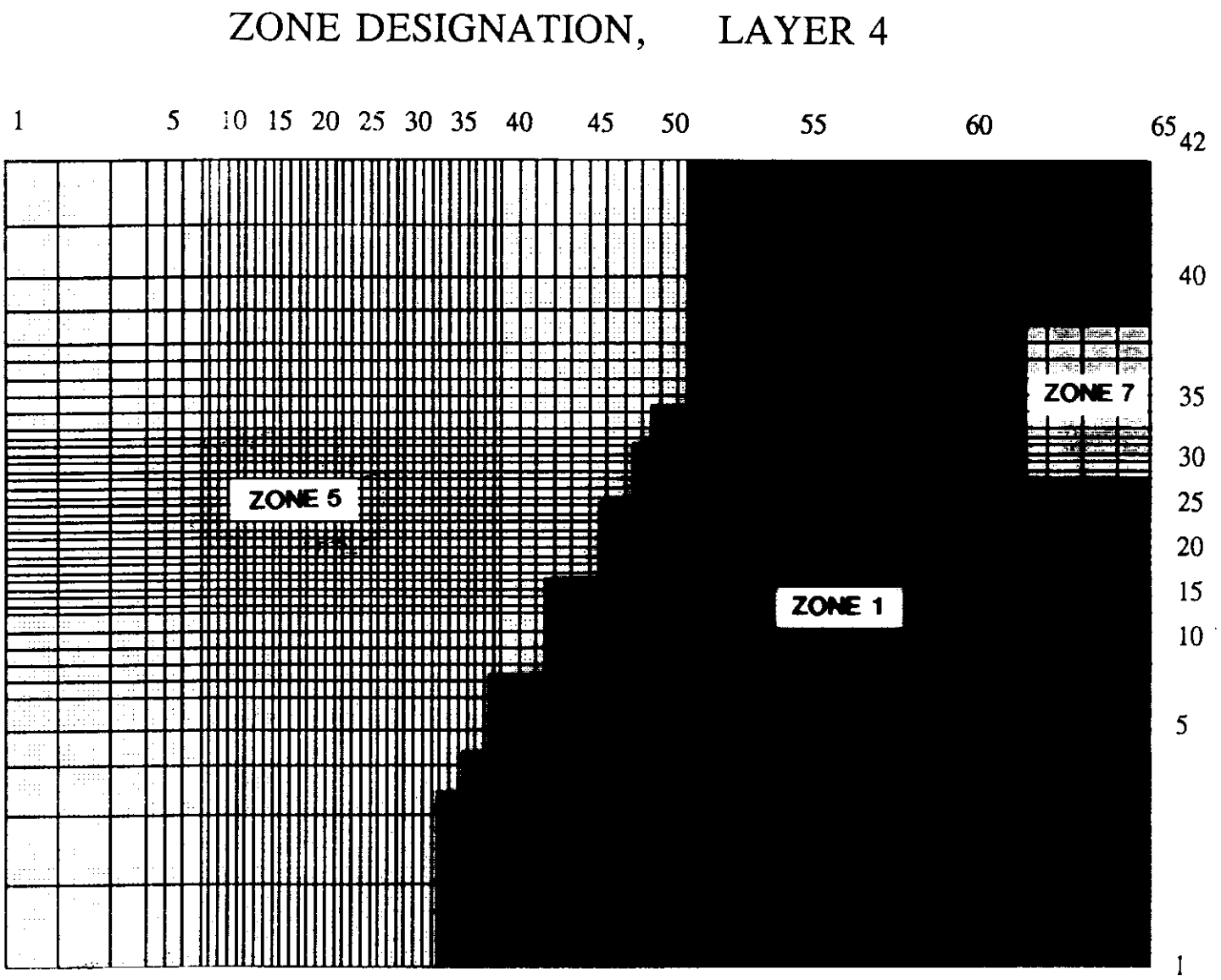

Figure H-4 Groundwater Model Hydrofacies Zone Designation, Layer 4.

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9 3 1 2 3 2 0 8 3 4

ZONE DESIGNATION, LAYER 5

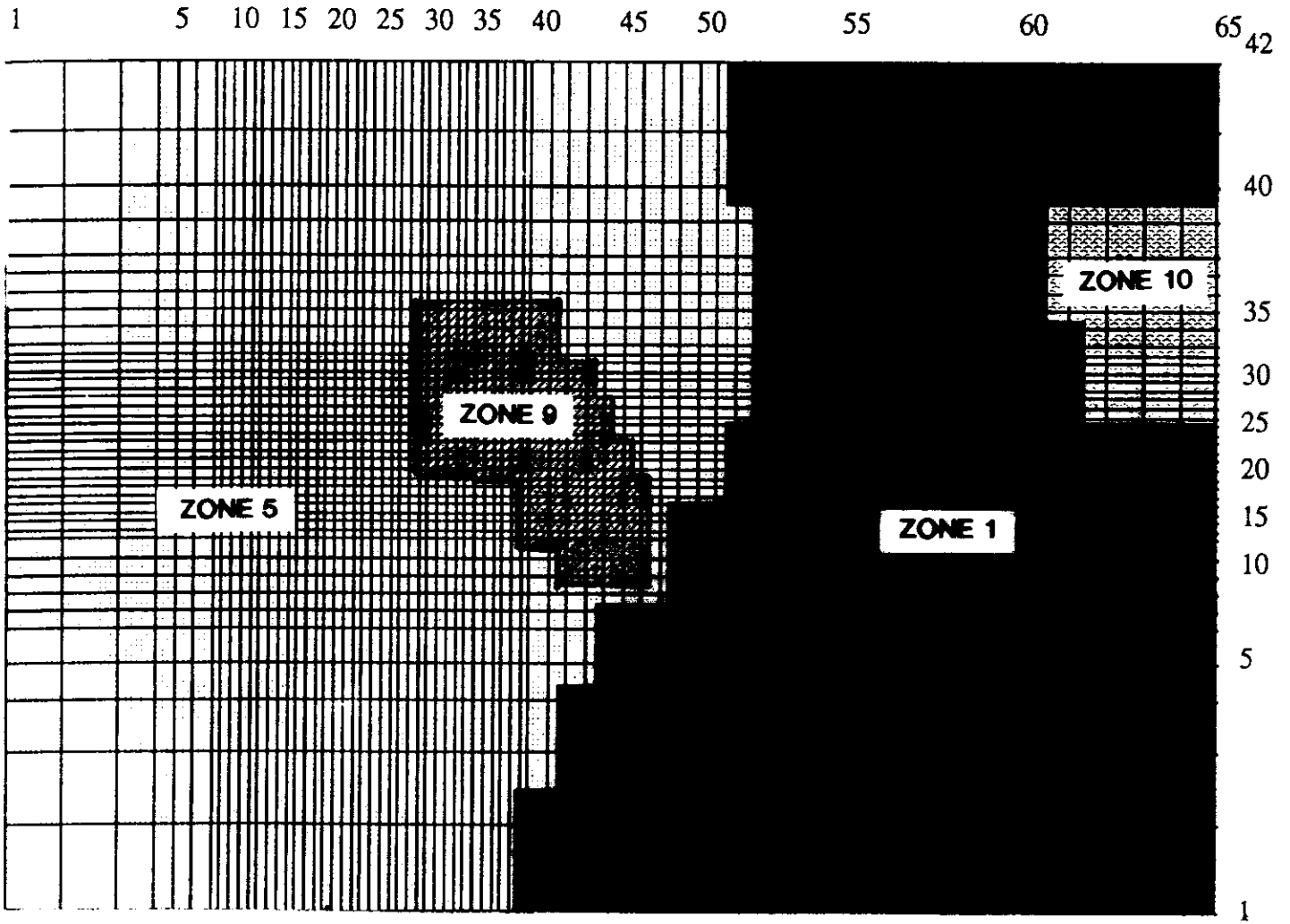

Figure H-5 Groundwater Model Hydrofacies Zone Designation, Layer 5.

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9 3 1 2 1 5 2 1 3 3 5

ZONE DESIGNATION, LAYER 6

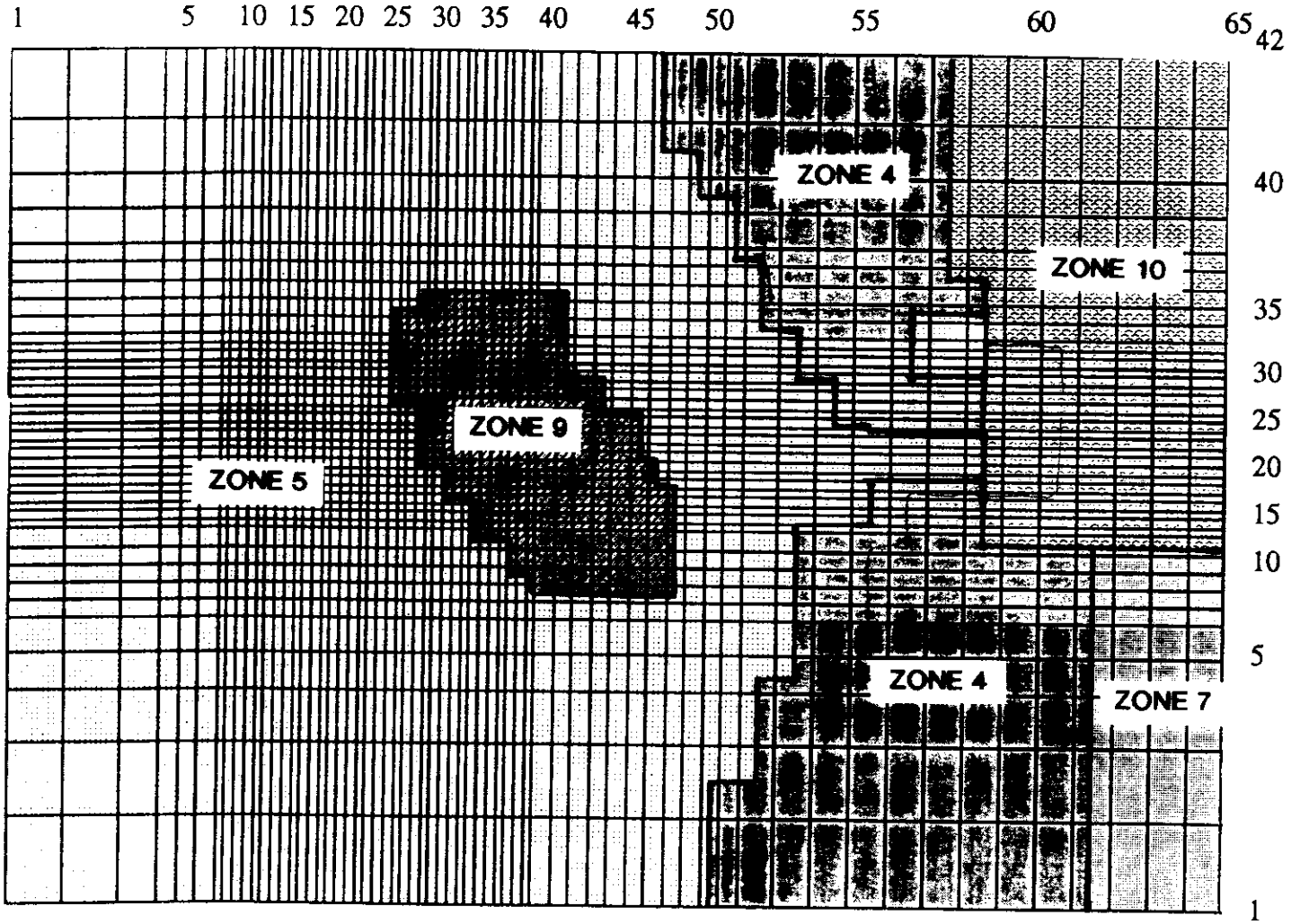

Figure H-6 Groundwater Model Hydrofacies Zone Designation, Layer 6.

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9 3 1 2 1 3 0 2 3 8 3 7

ZONE DESIGNATION, LAYER 7

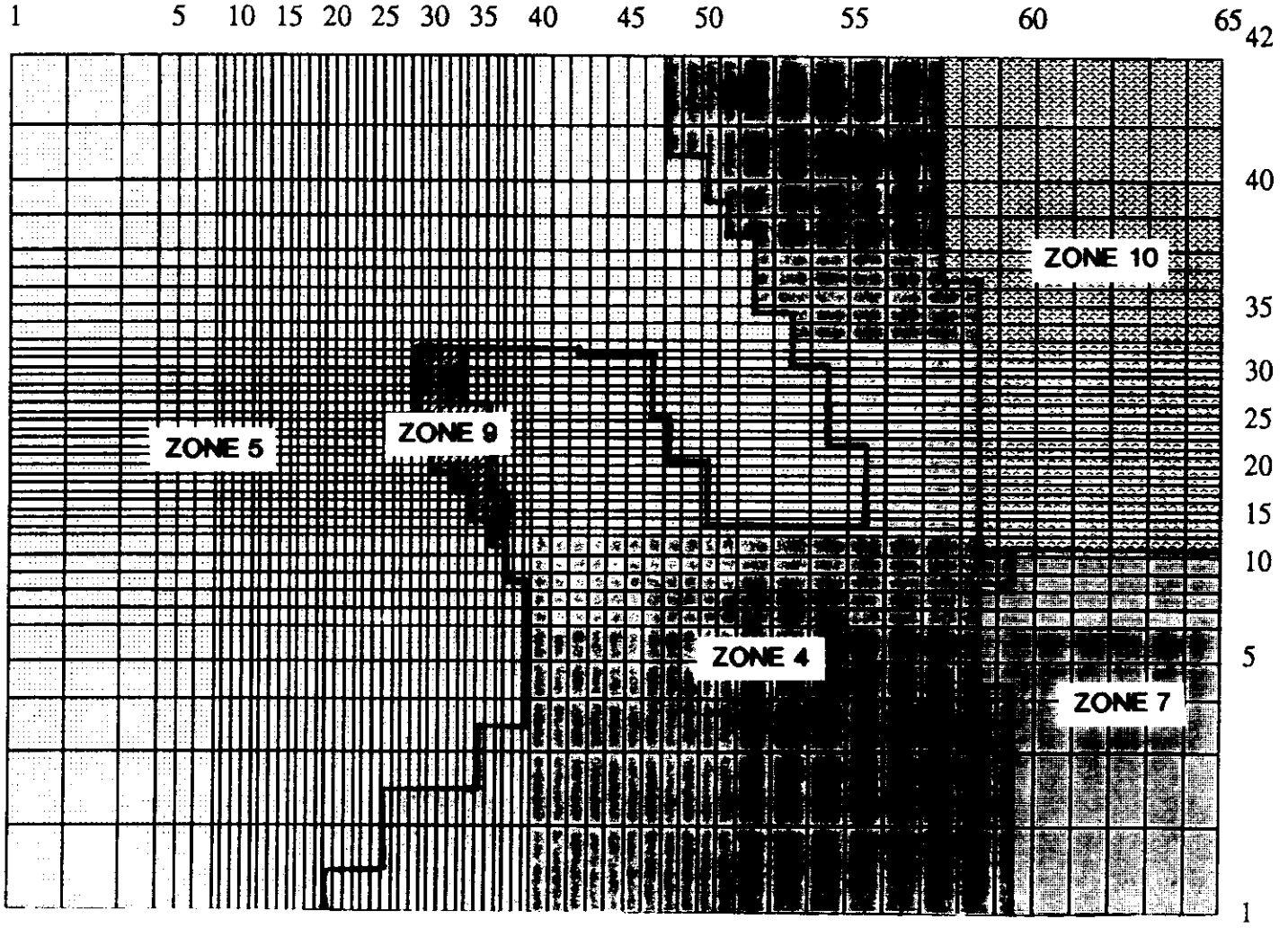

Figure H-7 Groundwater Model Hydrofacies Zone Designation, Layer 7.

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9 3 1 2 1 3 3 9

ZONE DESIGNATION, LAYER 8

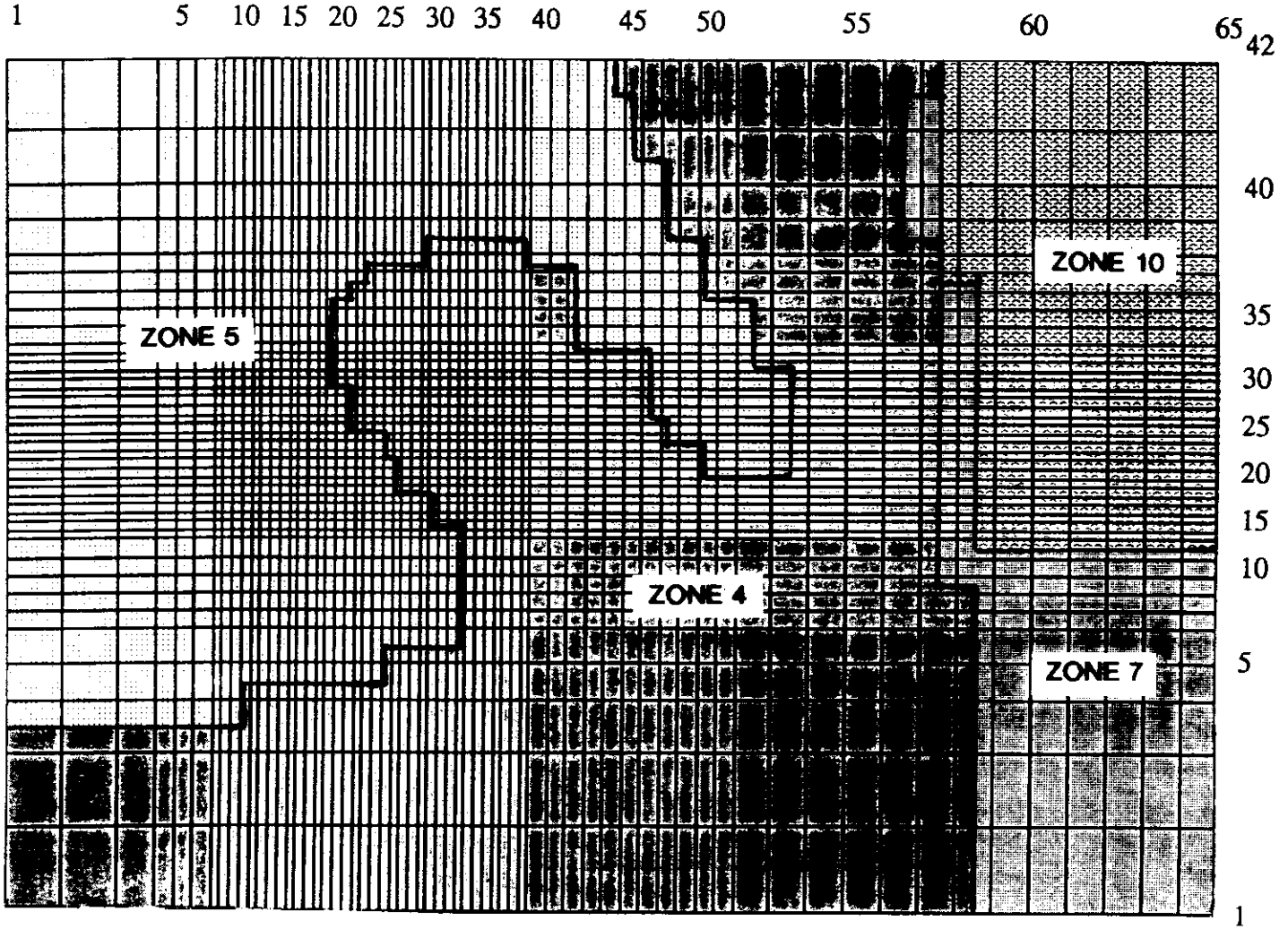

Figure H-8 Groundwater Model Hydrofacies Zone Designation, Layer 8.

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ZONE DESIGNATION, LAYER 9

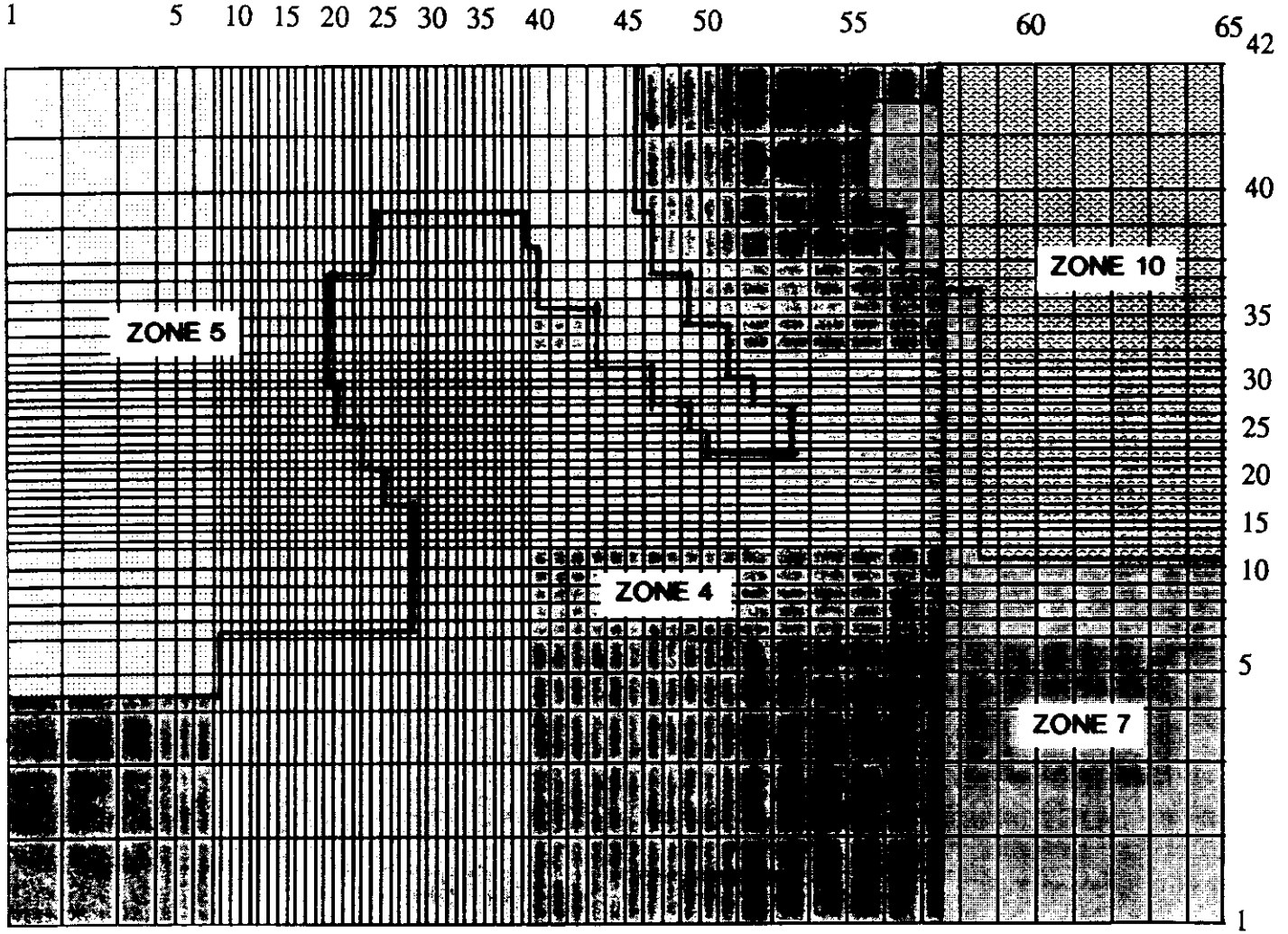

Figure H-9 Groundwater Model Hydrofacies Zone Designation, Layer 9.

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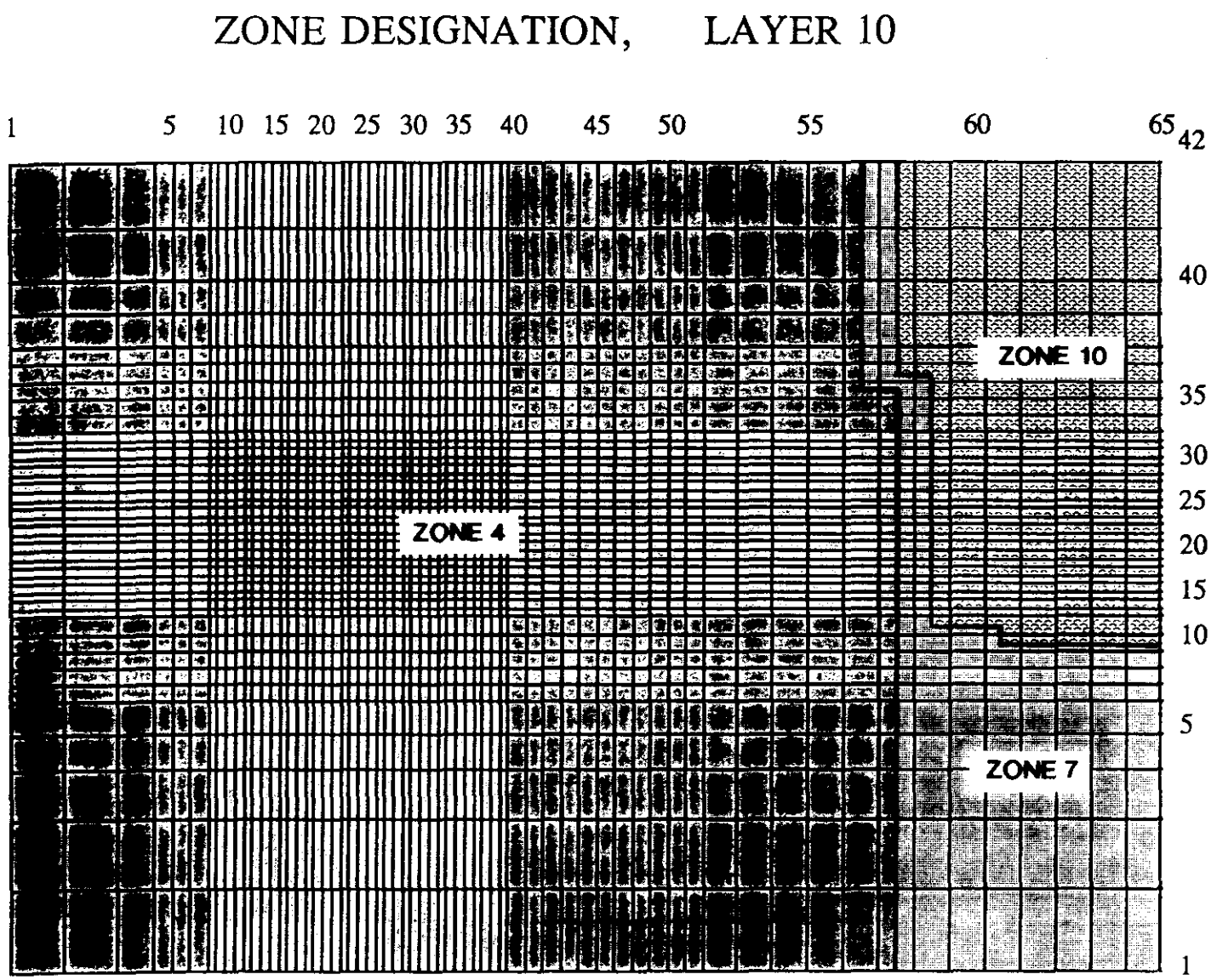

Figure H-10 Groundwater Model Hydrofacies Zone Designation, Layer 10.

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7 3 1 2 3 5 2 0 8 4 5

ZONE DESIGNATION, LAYER 11

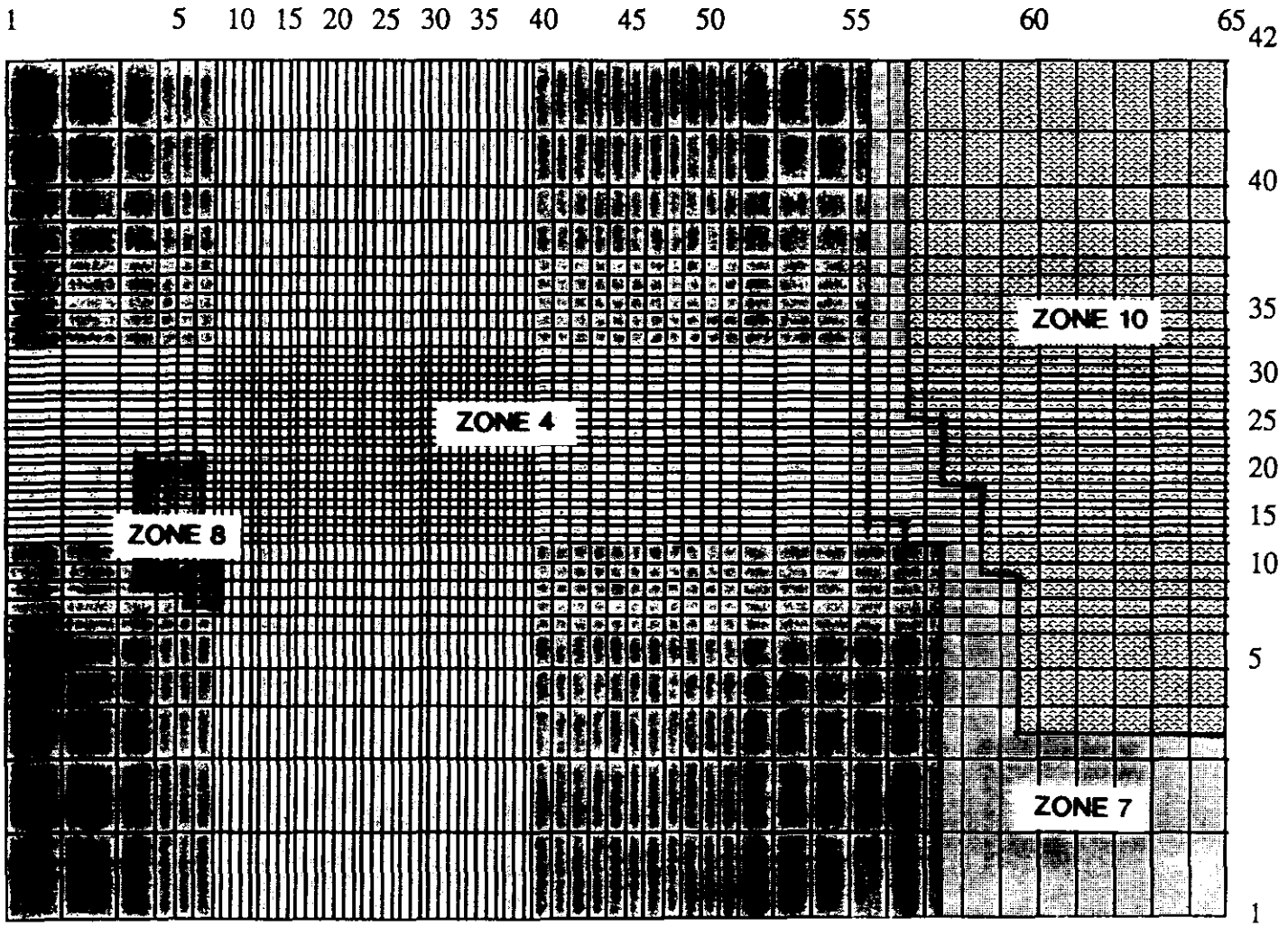

Figure H-11 Groundwater Model Hydrofacies Zone Designation, Layer 11.

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9 3 1 2 3 0 2 0 3 8 1 7

ZONE DESIGNATION, LAYER 12

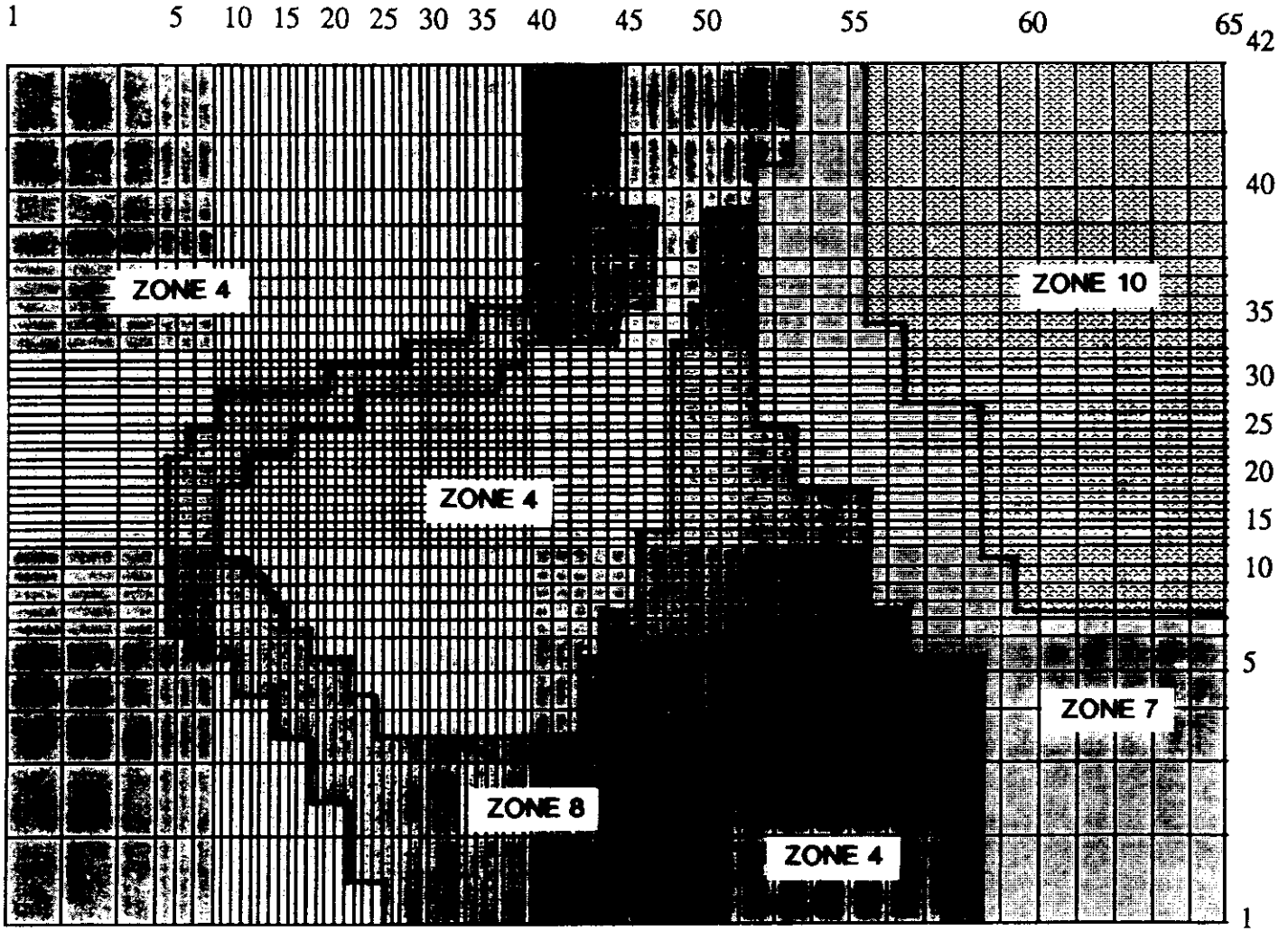

Figure H-12 Groundwater Model Hydrofacies Zone Designation, Layer 12.

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9 3 1 2 3 5 2 0 8 9

ZONE DESIGNATION, LAYER 13

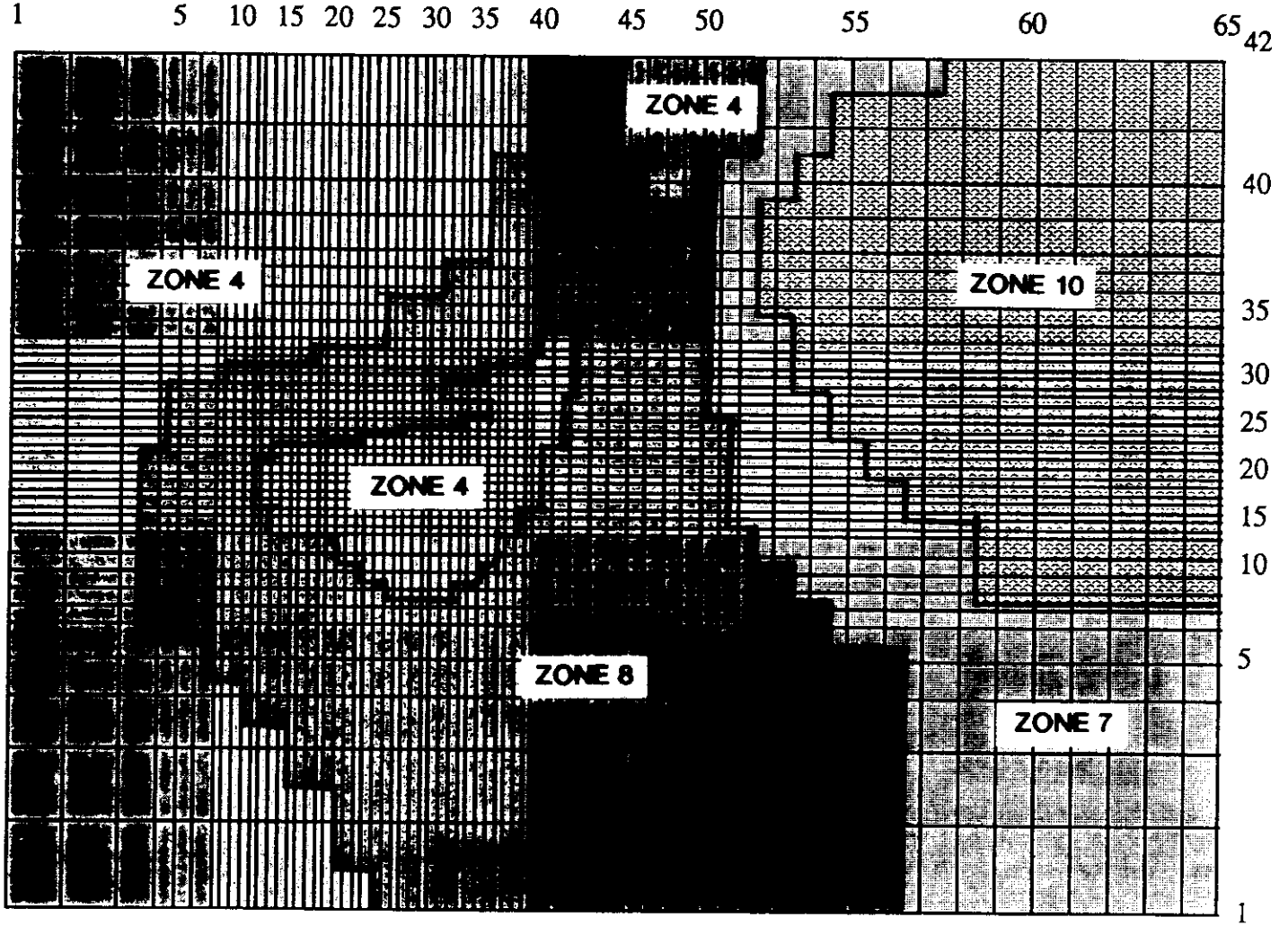

Figure H-13 Groundwater Model Hydrofacies Zone Designation, Layer 13.

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9 3 1 2 3 5 2 0 8 5 1

ZONE DESIGNATION, LAYER 14

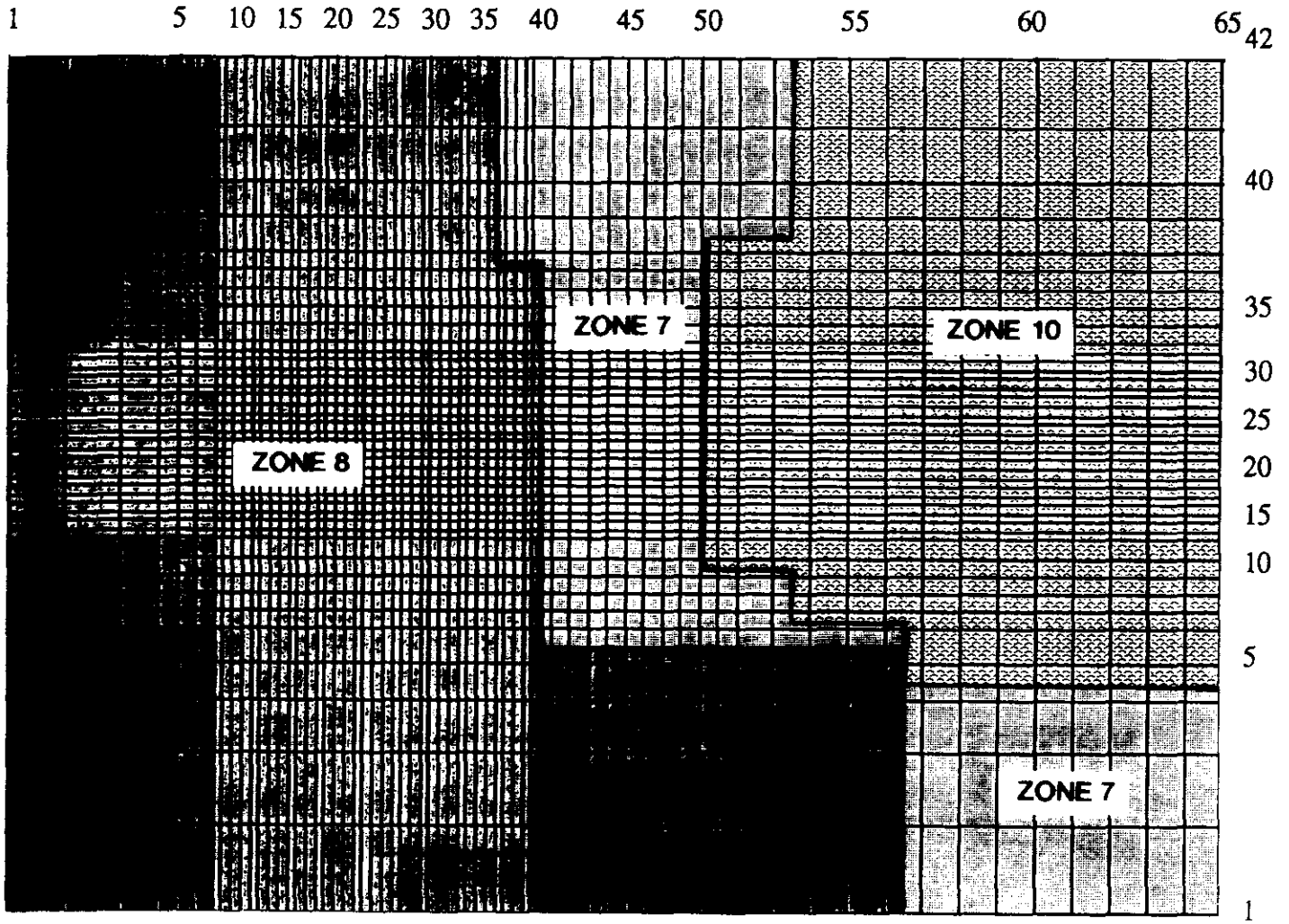

Figure H-14 Groundwater Model Hydrofacies Zone Designation, Layer 14.

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ZONE DESIGNATION, LAYER 15

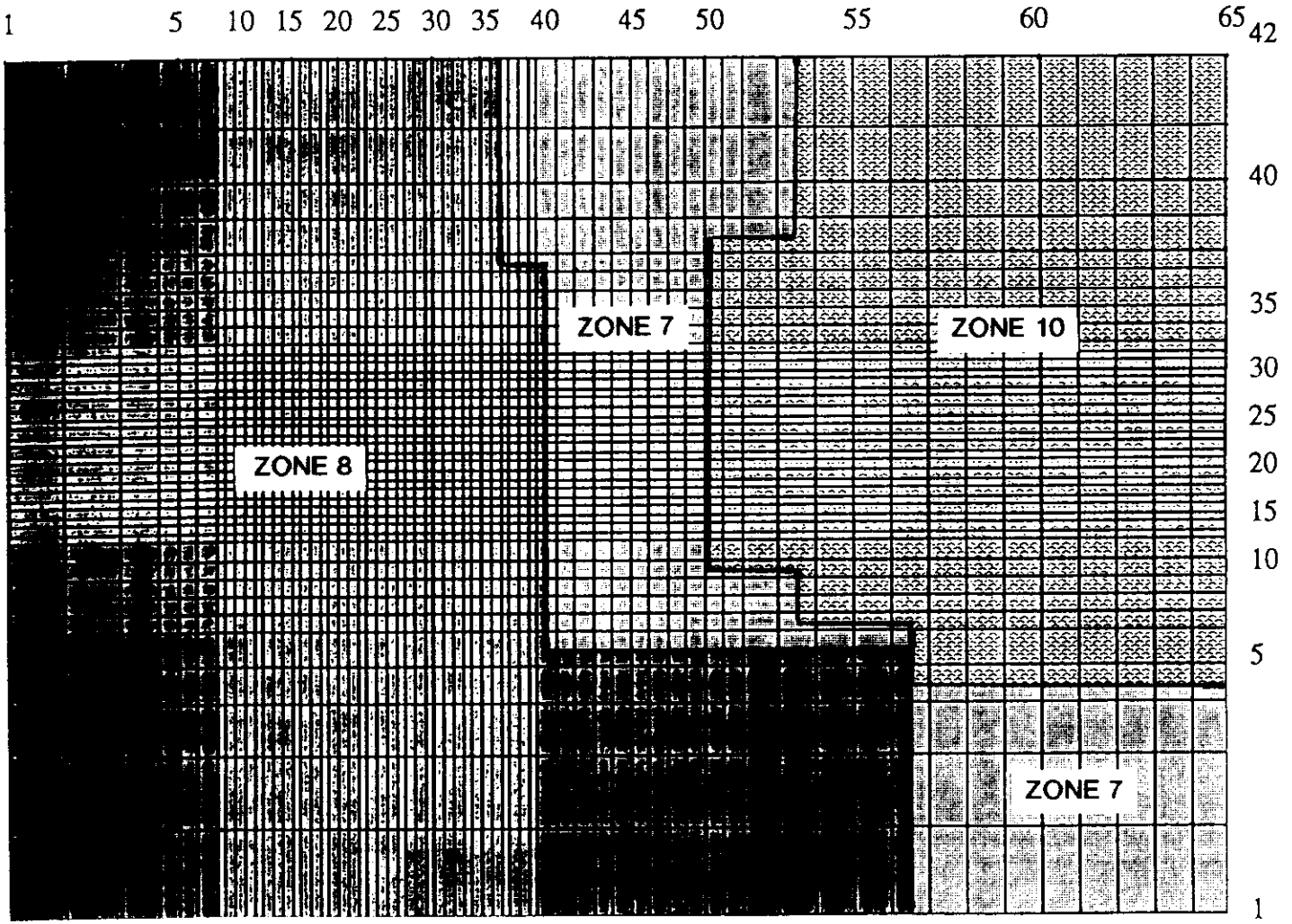

Figure H-15 Groundwater Model Hydrofacies Zone Designation, Layer 15.

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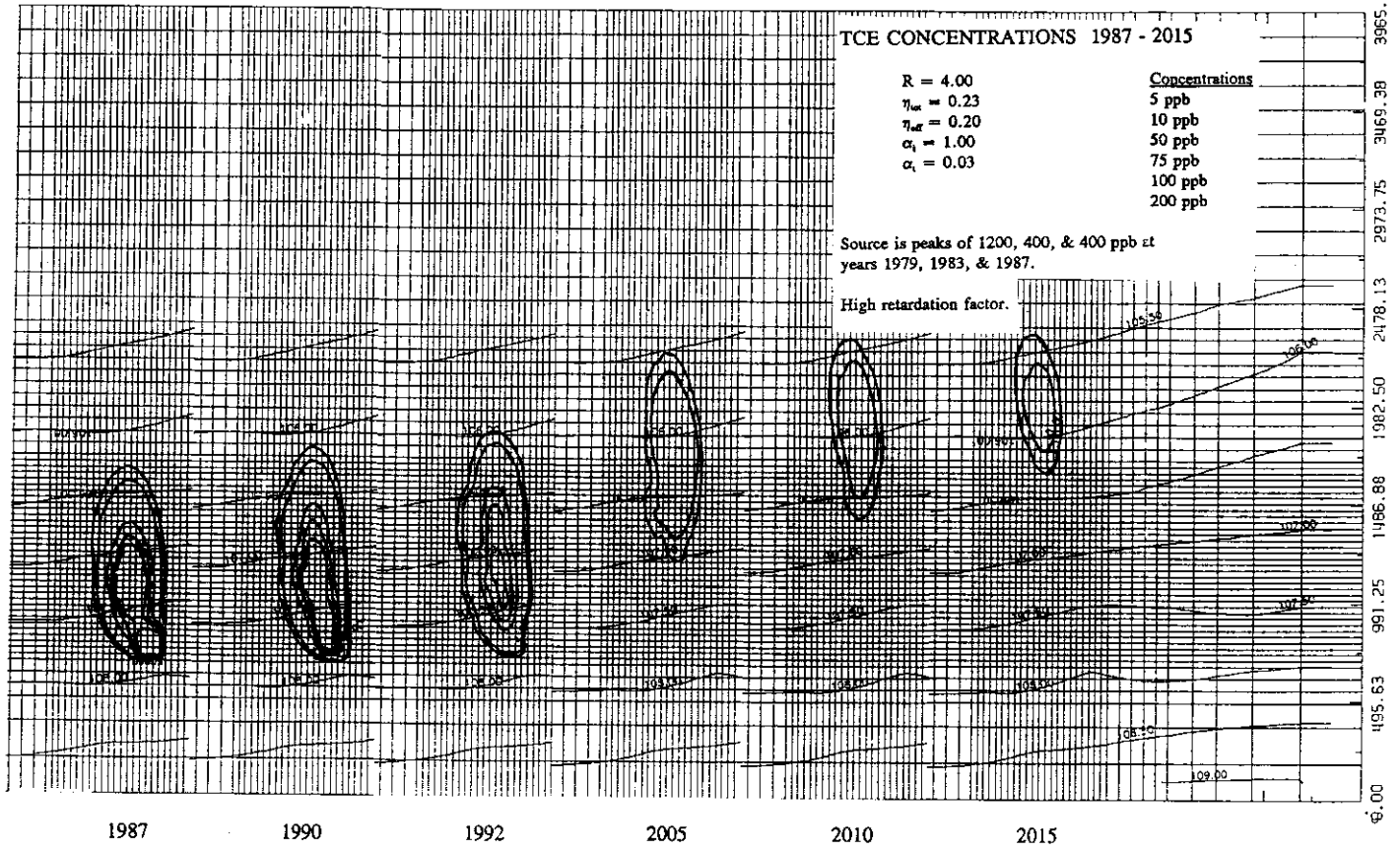

Computed TCE Plumes with Retardation Factor of 4.0,

Figure H-16

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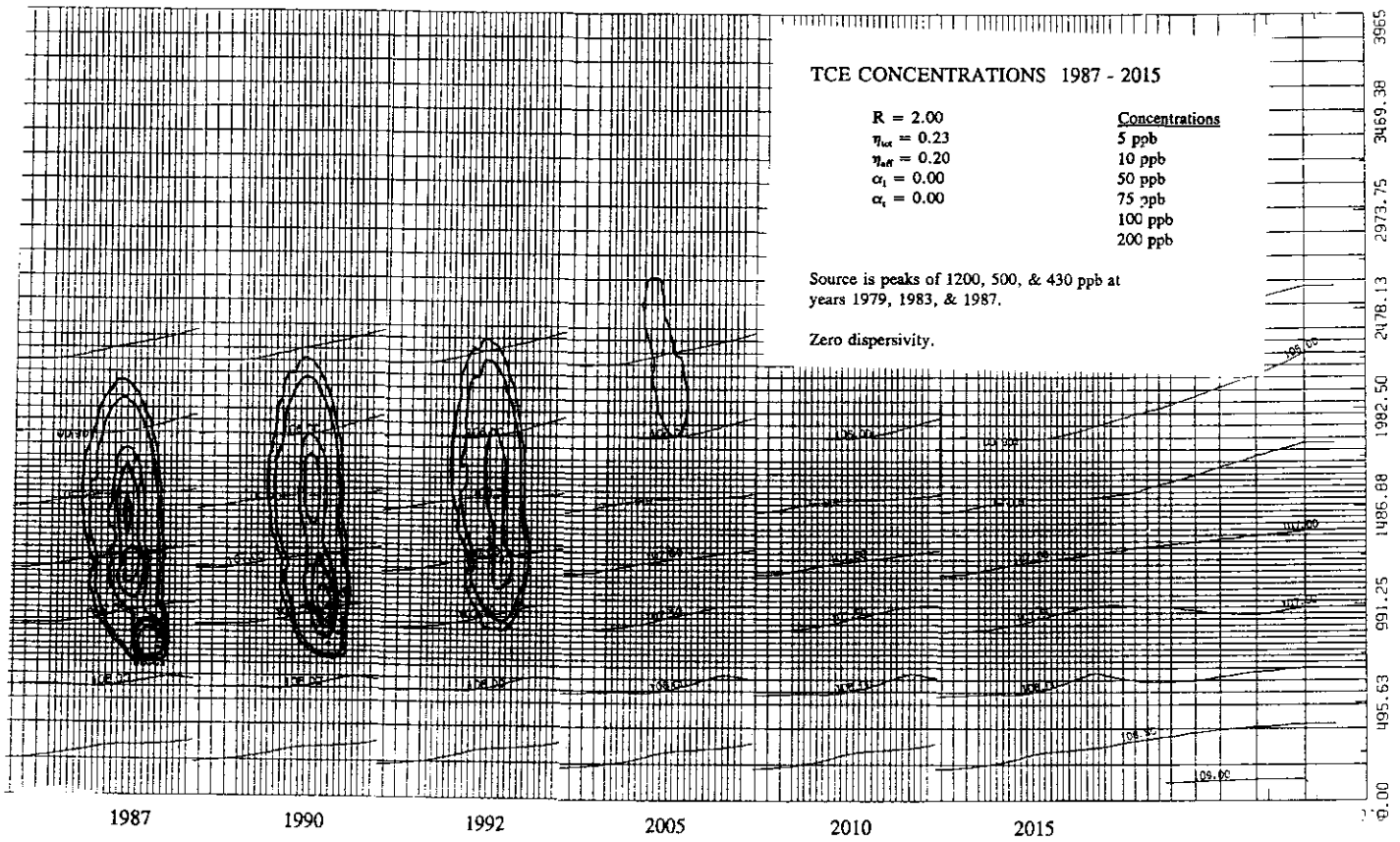

Computed TCE Plumes with No Dispersion.

Figure H-17

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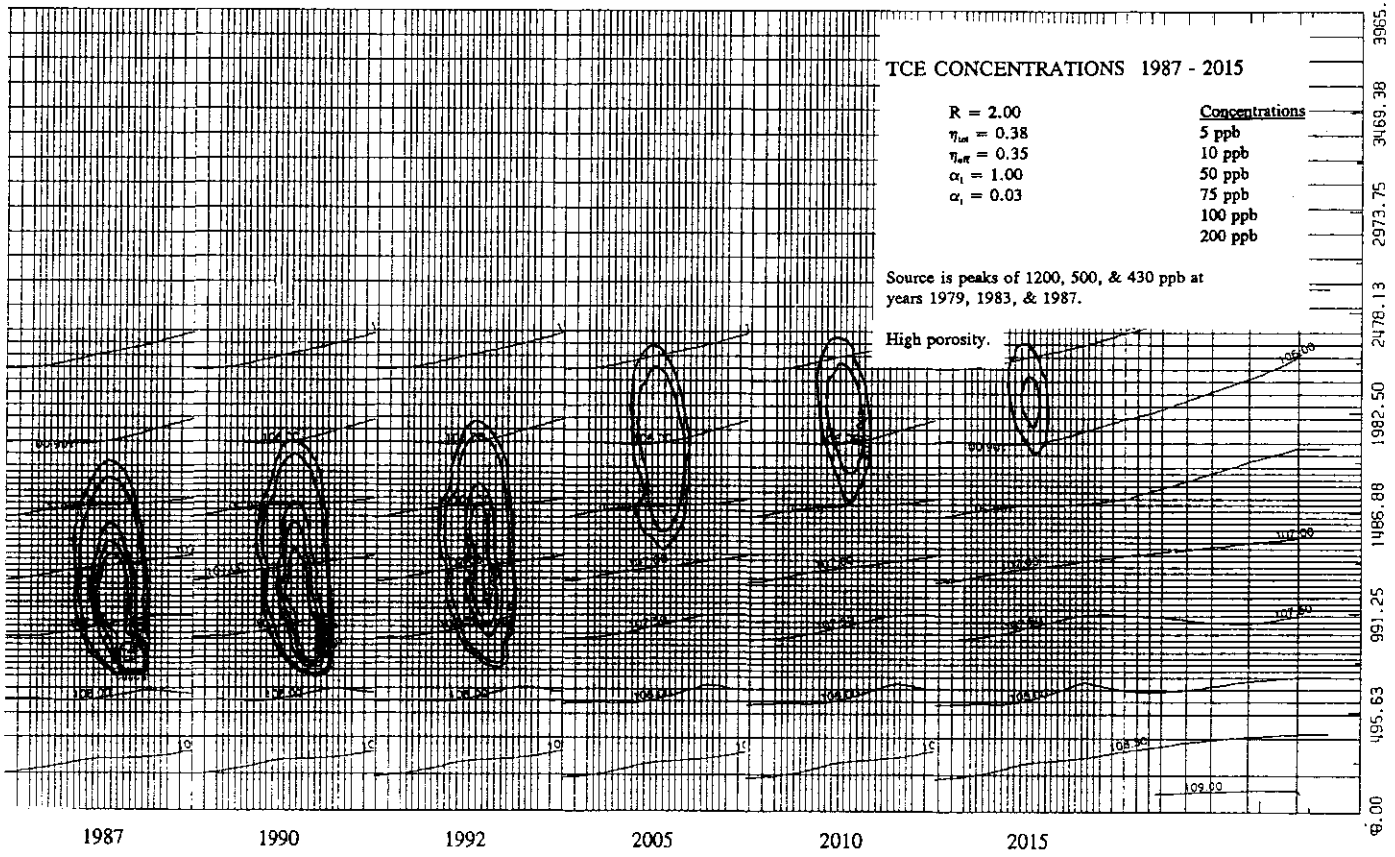

Computed TCE Plumes with Total Porosity of 0.38 and Effective Porosity of 0.35.

Figure H-18

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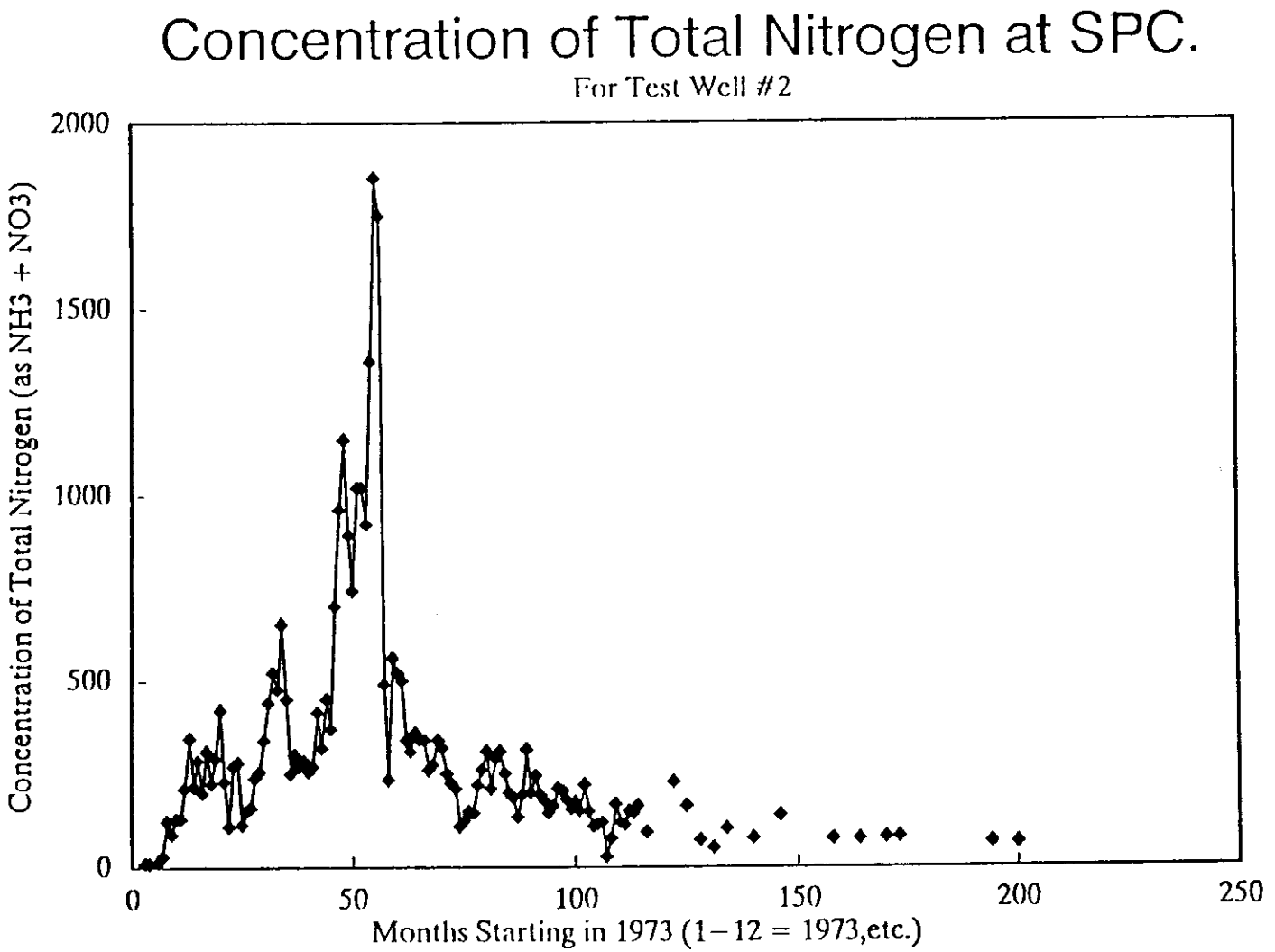

Figure H-19 Total Nitrogen Concentrations for Well TW-2.

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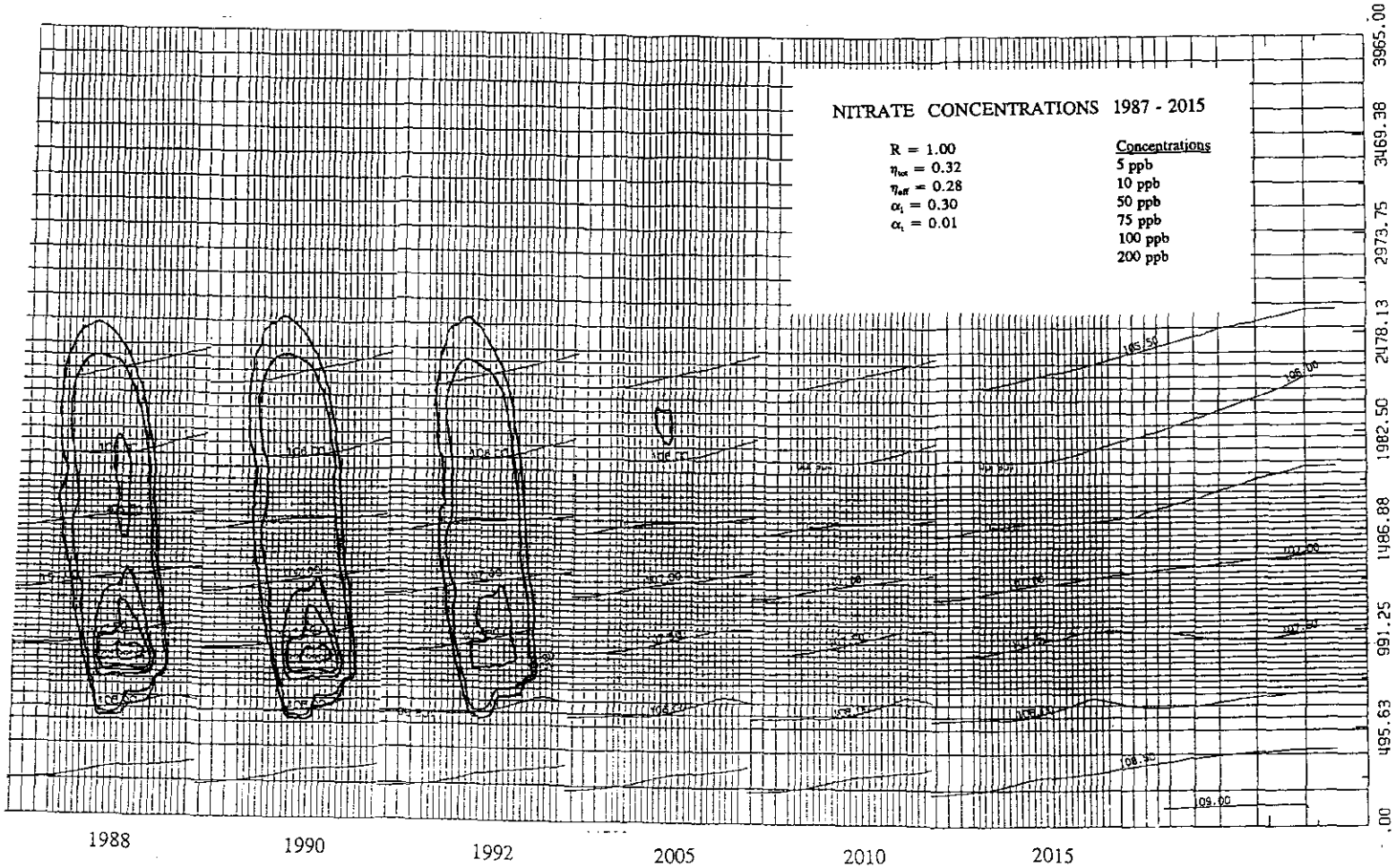

Computed Nitrate Plumes with Conservative Transport Parameters and No Retardation.

Figure H-20

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SATURATED ZONE CONTAMINANT TRANSPORT MODEL INPUT FILE

0 3 1 2 3 2 0 3 6 2

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0 0 1 2 3 5 2 0 3 5 3

```
/
/       The following is a PORFLOW v-2.4 input file for modeling
/       saturated zone, TCE contaminant transport at the
/       1100-EM-1 Operable Unit, Hanford, WA.
/
/       The files 'xval.dat', 'yval.dat', 'zval.dat', and
/       'hedstrt.dat' must be in the same dir for operation
/
/
/
TITLe 1100-EM-1 Groundwater Model
USER USACE Walla Walla Dist, Environmental Engineering Br.
/Mat Johansen - (509)522-6645
/
/**************************************************GridDimensions
/
GRID is 65 x 42 x 15
/
COORdinate X values read from 'xval.dat'
COORdinate Y values read from 'yval.dat'
COORdinate Z values read from 'zval.dat'
/
/**************************************************GETINITIAL P's
/
READ # 4 from 'hedstrt.arc'
/
/**************************************************ZONEDESIGNATION
/layer 1
ZONE 1  from (1,1,1) to (65,42,1)
/layer 2
ZONE 1  from (1,1,2) to (65,42,2)
/layer 3
ZONE 1  from (1,1,3) to (65,42,3)
ZONE 5  from (23,40,3) to (50,42,3)
ZONE 5  from (27,38,3) to (48,40,3)
ZONE 5  from (28,36,3) to (48,38,3)
ZONE 5  from (30,33,3) to (46,36,3)
ZONE 5  from (33,30,3) to (46,37,3)
ZONE 5  from (33,28,3) to (44,30,3)
ZONE 5  from (35,25,3) to (44,28,3)
ZONE 5  from (35,18,3) to (42,25,3)
/layer 4
ZONE 5  from (1,1,4) to (65,42,4)
ZONE 1  from (34,1,4) to (58,3,4)
ZONE 1  from (37,3,4) to (58,4,4)
ZONE 1  from (40,4,4) to (56,7,4)
ZONE 1  from (44,7,4) to (56,10,4)
ZONE 1  from (44,10,4) to (54,15,4)
ZONE 1  from (47,15,4) to (54,24,4)
ZONE 1  from (49,24,4) to (54,31,4)
ZONE 1  from (50,31,4) to (54,34,4)
ZONE 1  from (52,34,4) to (53,40,4)
ZONE 1  from (52,1,4) to (65,42,4)
ZONE 7  from (62,32,4) to (65,36,4)
```

/layer 5
ZONE 5 from (1,1,5) to (65,42,5)
ZONE 1 from (40,1,5) to (58,2,5)
ZONE 1 from (43,2,5) to (58,4,5)
ZONE 1 from (45,4,5) to (56,7,5)
ZONE 1 from (49,7,5) to (56,10,5)
ZONE 1 from (49,10,5) to (54,15,5)
ZONE 1 from (52,15,5) to (54,24,5)
ZONE 1 from (53,24,5) to (54,34,5)
ZONE 1 from (52,40,5) to (65,42,5)
ZONE 1 from (53,1,5) to (65,42,5)
ZONE 7 from (61,35,5) to (65,38,5)
ZONE 7 from (62,30,5) to (65,35,5)
ZONE 9 from (29,19,5) to (42,35,5)
ZONE 9 from (33,21,5) to (44,31,5)
ZONE 9 from (35,18,5) to (45,27,5)
ZONE 9 from (40,11,5) to (46,22,5)
ZONE 9 from (43,9,5) to (47,18,5)
/layer 6
ZONE 5 from (1,1,6) to (65,42,6)
ZONE 4 from (48,41,6) to (65,42,6)
ZONE 4 from (50,40,6) to (65,42,6)
ZONE 4 from (52,38,6) to (65,42,6)
ZONE 4 from (53,34,6) to (65,42,6)
ZONE 4 from (54,29,6) to (65,42,6)
ZONE 4 from (55,24,6) to (65,42,6)
ZONE 4 from (56,1,6) to (65,42,6)
ZONE 4 from (51,1,6) to (65,2,6)
ZONE 4 from (53,2,6) to (65,4,6)
ZONE 4 from (54,4,6) to (65,12,6)
ZONE 5 from (57,31,6) to (58,34,6)
ZONE 5 from (57,31,6) to (59,33,6)
ZONE 5 from (56,19,6) to (58,21,6)
ZONE 7 from (59,37,6) to (65,39,6)
ZONE 7 from (60,34,6) to (65,39,6)
ZONE 7 from (61,31,6) to (65,39,6)
ZONE 7 from (62,1,6) to (65,39,6)
ZONE 9 from (26,26,6) to (29,34,6)
ZONE 9 from (29,19,6) to (42,35,6)
ZONE 9 from (32,15,6) to (44,28,6)
ZONE 9 from (35,11,6) to (46,24,6)
ZONE 9 from (39,9,6) to (47,19,6)
ZONE 9 from (41,8,6) to (48,16,6)
/layer 7
ZONE 4 from (1,1,7) to (65,42,7)
ZONE 9 from (28,10,7) to (33,33,7)
ZONE 9 from (28,10,7) to (36,26,7)
ZONE 9 from (28,10,7) to (38,16,7)
ZONE 5 from (1,1,7) to (19,2,7)
ZONE 5 from (1,2,7) to (25,3,7)
ZONE 5 from (1,3,7) to (35,4,7)
ZONE 5 from (1,4,7) to (40,8,7)
ZONE 5 from (1,8,7) to (38,10,7)
ZONE 5 from (1,8,7) to (36,13,7)

ZONE 5 from (1,8,7) to (34,16,7)
ZONE 5 from (1,8,7) to (32,18,7)
ZONE 5 from (1,8,7) to (30,22,7)
ZONE 5 from (1,8,7) to (28,33,7)
ZONE 5 from (1,33,7) to (52,38,7)
ZONE 5 from (1,33,7) to (51,39,7)
ZONE 5 from (1,33,7) to (50,40,7)
ZONE 5 from (1,33,7) to (48,42,7)
ZONE 5 from (44,32,7) to (52,38,7)
ZONE 5 from (48,25,7) to (53,34,7)
ZONE 5 from (49,20,7) to (54,30,7)
ZONE 5 from (51,13,7) to (55,21,7)
ZONE 7 from (60,1,7) to (65,16,7)
ZONE 7 from (59,5,7) to (60,8,7)
ZONE 7 from (61,16,7) to (65,34,7)
ZONE 7 from (60,34,7) to (65,39,7)
ZONE 7 from (59,36,7) to (65,39,7)
ZONE 7 from (58,38,7) to (65,40,7)
/layer 8
ZONE 4 from (1,1,8) to (65,42,8)
ZONE 5 from (1,4,8) to (10,5,8)
ZONE 5 from (1,5,8) to (25,6,8)
ZONE 5 from (1,6,8) to (33,12,8)
ZONE 5 from (1,12,8) to (30,16,8)
ZONE 5 from (1,16,8) to (26,20,8)
ZONE 5 from (1,20,8) to (25,23,8)
ZONE 5 from (1,22,8) to (21,28,8)
ZONE 5 from (1,22,8) to (19,36,8)
ZONE 5 from (1,36,8) to (21,37,8)
ZONE 5 from (1,37,8) to (23,38,8)
ZONE 5 from (1,38,8) to (29,39,8)
ZONE 5 from (1,39,8) to (46,41,8)
ZONE 5 from (1,40,8) to (45,42,8)
ZONE 5 from (41,38,8) to (48,40,8)
ZONE 5 from (50,23,8) to (52,28,8)
ZONE 5 from (51,19,8) to (53,27,8)
/
ZONE 5 from (44,33,8) to (50,38,8)
ZONE 5 from (47,25,8) to (52,35,8)
ZONE 5 from (49,23,8) to (53,30,8)
/
ZONE 7 from (59,1,8) to (65,8,8)
ZONE 7 from (60,8,8) to (65,40,8)
ZONE 7 from (59,36,8) to (65,40,8)
ZONE 7 from (58,38,8) to (65,40,8)
ZONE 7 from (57,39,8) to (65,41,8)
/layer 9
ZONE 4 from (1,1,9) to (65,42,9)
ZONE 5 from (1,5,9) to (7,7,9)
ZONE 5 from (1,7,9) to (28,16,9)
ZONE 5 from (1,16,9) to (25,20,9)
ZONE 5 from (1,20,9) to (22,25,9)
ZONE 5 from (1,25,9) to (20,29,9)
ZONE 5 from (1,29,9) to (19,38,9)

ZONE 5 from (1,38,9) to (24,40,9)
ZONE 5 from (1,40,9) to (46,41,9)
ZONE 5 from (1,41,9) to (44,42,9)
ZONE 5 from (41,39,9) to (46,42,9)
ZONE 5 from (50,25,9) to (52,30,9)
ZONE 5 from (51,22,9) to (53,27,9)
/
ZONE 5 from (42,36,9) to (47,39,9)
ZONE 5 from (45,32,9) to (49,37,9)
ZONE 5 from (48,28,9) to (51,34,9)
/
ZONE 7 from (56,40,9) to (65,41,9)
ZONE 7 from (57,38,9) to (65,41,9)
ZONE 7 from (58,35,9) to (65,41,9)
ZONE 7 from (59,1,9) to (65,40,9)
ZONE 7 from (58,1,9) to (65,9,9)
ZONE 10 FROM (60,20,10) TO (65,40,10)
/layer 10
ZONE 4 from (1,1,10) to (65,42,10)
ZONE 7 from (57,40,10) to (65,42,10)
ZONE 7 from (57,39,10) to (65,42,10)
ZONE 7 from (57,38,10) to (65,42,10)
ZONE 7 from (57,36,10) to (65,42,10)
ZONE 7 from (58,1,10) to (65,42,10)
ZONE 10 FROM (59,37,10) TO (65,42,10)
ZONE 10 FROM (61,10,10) TO (65,40,10)
/
/layer 11
/
ZONE 4 from (1,1,11) to (65,42,11)
ZONE 7 from (55,25,11) to (65,42,11)
/
ZONE 7 from (56,15,11) to (65,42,11)
ZONE 7 from (57,12,11) to (65,42,11)
ZONE 7 from (58,1,11) to (65,42,11)
ZONE 8 from (4,9,11) to (7,13,11)
ZONE 8 from (6,8,11) to (8,10,11)
ZONE 8 from (4,13,11) to (6,21,11)
ZONE 10 FROM (57,26,11) TO (65,42,11)
ZONE 10 FROM (58,18,11) TO (65,39,11)
ZONE 10 FROM (59,10,11) TO (65,35,11)
ZONE 10 FROM (60,4,11) TO (65,30,11)
/
/layer 12
ZONE 4 from (1,1,12) to (65,42,12)
ZONE 8 from (26,1,12) to (58,2,12)
ZONE 8 from (22,2,12) to (58,3,12)
ZONE 8 from (18,3,12) to (24,4,12)
ZONE 8 from (14,4,12) to (21,5,12)
ZONE 8 from (10,5,12) to (17,6,12)
ZONE 8 from (6,6,12) to (14,7,12)
ZONE 8 from (5,7,12) to (13,8,12)
ZONE 8 from (5,9,12) to (12,9,12)
ZONE 8 from (5,9,12) to (10,10,12)

ZONE 8 from (5,11,12) to (7,18,12)
ZONE 8 from (5,19,12) to (10,21,12)
ZONE 8 from (6,22,12) to (15,24,12)
ZONE 8 from (8,25,12) to (23,28,12)
ZONE 8 from (20,29,12) to (37,31,12)
ZONE 8 from (28,32,12) to (39,33,12)
ZONE 8 from (35,34,12) to (45,35,12)
ZONE 8 from (41,36,12) to (47,39,12)
ZONE 8 from (41,40,12) to (45,42,12)
ZONE 8 from (44,3,12) to (65,5,12)!!!
ZONE 8 from (45,5,12) to (65,7,12)!!!
ZONE 8 from (47,7,12) to (55,13,12)!!!
ZONE 8 from (49,14,12) to (55,35,12)!!!
ZONE 8 from (51,36,12) to (55,40,12)!!!
ZONE 8 from (54,40,12) to (65,42,12)!!!
ZONE 4 from (46,40,12) to (53,42,12)
ZONE 4 from (52,1,12) to (57,2,12)!!!!
ZONE 7 from (59,1,12) to (65,42,12)
ZONE 7 from (57,6,12) to (65,42,12)
ZONE 7 from (56,8,12) to (65,42,12)
ZONE 7 from (54,18,12) to (65,42,12)
ZONE 7 from (53,25,12) to (65,40,12)
ZONE 10 FROM (56,35,12) TO (65,42,12)
ZONE 10 FROM (57,28,12) TO (65,39,12)
ZONE 10 FROM (59,20,12) TO (65,35,12)
ZONE 10 FROM (60,8,12) TO (65,30,12)
/
/layer 13
/
ZONE 8 from (1,1,13) to (65,42,13)
ZONE 4 from (1,1,13) to (24,1,13)
ZONE 4 from (1,2,13) to (20,2,13)
ZONE 4 from (1,3,13) to (15,3,13)
ZONE 4 from (1,4,13) to (10,4,13)
ZONE 4 from (1,5,13) to (6,5,13)
ZONE 4 from (1,6,13) to (3,10,13)
ZONE 4 from (1,11,13) to (2,22,13)
ZONE 4 from (1,21,13) to (3,30,13)
ZONE 4 from (1,25,13) to (4,30,13)
ZONE 4 from (1,29,13) to (7,35,13)
ZONE 4 from (1,31,13) to (14,40,13)
ZONE 4 from (1,33,13) to (20,40,13)
ZONE 4 from (1,36,13) to (26,42,13)
ZONE 4 from (1,38,13) to (31,42,13)
ZONE 4 from (1,41,13) to (35,42,13)
ZONE 4 from (47,40,13) to (49,42,13)
ZONE 4 from (46,41,13) to (52,42,13)!!!!
ZONE 4 from (26,8,13) to (32,10,13)
ZONE 4 from (23,9,13) to (35,10,13)
ZONE 4 from (21,10,13) to (37,11,13)
ZONE 4 from (14,12,13) to (39,14,13)
ZONE 4 from (12,15,13) to (41,19,13)
ZONE 4 from (14,20,13) to (41,21,13)
ZONE 4 from (23,22,13) to (42,22,13)

ZONE 4 from (28,23,13) to (42,23,13)
ZONE 4 from (34,24,13) to (42,24,13)
ZONE 4 from (37,25,13) to (42,26,13)
ZONE 4 from (32,27,13) to (42,28,13)
ZONE 4 from (36,28,13) to (43,30,13)
ZONE 4 from (41,31,13) to (43,31,13)
ZONE 4 from (42,32,13) to (43,33,13)
ZONE 8 from (41,41,13) to (44,42,13)
ZONE 7 from (57,1,13) to (65,42,13)
ZONE 7 from (55,6,13) to (65,42,13)
ZONE 7 from (54,8,13) to (65,35,13)
ZONE 7 from (53,10,13) to (65,35,13)
ZONE 7 from (52,13,13) to (65,35,13)
ZONE 7 from (51,25,13) to (65,40,13)
ZONE 7 from (51,29,13) to (65,37,13)
ZONE 7 from (53,41,13) to (65,42,13)
ZONE 10 FROM (55,23,13) TO (65,41,13)
ZONE 10 FROM (53,35,13) TO (65,39,13)
ZONE 10 FROM (54,28,13) TO (65,40,13)
ZONE 10 FROM (56,18,13) TO (65,40,13)
ZONE 10 FROM (57,14,13) TO (65,40,13)
ZONE 10 FROM (59,8,13) TO (65,40,13)
/
/layer 14
/
ZONE 8 from (1,1,14) to (65,42,14)
/ZONE 4 from (1,1,14) to (2,42,14)
/ZONE 4 from (1,1,14) to (3,42,14)
/ZONE 4 from (1,28,14) to (5,33,14)
/ZONE 4 from (1,34,14) to (13,34,14)
/ZONE 4 from (1,35,14) to (19,36,14)
/ZONE 4 from (1,37,14) to (23,38,14)
/ZONE 4 from (1,39,14) to (27,39,14)
/ZONE 4 from (1,40,14) to (33,42,14)
/ZONE 4 from (18,14,14) to (25,18,14)
/ZONE 4 from (23,15,14) to (35,19,14)
ZONE 7 from (57,1,14) to (65,42,14)
ZONE 7 from (42,6,14) to (65,42,14)
ZONE 7 from (38,38,14) to (65,42,14)
ZONE 10 FROM (57,5,14) TO (65,42,14)
ZONE 10 FROM (54,7,14) TO (65,42,14)
ZONE 10 FROM (51,10,14) TO (65,38,14)
ZONE 10 FROM (55,35,14) TO (65,42,14)
/
/
/layer 15
/
ZONE 8 from (1,1,15) to (65,42,15)
/ONE 4 from (1,1,15) to (4,3,15)
/ONE 4 from (1,1,15) to (3,42,15)
/ONE 4 from (1,28,15) to (5,33,15)
/ONE 4 from (1,34,15) to (13,34,15)
/ONE 4 from (1,35,15) to (19,36,15)
/ONE 4 from (1,37,15) to (23,38,15)

```
/ONE 4  from (1,39,15) to (27,39,15)
/ONE 4  from (1,40,15) to (33,42,15)
/ONE 4  from (18,14,15) to (25,18,15)
/ONE 4  from (23,15,15) to (35,19,15)
ZONE 7  from (48,1,15) to (65,42,15)
ZONE 7  from (45,6,15) to (65,42,15)
ZONE 7  from (38,38,15) to (65,42,15)
/ZONE 10 FROM (57,1,15) TO (65,42,15)!@
/ZONE 10 FROM (54,6,15) TO (65,42,15)!@
/ZONE 10 FROM (42,10,15) TO (65,38,15)!@
/ZONE 10 FROM (45,35,15) TO (65,42,15)!@
/
/ global
zone 10 from (59,11,6) to (65,42,15)
zone 10 from (58,37,6) to (65,42,15)
/
/*************************************************SOILPROPERTIES
/
PROP EFFE C
/
for zone 1
HYDRualic properties; ss= 0.2, Kx= 20., Ky= 20., Kz= 1.2
SOIL density = 1850, eff porosities = .28, tot pors = .32 iffpors = .28
TRAN R=2.5500, Dm=1.E-10, Disp(l)=.300 , Disp(t)=0.010
/
for zone 4
HYDRualic properties; ss= 0.2, Kx=  60., Ky=  60., Kz= 3.9
SOIL density = 1850, eff porosities = .28, tot pors = .32 iffpors = .28
TRAN R=2.5500, Dm=1.E-10, Disp(l)=.300 , Disp(t)=0.010
/
for zone 5
HYDRualic properties; ss= 0.2, Kx= .01, Ky= .01, Kz= .001
SOIL density = 1850, eff porosities = .24, tot pors = .27 diffpors = .24
TRAN R=20., Dm=1.E-20, Disp(l)=0.00, Disp(t)=0.00
/
for zone 7
HYDRualic properties; ss= 0.2, Kx= 1000., Ky= 1000., Kz=  64.
SOIL density = 1850, eff porosities = .28, tot pors = .32 iffpors = .28
TRAN R=2.5500, Dm=1.E-10, Disp(l)=.300 , Disp(t)=0.010
/
for zone 8
HYDRualic properties; ss= 0.2, Kx= 500., Ky= 500., Kz= 13.7
SOIL density = 1850, eff porosities = .28, tot pors = .32 iffpors = .28
TRAN R=2.5500, Dm=1.E-10, Disp(l)=.300 , Disp(t)=0.010
/
for zone 9
HYDRualic properties; ss= 0.2, Kx= .05, Ky= .05, Kz= .005
SOIL density = 1850, eff porosities = .24, tot pors = .27 diffpors = .24
TRAN R=20., Dm=1.E-20, Disp(l)=0.00, Disp(t)=0.00
/
for zone 10
HYDRualic properties; ss= 0.2, Kx= 5000., Ky= 5000., Kz= 50.
SOIL density = 1850, eff porosities = .28, tot pors = .32 iffpors = .28
TRAN R=2.5500, Dm=1.E-10, Disp(l)=.300 , Disp(t)=0.010
```

1 3 1 2 3 2 3 7 0

```
/
/*************************************************BOUNDARYCONDITIONS
/
/       constant heads for upgradient boundary
/
BOUNdary for P: -1; = 109.00    for (1,1,4) to (1,42,15)
BOUNdary for P: -1; = 108.70    for (1,26,4) to (1,42,15)
BOUNdary for P: -1; = 109.20    for (1,1,4) to (1,10,15)
BOUNdary for P: -1; = 110.70    for (1,1,1) to (1,42,3)
/
/ assign constant hydraulic flux for north and south boundaries
/
BOUNdary for P: +2; FLUX = 0.0  !!! for (2,42,1) to (64,42,15)
BOUNdary for P: +2; = 104.70 for (59,42,4) to (62,42,15)
BOUNdary for P: +2; = 104.70 for (63,42,4) to (64,42,15)
BOUNdary for P: +2; = 104.99 for (59,42,1) to (64,42,3)
BOUNdary for P: -2; FLUX = 0.0 !!! for (2,1,1) to (64,1,15)
BOUNdary for P: -2; FLUX = 0.05 for (12,1,5) to (42,1,10)
BOUNdary for P: -2; FLUX = 0.12 for (42,1,5) to (53,1,10)
BOUNdary for P: -2; FLUX = 0.45 for (53,1,5) to (57,1,10)
/
/ assign constant hydraulic flux for upper and lower boundaries
/
BOUNdary for P: +3; FLUX =-1.0E-5 all
BOUNdary for P: -3; FLUX = 0.0005    all
/
/*************************************************INITIALCONDITIONS
/
/       river boundary
/
FIXEd P from (57,1,1) to (65,1,15)
FIXEd P from (57,2,1) to (65,2,15)
FIXEd P from (59,3,1) to (65,3,15)
FIXEd P from (60,4,1) to (65,4,15)
FIXEd P from (61,5,1) to (65,6,15)
FIXEd P from (61,7,1) to (65,9,15)
FIXEd P from (61,10,1) to (65,12,15)
FIXEd P from (61,13,1) to (65,15,15)
FIXEd P from (62,16,1) to (65,18,15)
FIXEd P from (62,19,1) to (65,21,15)
FIXEd P from (62,22,1) to (65,24,15)
FIXEd P from (62,25,1) to (65,27,15)
FIXEd P from (62,28,1) to (65,31,15)
FIXEd P from (63,32,1) to (65,33,15)
FIXEd P from (64,34,1) to (65,35,15)
FIXEd P  from (65,36,1) to (65,42,15)
/
/*************************************************SOURCE
/ see initial C commands below
/*************************************************OUTPUT& SOLUTION
/
OUTput c in XY plane every 5000 steps
/
TIME = 0 at start of simulation
```

```
FLUX Bala C for 2 2 2 to 64 41 15 every 10
HIST C 'c:\pf\3z40.his'(10,17,10)(24,19,10)(36,21,10)(10,17,11) 1
/
convergence epsilon to 1.e-5
/
SOLVE for 1000 days in steps of 250 1.08 max of 1000
INITial C = 1100 from (8,15,10) to (11,20,12)
SOLVE for 1500 days in steps of 250 1.08 max of 1000
/save P,C on file 'c:\pfo\3z402500.arc' NOW
INITial C =  380 from (8,15,10) to (11,20,12)
/
SOLVE for 1650 days in steps of 215 1.08 max of 1000!!!4150
/save P,C on file 'c:\pfo\3z404150.arc' NOW
INITial C =  400 from (8,15,10) to (11,18,12)
/
SOLVE for 150  days in steps of 25 1.08 max of 1000!!!4300
save P,C on file 'c:\pfo\3z401987.arc' NOW
/
SOLVE for 813 days in steps of  55 1.08 max of 1000!!!5113
save P,C on file 'c:\pfo\3z401990.arc' NOW
/
SOLVE for 365 days in steps of 55 1.08 max of 1000!!!5478
/save P,C on file 'c:\pfo\3z401991.arc' NOW
/
SOLVE for 522 days in steps of 225 1.08 max of 1000!!!6000
save P,C on file 'c:\pfo\3z401992.arc' NOW
/
SOLVE for 2190 days in steps of 225 1.08 max of 1000!!!8190
save P,C on file 'c:\pfo\3z401998.arc' NOW
/
SOLVE for 2555 days in steps of 225 1.08 max of 1000!!!10745
save P,C on file 'c:\pfo\3z402005.arc' NOW
/
SOLVE for 1826 days in steps of 225 1.08 max of 1000!!!12571
save P,C on file 'c:\pfo\3z402010.arc' NOW
/
SOLVE for 1826 days in steps of  225 1.08 max of 1000!!!14397
save P,C on file 'c:\pfo\3z402015.arc' NOW
/
SOLVE for 1826 days in steps of  225 1.08 max of 1000!!!16223
save P,C on file 'c:\pfo\3z402020.arc' NOW
end
quit
/**************************************************END
```

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SATURATED ZONE CONTAMINANT TRANSPORT MODEL OUTPUT FILE

7 3 1 2 3 ' 2 3 8 7 4

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3 3 1 2 3 5 2 7 3 7 5

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1*****************************************************************************

        THIS OUTPUT IS PRODUCED BY THE COMPUTATIONAL MODEL

        ---------------P O R F L O W - 3 D ---------------

          FOR TRANSIENT OR STEADY STATE ANALYSIS OF
         FLOW, HEAT AND MULTI-COMPONENT MASS TRANSPORT
        IN VARIABLY SATURATED POROUS OR FRACTURED MEDIA

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        FOR ENQIRIES AND ASSISTANCE: CALL 310-471-3023 USA

          VERSION 2.40.0 /MASTER - DATE: 02 JAN 92
        DATE OF RUN: 10/20/92  -  TIME OF RUN: 12:37:28.1

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-------------------------------------------------------------------------
RECORD OF INPUT DATA STREAM
-------------------------------------------------------------------------
** RECORD NO.  1 COMMENT ******* /
** RECORD NO.  2 COMMENT ******* /    The following is a PORFLOW v-2.4 input file for modeling
** RECORD NO.  3 COMMENT ******* /    saturated zone, TCE contaminant transport at the
** RECORD NO.  4 COMMENT ******* /    1100-EM-1 Operable Unit, Hanford, WA.
** RECORD NO.  5 COMMENT ******* /
** RECORD NO.  6 COMMENT ******* /    The files 'xval.dat', 'yval.dat', 'zval.dat', and
** RECORD NO.  7 COMMENT ******* /    'hedstrt.dat' must be in the same dir for operation
** RECORD NO.  8 COMMENT ******* /
** RECORD NO.  9 COMMENT ******* /
** RECORD NO. 10 COMMENT ******* /
** RECORD NO. 11 KEYWORD ******* TITLe 1100-EM-1 Groundwater Model


=========================================================================
====
****WARNING:  INVALID STRUCTURE FOR NUMERIC DATA.  DATA STRING BELOW IGNORED.
        1100-EM-1

=========================================================================
====


** RECORD NO. 12 KEYWORD ******* USER USACE Walla Walla Dist, Environmental Engineering Br.
** RECORD NO. 13 COMMENT ******* /Mat Johansen - (509)522-6645
** RECORD NO. 14 COMMENT ******* /
** RECORD NO. 15 COMMENT ******* /*************************************************GriDimensions
** RECORD NO. 16 COMMENT ******* /
** RECORD NO. 17 KEYWORD ******* GRID is 65 x 42 x 15
** RECORD NO. 18 COMMENT ******* /
** RECORD NO. 19 KEYWORD ******* COORdinate X values read from 'xval.dat'
```

```
======> UNIT 10 OPEN FOR I/O IN FORMATTED   MODE; FILE NAME: xval.dat

** RECORD NO. 20 KEYWORD ******* COORdinate Y values read from 'yval.dat'

======> UNIT 10 OPEN FOR I/O IN FORMATTED   MODE; FILE NAME: yval.dat

** RECORD NO. 21 KEYWORD ******* COORdinate Z values read from 'zval.dat'
** RECORD NO. 22 COMMENT ******* /
** RECORD NO. 23 COMMENT ******* /**************************************************INITIAL P's
** RECORD NO. 24 COMMENT ******* /

======> UNIT 10 OPEN FOR I/O IN FORMATTED   MODE; FILE NAME: zval.dat

** RECORD NO. 25 KEYWORD ******* READ # 4 from 'hedstrt.arc'
** RECORD NO. 26 COMMENT ******* /
** RECORD NO. 27 COMMENT ******* /**************************************************ZONDESIGNATION
** RECORD NO. 28 COMMENT ******* /layer 1

======> UNIT 11 OPEN FOR I/O IN FORMATTED   MODE; FILE NAME: hedstrt.arc


      <---- START OF FILE READ/WRITE OPERATIONS ON UNIT#: 11---->


ARCHIVED BY ACRi PROGRAM : PORFLOW-3D - VERSION 2.40.0 /MASTER - DATE: 02 JAN 92
ACRi LICENSE NUMBER .... : 3240AWW034
DATA GENERATED BY USER . : USACE Walla Walla Dist, Environmental Engineering Br.
DATE OF GENERATION ..... : 07/04/92
TIME OF GENERATION ..... : 18:52:19.1
TITLE OF DATA SET ..... : 1100-EM-1 Groundwater Model
GRID DIMENSIONS ..... :   65 BY  42 BY  15


      ----> SIMULATION TIME OF STORED DATA:   1.000E+30
      ----> STEP NUMBER AT WHICH GENERATED:  6520

      ----> READING VARIABLE: P   - PRESSURE OR PRESSURE HEAD

================================================================================
    END-OF-FILE REACHED ON FILE UNIT # 11; LAST RECORD READ AFTER REWINDING.
================================================================================


      <---- START OF FILE READ/WRITE OPERATIONS ON UNIT#: 11---->


ARCHIVED BY ACRi PROGRAM : PORFLOW-3D - VERSION 2.40.0 /MASTER - DATE: 02 JAN 92
ACRi LICENSE NUMBER .... : 3240AWW034
DATA GENERATED BY USER . : USACE Walla Walla Dist, Environmental Engineering Br.
DATE OF GENERATION ..... : 07/04/92
TIME OF GENERATION ..... : 18:52:19.1
TITLE OF DATA SET ..... : 1100-EM-1 Groundwater Model
GRID DIMENSIONS ..... :   65 BY  42 BY  15


      ----> SIMULATION TIME OF STORED DATA:   1.000E+30
      ----> STEP NUMBER AT WHICH GENERATED:  6520

      ----> READING VARIABLE: P   - PRESSURE OR PRESSURE HEAD

      ====> DATA SET NUMBER:   1 READ FROM  hedstrt.arc

** RECORD NO. 29 KEYWORD ******* ZONE 1  from (1,1,1) to (65,42,1)
** RECORD NO. 30 COMMENT ******* /layer 2
** RECORD NO. 31 KEYWORD ******* ZONE 1  from (1,1,2) to (65,42,2)
** RECORD NO. 32 COMMENT ******* /layer 3
** RECORD NO. 33 KEYWORD ******* ZONE 1  from (1,1,3) to (65,42,3)
** RECORD NO. 34 KEYWORD ******* ZONE 5  from (23,40,3) to (50,42,3)
** RECORD NO. 35 KEYWORD ******* ZONE 5  from (27,38,3) to (48,40,3)
** RECORD NO. 36 KEYWORD ******* ZONE 5  from (28,36,3) to (48,38,3)
** RECORD NO. 37 KEYWORD ******* ZONE 5  from (30,33,3) to (46,36,3)
** RECORD NO. 38 KEYWORD ******* ZONE 5  from (33,30,3) to (46,37,3)
** RECORD NO. 39 KEYWORD ******* ZONE 5  from (33,28,3) to (44,30,3)
** RECORD NO. 40 KEYWORD ******* ZONE 5  from (35,25,3) to (44,28,3)
** RECORD NO. 41 KEYWORD ******* ZONE 5  from (35,18,3) to (42,25,3)
** RECORD NO. 42 COMMENT ******* /layer 4
** RECORD NO. 43 KEYWORD ******* ZONE 5  from (1,1,4) to (65,42,4)
** RECORD NO. 44 KEYWORD ******* ZONE 1  from (34,1,4) to (58,3,4)
** RECORD NO. 45 KEYWORD ******* ZONE 1  from (37,3,4) to (58,4,4)
** RECORD NO. 46 KEYWORD ******* ZONE 1  from (40,4,4) to (56,7,4)
** RECORD NO. 47 KEYWORD ******* ZONE 1  from (44,7,4) to (56,10,4)
** RECORD NO. 48 KEYWORD ******* ZONE 1  from (44,10,4) to (54,15,4)
** RECORD NO. 49 KEYWORD ******* ZONE 1  from (47,15,4) to (54,24,4)
** RECORD NO. 50 KEYWORD ******* ZONE 1  from (49,24,4) to (54,31,4)
** RECORD NO. 51 KEYWORD ******* ZONE 1  from (50,31,4) to (54,34,4)
** RECORD NO. 52 KEYWORD ******* ZONE 1  from (52,34,4) to (53,40,4)
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** RECORD NO. 53 KEYWORD ******* ZONE 1 from (52,1,4) to (65,42,4)
** RECORD NO. 54 KEYWORD ******* ZONE 7 from (62,32,4) to (65,36,4)
** RECORD NO. 55 COMMENT ******* /layer 5
** RECORD NO. 56 KEYWORD ******* ZONE 5 from (1,1,5) to (65,42,5)
** RECORD NO. 57 KEYWORD ******* ZONE 1 from (40,1,5) to (58,2,5)
** RECORD NO. 58 KEYWORD ******* ZONE 1 from (43,2,5) to (58,4,5)
** RECORD NO. 59 KEYWORD ******* ZONE 1 from (45,4,5) to (56,7,5)
** RECORD NO. 60 KEYWORD ******* ZONE 1 from (49,7,5) to (56,10,5)
** RECORD NO. 61 KEYWORD ******* ZONE 1 from (49,10,5) to (54,15,5)
** RECORD NO. 62 KEYWORD ******* ZONE 1 from (52,15,5) to (54,24,5)
** RECORD NO. 63 KEYWORD ******* ZONE 1 from (53,24,5) to (54,34,5)
** RECORD NO. 64 KEYWORD ******* ZONE 1 from (52,40,5) to (65,42,5)
** RECORD NO. 65 KEYWORD ******* ZONE 1 from (53,1,5) to (65,42,5)
** RECORD NO. 66 KEYWORD ******* ZONE 7 from (61,35,5) to (65,38,5)
** RECORD NO. 67 KEYWORD ******* ZONE 7 from (62,30,5) to (65,35,5)
** RECORD NO. 68 KEYWORD ******* ZONE 9 from (29,19,5) to (42,35,5)
** RECORD NO. 69 KEYWORD ******* ZONE 9 from (33,21,5) to (44,31,5)
** RECORD NO. 70 KEYWORD ******* ZONE 9 from (35,18,5) to (45,27,5)
** RECORD NO. 71 KEYWORD ******* ZONE 9 from (40,11,5) to (46,22,5)
** RECORD NO. 72 KEYWORD ******* ZONE 9 from (43,9,5) to (47,18,5)
** RECORD NO. 73 COMMENT ******* /layer 6
** RECORD NO. 74 KEYWORD ******* ZONE 5 from (1,1,6) to (65,42,6)
** RECORD NO. 75 KEYWORD ******* ZONE 4 from (48,41,6) to (65,42,6)
** RECORD NO. 76 KEYWORD ******* ZONE 4 from (50,40,6) to (65,42,6)
** RECORD NO. 77 KEYWORD ******* ZONE 4 from (52,38,6) to (65,42,6)
** RECORD NO. 78 KEYWORD ******* ZONE 4 from (53,34,6) to (65,42,6)
** RECORD NO. 79 KEYWORD ******* ZONE 4 from (54,29,6) to (65,42,6)
** RECORD NO. 80 KEYWORD ******* ZONE 4 from (55,24,6) to (65,42,6)
** RECORD NO. 81 KEYWORD ******* ZONE 4 from (56,1,6) to (65,42,6)
** RECORD NO. 82 KEYWORD ******* ZONE 4 from (51,1,6) to (65,2,6)
** RECORD NO. 83 KEYWORD ******* ZONE 4 from (53,2,6) to (65,4,6)
** RECORD NO. 84 KEYWORD ******* ZONE 4 from (54,4,6) to (65,12,6)
** RECORD NO. 85 KEYWORD ******* ZONE 5 from (57,31,6) to (58,34,6)
** RECORD NO. 86 KEYWORD ******* ZONE 5 from (57,31,6) to (59,33,6)
** RECORD NO. 87 KEYWORD ******* ZONE 5 from (56,19,6) to (58,21,6)
** RECORD NO. 88 KEYWORD ******* ZONE 7 from (59,37,6) to (65,39,6)
** RECORD NO. 89 KEYWORD ******* ZONE 7 from (60,34,6) to (65,39,6)
** RECORD NO. 90 KEYWORD ******* ZONE 7 from (61,31,6) to (65,39,6)
** RECORD NO. 91 KEYWORD ******* ZONE 7 from (62,1,6) to (65,39,6)
** RECORD NO. 92 KEYWORD ******* ZONE 9 from (26,26,6) to (29,34,6)
** RECORD NO. 93 KEYWORD ******* ZONE 9 from (29,19,6) to (42,35,6)
** RECORD NO. 94 KEYWORD ******* ZONE 9 from (32,15,6) to (44,28,6)
** RECORD NO. 95 KEYWORD ******* ZONE 9 from (35,11,6) to (46,24,6)
** RECORD NO. 96 KEYWORD ******* ZONE 9 from (39,9,6) to (47,19,6)
** RECORD NO. 97 KEYWORD ******* ZONE 9 from (41,8,6) to (48,16,6)
** RECORD NO. 98 COMMENT ******* /layer 7
** RECORD NO. 99 KEYWORD ******* ZONE 4 from (1,1,7) to (65,42,7)
** RECORD NO.100 KEYWORD ******* ZONE 9 from (28,10,7) to (33,33,7)
** RECORD NO.101 KEYWORD ******* ZONE 9 from (28,10,7) to (36,26,7)
** RECORD NO.102 KEYWORD ******* ZONE 9 from (28,10,7) to (38,16,7)
** RECORD NO.103 KEYWORD ******* ZONE 5 from (1,1,7) to (19,2,7)
** RECORD NO.104 KEYWORD ******* ZONE 5 from (1,2,7) to (25,3,7)
** RECORD NO.105 KEYWORD ******* ZONE 5 from (1,3,7) to (35,4,7)
** RECORD NO.106 KEYWORD ******* ZONE 5 from (1,4,7) to (40,8,7)
** RECORD NO.107 KEYWORD ******* ZONE 5 from (1,8,7) to (38,10,7)
** RECORD NO.108 KEYWORD ******* ZONE 5 from (1,8,7) to (36,13,7)
** RECORD NO.109 KEYWORD ******* ZONE 5 from (1,8,7) to (34,16,7)
** RECORD NO.110 KEYWORD ******* ZONE 5 from (1,8,7) to (32,18,7)
** RECORD NO.111 KEYWORD ******* ZONE 5 from (1,8,7) to (30,22,7)
** RECORD NO.112 KEYWORD ******* ZONE 5 from (1,8,7) to (28,33,7)
** RECORD NO.113 KEYWORD ******* ZONE 5 from (1,33,7) to (52,38,7)
** RECORD NO.114 KEYWORD ******* ZONE 5 from (1,33,7) to (51,39,7)
** RECORD NO.115 KEYWORD ******* ZONE 5 from (1,33,7) to (50,40,7)
** RECORD NO.116 KEYWORD ******* ZONE 5 from (1,33,7) to (48,42,7)
** RECORD NO.117 KEYWORD ******* ZONE 5 from (44,32,7) to (52,38,7)
** RECORD NO.118 KEYWORD ******* ZONE 5 from (48,25,7) to (53,34,7)
** RECORD NO.119 KEYWORD ******* ZONE 5 from (49,20,7) to (54,30,7)
** RECORD NO.120 KEYWORD ******* ZONE 5 from (51,13,7) to (55,21,7)
** RECORD NO.121 KEYWORD ******* ZONE 7 from (60,1,7) to (65,16,7)
** RECORD NO.122 KEYWORD ******* ZONE 7 from (59,5,7) to (60,8,7)
** RECORD NO.123 KEYWORD ******* ZONE 7 from (61,16,7) to (65,34,7)
** RECORD NO.124 KEYWORD ******* ZONE 7 from (60,34,7) to (65,39,7)
** RECORD NO.125 KEYWORD ******* ZONE 7 from (59,36,7) to (65,39,7)
** RECORD NO.126 KEYWORD ******* ZONE 7 from (58,38,7) to (65,40,7)
** RECORD NO.127 COMMENT ******* /layer 8
** RECORD NO.128 KEYWORD ******* ZONE 4 from (1,1,8) to (65,42,8)
** RECORD NO.129 KEYWORD ******* ZONE 5 from (1,4,8) to (10,5,8)
** RECORD NO.130 KEYWORD ******* ZONE 5 from (1,5,8) to (25,6,8)
** RECORD NO.131 KEYWORD ******* ZONE 5 from (1,6,8) to (33,12,8)
** RECORD NO.132 KEYWORD ******* ZONE 5 from (1,12,8) to (30,16,8)
** RECORD NO.133 KEYWORD ******* ZONE 5 from (1,16,8) to (26,20,8)
** RECORD NO.134 KEYWORD ******* ZONE 5 from (1,20,8) to (25,23,8)
** RECORD NO.135 KEYWORD ******* ZONE 5 from (1,22,8) to (21,28,8)
** RECORD NO.136 KEYWORD ******* ZONE 5 from (1,22,8) to (19,36,8)
** RECORD NO.137 KEYWORD ******* ZONE 5 from (1,36,8) to (21,37,8)
** RECORD NO.138 KEYWORD ******* ZONE 5 from (1,37,8) to (23,38,8)
** RECORD NO.139 KEYWORD ******* ZONE 5 from (1,38,8) to (29,39,8)
** RECORD NO.140 KEYWORD ******* ZONE 5 from (1,39,8) to (46,41,8)
** RECORD NO.141 KEYWORD ******* ZONE 5 from (1,40,8) to (45,42,8)
** RECORD NO.142 KEYWORD ******* ZONE 5 from (41,38,8) to (48,40,8)

** RECORD NO.143 KEYWORD ******* ZONE 5 from (50,23,8) to (52,28,8)
** RECORD NO.144 KEYWORD ******* ZONE 5 from (51,19,8) to (53,27,8)
** RECORD NO.145 COMMENT ******* /
** RECORD NO.146 KEYWORD ******* ZONE 5 from (44,33,8) to (50,38,8)
** RECORD NO.147 KEYWORD ******* ZONE 5 from (47,25,8) to (52,35,8)
** RECORD NO.148 KEYWORD ******* ZONE 5 from (49,23,8) to (53,30,8)
** RECORD NO.149 COMMENT ******* /
** RECORD NO.150 KEYWORD ******* ZONE 7 from (59,1,8) to (65,8,8)
** RECORD NO.151 KEYWORD ******* ZONE 7 from (60,8,8) to (65,40,8)
** RECORD NO.152 KEYWORD ******* ZONE 7 from (59,36,8) to (65,40,8)
** RECORD NO.153 KEYWORD ******* ZONE 7 from (58,38,8) to (65,40,8)
** RECORD NO.154 KEYWORD ******* ZONE 7 from (57,39,8) to (65,41,8)
** RECORD NO.155 COMMENT ******* /layer 9
** RECORD NO.156 KEYWORD ******* ZONE 4 from (1,1,9) to (65,42,9)
** RECORD NO.157 KEYWORD ******* ZONE 5 from (1,5,9) to (7,7,9)
** RECORD NO.158 KEYWORD ******* ZONE 5 from (1,7,9) to (28,16,9)
** RECORD NO.159 KEYWORD ******* ZONE 5 from (1,16,9) to (25,20,9)
** RECORD NO.160 KEYWORD ******* ZONE 5 from (1,20,9) to (22,25,9)
** RECORD NO.161 KEYWORD ******* ZONE 5 from (1,25,9) to (20,29,9)
** RECORD NO.162 KEYWORD ******* ZONE 5 from (1,29,9) to (19,38,9)
** RECORD NO.163 KEYWORD ******* ZONE 5 from (1,38,9) to (24,40,9)
** RECORD NO.164 KEYWORD ******* ZONE 5 from (1,40,9) to (46,41,9)
** RECORD NO.165 KEYWORD ******* ZONE 5 from (1,41,9) to (44,42,9)
** RECORD NO.166 KEYWORD ******* ZONE 5 from (41,39,9) to (46,42,9)
** RECORD NO.167 KEYWORD ******* ZONE 5 from (50,25,9) to (52,30,9)
** RECORD NO.168 KEYWORD ******* ZONE 5 from (51,22,9) to (53,27,9)
** RECORD NO.169 COMMENT ******* /
** RECORD NO.170 KEYWORD ******* ZONE 5 from (42,36,9) to (47,39,9)
** RECORD NO.171 KEYWORD ******* ZONE 5 from (45,32,9) to (49,37,9)
** RECORD NO.172 KEYWORD ******* ZONE 5 from (48,28,9) to (51,34,9)
** RECORD NO.173 COMMENT ******* /
** RECORD NO.174 KEYWORD ******* ZONE 7 from (56,40,9) to (65,41,9)
** RECORD NO.175 KEYWORD ******* ZONE 7 from (57,38,9) to (65,41,9)
** RECORD NO.176 KEYWORD ******* ZONE 7 from (58,35,9) to (65,41,9)
** RECORD NO.177 KEYWORD ******* ZONE 7 from (59,1,9) to (65,40,9)
** RECORD NO.178 KEYWORD ******* ZONE 7 from (58,1,9) to (65,9,9)
** RECORD NO.179 KEYWORD ******* ZONE 10 FROM (60,20,10) TO (65,40,10)
** RECORD NO.180 COMMENT ******* /layer 10
** RECORD NO.181 KEYWORD ******* ZONE 4 from (1,1,10) to (65,42,10)
** RECORD NO.182 KEYWORD ******* ZONE 7 from (57,40,10) to (65,42,10)
** RECORD NO.183 KEYWORD ******* ZONE 7 from (57,39,10) to (65,42,10)
** RECORD NO.184 KEYWORD ******* ZONE 7 from (57,38,10) to (65,42,10)
** RECORD NO.185 KEYWORD ******* ZONE 7 from (57,36,10) to (65,42,10)
** RECORD NO.186 KEYWORD ******* ZONE 7 from (58,1,10) to (65,42,10)
** RECORD NO.187 KEYWORD ******* ZONE 10 FROM (59,37,10) TO (65,42,10)
** RECORD NO.188 KEYWORD ******* ZONE 10 FROM (61,10,10) TO (65,40,10)
** RECORD NO.189 COMMENT ******* /
** RECORD NO.190 COMMENT ******* /layer 11
** RECORD NO.191 COMMENT ******* /
** RECORD NO.192 KEYWORD ******* ZONE 4 from (1,1,11) to (65,42,11)
** RECORD NO.193 KEYWORD ******* ZONE 7 from (55,25,11) to (65,42,11)
** RECORD NO.194 COMMENT ******* /
** RECORD NO.195 KEYWORD ******* ZONE 7 from (56,15,11) to (65,42,11)
** RECORD NO.196 KEYWORD ******* ZONE 7 from (57,12,11) to (65,42,11)
** RECORD NO.197 KEYWORD ******* ZONE 7 from (58,1,11) to (65,42,11)
** RECORD NO.198 KEYWORD ******* ZONE 8 from (4,9,11) to (7,13,11)
** RECORD NO.199 KEYWORD ******* ZONE 8 from (6,8,11) to (8,10,11)
** RECORD NO.200 KEYWORD ******* ZONE 8 from (4,13,11) to (6,21,11)
** RECORD NO.201 KEYWORD ******* ZONE 10 FROM (57,26,11) TO (65,42,11)
** RECORD NO.202 KEYWORD ******* ZONE 10 FROM (58,18,11) TO (65,39,11)
** RECORD NO.203 KEYWORD ******* ZONE 10 FROM (59,10,11) TO (65,35,11)
** RECORD NO.204 KEYWORD ******* ZONE 10 FROM (60,4,11) TO (65,30,11)
** RECORD NO.205 COMMENT ******* /
** RECORD NO.206 COMMENT ******* /layer 12
** RECORD NO.207 KEYWORD ******* ZONE 4 from (1,1,12) to (65,42,12)
** RECORD NO.208 KEYWORD ******* ZONE 8 from (26,1,12) to (58,2,12)
** RECORD NO.209 KEYWORD ******* ZONE 8 from (22,2,12) to (58,3,12)
** RECORD NO.210 KEYWORD ******* ZONE 8 from (18,3,12) to (24,4,12)
** RECORD NO.211 KEYWORD ******* ZONE 8 from (14,4,12) to (21,5,12)
** RECORD NO.212 KEYWORD ******* ZONE 8 from (10,5,12) to (17,6,12)
** RECORD NO.213 KEYWORD ******* ZONE 8 from (6,6,12) to (14,7,12)
** RECORD NO.214 KEYWORD ******* ZONE 8 from (5,7,12) to (13,8,12)
** RECORD NO.215 KEYWORD ******* ZONE 8 from (5,9,12) to (12,9,12)
** RECORD NO.216 KEYWORD ******* ZONE 8 from (5,9,12) to (10,10,12)
** RECORD NO.217 KEYWORD ******* ZONE 8 from (5,11,12) to (7,18,12)
** RECORD NO.218 KEYWORD ******* ZONE 8 from (5,19,12) to (10,21,12)
** RECORD NO.219 KEYWORD ******* ZONE 8 from (6,22,12) to (15,24,12)
** RECORD NO.220 KEYWORD ******* ZONE 8 from (8,25,12) to (23,28,12)
** RECORD NO.221 KEYWORD ******* ZONE 8 from (20,29,12) to (37,31,12)
** RECORD NO.222 KEYWORD ******* ZONE 8 from (28,32,12) to (39,33,12)
** RECORD NO.223 KEYWORD ******* ZONE 8 from (35,34,12) to (45,35,12)
** RECORD NO.224 KEYWORD ******* ZONE 8 from (41,36,12) to (47,39,12)
** RECORD NO.225 KEYWORD ******* ZONE 8 from (41,40,12) to (45,42,12)
** RECORD NO.226 KEYWORD ******* ZONE 8 from (44,3,12) to (65,5,12)!!!
** RECORD NO.227 KEYWORD ******* ZONE 8 from (45,5,12) to (65,7,12)!!!
** RECORD NO.228 KEYWORD ******* ZONE 8 from (47,7,12) to (55,13,12)!!!
** RECORD NO.229 KEYWORD ******* ZONE 8 from (49,14,12) to (55,35,12)!!!
** RECORD NO.230 KEYWORD ******* ZONE 8 from (51,36,12) to (55,40,12)!!!
** RECORD NO.231 KEYWORD ******* ZONE 8 from (54,40,12) to (65,42,12)!!!
** RECORD NO.232 KEYWORD ******* ZONE 4 from (46,40,12) to (53,42,12)

** RECORD NO.233 KEYWORD ******* ZONE 4 from (52,1,12) to (57,2,12)!!!!
** RECORD NO.234 KEYWORD ******* ZONE 7 from (59,1,12) to (65,42,12)
** RECORD NO.235 KEYWORD ******* ZONE 7 from (57,6,12) to (65,42,12)
** RECORD NO.236 KEYWORD ******* ZONE 7 from (56,8,12) to (65,42,12)
** RECORD NO.237 KEYWORD ******* ZONE 7 from (54,18,12) to (65,42,12)
** RECORD NO.238 KEYWORD ******* ZONE 7 from (53,25,12) to (65,40,12)
** RECORD NO.239 KEYWORD ******* ZONE 10 FROM (56,35,12) TO (65,42,12)
** RECORD NO.240 KEYWORD ******* ZONE 10 FROM (57,28,12) TO (65,39,12)
** RECORD NO.241 KEYWORD ******* ZONE 10 FROM (59,20,12) TO (65,35,12)
** RECORD NO.242 KEYWORD ******* ZONE 10 FROM (60,8,12) TO (65,30,12)
** RECORD NO.243 COMMENT ******* /
** RECORD NO.244 COMMENT ******* /layer 13
** RECORD NO.245 COMMENT ******* /
** RECORD NO.246 KEYWORD ******* ZONE 8 from (1,1,13) to (65,42,13)
** RECORD NO.247 KEYWORD ******* ZONE 4 from (1,1,13) to (24,1,13)
** RECORD NO.248 KEYWORD ******* ZONE 4 from (1,2,13) to (20,2,13)
** RECORD NO.249 KEYWORD ******* ZONE 4 from (1,3,13) to (15,3,13)
** RECORD NO.250 KEYWORD ******* ZONE 4 from (1,4,13) to (10,4,13)
** RECORD NO.251 KEYWORD ******* ZONE 4 from (1,5,13) to (6,5,13)
** RECORD NO.252 KEYWORD ******* ZONE 4 from (1,6,13) to (3,10,13)
** RECORD NO.253 KEYWORD ******* ZONE 4 from (1,11,13) to (2,22,13)
** RECORD NO.254 KEYWORD ******* ZONE 4 from (1,21,13) to (3,30,13)
** RECORD NO.255 KEYWORD ******* ZONE 4 from (1,25,13) to (4,30,13)
** RECORD NO.256 KEYWORD ******* ZONE 4 from (1,29,13) to (7,35,13)
** RECORD NO.257 KEYWORD ******* ZONE 4 from (1,31,13) to (14,40,13)
** RECORD NO.258 KEYWORD ******* ZONE 4 from (1,33,13) to (20,40,13)
** RECORD NO.259 KEYWORD ******* ZONE 4 from (1,36,13) to (26,42,13)
** RECORD NO.260 KEYWORD ******* ZONE 4 from (1,38,13) to (31,42,13)
** RECORD NO.261 KEYWORD ******* ZONE 4 from (1,41,13) to (35,42,13)
** RECORD NO.262 KEYWORD ******* ZONE 4 from (47,40,13) to (49,42,13)
** RECORD NO.263 KEYWORD ******* ZONE 4 from (46,41,13) to (52,42,13)!!!!
** RECORD NO.264 KEYWORD ******* ZONE 4 from (26,8,13) to (32,10,13)
** RECORD NO.265 KEYWORD ******* ZONE 4 from (23,9,13) to (35,10,13)
** RECORD NO.266 KEYWORD ******* ZONE 4 from (21,10,13) to (37,11,13)
** RECORD NO.267 KEYWORD ******* ZONE 4 from (14,12,13) to (39,14,13)
** RECORD NO.268 KEYWORD ******* ZONE 4 from (12,15,13) to (41,19,13)
** RECORD NO.269 KEYWORD ******* ZONE 4 from (14,20,13) to (41,21,13)
** RECORD NO.270 KEYWORD ******* ZONE 4 from (23,22,13) to (42,22,13)
** RECORD NO.271 KEYWORD ******* ZONE 4 from (28,23,13) to (42,23,13)
** RECORD NO.272 KEYWORD ******* ZONE 4 from (34,24,13) to (42,24,13)
** RECORD NO.273 KEYWORD ******* ZONE 4 from (37,25,13) to (42,26,13)
** RECORD NO.274 KEYWORD ******* ZONE 4 from (32,27,13) to (42,28,13)
** RECORD NO.275 KEYWORD ******* ZONE 4 from (36,28,13) to (43,30,13)
** RECORD NO.276 KEYWORD ******* ZONE 4 from (41,31,13) to (43,31,13)
** RECORD NO.277 KEYWORD ******* ZONE 4 from (42,32,13) to (43,33,13)
** RECORD NO.278 KEYWORD ******* ZONE 8 from (41,41,13) to (44,42,13)
** RECORD NO.279 KEYWORD ******* ZONE 7 from (57,1,13) to (65,42,13)
** RECORD NO.280 KEYWORD ******* ZONE 7 from (55,6,13) to (65,42,13)
** RECORD NO.281 KEYWORD ******* ZONE 7 from (54,8,13) to (65,35,13)
** RECORD NO.282 KEYWORD ******* ZONE 7 from (53,10,13) to (65,35,13)
** RECORD NO.283 KEYWORD ******* ZONE 7 from (52,13,13) to (65,35,13)
** RECORD NO.284 KEYWORD ******* ZONE 7 from (51,25,13) to (65,40,13)
** RECORD NO.285 KEYWORD ******* ZONE 7 from (51,29,13) to (65,37,13)
** RECORD NO.286 KEYWORD ******* ZONE 7 from (53,41,13) to (65,42,13)
** RECORD NO.287 KEYWORD ******* ZONE 10 FROM (55,23,13) TO (65,41,13)
** RECORD NO.288 KEYWORD ******* ZONE 10 FROM (53,35,13) TO (65,39,13)
** RECORD NO.289 KEYWORD ******* ZONE 10 FROM (54,28,13) TO (65,40,13)
** RECORD NO.290 KEYWORD ******* ZONE 10 FROM (56,18,13) TO (65,40,13)
** RECORD NO.291 KEYWORD ******* ZONE 10 FROM (57,14,13) TO (65,40,13)
** RECORD NO.292 KEYWORD ******* ZONE 10 FROM (59,8,13) TO (65,40,13)
** RECORD NO.293 COMMENT ******* /
** RECORD NO.294 COMMENT ******* /layer 14
** RECORD NO.295 COMMENT ******* /
** RECORD NO.296 KEYWORD ******* ZONE 8 from (1,1,14) to (65,42,14)
** RECORD NO.297 COMMENT ******* /ZONE 4 from (1,1,14) to (2,42,14)
** RECORD NO.298 COMMENT ******* /ZONE 4 from (1,1,14) to (3,42,14)
** RECORD NO.299 COMMENT ******* /ZONE 4 from (1,28,14) to (5,33,14)
** RECORD NO.300 COMMENT ******* /ZONE 4 from (1,34,14) to (13,34,14)
** RECORD NO.301 COMMENT ******* /ZONE 4 from (1,35,14) to (19,36,14)
** RECORD NO.302 COMMENT ******* /ZONE 4 from (1,37,14) to (23,38,14)
** RECORD NO.303 COMMENT ******* /ZONE 4 from (1,39,14) to (27,39,14)
** RECORD NO.304 COMMENT ******* /ZONE 4 from (1,40,14) to (33,42,14)
** RECORD NO.305 COMMENT ******* /ZONE 4 from (18,14,14) to (25,18,14)
** RECORD NO.306 COMMENT ******* /ZONE 4 from (23,15,14) to (35,19,14)
** RECORD NO.307 KEYWORD ******* ZONE 7 from (57,1,14) to (65,42,14)
** RECORD NO.308 KEYWORD ******* ZONE 7 from (42,6,14) to (65,42,14)
** RECORD NO.309 KEYWORD ******* ZONE 7 from (38,38,14) to (65,42,14)
** RECORD NO.310 KEYWORD ******* ZONE 10 FROM (57,5,14) TO (65,42,14)
** RECORD NO.311 KEYWORD ******* ZONE 10 FROM (54,7,14) TO (65,42,14)
** RECORD NO.312 KEYWORD ******* ZONE 10 FROM (51,10,14) TO (65,38,14)
** RECORD NO.313 KEYWORD ******* ZONE 10 FROM (55,35,14) TO (65,42,14)
** RECORD NO.314 COMMENT ******* /
** RECORD NO.315 COMMENT ******* /
** RECORD NO.316 COMMENT ******* /layer 15
** RECORD NO.317 COMMENT ******* /
** RECORD NO.318 KEYWORD ******* ZONE 8 from (1,1,15) to (65,42,15)
** RECORD NO.319 COMMENT ******* /ONE 4 from (1,1,15) to (4,3,15)
** RECORD NO.320 COMMENT ******* /ONE 4 from (1,1,15) to (3,42,15)
** RECORD NO.321 COMMENT ******* /ONE 4 from (1,28,15) to (5,33,15)
** RECORD NO.322 COMMENT ******* /ONE 4 from (1,34,15) to (13,34,15)

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** RECORD NO.323 COMMENT ******* /ONE 4  from (1,35,15) to (19,36,15)
** RECORD NO.324 COMMENT ******* /ONE 4  from (1,37,15) to (23,38,15)
** RECORD NO.325 COMMENT ******* /ONE 4  from (1,39,15) to (27,39,15)
** RECORD NO.326 COMMENT ******* /ONE 4  from (1,40,15) to (33,42,15)
** RECORD NO.327 COMMENT ******* /ONE 4  from (18,14,15) to (25,18,15)
** RECORD NO.328 COMMENT ******* /ONE 4  from (23,15,15) to (35,19,15)
** RECORD NO.329 KEYWORD ******* ZONE 7  from (48,1,15) to (65,42,15)
** RECORD NO.330 KEYWORD ******* ZONE 7  from (45,6,15) to (65,42,15)
** RECORD NO.331 KEYWORD ******* ZONE 7  from (38,38,15) to (65,42,15)
** RECORD NO.332 COMMENT ******* /ZONE 10 FROM (57,1,15) TO (65,42,15)!@
** RECORD NO.333 COMMENT ******* /ZONE 10 FROM (54,6,15) TO (65,42,15)!@
** RECORD NO.334 COMMENT ******* /ZONE 10 FROM (42,10,15) TO (65,38,15)!@
** RECORD NO.335 COMMENT ******* /ZONE 10 FROM (45,35,15) TO (65,42,15)!@
** RECORD NO.336 COMMENT ******* /
** RECORD NO.337 COMMENT ******* / global
** RECORD NO.338 KEYWORD ******* zone 10 from (59,11,6) to (65,42,15)
** RECORD NO.339 KEYWORD ******* zone 10 from (58,37,6) to (65,42,15)
** RECORD NO.340 COMMENT ******* /
** RECORD NO.341 COMMENT ******* /**********************************************SOILPROPERTIES
** RECORD NO.342 COMMENT ******* /
** RECORD NO.343 KEYWORD ******* PROP EFFE C
** RECORD NO.344 COMMENT ******* /
** RECORD NO.345 KEYWORD ******* for zone 1
** RECORD NO.346 KEYWORD ******* HYDRualic properties; as= 0.2, Kx= 20., Ky= 20., Kz= 1.2
** RECORD NO.347 KEYWORD ******* SOIL density = 1850, eff porosities = .28, tot pors = .32 iffpors = .28
** RECORD NO.348 KEYWORD ******* TRAN R=2.5500, Dm=1.E-10, Disp(l)=.300 , Disp(t)=0.010
** RECORD NO.349 COMMENT ******* /
** RECORD NO.350 KEYWORD ******* for zone 4
** RECORD NO.351 KEYWORD ******* HYDRualic properties; as= 0.2, Kx= 60., Ky= 60., Kz= 3.9
** RECORD NO.352 KEYWORD ******* SOIL density = 1850, eff porosities = .28, tot pors = .32 iffpors = .28
** RECORD NO.353 KEYWORD ******* TRAN R=2.5500, Dm=1.E-10, Disp(l)=.300 , Disp(t)=0.010
** RECORD NO.354 COMMENT ******* /
** RECORD NO.355 KEYWORD ******* for zone 5
** RECORD NO.356 KEYWORD ******* HYDRualic properties; as= 0.2, Kx= .01, Ky= .01, Kz= .001
** RECORD NO.357 KEYWORD ******* SOIL density = 1850, eff porosities = .24, tot pors = .27 diffpors = .24
** RECORD NO.358 KEYWORD ******* TRAN R=20., Dm=1.E-20, Disp(l)=0.00, Disp(t)=0.00
** RECORD NO.359 COMMENT ******* /
** RECORD NO.360 KEYWORD ******* for zone 7
** RECORD NO.361 KEYWORD ******* HYDRualic properties; as= 0.2, Kx= 1000., Ky= 1000., Kz= 64.
** RECORD NO.362 KEYWORD ******* SOIL density = 1850, eff porosities = .28, tot pors = .32 iffpors = .28
** RECORD NO.363 KEYWORD ******* TRAN R=2.5500, Dm=1.E-10, Disp(l)=.300 , Disp(t)=0.010
** RECORD NO.364 COMMENT ******* /
** RECORD NO.365 KEYWORD ******* for zone 8
** RECORD NO.366 KEYWORD ******* HYDRualic properties; as= 0.2, Kx= 500., Ky= 500., Kz= 13.7
** RECORD NO.367 KEYWORD ******* SOIL density = 1850, eff porosities = .28, tot pors = .32 iffpors = .28
** RECORD NO.368 KEYWORD ******* TRAN R=2.5500, Dm=1.E-10, Disp(l)=.300 , Disp(t)=0.010
** RECORD NO.369 COMMENT ******* /
** RECORD NO.370 KEYWORD ******* for zone 9
** RECORD NO.371 KEYWORD ******* HYDRualic properties; as= 0.2, Kx= .05, Ky= .05, Kz= .005
** RECORD NO.372 KEYWORD ******* SOIL density = 1850, eff porosities = .24, tot pors = .27 diffpors = .24
** RECORD NO.373 KEYWORD ******* TRAN R=20., Dm=1.E-20, Disp(l)=0.00, Disp(t)=0.00
** RECORD NO.374 COMMENT ******* /
** RECORD NO.375 KEYWORD ******* for zone 10
** RECORD NO.376 KEYWORD ******* HYDRualic properties; as= 0.2, Kx= 5000., Ky= 5000., Kz= 50.
** RECORD NO.377 KEYWORD ******* SOIL density = 1850, eff porosities = .28, tot pors = .32 iffpors = .28
** RECORD NO.378 KEYWORD ******* TRAN R=2.5500, Dm=1.E-10, Disp(l)=.300 , Disp(t)=0.010
** RECORD NO.379 COMMENT ******* /
** RECORD NO.380 COMMENT ******* /**********************************************BOUNDARYCONDITIONS
** RECORD NO.381 COMMENT ******* /
** RECORD NO.382 COMMENT ******* /   constant heads for upgradient boundary
** RECORD NO.383 COMMENT ******* /
** RECORD NO.384 KEYWORD ******* BOUNdary for P: -1; = 109.00    for (1,1,4) to (1,42,15)
** RECORD NO.385 KEYWORD ******* BOUNdary for P: -1; = 108.70    for (1,26,4) to (1,42,15)
** RECORD NO.386 KEYWORD ******* BOUNdary for P: -1; = 109.20    for (1,1,4) to (1,10,15)
** RECORD NO.387 KEYWORD ******* BOUNdary for P: -1; = 110.70    for (1,1,1) to (1,42,3)
** RECORD NO.388 COMMENT ******* /
** RECORD NO.389 COMMENT ******* / assign constant hydraulic flux for north and south boundaries
** RECORD NO.390 COMMENT ******* /
** RECORD NO.391 KEYWORD ******* BOUNdary for P: +2; FLUX = 0.0  !!! for (2,42,1) to (64,42,15)
** RECORD NO.392 KEYWORD ******* BOUNdary for P: +2; = 104.70 for (59,42,4) to (62,42,15)
** RECORD NO.393 KEYWORD ******* BOUNdary for P: +2; = 104.70 for (63,42,4) to (64,42,15)
** RECORD NO.394 KEYWORD ******* BOUNdary for P: +2; = 104.99 for (59,42,1) to (64,42,3)
** RECORD NO.395 KEYWORD ******* BOUNdary for P: -2; FLUX = 0.0 !!! for (2,1,1) to (64,1,15)
** RECORD NO.396 KEYWORD ******* BOUNdary for P: -2; FLUX = 0.05 for (12,1,5) to (42,1,10)
** RECORD NO.397 KEYWORD ******* BOUNdary for P: -2; FLUX = 0.12 for (42,1,5) to (53,1,10)
** RECORD NO.398 KEYWORD ******* BOUNdary for P: -2; FLUX = 0.45 for (53,1,5) to (57,1,10)
** RECORD NO.399 COMMENT ******* /
** RECORD NO.400 COMMENT ******* / assign constant hydraulic flux for upper and lower boundaries
** RECORD NO.401 COMMENT ******* /
** RECORD NO.402 KEYWORD ******* BOUNdary for P: +3; FLUX =-1.0E-5 all
** RECORD NO.403 KEYWORD ******* BOUNdary for P: -3; FLUX = 0.0005   all
** RECORD NO.404 COMMENT ******* /
** RECORD NO.405 COMMENT ******* /**********************************************INITIALCONDITIONS
** RECORD NO.406 COMMENT ******* /
** RECORD NO.407 COMMENT ******* /   river boundary
** RECORD NO.408 COMMENT ******* /
** RECORD NO.409 KEYWORD ******* FIXEd P from (57,1,1) to (65,1,15)
** RECORD NO.410 KEYWORD ******* FIXEd P from (57,2,1) to (65,2,15)
** RECORD NO.411 KEYWORD ******* FIXEd P from (59,3,1) to (65,3,15)
** RECORD NO.412 KEYWORD ******* FIXEd P from (60,4,1) to (65,4,15)
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** RECORD NO.413 KEYWORD ******* FIXEd P from (61,5,1) to (65,6,15)
** RECORD NO.414 KEYWORD ******* FIXEd P from (61,7,1) to (65,9,15)
** RECORD NO.415 KEYWORD ******* FIXEd P from (61,10,1) to (65,12,15)
** RECORD NO.416 KEYWORD ******* FIXEd P from (61,13,1) to (65,15,15)
** RECORD NO.417 KEYWORD ******* FIXEd P from (62,16,1) to (65,18,15)
** RECORD NO.418 KEYWORD ******* FIXEd P from (62,19,1) to (65,21,15)
** RECORD NO.419 KEYWORD ******* FIXEd P from (62,22,1) to (65,24,15)
** RECORD NO.420 KEYWORD ******* FIXEd P from (62,25,1) to (65,27,15)
** RECORD NO.421 KEYWORD ******* FIXEd P from (62,28,1) to (65,31,15)
** RECORD NO.422 KEYWORD ******* FIXEd P from (63,32,1) to (65,33,15)
** RECORD NO.423 KEYWORD ******* FIXEd P from (64,34,1) to (65,35,15)
** RECORD NO.424 KEYWORD ******* FIXEd P from (65,36,1) to (65,42,15)
** RECORD NO.425 COMMENT ******* /
** RECORD NO.426 COMMENT ******* /**********SOURCE
** RECORD NO.427 COMMENT ******* / see initial C commands below
** RECORD NO.428 COMMENT ******* /**********OUTPUT SOLUTION
** RECORD NO.429 COMMENT ******* /
** RECORD NO.430 KEYWORD ******* OUTput c in XY plane every 5000 steps
** RECORD NO.431 COMMENT ******* /
** RECORD NO.432 KEYWORD ******* TIME = 0 at start of simulation
** RECORD NO.433 KEYWORD ******* FLUX Bala C for 2 2 2 to 64 41 15 every 10

=======> UNIT 14 OPEN FOR I/O IN FORMATTED MODE; FILE NAME: FLUXBAL

** RECORD NO.434 KEYWORD ******* HIST C 'c:\pf\3z40.his'(10,17,10)(24,19,10)(36,21,10)(10,17,11) 1
** RECORD NO.435 COMMENT ******* /

=======> UNIT 13 OPEN FOR I/O IN FORMATTED MODE; FILE NAME: c:\pf\3z40.his

** RECORD NO.436 KEYWORD ******* convergence epsilon to 1.e-5
** RECORD NO.437 COMMENT ******* /
** RECORD NO.438 KEYWORD ******* SOLVE for 1000 days in steps of 250 1.08 max of 1000

1----------
1100-EM-1 Groundwater Model

GRID DIMENSIONS.....(IMAX,JMAX,KMAX) = 65 BY 42 BY 15
MAXIMUM NUMBER OF NODES IN EACH 3-D ARRAY. = 50000
NUMBER OF THREE DIMENSIONAL FIELD ARRAYS.. = 40
FIELD LENGTH ALLOCATED FOR 3-D ARRAYS..... =7812.5 Kbyte
FIELD LENGTH ACTUALLY USED FOR 3-D ARRAYS. =6398.4 Kbyte

X COORDINATE VALUES
==========

0.00 183.00 366.00 488.00 549.00 610.00 671.00 701.50

732.00 762.50 793.00 823.50 854.00 884.50 915.00 945.50

976.00 1006.50 1037.00 1067.50 1098.00 1128.50 1159.00 1189.50

1220.00 1250.50 1281.00 1311.50 1342.00 1372.50 1403.00 1433.50

1464.00 1494.50 1525.00 1555.50 1586.00 1616.50 1647.00 1677.50

1708.00 1769.00 1830.00 1891.00 1952.00 2013.00 2074.00 2135.00

2196.00 2257.00 2318.00 2379.00 2501.00 2623.00 2745.00 2867.00

2989.00 3111.00 3233.00 3355.00 3477.00 3599.00 3721.00 3843.00

3965.00

Y COORDINATE VALUES
==========

0.00 305.00 549.00 732.00 854.00 976.00 1037.00 1098.00

1159.00 1220.00 1281.00 1311.50 1342.00 1372.50 1403.00 1433.50

1464.00 1494.50 1525.00 1555.50 1586.00 1616.50 1647.00 1677.50

1708.00 1738.50 1769.00 1799.50 1830.00 1860.50 1891.00 1921.50

1952.00 2013.00 2074.00 2135.00 2196.00 2257.00 2379.00 2501.00

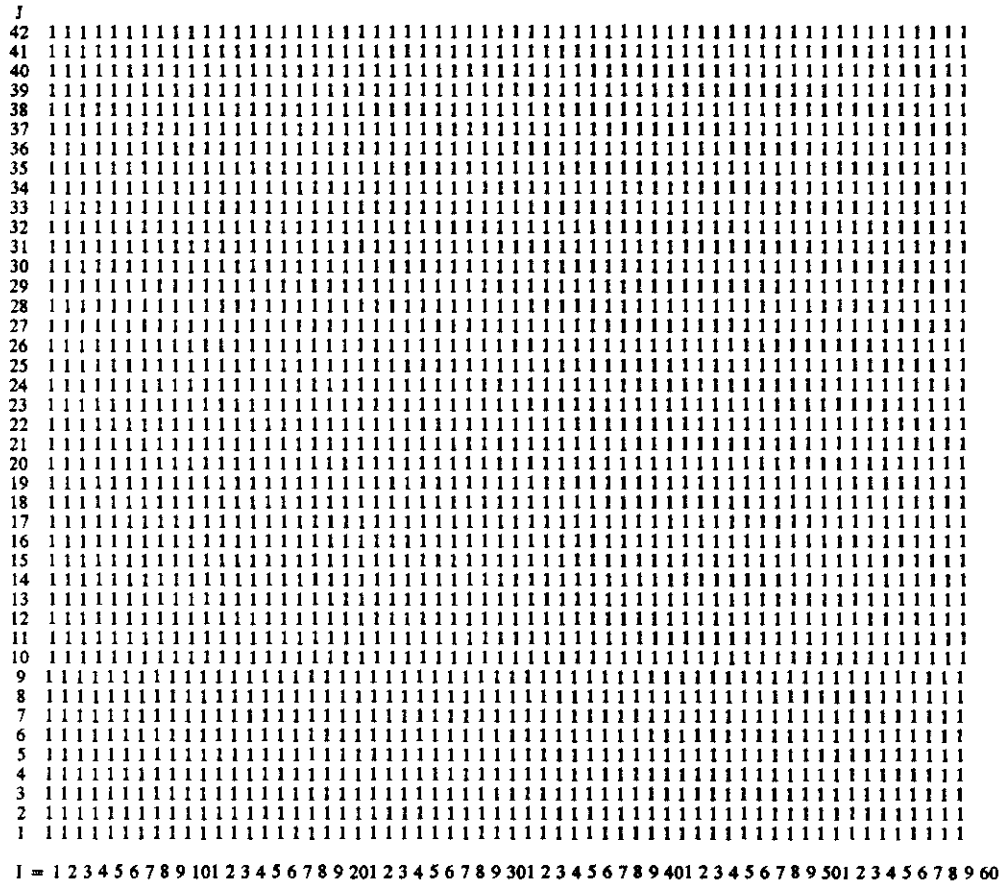
2684.00 2928.00

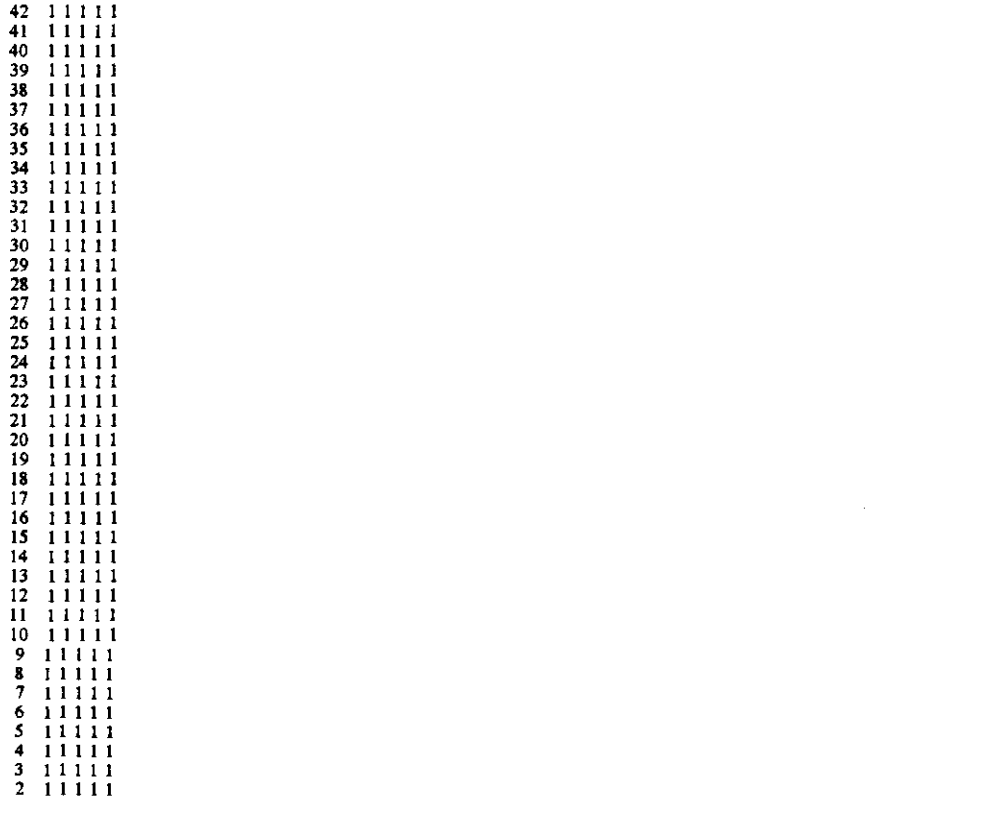
Z COORDINATE VALUES
==========

57.00 89.00 92.00 95.00 97.00 99.00 100.00 101.00

102.00 103.50 105.00 106.00 107.00 109.00 111.00

ZONE IDENTIFIERS AT PLANE K = 1





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1  1 1 1 1 1

I = 1 2 3 4 5
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ZONE IDENTIFIERS AT PLANE K = 2

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J
42  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
41  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
40  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
39  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
38  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
37  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
36  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
35  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
34  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
33  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
32  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
31  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
30  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
29  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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27  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
26  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
25  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
24  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
23  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
22  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
21  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
20  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
19  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
18  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
17  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
16  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
15  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
14  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
13  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
12  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
11  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
10  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
 9  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
 8  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
 7  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
 6  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
 5  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
 4  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
 3  1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
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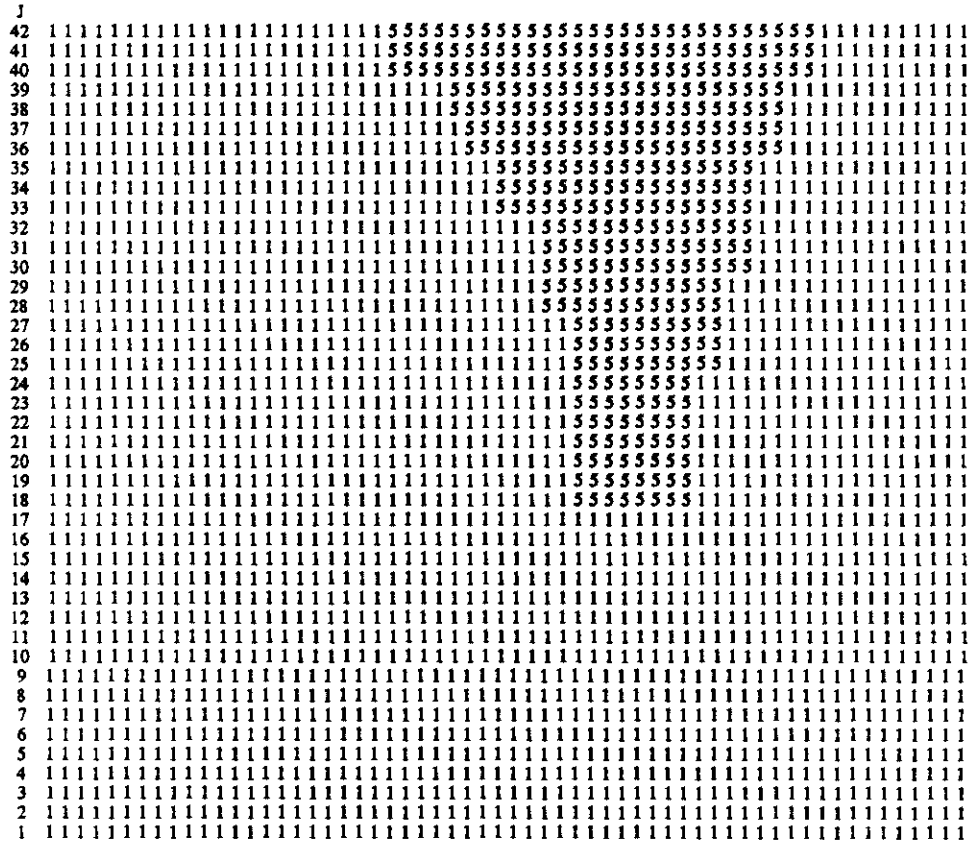

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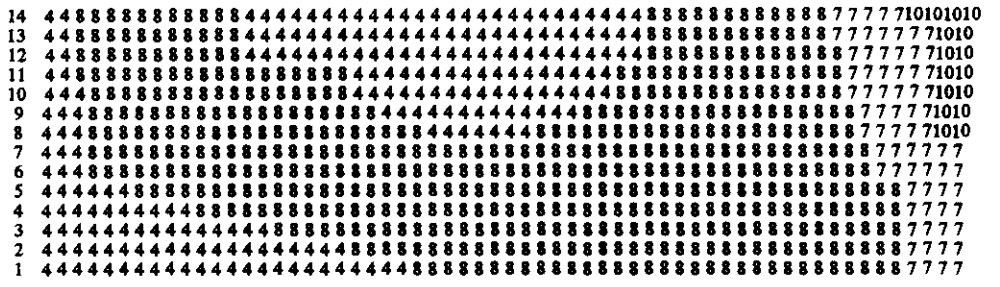

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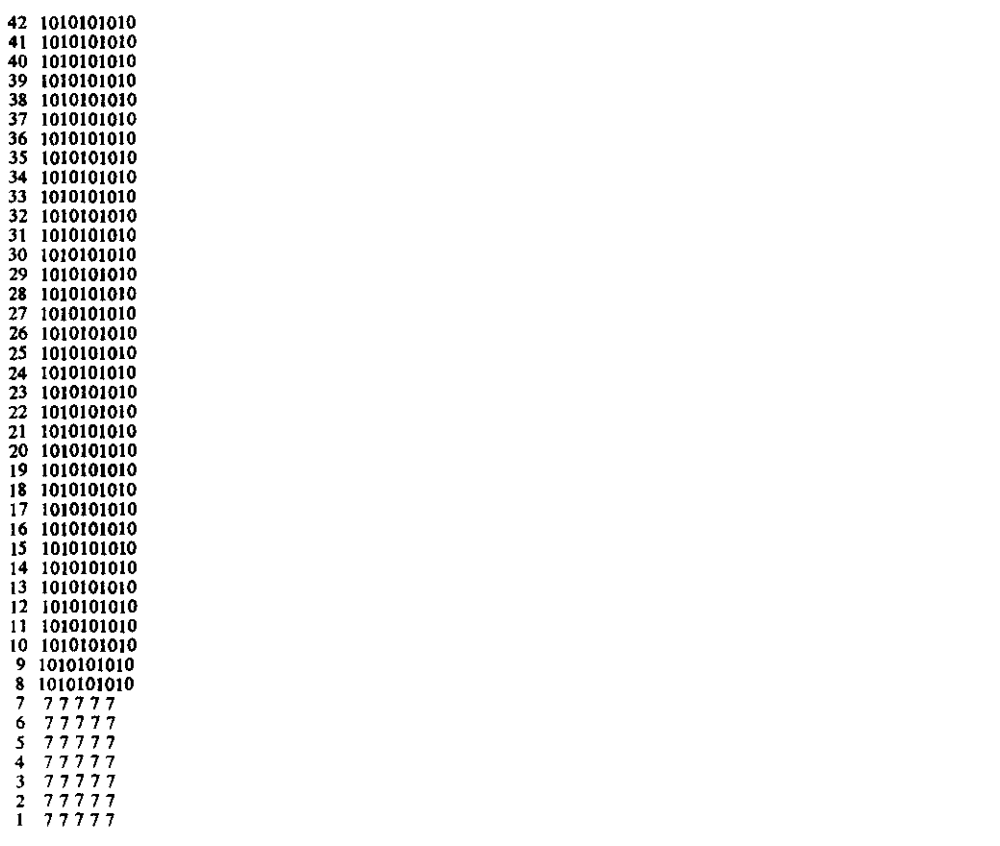

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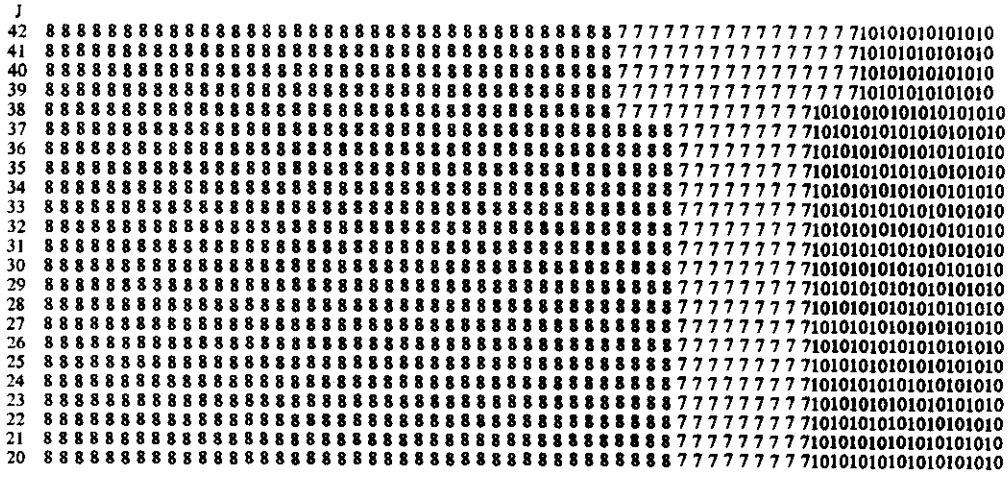

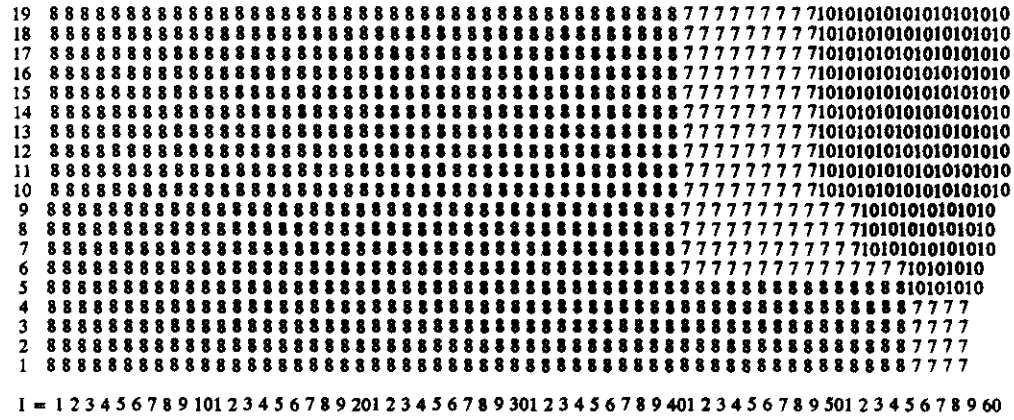

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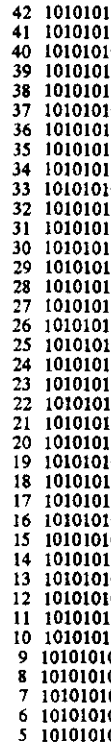

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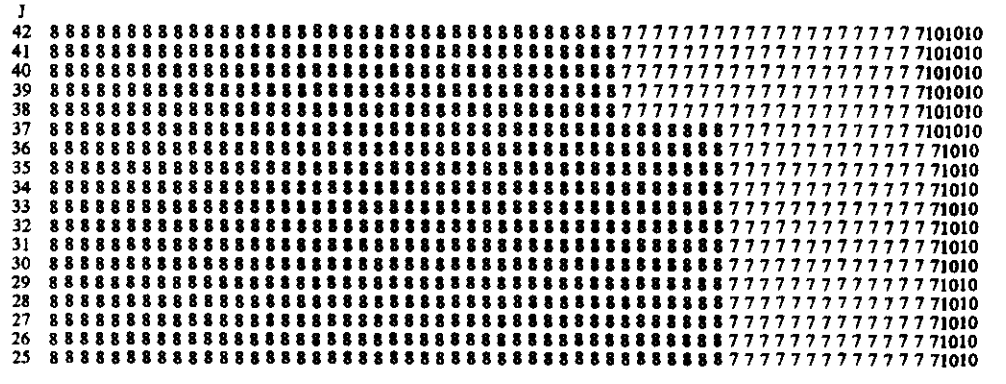
ZONE IDENTIFIERS AT PLANE K = 15



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 5 7 7 7 7 7
 4 7 7 7 7 7
 3 7 7 7 7 7
 2 7 7 7 7 7
 1 7 7 7 7 7

 I = 1 2 3 4 5
```

BOUNDING INDICES FOR ACTIVE ZONES
==================================

ZONE#	LOWER BOUND	UPPER BOUND
1	(1, 1, 1)	(65, 42, 5)
4	(1, 1, 6)	(61, 42, 13)
5	(1, 1, 3)	(58, 42, 9)
7	(38, 1, 4)	(65, 42, 15)
8	(1, 1, 11)	(58, 42, 15)
9	(26, 8, 5)	(48, 35, 7)
10	(51, 4, 6)	(65, 42, 15)

TIME HISTORY OUTPUT AT NODES
==============================

I	J	K
10	17	10
24	19	10

36 21 10
10 17 11

1---

1100-EM-1 Groundwater Model

PROGRAM CONSTANTS, PARAMETERS AND REFERENCE VALUES

CARTESIAN/RADIAL GEOMETRY INDEX = 1
CYCLICAL BOUNDARY INDEX ..... = 0
DENSITY OPTION INDEX..... = 0
HYDRAULIC CONDUCTIVITY INDEX ... = 0

START TIME ..... = 0.000E+00
CURRENT VALUE OF MAX. TIME ..... = 1.000E+03
STARTING TIME STEP ..... = 2.315E+02
TIME STEP INCREMENT FACTOR ..... = 1.080E+00
MAXIMUM TIME STEP ..... = 1.000E+03
TOTAL VOLUME OF FLUID IN FIELD.. = 1.029E+08
REFERENCE TEMPERATURE ..... = 0.000E+00

HYDRAULIC PROPERTIES OF POROUS MEDIA

ACTIVE ZONE #	SPECIFIC STORATIVITY	X-DIR. HYDRAULIC K	Y-DIR. HYDRAULIC K	Z-DIR. HYDRAULIC K
1	2.000E-01	2.000E+01	2.000E+01	1.200E+00
4	2.000E-01	6.000E+01	6.000E+01	3.900E+00
5	2.000E-01	1.000E-02	1.000E-02	1.000E-03
7	2.000E-01	1.000E+03	1.000E+03	6.400E+01
8	2.000E-01	5.000E+02	5.000E+02	1.370E+01
9	2.000E-01	5.000E-02	5.000E-02	5.000E-03
10	2.000E-01	5.000E+03	5.000E+03	5.000E+01

VALUES AT DIAGNOSTIC GRID NODE (33, 21, 8)

U - X-DIR. VELOCITY COMPONENT = 0.000E+00
V - Y-DIR. VELOCITY COMPONENT = 0.000E+00
W - Z-DIR. VELOCITY COMPONENT = 0.000E+00
P - PRESSURE OR PRESSURE HEAD = 1.066E+02

FIXED P NODES WITHIN THE FLOW FIELD

#	FROM	TO
1	(57, 2, 2)	(64, 2, 14)
2	(57, 2, 2)	(64, 2, 14)
3	(59, 3, 2)	(64, 3, 14)
4	(60, 4, 2)	(64, 4, 14)
5	(61, 5, 2)	(64, 6, 14)
6	(61, 7, 2)	(64, 9, 14)
7	(61, 10, 2)	(64, 12, 14)
8	(61, 13, 2)	(64, 15, 14)
9	(62, 16, 2)	(64, 18, 14)
10	(62, 19, 2)	(64, 21, 14)
11	(62, 22, 2)	(64, 24, 14)
12	(62, 25, 2)	(64, 27, 14)
13	(62, 28, 2)	(64, 31, 14)
14	(63, 32, 2)	(64, 33, 14)
15	(64, 34, 2)	(64, 35, 14)
16	(64, 36, 2)	(64, 41, 14)

DEPENDENT VARIABLE SPECIFICATIONS

VARIABLE	SYMBOL	SOLVE OPTION	INTEG. PROFILE	# OF SWEEPS	RELAX FACTOR
4	P	1	1	1	1.00

MATRIX SWEEP DIRECTIONS: X + Y + Z

1

	<---------- VALUES AT NODE ---------->				<--- MATRIX RESIDUE OR --->				
	<---------- (33, 21, 8) ---------->				<--- RELATIVE CHANGE --->			CONVERGENCE	
STEP	TIME	U	V	W	P	MASS	ENERGY	REF VALU	INDEX	#ITER
6520	0.00E+00	1.14E-01	1.57E-02	7.09E-04	1.07E+02	0.00E+00	0.00E+00	0.00E+00	0.0	1
6521	2.50E+02	1.13E-01	1.57E-02	7.06E-04	1.07E+02	1.17E-02	0.00E+00	1.17E-02	11.7	1
6522	5.20E+02	1.12E-01	1.56E-02	7.06E-04	1.07E+02	9.92E-03	0.00E+00	9.92E-03	9.9	1
6523	8.12E+02	1.11E-01	1.56E-02	7.04E-04	1.07E+02	8.28E-03	0.00E+00	8.28E-03	8.3	1
6524	1.00E+03	1.10E-01	1.56E-02	7.02E-04	1.07E+02	4.50E-03	0.00E+00	4.50E-03	4.5	1

** RECORD NO.439 KEYWORD ******* INITial C = 1100 from (8,15,10) to (11,20,12)
** RECORD NO.440 KEYWORD ******* SOLVE for 1500 days in steps of 250 1.08 max of 1000
** RECORD NO.441 COMMENT ******* /save P,C on file 'c:\pfo\3z402500.arc'NOW

9 3 1 2 3 3 2 1 3 7 9

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 6525  1.25E+03  1.09E-01 1.56E-02 7.01E-04 1.07E+02 4.80E-03 0.00E+00 4.80E-03     4.8  1
 6526  1.52E+03  1.08E-01 1.55E-02 7.00E-04 1.07E+02 4.12E-03 0.00E+00 4.12E-03     4.1  1
 6527  1.81E+03  1.07E-01 1.55E-02 6.98E-04 1.07E+02 3.49E-03 0.00E+00 3.49E-03     3.5  1
 6528  2.13E+03  1.06E-01 1.55E-02 6.98E-04 1.07E+02 2.92E-03 0.00E+00 2.92E-03     2.9  1
 6529  2.47E+03  1.06E-01 1.54E-02 6.97E-04 1.07E+02 2.40E-03 0.00E+00 2.40E-03     2.4  1

+-+-+-+-+-+-+-+-+-+ FLUX SUMMARY FOR C +-+-+-+-+-+-+-+-+-+
ACTIVE SUBDOMAIN: (  2,  2,  2) ( 64, 41, 14)
TIME.....= 2.5000E+03
TOTAL PROPERTY IN THE REGION... = 5.2275E+07
CHANGE FROM LAST TIME STEP..... = -2.6940E+05
CUMULATIVE CONVECTIVE INFLUX... = 4.7076E-16
CUMULATIVE DIFFUSIVE INFLUX.... = -1.1868E+07
NET INFLUX FOR THE REGION..... = -1.1868E+07
NET ACCUMULATED IN THE REGION.. = -1.1707E+07

    PLANE OF            INSTANTANEOUS FLUX
  CALCULATIONS      CONVECTIVE  DIFFUSIVE    TOTAL

X- PLANE AT I =   2   0.000E+00 0.000E+00 0.000E+00
X+ PLANE AT I =  64   0.000E+00 4.859E-06 4.859E-06
Y- PLANE AT J =   2   1.254E-18 -4.457E-09 -4.457E-09
Y+ PLANE AT J =  41   0.000E+00 5.222E-05 5.222E-05
Z- PLANE AT K =   2   0.000E+00 0.000E+00 0.000E+00
Z+ PLANE AT K =  14   0.000E+00 8.218E+03 8.218E+03
+-+-+-+-+-+-+-+-+-+ END OF FLUX SUMMARY +-+-+-+-+-+-+-+-+-+

 6530  2.50E+03  1.05E-01 1.54E-02 6.92E-04 1.07E+02 2.29E-04 0.00E+00 2.29E-04     0.2  1
** RECORD NO.442 KEYWORD ******* INITial C =  380 from (8,15,10) to (11,20,12)
** RECORD NO.443 COMMENT ******* /
** RECORD NO.444 KEYWORD ******* SOLVE for 1650 days in steps of 215 1.08 max of 1000!!!4150
** RECORD NO.445 COMMENT ******* /save P,C on file 'c:\pfo\3z404150.arc'NOW
 6531  2.71E+03  1.05E-01 1.54E-02 6.94E-04 1.07E+02 1.24E-03 0.00E+00 1.24E-03     1.2  1
 6532  2.95E+03  1.05E-01 1.53E-02 6.93E-04 1.07E+02 1.11E-03 0.00E+00 1.11E-03     1.1  1
 6533  3.20E+03  1.05E-01 1.53E-02 6.93E-04 1.07E+02 9.84E-04 0.00E+00 9.84E-04     1.0  1
 6534  3.47E+03  1.04E-01 1.53E-02 6.92E-04 1.07E+02 8.61E-04 0.00E+00 8.61E-04     0.9  1
 6535  3.76E+03  1.04E-01 1.52E-02 6.92E-04 1.07E+02 7.44E-04 0.00E+00 7.44E-04     0.7  1
 6536  4.08E+03  1.04E-01 1.52E-02 6.91E-04 1.07E+02 6.35E-04 0.00E+00 6.35E-04     0.6  1
 6537  4.15E+03  1.04E-01 1.51E-02 6.89E-04 1.07E+02 1.38E-04 0.00E+00 1.38E-04     0.1  1
** RECORD NO.446 KEYWORD ******* INITial C =  400 from (8,15,10) to (11,18,12)
** RECORD NO.447 COMMENT ******* /
** RECORD NO.448 KEYWORD ******* SOLVE for 150  days in steps of 25 1.08 max of 1000!!!4300
 6538  4.17E+03  1.04E-01 1.51E-02 6.86E-04 1.07E+02 7.27E-05 0.00E+00 7.27E-05     0.1  1
 6539  4.20E+03  1.04E-01 1.51E-02 6.85E-04 1.07E+02 7.02E-05 0.00E+00 7.02E-05     0.1  1

+-+-+-+-+-+-+-+-+-+ FLUX SUMMARY FOR C +-+-+-+-+-+-+-+-+-+
ACTIVE SUBDOMAIN: (  2,  2,  2) ( 64, 41, 14)
TIME.....= 4.2312E+03
TOTAL PROPERTY IN THE REGION... = 6.8346E+07
CHANGE FROM LAST TIME STEP..... = -2.5590E+05
CUMULATIVE CONVECTIVE INFLUX... = 2.2684E-13
CUMULATIVE DIFFUSIVE INFLUX.... = -3.0160E+07
NET INFLUX FOR THE REGION..... = -3.0160E+07
NET ACCUMULATED IN THE REGION.. = 4.3641E+06

    PLANE OF            INSTANTANEOUS FLUX
  CALCULATIONS      CONVECTIVE  DIFFUSIVE    TOTAL

X- PLANE AT I =   2   0.000E+00 0.000E+00 0.000E+00
X+ PLANE AT I =  64   0.000E+00 2.510E-04 2.510E-04
Y- PLANE AT J =   2   4.195E-16 -1.065E-06 -1.065E-06
Y+ PLANE AT J =  41   0.000E+00 1.160E-04 1.160E-04
Z- PLANE AT K =   2   0.000E+00 0.000E+00 0.000E+00
Z+ PLANE AT K =  14   0.000E+00 1.073E+04 1.073E+04
+-+-+-+-+-+-+-+-+-+ END OF FLUX SUMMARY +-+-+-+-+-+-+-+-+-+

 6540  4.23E+03  1.04E-01 1.50E-02 6.84E-04 1.07E+02 6.72E-05 0.00E+00 6.72E-05     0.1  1
 6541  4.26E+03  1.04E-01 1.50E-02 6.83E-04 1.07E+02 6.76E-05 0.00E+00 6.76E-05     0.1  1
 6542  4.30E+03  1.04E-01 1.50E-02 6.83E-04 1.07E+02 6.74E-05 0.00E+00 6.74E-05     0.1  1
 6543  4.30E+03  1.05E-01 1.49E-02 6.81E-04 1.07E+02 5.65E-05 0.00E+00 5.65E-05     0.1  1
** RECORD NO.449 KEYWORD ******* save P,C on file 'c:\pfo\3z401987.arc'NOW
** RECORD NO.450 COMMENT ******* /

= = = = = = > UNIT 12 OPEN FOR I/O IN FORMATTED  MODE; FILE NAME: c:\pfo\3z401987.arc


      <--- START OF FILE READ/WRITE OPERATIONS ON UNIT#: 12---->


ARCHIVED BY ACRi PROGRAM : PORFLOW-3D - VERSION 2.40.0 /MASTER - DATE: 02 JAN 92
ACRi LICENSE NUMBER .... : 3240AWW034
DATA GENERATED BY USER . : USACE Walla Walla Dist, Environmental Engineering Br.
DATE OF GENERATION ..... : 10/20/92
TIME OF GENERATION ..... : 12:37:28.1
TITLE OF DATA SET ..... : 1100-EM-1 Groundwater Model
GRID DIMENSIONS ..... :   65 BY  42 BY  15


     ---> SIMULATION TIME OF STORED DATA:   4.300E+03
     ---> STEP NUMBER AT WHICH GENERATED:  6543
```

9 3 1 2 3 7 2 9 7 0

9 3 1 2 3 3 2 1 9 3 1 1

```
      ----> WRITING VARIABLE: P   - PRESSURE OR PRESSURE HEAD
      ----> WRITING VARIABLE: C   - SPECIES CONCENTRATION.....

      =====> DATA SET NUMBER:   1 WRITTEN TO c:\pfo\3z401987.arc

** RECORD NO.451 KEYWORD ******* SOLVE for 813 days in steps of  55 1.08 max of 1000!!!5113
 6544  4.35E+03  1.05E-01 1.49E-02 6.83E-04 1.07E+02 9.17E-05 0.00E+00 9.17E-05     0.1  1
 6545  4.41E+03  1.05E-01 1.48E-02 6.84E-04 1.07E+02 9.59E-05 0.00E+00 9.59E-05     0.1  1
 6546  4.48E+03  1.05E-01 1.48E-02 6.84E-04 1.07E+02 1.00E-04 0.00E+00 1.00E-04     0.1  1
 6547  4.55E+03  1.05E-01 1.48E-02 6.84E-04 1.07E+02 1.04E-04 0.00E+00 1.04E-04     0.1  1
 6548  4.62E+03  1.05E-01 1.47E-02 6.84E-04 1.07E+02 1.08E-04 0.00E+00 1.08E-04     0.1  1
 6549  4.70E+03  1.05E-01 1.47E-02 6.84E-04 1.07E+02 1.12E-04 0.00E+00 1.12E-04     0.1  1

+-+-+-+-+-+-+-+-+-+ FLUX SUMMARY FOR C  +-+-+-+-+-+-+-+-+-+
ACTIVE SUBDOMAIN: (  2,  2,  2) ( 64, 41, 14)
TIME.....= 4.7908E+03
TOTAL PROPERTY IN THE REGION... =  6.2983E+07
CHANGE FROM LAST TIME STEP..... = -8.3245E+05
CUMULATIVE CONVECTIVE INFLUX... =  1.1015E-12
CUMULATIVE DIFFUSIVE INFLUX.... = -3.6808E+07
NET INFLUX FOR THE REGION..... = -3.6808E+07
NET ACCUMULATED IN THE REGION.. = -9.9905E+05

    PLANE OF            INSTANTANEOUS FLUX
  CALCULATIONS      CONVECTIVE  DIFFUSIVE    TOTAL

X- PLANE AT I =  2    0.000E+00 0.000E+00 0.000E+00
X+ PLANE AT I =  64    0.000E+00 6.465E-04 6.465E-04
Y- PLANE AT J =  2    3.615E-15 -3.247E-06 -3.247E-06
Y+ PLANE AT J =  41    0.000E+00 4.153E-05 4.153E-05
Z- PLANE AT K =  2    7.469E-19 -7.469E-19 0.000E+00
Z+ PLANE AT K =  14    0.000E+00 1.209E+04 1.209E+04
+-+-+-+-+-+-+-+-+-+ END OF FLUX SUMMARY +-+-+-+-+-+-+-+-+-+

 6550  4.79E+03  1.05E-01 1.47E-02 6.84E-04 1.07E+02 1.15E-04 0.00E+00 1.15E-04     0.1  1
 6551  4.89E+03  1.06E-01 1.46E-02 6.84E-04 1.07E+02 1.19E-04 0.00E+00 1.19E-04     0.1  1
 6552  4.99E+03  1.06E-01 1.46E-02 6.83E-04 1.07E+02 1.22E-04 0.00E+00 1.22E-04     0.1  1
 6553  5.10E+03  1.06E-01 1.46E-02 6.82E-04 1.07E+02 1.25E-04 0.00E+00 1.25E-04     0.1  1
 6554  5.11E+03  1.06E-01 1.46E-02 6.82E-04 1.07E+02 4.86E-05 0.00E+00 4.86E-05     0.0  1
** RECORD NO.452 KEYWORD ******* save P,C on file 'c:\pfo\3z401990.arc'NOW
** RECORD NO.453 COMMENT ******* /

=======> UNIT 12 OPEN FOR I/O IN FORMATTED   MODE; FILE NAME: c:\pfo\3z401990.arc

      <---- START OF FILE READ/WRITE OPERATIONS ON UNIT#: 12---->

ARCHIVED BY ACRi PROGRAM : PORFLOW-3D - VERSION 2.40.0 /MASTER - DATE: 02 JAN 92
ACRi LICENSE NUMBER .... : 3240AWW034
DATA GENERATED BY USER . : USACE Walla Walla Dist, Environmental Engineering Br.
DATE OF GENERATION ..... : 10/20/92
TIME OF GENERATION ..... : 12:37:28.1
TITLE OF DATA SET ..... : 1100-EM-1 Groundwater Model
GRID DIMENSIONS ..... :   65 BY  42 BY  15


      ----> SIMULATION TIME OF STORED DATA:   5.113E+03
      ----> STEP NUMBER AT WHICH GENERATED: 6554

      ----> WRITING VARIABLE: P   - PRESSURE OR PRESSURE HEAD
      ----> WRITING VARIABLE: C   - SPECIES CONCENTRATION.....

      =====> DATA SET NUMBER:   1 WRITTEN TO c:\pfo\3z401990.arc

** RECORD NO.454 KEYWORD ******* SOLVE for 365 days in steps of 55 1.08 max of 1000!!!5478
** RECORD NO.455 COMMENT ******* /save P,C on file 'c:\pfo\3z401991.arc'NOW
** RECORD NO.456 COMMENT ******* /
 6555  5.17E+03  1.06E-01 1.45E-02 6.82E-04 1.07E+02 6.82E-05 0.00E+00 6.82E-05     0.1  1
 6556  5.23E+03  1.06E-01 1.45E-02 6.81E-04 1.07E+02 6.78E-05 0.00E+00 6.78E-05     0.1  1
 6557  5.29E+03  1.06E-01 1.44E-02 6.81E-04 1.07E+02 6.87E-05 0.00E+00 6.87E-05     0.1  1
 6558  5.36E+03  1.07E-01 1.44E-02 6.81E-04 1.07E+02 7.29E-05 0.00E+00 7.29E-05     0.1  1
 6559  5.44E+03  1.07E-01 1.44E-02 6.81E-04 1.07E+02 7.69E-05 0.00E+00 7.69E-05     0.1  1

+-+-+-+-+-+-+-+-+-+ FLUX SUMMARY FOR C  +-+-+-+-+-+-+-+-+-+
ACTIVE SUBDOMAIN: (  2,  2,  2) ( 64, 41, 14)
TIME.....= 5.4780E+03
TOTAL PROPERTY IN THE REGION... =  5.7236E+07
CHANGE FROM LAST TIME STEP..... = -2.8240E+05
CUMULATIVE CONVECTIVE INFLUX... =  1.5094E-11
CUMULATIVE DIFFUSIVE INFLUX.... = -4.5078E+07
NET INFLUX FOR THE REGION..... = -4.5078E+07
NET ACCUMULATED IN THE REGION.. = -6.7457E+06

    PLANE OF            INSTANTANEOUS FLUX
  CALCULATIONS      CONVECTIVE  DIFFUSIVE    TOTAL

X- PLANE AT I =  2    0.000E+00 0.000E+00 0.000E+00
X+ PLANE AT I =  64    0.000E+00 7.819E-04 7.819E-04
Y- PLANE AT J =  2    4.548E-14 -1.073E-05 -1.073E-05
```

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Y+ PLANE AT J =  41     0.000E+00 1.323E-05 1.323E-05
Z- PLANE AT K =   2     7.187E-19 -7.187E-19 0.000E+00
Z+ PLANE AT K =  14     0.000E+00 1.226E+04 1.226E+04
+-+-+-+-+-+-+-+-+-+ END OF FLUX SUMMARY +-+-+-+-+-+-+-+-+-+

 6560  5.48E+03  1.07E-01 1.44E-02 6.80E-04 1.07E+02 6.13E-05 0.00E+00 6.13E-05     0.1  1
** RECORD NO.457 KEYWORD ******* SOLVE for 522 days in steps of 225 1.08 max of 1000!!!6000
 6561  5.70E+03  1.07E-01 1.43E-02 6.78E-04 1.07E+02 2.02E-04 0.00E+00 2.02E-04     0.2  1
 6562  5.95E+03  1.07E-01 1.43E-02 6.76E-04 1.07E+02 1.93E-04 0.00E+00 1.93E-04     0.2  1
 6563  6.00E+03  1.07E-01 1.43E-02 6.76E-04 1.07E+02 6.61E-05 0.00E+00 6.61E-05     0.1  1
** RECORD NO.458 KEYWORD ******* save P,C on file 'c:\pfo\3z401992.arc'NOW
** RECORD NO.459 COMMENT ******* /

=======> UNIT 12 OPEN FOR I/O IN FORMATTED   MODE; FILE NAME: c:\pfo\3z401992.arc


      <---- START OF FILE READ/WRITE OPERATIONS ON UNIT#: 12---->


ARCHIVED BY ACRi PROGRAM : PORFLOW-3D - VERSION 2.40.0 /MASTER - DATE: 02 JAN 92
ACRi LICENSE NUMBER .... : 3240AWW034
DATA GENERATED BY USER . : USACE Walla Walla Dist, Environmental Engineering Br.
DATE OF GENERATION ..... : 10/20/92
TIME OF GENERATION ..... : 12:37:28.1
TITLE OF DATA SET ..... : 1100-EM-1 Groundwater Model
GRID DIMENSIONS ..... :   65 BY  42 BY  15


      ----> SIMULATION TIME OF STORED DATA:   6.000E+03
      ----> STEP NUMBER AT WHICH GENERATED:  6563

      ----> WRITING VARIABLE: P   - PRESSURE OR PRESSURE HEAD
      ----> WRITING VARIABLE: C   - SPECIES CONCENTRATION.....

      =====> DATA SET NUMBER:   1 WRITTEN TO c:\pfo\3z401992.arc

** RECORD NO.460 KEYWORD ******* SOLVE for 2190 days in steps of 225 1.08 max of 1000!!!8190
 6564  6.22E+03  1.08E-01 1.43E-02 6.75E-04 1.07E+02 1.56E-04 0.00E+00 1.56E-04     0.2  1
 6565  6.47E+03  1.08E-01 1.43E-02 6.73E-04 1.07E+02 1.49E-04 0.00E+00 1.49E-04     0.1  1
 6566  6.73E+03  1.08E-01 1.42E-02 6.72E-04 1.07E+02 1.40E-04 0.00E+00 1.40E-04     0.1  1
 6567  7.01E+03  1.08E-01 1.42E-02 6.71E-04 1.07E+02 1.31E-04 0.00E+00 1.31E-04     0.1  1
 6568  7.32E+03  1.08E-01 1.42E-02 6.70E-04 1.07E+02 1.21E-04 0.00E+00 1.21E-04     0.1  1
 6569  7.65E+03  1.08E-01 1.42E-02 6.69E-04 1.07E+02 1.11E-04 0.00E+00 1.11E-04     0.1  1

+-+-+-+-+-+-+-+-+-+ FLUX SUMMARY FOR C  +-+-+-+-+-+-+-+-+-+
ACTIVE SUBDOMAIN: (  2,  2,  2) ( 64, 41, 14)
TIME..........................= 8.0076E+03
TOTAL PROPERTY IN THE REGION... =  4.0900E+07
CHANGE FROM LAST TIME STEP..... = -2.1662E+06
CUMULATIVE CONVECTIVE INFLUX... =  1.8358E-09
CUMULATIVE DIFFUSIVE INFLUX.... = -8.3514E+07
NET INFLUX FOR THE REGION...... = -8.3514E+07
NET ACCUMULATED IN THE REGION.. = -2.3082E+07

    PLANE OF              INSTANTANEOUS FLUX
  CALCULATIONS      CONVECTIVE  DIFFUSIVE    TOTAL

X- PLANE AT I =   2    0.000E+00 0.000E+00 0.000E+00
X+ PLANE AT I =  64    0.000E+00 7.563E-04 7.563E-04
Y- PLANE AT J =   2    1.659E-12 -1.056E-04 -1.056E-04
Y+ PLANE AT J =  41    0.000E+00 1.722E-06 1.722E-06
Z- PLANE AT K =   2    6.422E-19 -6.422E-19 0.000E+00
Z+ PLANE AT K =  14    0.000E+00 1.796E+04 1.796E+04
+-+-+-+-+-+-+-+-+-+ END OF FLUX SUMMARY +-+-+-+-+-+-+-+-+-+

 6570  8.01E+03  1.08E-01 1.42E-02 6.68E-04 1.07E+02 1.02E-04 0.00E+00 1.02E-04     0.1  1
 6571  8.19E+03  1.09E-01 1.42E-02 6.67E-04 1.07E+02 7.26E-05 0.00E+00 7.26E-05     0.1  1
** RECORD NO.461 KEYWORD ******* save P,C on file 'c:\pfo\3z401998.arc'NOW
** RECORD NO.462 COMMENT ******* /

=======> UNIT 12 OPEN FOR I/O IN FORMATTED   MODE; FILE NAME: c:\pfo\3z401998.arc


      <---- START OF FILE READ/WRITE OPERATIONS ON UNIT#: 12---->


ARCHIVED BY ACRi PROGRAM : PORFLOW-3D - VERSION 2.40.0 /MASTER - DATE: 02 JAN 92
ACRi LICENSE NUMBER .... : 3240AWW034
DATA GENERATED BY USER . : USACE Walla Walla Dist, Environmental Engineering Br.
DATE OF GENERATION ..... : 10/20/92
TIME OF GENERATION ..... : 12:37:28.1
TITLE OF DATA SET ..... : 1100-EM-1 Groundwater Model
GRID DIMENSIONS ..... :   65 BY  42 BY  15


      ----> SIMULATION TIME OF STORED DATA:   8.190E+03
      ----> STEP NUMBER AT WHICH GENERATED:  6571

      ----> WRITING VARIABLE: P   - PRESSURE OR PRESSURE HEAD
      ----> WRITING VARIABLE: C   - SPECIES CONCENTRATION.....
```

9 3 1 2 2 1 9 1 2

9 3 1 2 3 5 2 3 9 1 3

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     = = = = > DATA SET NUMBER:   1 WRITTEN TO c:\pfo\3z401998.arc

** RECORD NO.463 KEYWORD ******* SOLVE for 2555 days in steps of 225 1.08 max of 1000!!!!10745
 6572  8.41E+03  1.09E-01 1.42E-02 6.67E-04 1.07E+02 7.21E-05 0.00E+00 7.21E-05     0.1   1
 6573  8.66E+03  1.09E-01 1.41E-02 6.66E-04 1.07E+02 7.15E-05 0.00E+00 7.15E-05     0.1   1
 6574  8.92E+03  1.09E-01 1.41E-02 6.65E-04 1.07E+02 7.13E-05 0.00E+00 7.13E-05     0.1   1
 6575  9.20E+03  1.09E-01 1.41E-02 6.64E-04 1.07E+02 7.10E-05 0.00E+00 7.10E-05     0.1   1
 6576  9.51E+03  1.10E-01 1.41E-02 6.63E-04 1.07E+02 7.07E-05 0.00E+00 7.07E-05     0.1   1
 6577  9.84E+03  1.10E-01 1.41E-02 6.62E-04 1.07E+02 7.03E-05 0.00E+00 7.03E-05     0.1   1
 6578  1.02E+04  1.10E-01 1.40E-02 6.61E-04 1.07E+02 6.98E-05 0.00E+00 6.98E-05     0.1   1
 6579  1.06E+04  1.10E-01 1.40E-02 6.60E-04 1.07E+02 6.97E-05 0.00E+00 6.97E-05     0.1   1

+-+-+-+-+-+-+-+-+-+ FLUX SUMMARY FOR C  +-+-+-+-+-+-+-+-+-+
ACTIVE SUBDOMAIN: (  2,  2,  2) ( 64, 41, 14)
TIME.....= 1.0745E+04
TOTAL PROPERTY IN THE REGION... = 2.4428E+07
CHANGE FROM LAST TIME STEP..... = -9.9931E+05
CUMULATIVE CONVECTIVE INFLUX... = 1.7962E-08
CUMULATIVE DIFFUSIVE INFLUX.... = -1.3414E+08
NET INFLUX FOR THE REGION..... = -1.3414E+08
NET ACCUMULATED IN THE REGION.. = -3.9554E+07

    PLANE OF            INSTANTANEOUS FLUX
  CALCULATIONS      CONVECTIVE  DIFFUSIVE    TOTAL

X- PLANE AT I =  2    0.000E+00 0.000E+00 0.000E+00
X+ PLANE AT I =  64    0.000E+00 8.086E-04 8.086E-04
Y- PLANE AT J =  2    1.040E-11 -4.459E-04 -4.459E-04
Y+ PLANE AT J =  41    0.000E+00 2.354E-07 2.354E-07
Z- PLANE AT K =  2    5.613E-19 -5.613E-19 0.000E+00
Z+ PLANE AT K =  14    0.000E+00 1.683E+04 1.683E+04
+-+-+-+-+-+-+-+-+-+ END OF FLUX SUMMARY +-+-+-+-+-+-+-+-+-+

 6580  1.07E+04  1.10E-01 1.40E-02 6.60E-04 1.07E+02 6.62E-05 0.00E+00 6.62E-05     0.1   1
** RECORD NO.464 KEYWORD ******* save P,C on file 'c:\pfo\3z402005.arc'NOW
** RECORD NO.465 COMMENT ******* /

= = = = = = > UNIT 12 OPEN FOR I/O IN FORMATTED   MODE; FILE NAME: c:\pfo\3z402005.arc


      <---- START OF FILE READ/WRITE OPERATIONS ON UNIT#: 12---->


ARCHIVED BY ACRi PROGRAM : PORFLOW-3D - VERSION 2.40.0 /MASTER - DATE: 02 JAN 92
ACRi LICENSE NUMBER .... : 3240AWW034
DATA GENERATED BY USER . : USACE Walla Walla Dist, Environmental Engineering Br.
DATE OF GENERATION ..... : 10/20/92
TIME OF GENERATION ..... : 12:37:28.1
TITLE OF DATA SET ..... : 1100-EM-1 Groundwater Model
GRID DIMENSIONS ..... :   65 BY  42 BY  15


      ----> SIMULATION TIME OF STORED DATA:   1.074E+04
      ----> STEP NUMBER AT WHICH GENERATED:  6580

      ----> WRITING VARIABLE: P   - PRESSURE OR PRESSURE HEAD
      ----> WRITING VARIABLE: C   - SPECIES CONCENTRATION.....

      = = = = > DATA SET NUMBER:   1 WRITTEN TO c:\pfo\3z402005.arc

** RECORD NO.466 KEYWORD ******* SOLVE for 1826 days in steps of 225 1.08 max of 1000!!!!12571
 6581  1.10E+04  1.10E-01 1.40E-02 6.60E-04 1.07E+02 6.68E-05 0.00E+00 6.68E-05     0.1   1
 6582  1.12E+04  1.11E-01 1.40E-02 6.59E-04 1.07E+02 6.62E-05 0.00E+00 6.62E-05     0.1   1
 6583  1.15E+04  1.11E-01 1.40E-02 6.58E-04 1.07E+02 6.60E-05 0.00E+00 6.60E-05     0.1   1
 6584  1.18E+04  1.11E-01 1.40E-02 6.57E-04 1.07E+02 6.58E-05 0.00E+00 6.58E-05     0.1   1
 6585  1.21E+04  1.11E-01 1.40E-02 6.56E-04 1.07E+02 6.57E-05 0.00E+00 6.57E-05     0.1   1
 6586  1.24E+04  1.11E-01 1.40E-02 6.55E-04 1.07E+02 6.51E-05 0.00E+00 6.51E-05     0.1   1
 6587  1.26E+04  1.11E-01 1.40E-02 6.56E-04 1.07E+02 6.23E-05 0.00E+00 6.23E-05     0.1   1
** RECORD NO.467 KEYWORD ******* save P,C on file 'c:\pfo\3z402010.arc'NOW
** RECORD NO.468 COMMENT ******* /

= = = = = = > UNIT 12 OPEN FOR I/O IN FORMATTED   MODE; FILE NAME: c:\pfo\3z402010.arc


      <---- START OF FILE READ/WRITE OPERATIONS ON UNIT#: 12---->


ARCHIVED BY ACRi PROGRAM : PORFLOW-3D - VERSION 2.40.0 /MASTER - DATE: 02 JAN 92
ACRi LICENSE NUMBER .... : 3240AWW034
DATA GENERATED BY USER . : USACE Walla Walla Dist, Environmental Engineering Br.
DATE OF GENERATION ..... : 10/20/92
TIME OF GENERATION ..... : 12:37:28.1
TITLE OF DATA SET ..... : 1100-EM-1 Groundwater Model
GRID DIMENSIONS ..... :   65 BY  42 BY  15


      ----> SIMULATION TIME OF STORED DATA:   1.257E+04
      ----> STEP NUMBER AT WHICH GENERATED:  6587

      ----> WRITING VARIABLE: P   - PRESSURE OR PRESSURE HEAD
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      ----> WRITING VARIABLE: C   - SPECIES CONCENTRATION.....

      =====> DATA SET NUMBER:   1 WRITTEN TO c:\pfo\3z402010.arc

** RECORD NO.469 KEYWORD ******* SOLVE for 1826 days in steps of  225 1.08 max of 1000!!!!14397
 6588  1.28E+04  1.12E-01 1.39E-02 6.55E-04 1.07E+02 6.31E-05 0.00E+00 6.31E-05     0.1  1
 6589  1.30E+04  1.12E-01 1.39E-02 6.54E-04 1.07E+02 6.25E-05 0.00E+00 6.25E-05     0.1  1

+-+-+-+-+-+-+-+-+-+ FLUX SUMMARY FOR C  +-+-+-+-+-+-+-+-+-+
ACTIVE SUBDOMAIN: (  2,  2,  2) ( 64, 41, 14)
TIME.....= 1.3301E+04
TOTAL PROPERTY IN THE REGION... =  1.1012E+07
CHANGE FROM LAST TIME STEP..... = -1.1055E+06
CUMULATIVE CONVECTIVE INFLUX... =  6.2242E-08
CUMULATIVE DIFFUSIVE INFLUX.... = -1.6462E+08
NET INFLUX FOR THE REGION..... = -1.6462E+08
NET ACCUMULATED IN THE REGION.. = -5.2970E+07

    PLANE OF            INSTANTANEOUS FLUX
  CALCULATIONS      CONVECTIVE  DIFFUSIVE    TOTAL

X- PLANE AT I =   2    0.000E+00 0.000E+00 0.000E+00
X+ PLANE AT I =  64    0.000E+00 4.998E-04 4.998E-04
Y- PLANE AT J =   2    2.240E-11 -1.002E-03 -1.002E-03
Y+ PLANE AT J =  41    0.000E+00 9.801E-08 9.801E-08
Z- PLANE AT K =   2    4.926E-19 -4.926E-19 0.000E+00
Z+ PLANE AT K =  14    0.000E+00 7.854E+03 7.854E+03
+-+-+-+-+-+-+-+-+-+ END OF FLUX SUMMARY +-+-+-+-+-+-+-+-+-+

 6590  1.33E+04  1.12E-01 1.39E-02 6.53E-04 1.07E+02 6.25E-05 0.00E+00 6.25E-05     0.1  1
 6591  1.36E+04  1.12E-01 1.39E-02 6.52E-04 1.07E+02 6.23E-05 0.00E+00 6.23E-05     0.1  1
 6592  1.39E+04  1.12E-01 1.39E-02 6.51E-04 1.07E+02 6.21E-05 0.00E+00 6.21E-05     0.1  1
 6593  1.42E+04  1.13E-01 1.39E-02 6.50E-04 1.07E+02 6.18E-05 0.00E+00 6.18E-05     0.1  1
 6594  1.44E+04  1.13E-01 1.39E-02 6.50E-04 1.07E+02 5.90E-05 0.00E+00 5.90E-05     0.1  1
** RECORD NO.470 KEYWORD ******* save P,C on file 'c:\pfo\3z402015.arc'NOW
** RECORD NO.471 COMMENT ******* /

======> UNIT 12 OPEN FOR I/O IN FORMATTED   MODE; FILE NAME: c:\pfo\3z402015.arc


      <--- START OF FILE READ/WRITE OPERATIONS ON UNIT#: 12--->


ARCHIVED BY ACRi PROGRAM : PORFLOW-3D - VERSION 2.40.0 /MASTER - DATE: 02 JAN 92
ACRi LICENSE NUMBER .... : 3240AWW034
DATA GENERATED BY USER . : USACE Walla Walla Dist, Environmental Engineering Br.
DATE OF GENERATION ..... : 10/20/92
TIME OF GENERATION ..... : 12:37:28.1
TITLE OF DATA SET ..... : 1100-EM-1 Groundwater Model
GRID DIMENSIONS ..... :   65 BY  42 BY  15


      ----> SIMULATION TIME OF STORED DATA:   1.440E+04
      ----> STEP NUMBER AT WHICH GENERATED:  6594

      ----> WRITING VARIABLE: P   - PRESSURE OR PRESSURE HEAD
      ----> WRITING VARIABLE: C   - SPECIES CONCENTRATION.....

      =====> DATA SET NUMBER:   1 WRITTEN TO c:\pfo\3z402015.arc

** RECORD NO.472 KEYWORD ******* SOLVE for 1826 days in steps of  225 1.08 max of 1000!!!!16223
 6595  1.46E+04  1.13E-01 1.39E-02 6.50E-04 1.07E+02 5.97E-05 0.00E+00 5.97E-05     0.1  1
 6596  1.49E+04  1.13E-01 1.39E-02 6.49E-04 1.07E+02 5.92E-05 0.00E+00 5.92E-05     0.1  1
 6597  1.51E+04  1.13E-01 1.38E-02 6.48E-04 1.07E+02 5.92E-05 0.00E+00 5.92E-05     0.1  1
 6598  1.54E+04  1.13E-01 1.38E-02 6.47E-04 1.07E+02 5.89E-05 0.00E+00 5.89E-05     0.1  1
 6599  1.57E+04  1.14E-01 1.38E-02 6.46E-04 1.07E+02 5.90E-05 0.00E+00 5.90E-05     0.1  1

+-+-+-+-+-+-+-+-+-+ FLUX SUMMARY FOR C  +-+-+-+-+-+-+-+-+-+
ACTIVE SUBDOMAIN: (  2,  2,  2) ( 64, 41, 14)
TIME.....= 1.6048E+04
TOTAL PROPERTY IN THE REGION... =  3.5597E+06
CHANGE FROM LAST TIME STEP..... = -5.3664E+05
CUMULATIVE CONVECTIVE INFLUX... =  1.2776E-07
CUMULATIVE DIFFUSIVE INFLUX.... = -1.7602E+08
NET INFLUX FOR THE REGION..... = -1.7602E+08
NET ACCUMULATED IN THE REGION.. = -6.0422E+07

    PLANE OF            INSTANTANEOUS FLUX
  CALCULATIONS      CONVECTIVE  DIFFUSIVE    TOTAL

X- PLANE AT I =   2    0.000E+00 0.000E+00 0.000E+00
X+ PLANE AT I =  64    0.000E+00 1.798E-04 1.798E-04
Y- PLANE AT J =   2    2.282E-11 -1.311E-03 -1.311E-03
Y+ PLANE AT J =  41    0.000E+00 5.007E-08 5.007E-08
Z- PLANE AT K =   2    4.253E-19 -4.253E-19 0.000E+00
Z+ PLANE AT K =  14    0.000E+00 2.001E+03 2.001E+03
+-+-+-+-+-+-+-+-+-+ END OF FLUX SUMMARY +-+-+-+-+-+-+-+-+-+

 6600  1.60E+04  1.14E-01 1.38E-02 6.45E-04 1.07E+02 5.86E-05 0.00E+00 5.86E-05     0.1  1
 6601  1.62E+04  1.14E-01 1.38E-02 6.45E-04 1.07E+02 5.61E-05 0.00E+00 5.61E-05     0.1  1
```

** RECORD NO.473 KEYWORD ******* save P,C on file 'c:\pfo\3z402020.arc'NOW

= = = = = = > UNIT 12 OPEN FOR I/O IN FORMATTED MODE; FILE NAME: c:\pfo\3z402020.arc

<---- START OF FILE READ/WRITE OPERATIONS ON UNIT#: 12---->

ARCHIVED BY ACRi PROGRAM : PORFLOW-3D - VERSION 2.40.0 /MASTER - DATE: 02 JAN 92
ACRi LICENSE NUMBER .... : 3240AWW034
DATA GENERATED BY USER . : USACE Walla Walla Dist, Environmental Engineering Br.
DATE OF GENERATION ..... : 10/20/92
TIME OF GENERATION ..... : 12:37:28.1
TITLE OF DATA SET ..... : 1100-EM-1 Groundwater Model
GRID DIMENSIONS ..... : 65 BY 42 BY 15

----> SIMULATION TIME OF STORED DATA: 1.622E+04
----> STEP NUMBER AT WHICH GENERATED: 6601

----> WRITING VARIABLE: P - PRESSURE OR PRESSURE HEAD
----> WRITING VARIABLE: C - SPECIES CONCENTRATION.....

= = = = > DATA SET NUMBER: 1 WRITTEN TO c:\pfo\3z402020.arc

** RECORD NO.474 KEYWORD ******* end

****

--*-*-*-*-*-*-*-*-*-*-*- C - SPECIES CONCENTRATION..... FOR PLANE K = 1 AT STEP 6601, TIME= 1.6223E+04 -*-*-*-*-*-*-*-*-*-*-*-*-*

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	1	2	3	4	5	6	7	8	9	10	11
X =	0.00E+00	1.83E+02	3.66E+02	4.88E+02	5.49E+02	6.10E+02	6.71E+02	7.02E+02	7.32E+02	7.63E+02	7.93E+02

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 3 2 0 9 0 5

1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 12 13 14 15 16 17 18 19 20 21 22
X = 8.24E+02 8.54E+02 8.85E+02 9.15E+02 9.46E+02 9.76E+02 1.01E+03 1.04E+03 1.07E+03 1.10E+03 1.13E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 23 24 25 26 27 28 29 30 31 32 33
X = 1.16E+03 1.19E+03 1.22E+03 1.25E+03 1.28E+03 1.31E+03 1.34E+03 1.37E+03 1.40E+03 1.43E+03 1.46E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 · 2 0 9 3 6

2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	34	35	36	37	38	39	40	41	42	43	44		
X =	1.49E+03	1.52E+03	1.56E+03	1.59E+03	1.62E+03	1.65E+03	1.68E+03	1.71E+03	1.77E+03	1.83E+03	1.89E+03		

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	45	46	47	48	49	50	51	52	53	54	55		
X =	1.95E+03	2.01E+03	2.07E+03	2.13E+03	2.20E+03	2.26E+03	2.32E+03	2.38E+03	2.50E+03	2.62E+03	2.74E+03		

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 5 2 9 3 7

2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	56	57	58	59	60	61	62	63	64	65	
X =	2.87E+03	2.99E+03	3.11E+03	3.23E+03	3.35E+03	3.48E+03	3.60E+03	3.72E+03	3.84E+03	3.96E+03	

--*-*-*-*-*-*-*-*- C - SPECIES CONCENTRATION..... FOR PLANE K = 2 AT STEP 6601, TIME= 1.6223E+04 -*-*-*-*-*-*-*-*-*-*

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I =	1	2	3	4	5	6	7	8	9	10	11
X =	0.00E+00	1.83E+02	3.66E+02	4.88E+02	5.49E+02	6.10E+02	6.71E+02	7.02E+02	7.32E+02	7.63E+02	7.93E+02

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	12	13	14	15	16	17	18	19	20	21	22
X =	8.24E+02	8.54E+02	8.85E+02	9.15E+02	9.46E+02	9.76E+02	1.01E+03	1.04E+03	1.07E+03	1.10E+03	1.13E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 23 24 25 26 27 28 29 30 31 32 33

X = 1.16E+03 1.19E+03 1.22E+03 1.25E+03 1.28E+03 1.31E+03 1.34E+03 1.37E+03 1.40E+03 1.43E+03 1.46E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 34 35 36 37 38 39 40 41 42 43 44

X = 1.49E+03 1.52E+03 1.56E+03 1.59E+03 1.62E+03 1.65E+03 1.68E+03 1.71E+03 1.77E+03 1.83E+03 1.89E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 2 3 9 1 0

1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	45	46	47	48	49	50	51	52	53	54	55
X =	1.95E+03	2.01E+03	2.07E+03	2.13E+03	2.20E+03	2.26E+03	2.32E+03	2.38E+03	2.50E+03	2.62E+03	2.74E+03

Y	J										
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.60E-24	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	4.62E-19	2.88E-19	1.20E-19	4.32E-20	1.26E-20	1.34E-24	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	1.01E-18	8.76E-19	4.36E-19	1.66E-19	4.12E-20	1.92E-25	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	1.12E-18	1.14E-18	6.10E-19	2.33E-19	5.01E-20	3.13E-26	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	8.93E-19	1.03E-18	5.74E-19	2.21E-19	3.87E-20	5.28E-30	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	5.31E-19	6.86E-19	3.89E-19	1.47E-19	1.94E-20	6.40E-31	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	2.40E-19	3.48E-19	2.00E-19	7.34E-20	1.25E-21	7.35E-35	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	1.05E-19	1.67E-19	9.47E-20	1.79E-20	3.36E-41	9.50E-36	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	5.11E-20	8.54E-20	4.46E-20	1.04E-21	2.65E-43	1.31E-38	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	2.24E-20	3.87E-20	1.65E-20	0.00E+00	1.33E-43	5.73E-39	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	8.87E-21	1.56E-20	5.62E-21	0.00E+00	0.00E+00	5.04E-44	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	3.17E-21	5.63E-21	1.74E-21	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	1.02E-21	1.82E-21	4.93E-22	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	2.97E-22	5.32E-22	1.32E-22	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	7.86E-23	1.41E-22	3.13E-23	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	1.90E-23	3.42E-23	6.83E-24	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	4.20E-24	7.66E-24	1.43E-24	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	8.54E-25	1.59E-24	2.72E-25	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	1.61E-25	3.09E-25	4.81E-26	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	2.84E-26	5.67E-26	8.23E-27	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	4.77E-27	9.80E-27	1.24E-27	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	7.75E-28	1.60E-27	1.58E-28	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	1.22E-28	2.43E-28	1.39E-29	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	1.84E-29	3.37E-29	1.88E-31	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	2.66E-30	4.17E-30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	3.69E-31	4.58E-31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	4.95E-32	5.47E-32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	6.51E-33	7.01E-33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	8.58E-34	1.02E-33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	8.26E-35	1.10E-34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	7.38E-36	1.16E-35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	8.27E-37	1.81E-36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	1.02E-37	2.34E-37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	1.35E-38	3.25E-38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	1.39E-39	4.33E-39	4.13E-41	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	1.17E-40	3.46E-40	9.81E-45	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	1.07E-41	3.48E-41	1.40E-45	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	3.98E-43	4.60E-43	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	2.80E-45	2.80E-45	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	56	57	58	59	60	61	62	63	64	65
X =	2.87E+03	2.99E+03	3.11E+03	3.23E+03	3.35E+03	3.48E+03	3.60E+03	3.72E+03	3.84E+03	3.96E+03

--*-*-*-*-*-*-*-*-*- C - SPECIES CONCENTRATION..... FOR PLANE K = 3 AT STEP 6601, TIME= 1.6223E+04 -*-*-*-*-*-*-*-*-*-*-*

Y	J										
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 6 2 0 9 1 1

1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 1 2 3 4 5 6 7 8 9 10 11
X = 0.00E+00 1.83E+02 3.66E+02 4.88E+02 5.49E+02 6.10E+02 6.71E+02 7.02E+02 7.32E+02 7.63E+02 7.93E+02

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 12 13 14 15 16 17 18 19 20 21 22
X = 8.24E+02 8.54E+02 8.85E+02 9.15E+02 9.46E+02 9.76E+02 1.01E+03 1.04E+03 1.07E+03 1.10E+03 1.13E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 2 0 9 1 2

1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I = 23 24 25 26 27 28 29 30 31 32 33
X = 1.16E+03 1.19E+03 1.22E+03 1.25E+03 1.28E+03 1.31E+03 1.34E+03 1.37E+03 1.40E+03 1.43E+03 1.46E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I = 34 35 36 37 38 39 40 41 42 43 44
X = 1.49E+03 1.52E+03 1.56E+03 1.59E+03 1.62E+03 1.65E+03 1.68E+03 1.71E+03 1.77E+03 1.83E+03 1.89E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 45 46 47 48 49 50 51 52 53 54 55
X = 1.95E+03 2.01E+03 2.07E+03 2.13E+03 2.20E+03 2.26E+03 2.32E+03 2.38E+03 2.50E+03 2.62E+03 2.74E+03

Y	J										
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	3.91E-20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	1.10E-20	2.21E-21	7.02E-18	2.78E-18	8.52E-19	1.81E-19	1.47E-20	2.30E-22	0.00E+00
2.379E+03	39	0.00E+00	2.40E-21	1.04E-21	9.39E-15	6.52E-15	2.71E-15	7.38E-16	6.99E-17	1.14E-23	0.00E+00
2.257E+03	38	0.00E+00	4.77E-22	3.33E-22	2.12E-14	2.29E-14	9.38E-15	2.69E-15	2.09E-16	3.19E-25	0.00E+00
2.196E+03	37	0.00E+00	1.05E-22	8.45E-16	2.11E-14	2.99E-14	1.69E-14	6.09E-15	4.57E-16	1.00E-26	0.00E+00
2.135E+03	36	0.00E+00	1.88E-23	8.94E-16	1.05E-14	2.49E-14	1.83E-14	5.23E-15	2.83E-16	2.51E-31	0.00E+00
2.074E+03	35	0.00E+00	2.51E-24	4.11E-16	3.81E-15	1.49E-14	1.41E-14	3.64E-15	1.34E-16	4.73E-33	0.00E+00
2.013E+03	34	0.00E+00	3.09E-25	2.86E-16	1.10E-15	6.77E-15	6.87E-15	1.08E-15	1.24E-17	2.91E-37	0.00E+00
1.952E+03	33	0.00E+00	7.08E-26	1.64E-16	3.40E-16	2.85E-15	2.37E-15	1.37E-16	1.95E-43	1.34E-38	0.00E+00
1.922E+03	32	0.00E+00	2.24E-26	9.38E-17	1.29E-16	1.30E-15	7.68E-16	1.03E-17	0.00E+00	3.22E-41	0.00E+00
1.891E+03	31	0.00E+00	6.37E-27	4.35E-17	4.59E-17	5.16E-16	1.84E-16	0.00E+00	0.00E+00	2.69E-41	0.00E+00
1.861E+03	30	0.00E+00	1.44E-27	1.50E-17	1.50E-17	1.82E-16	4.10E-17	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	2.28E-28	4.18E-18	4.39E-18	5.71E-17	8.77E-18	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	2.96E-29	1.05E-18	1.16E-18	1.61E-17	1.85E-18	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	3.30E-30	2.38E-19	2.78E-19	4.13E-18	3.92E-19	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	3.24E-31	4.83E-20	6.02E-20	9.64E-19	7.75E-20	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	2.81E-32	8.61E-21	1.18E-20	2.06E-19	1.46E-20	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	2.14E-33	1.32E-21	2.11E-21	4.08E-20	2.67E-21	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	1.33E-34	1.69E-22	3.42E-22	7.51E-21	4.49E-22	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	5.53E-36	1.72E-23	5.09E-23	1.29E-21	7.09E-23	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	1.13E-24	6.95E-24	2.09E-22	1.07E-23	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	1.36E-25	9.07E-25	3.17E-23	1.44E-24	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	2.10E-26	1.15E-25	4.47E-24	1.67E-25	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	3.31E-27	1.42E-26	5.78E-25	1.55E-26	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	4.11E-28	1.69E-27	6.68E-26	7.56E-28	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	4.76E-29	1.92E-28	6.72E-27	6.44E-30	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	5.44E-30	2.09E-29	5.70E-28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	6.34E-31	2.20E-30	4.91E-29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	7.72E-32	2.29E-31	4.41E-30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	9.66E-33	2.42E-32	4.50E-31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	8.60E-34	1.94E-33	3.49E-32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	6.29E-35	1.62E-34	2.78E-33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	5.28E-36	1.72E-35	3.09E-34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	4.87E-37	1.97E-36	2.90E-35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	5.01E-38	2.47E-37	2.98E-36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	3.93E-39	2.39E-38	2.84E-37	3.51E-40	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	2.69E-40	2.05E-39	1.54E-38	1.40E-44	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	1.54E-41	1.33E-40	3.41E-40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	4.46E-43	1.02E-42	9.09E-43	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 56 57 58 59 60 61 62 63 64 65
X = 2.87E+03 2.99E+03 3.11E+03 3.23E+03 3.35E+03 3.48E+03 3.60E+03 3.72E+03 3.84E+03 3.96E+03

--*-*-*-*-*-*-*-*- C - SPECIES CONCENTRATION..... FOR PLANE K = 4 AT STEP 6601, TIME= 1.6223E+04 -*-*-*-*-*-*-*-*-*-*

Y	J										
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 2 1 9 1 4

1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	1	2	3	4	5	6	7	8	9	10	11
X =	0.00E+00	1.83E+02	3.66E+02	4.88E+02	5.49E+02	6.10E+02	6.71E+02	7.02E+02	7.32E+02	7.63E+02	7.93E+02

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	12	13	14	15	16	17	18	19	20	21	22
X =	8.24E+02	8.54E+02	8.85E+02	9.15E+02	9.46E+02	9.76E+02	1.01E+03	1.04E+03	1.07E+03	1.10E+03	1.13E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 5 2 3 9 1 5

2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	23	24	25	26	27	28	29	30	31	32	33
X =	1.16E+03	1.19E+03	1.22E+03	1.25E+03	1.28E+03	1.31E+03	1.34E+03	1.37E+03	1.40E+03	1.43E+03	1.46E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	34	35	36	37	38	39	40	41	42	43	44
X =	1.49E+03	1.52E+03	1.56E+03	1.59E+03	1.62E+03	1.65E+03	1.68E+03	1.71E+03	1.77E+03	1.83E+03	1.89E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 2 0 9 1 6

2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I =	45	46	47	48	49	50	51	52	53	54	55
X =	1.95E+03	2.01E+03	2.07E+03	2.13E+03	2.20E+03	2.26E+03	2.32E+03	2.38E+03	2.50E+03	2.62E+03	2.74E+03

Y	J										
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	4.94E-17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	6.82E-16	1.87E-14	6.52E-14	2.57E-14	7.77E-15	1.51E-15	1.04E-16	6.69E-12	0.00E+00
2.379E+03	39	0.00E+00	2.56E-16	1.43E-14	2.29E-11	1.77E-11	7.82E-12	2.06E-12	1.66E-13	1.64E-10	0.00E+00
2.257E+03	38	0.00E+00	6.82E-17	6.70E-15	7.03E-11	9.22E-11	5.21E-11	2.07E-11	1.54E-12	4.63E-08	0.00E+00
2.196E+03	37	0.00E+00	1.78E-17	1.17E-11	7.69E-11	1.34E-10	1.41E-10	1.68E-10	1.34E-11	6.24E-08	0.00E+00
2.135E+03	36	0.00E+00	3.57E-18	1.06E-11	3.54E-11	1.21E-10	2.53E-10	7.45E-06	5.23E-06	4.31E-07	0.00E+00
2.074E+03	35	0.00E+00	4.89E-19	4.03E-12	1.17E-11	7.84E-11	3.80E-10	1.04E-05	6.14E-06	4.60E-07	0.00E+00
2.013E+03	34	0.00E+00	5.42E-17	1.32E-10	2.22E-11	4.12E-11	2.72E-10	2.00E-05	6.85E-06	6.48E-07	0.00E+00
1.952E+03	33	0.00E+00	1.04E-16	2.16E-10	3.31E-11	2.16E-11	1.07E-10	1.82E-05	2.58E-06	4.74E-07	0.00E+00
1.922E+03	32	0.00E+00	5.51E-17	1.60E-10	2.67E-11	1.22E-11	3.63E-11	1.30E-05	1.02E-05	4.77E-07	0.00E+00
1.891E+03	31	0.00E+00	1.79E-17	7.06E-11	1.38E-11	5.83E-12	8.59E-12	5.08E-06	2.01E-05	8.95E-07	0.00E+00
1.861E+03	30	0.00E+00	4.26E-18	2.21E-11	5.19E-12	2.36E-12	1.71E-12	4.42E-06	4.41E-10	1.89E-11	0.00E+00
1.830E+03	29	0.00E+00	5.89E-19	5.11E-12	1.53E-12	8.13E-13	3.08E-13	3.17E-06	3.90E-12	2.73E-16	0.00E+00
1.800E+03	28	0.00E+00	6.69E-20	1.09E-12	3.86E-13	2.45E-13	5.37E-14	7.83E-06	4.57E-09	9.44E-13	0.00E+00
1.769E+03	27	0.00E+00	6.71E-21	2.19E-13	8.64E-14	6.52E-14	9.45E-15	8.38E-06	4.77E-09	1.00E-12	0.00E+00
1.739E+03	26	0.00E+00	6.06E-22	4.01E-14	1.73E-14	1.56E-14	1.62E-15	8.93E-06	1.03E-11	5.74E-17	0.00E+00
1.708E+03	25	0.00E+00	5.05E-23	6.51E-15	3.13E-15	3.40E-15	2.77E-16	2.22E-05	1.04E-08	1.86E-12	0.00E+00
1.678E+03	24	0.00E+00	3.85E-24	9.08E-16	5.07E-16	6.77E-16	4.73E-17	2.37E-05	1.09E-08	1.98E-12	0.00E+00
1.647E+03	23	0.00E+00	2.49E-25	1.06E-16	7.39E-17	1.25E-16	7.66E-18	1.55E-05	1.68E-11	8.67E-17	0.00E+00
1.617E+03	22	0.00E+00	1.02E-26	9.43E-18	9.67E-18	2.15E-17	1.19E-18	3.90E-05	1.50E-08	2.29E-12	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	1.51E-21	1.09E-18	3.46E-18	1.79E-19	4.13E-05	1.58E-08	2.46E-12	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	5.06E-23	1.19E-19	5.23E-19	2.46E-20	1.46E-05	1.48E-11	7.88E-17	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	2.98E-24	1.25E-20	7.38E-20	3.04E-21	4.04E-05	1.14E-08	1.46E-12	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	2.44E-25	1.30E-21	9.61E-21	3.26E-22	4.22E-05	1.22E-08	1.58E-12	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	1.29E-26	1.31E-22	1.13E-21	2.62E-23	3.87E-06	3.74E-12	2.98E-17	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	6.78E-28	1.26E-23	1.17E-22	1.48E-24	6.33E-08	8.93E-12	8.77E-16	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	3.94E-29	1.17E-24	1.06E-23	3.77E-05	6.65E-08	9.68E-12	9.75E-16	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	2.74E-30	1.04E-25	8.93E-25	4.03E-05	4.65E-11	3.30E-16	2.95E-20	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	2.45E-31	8.92E-27	7.53E-26	1.18E-04	3.44E-08	4.12E-12	4.19E-16	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	2.62E-32	7.48E-28	6.86E-27	1.25E-04	3.66E-08	4.47E-12	4.61E-16	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	2.19E-33	4.49E-29	4.62E-28	2.89E-05	3.21E-11	1.18E-16	1.16E-20	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	1.56E-34	3.32E-30	3.70E-29	6.28E-05	1.51E-08	3.38E-12	6.02E-16	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	1.34E-35	3.23E-31	3.75E-30	6.32E-05	1.69E-08	3.72E-12	6.71E-16	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	1.26E-36	3.39E-32	3.23E-31	5.24E-06	6.43E-12	4.38E-17	7.15E-21	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	1.33E-37	3.92E-33	3.18E-32	3.28E-05	9.72E-09	2.41E-12	4.71E-16	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	1.07E-38	3.54E-34	2.74E-33	3.17E-05	1.14E-08	2.80E-12	5.56E-16	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	7.52E-40	2.92E-35	1.37E-34	8.02E-06	4.45E-09	1.88E-12	6.20E-16	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	4.57E-41	1.64E-36	5.35E-06	9.87E-06	5.61E-09	2.47E-12	8.36E-16	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	1.39E-42	1.17E-07	4.99E-07	2.99E-07	2.73E-10	1.19E-13	3.93E-17	0.00E+00
3.050E+02	2	0.00E+00	4.96E-14	4.87E-11	8.87E-10	3.82E-08	1.56E-08	3.41E-11	1.50E-14	4.89E-18	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	56	57	58	59	60	61	62	63	64	65
X =	2.87E+03	2.99E+03	3.11E+03	3.23E+03	3.35E+03	3.48E+03	3.60E+03	3.72E+03	3.84E+03	3.96E+03

9 3 1 2 3 5 2 3 9 1 7

--*-*-*-*-*-*-*-*- C - SPECIES CONCENTRATION..... FOR PLANE K = 5 AT STEP 6601, TIME= 1.6223E+04 -*-*-*-*-*-*-*-*-*-*

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	I =	1	2	3	4	5	6	7	8	9	10	11
	X =	0.00E+00	1.83E+02	3.66E+02	4.88E+02	5.49E+02	6.10E+02	6.71E+02	7.02E+02	7.32E+02	7.63E+02	7.93E+02

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 2 0 9 1 3

3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

	I =	12	13	14	15	16	17	18	19	20	21	22	
	X =	8.24E+02	8.54E+02	8.85E+02	9.15E+02	9.46E+02	9.76E+02	1.01E+03	1.04E+03	1.07E+03	1.10E+03	1.13E+03	
Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

	I =	23	24	25	26	27	28	29	30	31	32	33	
	X =	1.16E+03	1.19E+03	1.22E+03	1.25E+03	1.28E+03	1.31E+03	1.34E+03	1.37E+03	1.40E+03	1.43E+03	1.46E+03	
Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

9 3 1 2 3 5 2 1 9 1 9

9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	I =	34	35	36	37	38	39	40	41	42	43	44
	X =	1.49E+03	1.52E+03	1.56E+03	1.59E+03	1.62E+03	1.65E+03	1.68E+03	1.71E+03	1.77E+03	1.83E+03	1.89E+03
Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.73E-24
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	I =	45	46	47	48	49	50	51	52	53	54	55
	X =	1.95E+03	2.01E+03	2.07E+03	2.13E+03	2.20E+03	2.26E+03	2.32E+03	2.38E+03	2.50E+03	2.62E+03	2.74E+03
Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	6.48E-19	1.34E-14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.501E+03	40	7.05E-17	1.71E-12	1.60E-11	6.99E-11	2.89E-11	8.79E-12	1.55E-12	9.44E-14	3.45E-09	0.00E+00	
2.379E+03	39	1.94E-17	1.71E-12	1.99E-11	4.17E-09	3.62E-09	2.52E-09	7.73E-10	5.87E-11	9.98E-08	0.00E+00	
2.257E+03	38	3.10E-18	1.05E-12	1.80E-11	1.57E-08	2.57E-08	2.57E-06	1.95E-06	1.32E-06	1.13E-06	0.00E+00	
2.196E+03	37	4.72E-19	4.97E-13	1.35E-08	2.37E-08	4.69E-08	4.04E-06	3.05E-06	2.02E-06	1.62E-06	0.00E+00	
2.135E+03	36	5.20E-20	1.57E-13	1.00E-08	1.03E-08	5.35E-08	8.50E-06	7.86E-06	5.34E-06	5.65E-06	0.00E+00	
2.074E+03	35	4.13E-21	2.57E-14	2.86E-09	3.09E-09	4.50E-08	9.14E-06	1.67E-05	1.02E-05	8.36E-06	0.00E+00	
2.013E+03	34	2.37E-22	5.09E-15	4.15E-09	1.14E-09	2.89E-08	7.86E-06	6.54E-05	2.00E-05	4.89E-05	0.00E+00	
1.952E+03	33	1.57E-23	2.08E-15	2.85E-09	5.60E-10	1.59E-08	2.62E-06	1.04E-04	4.24E-05	5.38E-05	0.00E+00	
1.922E+03	32	1.30E-24	9.66E-16	1.87E-09	3.31E-10	8.95E-09	7.61E-07	5.16E-05	6.21E-04	2.89E-05	0.00E+00	
1.891E+03	31	9.79E-26	3.85E-16	1.03E-09	1.74E-10	4.37E-09	1.46E-07	9.39E-05	6.55E-04	2.94E-05	0.00E+00	
1.861E+03	30	6.84E-27	8.81E-17	3.08E-10	6.28E-11	1.86E-09	2.21E-08	1.88E-03	6.22E-13	1.61E-14	0.00E+00	
1.830E+03	29	3.68E-28	1.00E-17	6.53E-11	1.74E-11	6.99E-10	2.84E-09	3.00E-03	1.34E-13	3.52E-19	0.00E+00	
1.800E+03	28	1.61E-29	1.01E-18	1.35E-11	4.18E-12	2.32E-10	3.40E-10	6.42E-03	5.64E-06	1.17E-09	0.00E+00	
1.769E+03	27	5.73E-31	9.24E-20	2.68E-12	8.99E-13	6.89E-11	4.02E-11	6.61E-03	5.89E-06	1.24E-09	0.00E+00	
1.739E+03	26	1.71E-32	7.84E-21	4.85E-13	1.74E-13	1.84E-11	4.72E-12	1.05E-02	4.05E-13	1.03E-18	0.00E+00	
1.708E+03	25	4.21E-34	6.35E-22	7.78E-14	3.05E-14	4.42E-12	5.98E-13	2.04E-02	1.29E-05	2.30E-09	0.00E+00	
1.678E+03	24	9.25E-36	4.88E-23	1.06E-14	4.78E-15	9.69E-13	8.56E-14	2.08E-02	1.35E-05	2.45E-09	0.00E+00	
1.647E+03	23	1.47E-37	3.25E-24	1.20E-15	6.73E-16	1.95E-13	1.29E-14	2.27E-02	7.81E-13	1.45E-18	0.00E+00	
1.617E+03	22	0.00E+00	1.37E-25	9.70E-17	8.41E-17	3.63E-14	2.02E-15	3.98E-02	1.85E-05	2.83E-09	0.00E+00	
1.586E+03	21	0.00E+00	0.00E+00	7.57E-23	8.97E-18	6.28E-15	3.14E-16	4.05E-02	1.95E-05	3.04E-09	0.00E+00	
1.556E+03	20	0.00E+00	0.00E+00	4.16E-24	9.20E-19	1.01E-15	4.54E-17	2.97E-02	9.16E-13	1.24E-18	0.00E+00	
1.525E+03	19	0.00E+00	0.00E+00	4.18E-25	9.21E-20	1.50E-16	6.00E-18	4.60E-02	1.41E-05	1.80E-09	0.00E+00	
1.495E+03	18	0.00E+00	0.00E+00	9.89E-26	9.10E-21	2.04E-17	7.03E-19	4.71E-02	1.50E-05	1.95E-09	0.00E+00	
1.464E+03	17	0.00E+00	0.00E+00	7.52E-27	8.78E-22	2.47E-18	6.68E-20	1.76E-02	4.51E-13	4.67E-19	0.00E+00	
1.434E+03	16	0.00E+00	0.00E+00	5.14E-28	8.15E-23	2.63E-19	5.67E-21	3.95E-05	5.56E-09	5.47E-13	0.00E+00	
1.403E+03	15	0.00E+00	0.00E+00	3.60E-29	7.24E-24	2.47E-20	2.03E-02	4.15E-05	6.04E-09	6.09E-13	0.00E+00	
1.373E+03	14	0.00E+00	0.00E+00	2.87E-30	6.16E-25	2.07E-21	5.08E-02	1.54E-12	1.91E-18	1.68E-22	0.00E+00	
1.342E+03	13	0.00E+00	0.00E+00	2.93E-31	5.00E-26	1.67E-22	6.81E-02	2.14E-05	2.56E-09	2.61E-13	0.00E+00	
1.312E+03	12	0.00E+00	0.00E+00	3.44E-32	3.85E-27	1.42E-23	6.80E-02	2.28E-05	2.79E-09	2.88E-13	0.00E+00	
1.281E+03	11	0.00E+00	0.00E+00	3.07E-33	1.98E-28	8.77E-25	3.66E-02	1.04E-12	4.90E-19	4.93E-23	0.00E+00	

1.220E+03	10	0.00E+00	0.00E+00	2.26E-34	1.48E-29	7.02E-26	1.47E-02	3.52E-06	7.92E-10	1.41E-13	0.00E+00	
1.159E+03	9	0.00E+00	0.00E+00	2.04E-35	1.47E-30	6.78E-27	1.40E-02	3.96E-06	8.74E-10	1.58E-13	0.00E+00	
1.098E+03	8	0.00E+00	0.00E+00	1.97E-36	1.56E-31	5.54E-28	5.02E-03	1.06E-13	6.93E-20	1.17E-23	0.00E+00	
1.037E+03	7	1.15E-13	2.21E-14	3.20E-15	3.62E-16	1.73E-17	6.55E-03	1.94E-06	4.83E-10	9.45E-14	0.00E+00	
9.760E+02	6	1.01E-14	3.35E-15	8.16E-16	1.41E-16	9.06E-18	6.02E-03	2.27E-06	5.62E-10	1.12E-13	0.00E+00	
8.540E+02	5	4.61E-16	2.37E-16	1.22E-16	3.80E-17	2.41E-18	2.15E-03	1.20E-06	5.07E-10	1.68E-13	0.00E+00	
7.320E+02	4	1.39E-17	1.29E-17	9.41E-18	3.11E-18	1.08E-03	2.41E-03	1.38E-06	6.06E-10	2.06E-13	0.00E+00	
5.490E+02	3	3.28E-19	4.64E-19	2.91E-19	3.24E-05	6.99E-04	4.12E-04	3.81E-07	1.66E-10	5.50E-14	0.00E+00	
3.050E+02	2	3.29E-21	1.76E-12	2.97E-08	2.71E-06	1.25E-04	5.12E-05	1.13E-07	4.95E-11	1.61E-14	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I =	56	57	58	59	60	61	62	63	64	65
X =	2.87E+03	2.99E+03	3.11E+03	3.23E+03	3.35E+03	3.48E+03	3.60E+03	3.72E+03	3.84E+03	3.96E+03

--*-*-*-*-*-*-*-*- C - SPECIES CONCENTRATION..... FOR PLANE K = 6 AT STEP 6601, TIME= 1.6223E+04 -*-*-*-*-*-*-*-*-*-*

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	1	2	3	4	5	6	7	8	9	10	11
X =	0.00E+00	1.83E+02	3.66E+02	4.88E+02	5.49E+02	6.10E+02	6.71E+02	7.02E+02	7.32E+02	7.63E+02	7.93E+02

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 5 2 0 9 2 1

1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 12 13 14 15 16 17 18 19 20 21 22
X = 8.24E+02 8.54E+02 8.85E+02 9.15E+02 9.46E+02 9.76E+02 1.01E+03 1.04E+03 1.07E+03 1.10E+03 1.13E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 23 24 25 26 27 28 29 30 31 32 33
X = 1.16E+03 1.19E+03 1.22E+03 1.25E+03 1.28E+03 1.31E+03 1.34E+03 1.37E+03 1.40E+03 1.43E+03 1.46E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I =	34	35	36	37	38	39	40	41	42	43	44
X =	1.49E+03	1.52E+03	1.56E+03	1.59E+03	1.62E+03	1.65E+03	1.68E+03	1.71E+03	1.77E+03	1.83E+03	1.89E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	6.52E-08	5.72E-07	6.20E-07	6.62E-07	8.54E-08	1.94E-08	4.11E-09	8.51E-10	
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.36E-07	6.47E-06	3.67E-07	6.56E-08	2.39E-08	6.00E-09	
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.11E-05	5.53E-06	1.06E-06	3.08E-07	
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.79E-05	1.90E-06	3.77E-07	1.26E-07	
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.87E-09	
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.05E-10	
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.04E-12	
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.98E-14	
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.46E-17	
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.06E-19	
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.84E-20	
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.58E-21	
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I =	45	46	47	48	49	50	51	52	53	54	55
X =	1.95E+03	2.01E+03	2.07E+03	2.13E+03	2.20E+03	2.26E+03	2.32E+03	2.38E+03	2.50E+03	2.62E+03	2.74E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	1.67E-10	2.03E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.501E+03	40	1.48E-09	3.89E-10	2.81E-07	8.27E-08	2.96E-08	1.29E-08	6.70E-09	4.25E-09	4.21E-09	0.00E+00	
2.379E+03	39	8.85E-08	1.97E-08	3.24E-06	1.60E-06	7.34E-07	3.59E-07	2.00E-07	1.33E-07	1.18E-07	0.00E+00	
2.257E+03	38	4.56E-08	7.00E-07	1.47E-05	9.45E-06	4.90E-06	2.65E-06	1.49E-06	1.02E-06	9.45E-07	0.00E+00	
2.196E+03	37	6.58E-09	6.43E-07	2.24E-05	1.92E-05	1.14E-05	6.60E-06	3.82E-06	2.54E-06	2.02E-06	0.00E+00	
2.135E+03	36	7.29E-10	1.40E-07	1.89E-05	4.33E-05	2.82E-05	1.73E-05	1.07E-05	6.90E-06	8.07E-06	0.00E+00	
2.074E+03	35	6.58E-11	2.31E-08	5.86E-06	1.80E-04	1.08E-04	5.71E-05	3.43E-05	1.92E-05	1.44E-05	0.00E+00	
2.013E+03	34	4.78E-12	3.07E-09	2.17E-06	8.21E-04	4.74E-04	2.50E-04	1.34E-04	5.73E-05	1.07E-04	0.00E+00	
1.952E+03	33	4.50E-13	3.37E-13	1.15E-06	2.17E-03	1.24E-03	6.50E-04	3.13E-04	1.16E-04	1.14E-04	0.00E+00	
1.922E+03	32	5.58E-14	4.44E-17	1.02E-06	3.90E-03	2.21E-03	1.16E-03	4.48E-04	1.67E-03	6.56E-05	0.00E+00	
1.891E+03	31	6.63E-15	4.25E-11	1.71E-06	6.85E-03	3.91E-03	2.09E-03	7.80E-04	1.71E-03	6.60E-05	0.00E+00	
1.861E+03	30	7.95E-16	3.83E-15	4.09E-03	1.16E-02	6.82E-03	3.81E-03	4.70E-03	2.37E-12	3.89E-14	0.00E+00	
1.830E+03	29	7.71E-17	6.82E-16	4.87E-03	1.92E-02	1.16E-02	6.78E-03	8.34E-03	1.43E-12	5.08E-18	0.00E+00	
1.800E+03	28	6.48E-18	1.19E-16	9.68E-03	3.08E-02	1.92E-02	1.16E-02	2.11E-02	5.10E-05	1.37E-08	0.00E+00	
1.769E+03	27	4.71E-19	1.98E-17	1.19E-02	4.72E-02	3.06E-02	1.89E-02	2.17E-02	5.20E-05	1.43E-08	0.00E+00	
1.739E+03	26	3.09E-20	3.18E-18	1.04E-02	6.90E-02	4.65E-02	2.96E-02	3.53E-02	5.06E-12	1.52E-17	0.00E+00	

1.708E+03	25	1.82E-21	5.78E-19	5.29E-03	9.58E-02	6.72E-02	4.38E-02	8.31E-02	1.26E-04	2.90E-08	0.00E+00	
1.678E+03	24	1.06E-22	1.72E-19	2.08E-03	1.27E-01	9.21E-02	6.14E-02	8.20E-02	1.28E-04	3.04E-08	0.00E+00	
1.647E+03	23	6.55E-24	6.74E-20	5.26E-04	1.59E-01	1.20E-01	8.20E-02	9.43E-02	1.17E-11	2.25E-17	0.00E+00	
1.617E+03	22	2.04E-25	1.60E-20	9.14E-05	1.91E-01	1.50E-01	1.04E-01	2.03E-01	1.97E-04	3.87E-08	0.00E+00	
1.586E+03	21	0.00E+00	1.06E-20	8.37E-09	2.22E-01	1.80E-01	1.27E-01	1.96E-01	2.01E-04	4.08E-08	0.00E+00	
1.556E+03	20	0.00E+00	7.76E-25	2.94E-13	2.47E-01	2.07E-01	1.49E-01	1.68E-01	1.82E-11	2.03E-17	0.00E+00	
1.525E+03	19	0.00E+00	4.15E-29	9.26E-18	2.64E-01	2.30E-01	1.69E-01	3.28E-01	1.71E-04	2.75E-08	0.00E+00	
1.495E+03	18	0.00E+00	3.01E-33	1.64E-03	2.67E-01	2.46E-01	1.85E-01	3.19E-01	1.77E-04	2.93E-08	0.00E+00	
1.464E+03	17	0.00E+00	4.64E-34	1.30E-03	2.63E-01	2.55E-01	1.95E-01	2.36E-01	1.96E-11	8.09E-18	0.00E+00	
1.434E+03	16	0.00E+00	7.21E-35	8.52E-04	2.52E-01	2.56E-01	1.96E-01	2.81E-04	5.06E-08	5.87E-12	0.00E+00	
1.403E+03	15	0.00E+00	1.08E-35	6.28E-04	2.37E-01	2.51E-01	2.11E-01	2.85E-04	5.34E-08	6.40E-12	0.00E+00	
1.373E+03	14	0.00E+00	1.61E-36	5.71E-04	2.18E-01	2.40E-01	2.43E-01	2.10E-11	1.98E-17	1.93E-21	0.00E+00	
1.342E+03	13	0.00E+00	3.29E-09	3.04E-04	1.99E-01	2.26E-01	3.28E-01	1.50E-04	2.22E-08	2.56E-12	0.00E+00	
1.312E+03	12	0.00E+00	4.23E-09	1.26E-04	1.82E-01	2.11E-01	3.14E-01	1.55E-04	2.36E-08	2.78E-12	0.00E+00	
1.281E+03	11	1.21E-14	7.63E-09	3.14E-05	1.66E-01	1.91E-01	1.93E-01	1.45E-11	4.55E-18	4.79E-22	0.00E+00	
1.220E+03	10	1.72E-12	8.70E-09	5.59E-06	6.87E-02	8.11E-02	6.84E-02	1.48E-05	3.89E-09	7.50E-13	0.00E+00	
1.159E+03	9	1.23E-12	7.34E-09	1.11E-06	2.11E-02	2.33E-02	6.64E-02	1.61E-05	4.21E-09	8.23E-13	0.00E+00	
1.098E+03	8	8.07E-13	4.36E-09	2.38E-07	6.98E-03	6.34E-03	5.40E-02	1.91E-12	3.59E-19	6.32E-23	0.00E+00	
1.037E+03	7	3.89E-12	1.31E-09	5.76E-08	3.82E-03	2.07E-03	3.01E-02	7.77E-06	2.18E-09	4.52E-13	0.00E+00	
9.760E+02	6	7.94E-13	2.00E-10	1.13E-08	2.23E-03	7.28E-04	2.74E-02	8.75E-06	2.46E-09	5.23E-13	0.00E+00	
8.540E+02	5	6.44E-14	1.87E-11	9.12E-07	2.57E-03	1.04E-03	1.09E-02	5.64E-06	2.73E-09	9.81E-13	0.00E+00	
7.320E+02	4	3.77E-15	1.45E-12	1.21E-07	3.93E-04	6.81E-03	1.12E-02	6.04E-06	3.03E-09	1.12E-12	0.00E+00	
5.490E+02	3	1.74E-16	8.45E-14	6.99E-09	2.43E-04	1.03E-02	6.13E-03	5.80E-06	2.97E-09	1.10E-12	0.00E+00	
3.050E+02	2	2.61E-18	1.11E-11	3.78E-07	6.66E-05	5.01E-03	2.27E-03	4.52E-06	2.25E-09	8.11E-13	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	56	57	58	59	60	61	62	63	64	65
X =	2.87E+03	2.99E+03	3.11E+03	3.23E+03	3.35E+03	3.48E+03	3.60E+03	3.72E+03	3.84E+03	3.96E+03

--*-*-*-*-*-*-*-*- C - SPECIES CONCENTRATION..... FOR PLANE K = 7 AT STEP 6601, TIME= 1.6223E+04 -*-*-*-*-*-*-*-*-*-*

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	1	2	3	4	5	6	7	8	9	10	11
X =	0.00E+00	1.83E+02	3.66E+02	4.88E+02	5.49E+02	6.10E+02	6.71E+02	7.02E+02	7.32E+02	7.63E+02	7.93E+02

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 2 0 9 2 4

1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I =	12	13	14	15	16	17	18	19	20	21	22
X =	8.24E+02	8.54E+02	8.85E+02	9.15E+02	9.46E+02	9.76E+02	1.01E+03	1.04E+03	1.07E+03	1.10E+03	1.13E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I =	23	24	25	26	27	28	29	30	31	32	33
X =	1.16E+03	1.19E+03	1.22E+03	1.25E+03	1.28E+03	1.31E+03	1.34E+03	1.37E+03	1.40E+03	1.43E+03	1.46E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

9 3 1 2 3 5 2 0 9 2 5

2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	4.81E-03	6.33E-03	8.36E-03	1.11E-02	1.41E-02	1.76E-02	2.15E-02	2.75E-02	3.79E-02	5.77E-02	1.28E-04	
1.891E+03	31	6.59E-03	8.86E-03	1.18E-02	1.56E-02	1.95E-02	2.40E-02	2.88E-02	3.67E-02	5.28E-02	9.02E-02	1.47E-01	
1.861E+03	30	9.20E-03	1.20E-02	1.56E-02	1.99E-02	2.45E-02	2.98E-02	3.59E-02	4.68E-02	7.01E-02	1.26E-01	2.18E-01	
1.830E+03	29	1.27E-02	1.61E-02	2.05E-02	2.58E-02	3.16E-02	3.87E-02	4.72E-02	6.29E-02	9.65E-02	1.75E-01	3.07E-01	
1.800E+03	28	1.54E-02	1.96E-02	2.51E-02	3.21E-02	4.04E-02	5.03E-02	6.22E-02	8.38E-02	1.30E-01	2.24E-01	3.98E-01	
1.769E+03	27	1.66E-02	2.13E-02	2.80E-02	3.69E-02	4.77E-02	6.03E-02	7.53E-02	1.03E-01	1.65E-01	2.91E-01	5.22E-01	
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	5.43E-02	6.50E-02	7.87E-02	9.63E-02	1.31E-01	2.11E-01	3.67E-01	6.33E-01	
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	6.47E-02	7.82E-02	9.58E-02	1.18E-01	1.63E-01	2.61E-01	4.24E-01	6.78E-01	
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	7.63E-02	9.26E-02	1.14E-01	1.40E-01	1.90E-01	2.96E-01	4.14E-01	6.02E-01	
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	7.66E-02	9.33E-02	1.15E-01	1.41E-01	1.90E-01	2.88E-01	3.82E-01	5.29E-01	
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	6.47E-02	7.86E-02	9.62E-02	1.18E-01	1.58E-01	2.36E-01	3.02E-01	4.04E-01	
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	4.50E-02	5.48E-02	6.70E-02	8.18E-02	1.09E-01	1.58E-01	2.04E-01	2.66E-01	
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	2.68E-02	3.26E-02	3.98E-02	4.85E-02	6.38E-02	9.05E-02	1.17E-01	1.48E-01	
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	1.38E-02	1.68E-02	2.05E-02	2.49E-02	3.23E-02	4.43E-02	5.54E-02	6.83E-02	
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	6.17E-03	7.43E-03	9.01E-03	1.08E-02	1.35E-02	1.71E-02	2.04E-02	2.42E-02	
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	1.98E-03	2.50E-03	3.05E-03	3.41E-03	3.84E-03	4.17E-03	4.86E-03	5.58E-03	
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.94E-04	5.44E-04	5.96E-04	6.16E-04	6.99E-04	7.09E-04	
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.75E-05	5.38E-05	5.84E-05	5.70E-05	6.20E-05	3.13E-05	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I =	34	35	36	37	38	39	40	41	42	43	44
X =	1.49E+03	1.52E+03	1.56E+03	1.59E+03	1.62E+03	1.65E+03	1.68E+03	1.71E+03	1.77E+03	1.83E+03	1.89E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	2.13E-07	5.97E-07	6.37E-07	6.79E-07	1.44E-07	3.80E-08	8.69E-09	1.92E-09	
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.90E-06	1.39E-05	9.58E-07	1.69E-07	5.81E-08	1.52E-08	
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.00E-10	1.19E-04	1.15E-05	2.38E-06	7.36E-07	
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-15	1.26E-04	1.90E-06	5.82E-07	2.40E-07	
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.29E-09	
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.43E-10	
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.06E-12	
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.19E-43	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.34E-14	
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.73E-39	3.70E-42	0.00E+00	0.00E+00	0.00E+00	2.83E-16	
1.922E+03	32	3.86E-08	6.93E-12	0.00E+00	0.00E+00	0.00E+00	2.48E-34	1.25E-37	9.62E-41	8.41E-45	0.00E+00	0.00E+00	
1.891E+03	31	2.48E-01	3.22E-01	3.38E-02	0.00E+00	0.00E+00	4.74E-30	2.59E-33	2.38E-36	2.58E-40	4.20E-45	0.00E+00	
1.861E+03	30	3.83E-01	5.15E-01	9.65E-02	0.00E+00	0.00E+00	1.05E-25	4.79E-29	8.21E-33	7.80E-37	4.37E-41	1.40E-45	
1.830E+03	29	5.17E-01	6.97E-01	2.24E-01	0.00E+00	0.00E+00	2.26E-21	8.54E-25	1.04E-28	1.05E-32	3.67E-37	1.39E-41	
1.800E+03	28	6.67E-01	8.80E-01	1.03E+00	0.00E+00	0.00E+00	4.53E-17	1.30E-20	1.29E-24	1.38E-28	6.94E-33	2.22E-37	
1.769E+03	27	8.09E-01	1.05E+00	1.32E+00	2.32E-04	3.50E-08	9.02E-13	1.43E-16	1.03E-20	3.45E-25	2.20E-29	6.46E-34	
1.739E+03	26	9.38E-01	1.19E+00	1.46E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.708E+03	25	9.66E-01	1.24E+00	1.49E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.678E+03	24	8.12E-01	1.12E+00	1.37E+00	1.39E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.647E+03	23	7.01E-01	9.42E-01	1.13E+00	1.18E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.16E-42	1.35E-01	
1.617E+03	22	5.22E-01	6.44E-01	7.88E-01	8.06E-01	7.84E-04	3.24E-07	0.00E+00	0.00E+00	0.00E+00	9.49E-38	9.19E-01	
1.586E+03	21	3.35E-01	4.07E-01	4.89E-01	4.96E-01	5.89E-04	2.52E-07	0.00E+00	0.00E+00	0.00E+00	4.33E-33	4.86E-37	
1.556E+03	20	1.83E-01	2.18E-01	2.53E-01	2.63E-01	3.95E-04	1.74E-07	0.00E+00	0.00E+00	0.00E+00	2.47E-28	2.15E-32	
1.525E+03	19	8.21E-02	9.57E-02	9.69E-02	1.10E-01	1.15E-01	1.14E-01	0.00E+00	0.00E+00	0.00E+00	1.83E-23	1.26E-27	
1.495E+03	18	2.82E-02	3.20E-02	2.14E-02	2.70E-02	3.03E-02	2.97E-02	1.55E-05	2.97E-10	2.65E-14	1.91E-18	1.10E-22	
1.464E+03	17	6.33E-03	7.04E-03	4.68E-03	5.78E-03	6.38E-03	6.16E-03	5.03E-06	1.08E-10	9.83E-15	7.23E-19	4.22E-23	
1.434E+03	16	7.38E-04	7.75E-04	5.24E-04	6.09E-04	6.69E-04	6.33E-04	6.32E-07	1.86E-11	1.74E-15	1.31E-19	7.69E-24	
1.403E+03	15	1.90E-05	1.38E-05	1.15E-05	1.74E-05	1.80E-05	1.52E-05	0.00E+00	0.00E+00	0.00E+00	2.45E-24	2.21E-28	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.33E-29	6.37E-33	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.20E-33	2.16E-37	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.58E-38	1.98E-39	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.30E-40	1.56E-40	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-41	9.60E-42	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.19E-43	5.59E-43	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.80E-45	2.66E-44	
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.68E-19	
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.41E-19	
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.87E-20	
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I =	45	46	47	48	49	50	51	52	53	54	55
X =	1.95E+03	2.01E+03	2.07E+03	2.13E+03	2.20E+03	2.26E+03	2.32E+03	2.38E+03	2.50E+03	2.62E+03	2.74E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	3.99E-10	5.62E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

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2.501E+03	40	3.82E-09	8.29E-07	5.29E-07	1.26E-07	4.03E-08	1.64E-08	8.20E-09	5.11E-09	4.93E-09	0.00E+00
2.379E+03	39	2.18E-07	7.88E-06	6.32E-06	2.53E-06	1.03E-06	4.67E-07	2.48E-07	1.61E-07	1.39E-07	0.00E+00
2.257E+03	38	9.98E-08	1.30E-05	3.08E-05	1.58E-05	7.17E-06	3.61E-06	1.91E-06	1.23E-06	1.10E-06	0.00E+00
2.196E+03	37	1.51E-08	1.12E-05	3.98E-05	3.19E-05	1.71E-05	9.23E-06	5.03E-06	3.17E-06	2.45E-06	0.00E+00
2.135E+03	36	1.74E-09	1.90E-06	4.77E-05	9.13E-05	4.86E-05	2.65E-05	1.52E-05	9.12E-06	1.03E-05	0.00E+00
2.074E+03	35	1.61E-10	2.14E-07	1.69E-05	4.30E-04	2.03E-04	9.56E-05	5.15E-05	2.68E-05	1.91E-05	0.00E+00
2.013E+03	34	1.06E-11	6.06E-04	6.16E-03	1.94E-03	8.82E-04	4.06E-04	1.99E-04	8.24E-05	1.40E-04	0.00E+00
1.952E+03	33	9.28E-13	1.87E-03	1.79E-02	5.12E-03	2.29E-03	1.04E-03	4.62E-04	1.66E-04	1.48E-04	0.00E+00
1.922E+03	32	1.10E-13	2.83E-03	3.00E-02	9.10E-03	4.06E-03	1.85E-03	7.28E-04	2.19E-03	7.68E-05	0.00E+00
1.891E+03	31	1.28E-14	2.63E-03	4.59E-02	1.57E-02	7.08E-03	3.29E-03	1.23E-03	2.23E-03	7.72E-05	0.00E+00
1.861E+03	30	1.64E-15	2.29E-04	2.86E-02	2.60E-02	1.21E-02	5.95E-03	6.66E-03	3.25E-12	4.65E-14	0.00E+00
1.830E+03	29	1.72E-16	2.92E-05	2.70E-02	4.19E-02	2.03E-02	1.04E-02	1.17E-02	2.00E-12	5.57E-18	0.00E+00
1.800E+03	28	1.54E-17	3.76E-06	4.52E-02	6.53E-02	3.28E-02	1.76E-02	2.79E-02	5.72E-05	1.49E-08	0.00E+00
1.769E+03	27	1.18E-18	4.71E-07	5.30E-02	9.63E-02	5.06E-02	2.80E-02	2.89E-02	5.82E-05	1.55E-08	0.00E+00
1.739E+03	26	8.09E-20	5.90E-08	4.93E-02	1.34E-01	7.42E-02	4.29E-02	4.68E-02	6.74E-12	1.65E-17	0.00E+00
1.708E+03	25	5.00E-21	7.61E-09	2.88E-02	1.76E-01	1.03E-01	6.19E-02	1.03E-01	1.39E-04	3.10E-08	0.00E+00
1.678E+03	24	3.06E-22	9.71E-10	1.42E-02	2.19E-01	1.35E-01	8.41E-02	1.02E-01	1.41E-04	3.25E-08	0.00E+00
1.647E+03	23	1.53E-02	2.95E-03	5.65E-03	2.57E-01	1.69E-01	1.09E-01	1.17E-01	1.45E-11	2.39E-17	0.00E+00
1.617E+03	22	6.78E-02	9.18E-03	2.06E-03	2.87E-01	2.01E-01	1.35E-01	2.34E-01	2.11E-04	4.06E-08	0.00E+00
1.586E+03	21	1.97E-01	1.31E-01	1.07E-01	3.08E-01	2.29E-01	1.60E-01	2.26E-01	2.16E-04	4.27E-08	0.00E+00
1.556E+03	20	3.03E-01	2.40E-01	2.14E-01	3.17E-01	2.52E-01	1.83E-01	1.93E-01	2.11E-11	2.12E-17	0.00E+00
1.525E+03	19	1.07E-01	1.57E-01	1.99E-01	3.12E-01	2.67E-01	2.02E-01	3.55E-01	1.79E-04	2.83E-08	0.00E+00
1.495E+03	18	3.83E-27	1.15E-02	3.70E-02	2.94E-01	2.74E-01	2.17E-01	3.45E-01	1.85E-04	3.01E-08	0.00E+00
1.464E+03	17	2.10E-27	1.35E-03	1.18E-02	2.70E-01	2.74E-01	2.27E-01	2.60E-01	2.18E-11	8.33E-18	0.00E+00
1.434E+03	16	5.00E-28	1.58E-04	5.42E-03	2.43E-01	2.66E-01	2.28E-01	2.89E-04	5.16E-08	5.96E-12	0.00E+00
1.403E+03	15	1.98E-29	1.79E-05	3.26E-03	2.14E-01	2.54E-01	2.34E-01	2.93E-04	5.45E-08	6.49E-12	0.00E+00
1.373E+03	14	9.36E-31	2.06E-06	2.46E-03	1.86E-01	2.37E-01	2.35E-01	2.03E-11	1.98E-17	1.92E-21	0.00E+00
1.342E+03	13	7.19E-32	2.68E-07	1.28E-03	1.64E-01	2.19E-01	3.14E-01	1.44E-04	2.13E-08	2.46E-12	0.00E+00
1.312E+03	12	4.57E-33	6.47E-08	5.54E-04	1.50E-01	2.04E-01	3.00E-01	1.48E-04	2.27E-08	2.67E-12	0.00E+00
1.281E+03	11	3.90E-12	7.03E-08	1.48E-04	1.48E-01	1.88E-01	1.87E-01	1.39E-11	4.38E-18	4.62E-22	0.00E+00
1.220E+03	10	2.55E-11	5.64E-08	2.35E-05	8.60E-02	1.70E-01	8.02E-02	1.86E-05	4.12E-09	7.63E-13	0.00E+00
1.159E+03	9	9.59E-12	4.57E-08	4.14E-06	3.45E-02	1.42E-01	8.81E-02	2.06E-05	4.45E-09	8.36E-13	0.00E+00
1.098E+03	8	4.02E-12	2.49E-08	1.56E-06	1.35E-02	8.96E-02	9.29E-02	5.55E-12	3.96E-19	6.56E-23	0.00E+00
1.037E+03	7	1.31E-11	6.64E-09	2.53E-06	1.08E-02	6.04E-02	3.85E-02	9.95E-06	2.37E-09	4.73E-13	0.00E+00
9.760E+02	6	2.38E-12	8.54E-10	3.09E-06	7.23E-03	3.76E-02	3.80E-02	1.12E-05	2.67E-09	5.46E-13	0.00E+00
8.540E+02	5	1.83E-13	6.79E-11	6.65E-06	4.48E-03	1.92E-02	1.37E-02	6.55E-06	2.86E-09	1.01E-12	0.00E+00
7.320E+02	4	9.81E-15	4.82E-12	7.13E-07	1.21E-03	1.52E-02	1.34E-02	6.94E-06	3.17E-09	1.15E-12	0.00E+00
5.490E+02	3	4.26E-16	2.61E-13	3.37E-08	5.45E-04	1.54E-02	1.19E-02	6.65E-06	3.10E-09	1.13E-12	0.00E+00
3.050E+02	2	5.83E-18	3.90E-11	1.24E-06	2.73E-04	1.51E-02	9.37E-03	5.22E-06	2.36E-09	8.36E-13	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	56	57	58	59	60	61	62	63	64	65
X =	2.87E+03	2.99E+03	3.11E+03	3.23E+03	3.35E+03	3.48E+03	3.60E+03	3.72E+03	3.84E+03	3.96E+03

--*-*-*-*-*-*-*-*- C - SPECIES CONCENTRATION..... FOR PLANE K = 8 AT STEP 6601, TIME= 1.6223E+04 -*-*-*-*-*-*-*-*-*-*-

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 5 2 0 9 2 7

	I =	1	2	3	4	5	6	7	8	9	10	11
	X =	0.00E+00	1.83E+02	3.66E+02	4.88E+02	5.49E+02	6.10E+02	6.71E+02	7.02E+02	7.32E+02	7.63E+02	7.93E+02
Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.29E-08
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.19E-08	5.16E-08	1.40E-07
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.25E-07	2.87E-07	7.09E-07
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.94E-07	9.49E-07	2.22E-06
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.44E-07	2.23E-06	5.29E-06
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.40E-06	5.97E-06	1.25E-05
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-06	2.28E-05	3.58E-05
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.60E-04	1.40E-04	9.74E-05
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.84E-05
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.14E-05
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.83E-05
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.40E-03
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E-02
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	I =	12	13	14	15	16	17	18	19	20	21	22
	X =	8.24E+02	8.54E+02	8.85E+02	9.15E+02	9.46E+02	9.76E+02	1.01E+03	1.04E+03	1.07E+03	1.10E+03	1.13E+03
Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.34E-06	2.24E-06	4.07E-06	7.76E-06
2.196E+03	37	0.00E+00	3.38E-08	6.71E-08	1.50E-07	3.44E-07	9.20E-07	2.10E-06	4.38E-06	8.53E-06	1.58E-05	2.82E-05
2.135E+03	36	5.45E-08	1.44E-07	3.70E-07	8.82E-07	1.96E-06	4.38E-06	8.49E-06	1.56E-05	2.76E-05	4.75E-05	7.91E-05
2.074E+03	35	3.54E-07	8.15E-07	1.75E-06	3.53E-06	6.79E-06	1.27E-05	2.16E-05	3.91E-05	6.96E-05	1.19E-04	1.96E-04
2.013E+03	34	1.59E-06	3.27E-06	6.37E-06	1.15E-05	2.01E-05	3.42E-05	5.76E-05	1.02E-04	1.77E-04	2.95E-04	4.75E-04
1.952E+03	33	4.68E-06	9.17E-06	1.71E-05	3.01E-05	5.15E-05	8.69E-05	1.45E-04	2.44E-04	3.97E-04	6.24E-04	9.83E-04
1.922E+03	32	1.07E-05	1.97E-05	3.52E-05	5.96E-05	1.01E-04	1.72E-04	2.59E-04	3.98E-04	6.13E-04	9.40E-04	1.56E-03
1.891E+03	31	2.17E-05	3.56E-05	5.84E-05	9.45E-05	1.56E-04	2.64E-04	3.96E-04	6.10E-04	9.43E-04	1.44E-03	2.38E-03
1.861E+03	30	4.74E-05	6.50E-05	9.66E-05	1.49E-04	2.41E-04	4.06E-04	6.02E-04	9.26E-04	1.44E-03	2.17E-03	3.51E-03
1.830E+03	29	8.52E-05	9.96E-05	1.44E-04	2.24E-04	3.68E-04	6.21E-04	9.18E-04	1.40E-03	2.20E-03	3.22E-03	5.03E-03
1.800E+03	28	5.63E-05	1.11E-04	2.07E-04	3.56E-04	5.92E-04	9.78E-04	1.40E-03	2.07E-03	3.17E-03	4.50E-03	6.73E-03
1.769E+03	27	1.18E-04	2.69E-04	4.85E-04	7.61E-04	1.14E-03	1.70E-03	2.25E-03	3.08E-03	4.38E-03	6.04E-03	8.53E-03
1.739E+03	26	5.15E-04	1.04E-03	1.51E-03	1.93E-03	2.42E-03	3.10E-03	3.68E-03	4.61E-03	6.04E-03	8.13E-03	1.12E-02
1.708E+03	25	5.69E-03	5.18E-03	4.92E-03	4.78E-03	4.81E-03	5.19E-03	5.44E-03	6.26E-03	7.73E-03	1.00E-02	1.36E-02
1.678E+03	24	1.73E-02	1.21E-02	9.27E-03	7.20E-03	5.91E-03	5.64E-03	5.60E-03	6.33E-03	7.85E-03	1.04E-02	1.47E-02
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	1.19E-03	1.72E-03	2.52E-03	3.34E-03	4.61E-03	6.51E-03	9.18E-03	1.29E-02
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	9.45E-04	1.43E-03	2.16E-03	3.08E-03	4.48E-03	6.02E-03	8.26E-03	1.13E-02
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	7.20E-04	1.10E-03	1.66E-03	2.32E-03	3.31E-03	4.40E-03	5.98E-03	8.13E-03
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.13E-04	1.14E-03	1.52E-03	2.10E-03	2.74E-03	3.68E-03	4.96E-03
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.88E-04	5.48E-04	7.41E-04	1.04E-03	1.39E-03	1.89E-03	2.58E-03
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.60E-04	2.30E-04	3.38E-04	4.99E-04	7.36E-04	1.05E-03	1.42E-03
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.74E-05	9.04E-05	1.41E-04	2.15E-04	3.04E-04	4.02E-04	5.15E-04
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.23E-05	6.55E-05	8.43E-05
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.87E-06	6.09E-06	7.77E-06
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 23 24 25 26 27 28 29 30 31 32 33

X = 1.16E+03 1.19E+03 1.22E+03 1.25E+03 1.28E+03 1.31E+03 1.34E+03 1.37E+03 1.40E+03 1.43E+03 1.46E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.18E-27
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.28E-19
2.257E+03	38	1.36E-05	2.26E-05	3.65E-05	5.80E-05	9.17E-05	1.41E-04	1.89E-04	0.00E+00	0.00E+00	0.00E+00	2.57E-13	
2.196E+03	37	4.79E-05	7.77E-05	1.25E-04	1.98E-04	3.07E-04	4.61E-04	6.55E-04	1.02E-03	2.01E-03	2.75E-03	7.13E-08	
2.135E+03	36	1.27E-04	1.96E-04	3.14E-04	4.98E-04	7.67E-04	1.14E-03	1.61E-03	2.52E-03	3.62E-03	4.08E-03	0.00E+00	
2.074E+03	35	3.12E-04	4.85E-04	7.92E-04	1.24E-03	1.85E-03	2.67E-03	3.67E-03	5.65E-03	7.72E-03	8.17E-03	1.10E-05	
2.013E+03	34	7.51E-04	1.19E-03	1.94E-03	3.00E-03	4.40E-03	6.21E-03	8.30E-03	1.22E-02	1.87E-02	2.86E-02	4.77E-05	
1.952E+03	33	1.56E-03	2.65E-03	4.27E-03	6.47E-03	9.13E-03	1.22E-02	1.55E-02	2.09E-02	3.07E-02	4.68E-02	1.22E-04	
1.922E+03	32	2.91E-03	5.47E-03	8.43E-03	1.20E-02	1.58E-02	2.01E-02	2.45E-02	3.16E-02	4.44E-02	6.60E-02	1.06E-01	
1.891E+03	31	4.38E-03	7.81E-03	1.18E-02	1.62E-02	2.09E-02	2.61E-02	3.11E-02	4.02E-02	5.98E-02	1.03E-01	1.70E-01	
1.861E+03	30	6.32E-03	1.06E-02	1.55E-02	2.01E-02	2.54E-02	3.16E-02	3.87E-02	5.17E-02	8.01E-02	1.45E-01	2.51E-01	
1.830E+03	29	8.89E-03	1.47E-02	2.09E-02	2.68E-02	3.36E-02	4.20E-02	5.20E-02	7.06E-02	1.11E-01	2.02E-01	3.56E-01	
1.800E+03	28	1.16E-02	1.87E-02	2.67E-02	3.56E-02	4.56E-02	5.73E-02	7.10E-02	9.59E-02	1.51E-01	2.67E-01	4.79E-01	
1.769E+03	27	1.47E-02	2.26E-02	3.18E-02	4.16E-02	5.35E-02	6.77E-02	8.46E-02	1.17E-01	1.90E-01	3.43E-01	6.29E-01	
1.739E+03	26	1.55E-02	2.29E-02	3.26E-02	4.30E-02	5.96E-02	7.84E-02	1.01E-01	1.44E-01	2.40E-01	4.33E-01	7.68E-01	
1.708E+03	25	1.82E-02	2.63E-02	3.78E-02	5.16E-02	7.26E-02	9.65E-02	1.25E-01	1.79E-01	2.98E-01	5.09E-01	8.47E-01	
1.678E+03	24	1.97E-02	2.80E-02	3.96E-02	5.94E-02	8.64E-02	1.16E-01	1.50E-01	2.11E-01	3.40E-01	5.28E-01	8.10E-01	
1.647E+03	23	1.79E-02	2.60E-02	3.74E-02	5.91E-02	8.75E-02	1.18E-01	1.52E-01	2.12E-01	3.31E-01	4.89E-01	7.15E-01	
1.617E+03	22	1.55E-02	2.23E-02	3.18E-02	5.00E-02	7.39E-02	9.92E-02	1.28E-01	1.77E-01	2.72E-01	3.89E-01	5.45E-01	
1.586E+03	21	1.10E-02	1.58E-02	2.24E-02	3.50E-02	5.15E-02	6.90E-02	8.85E-02	1.21E-01	1.81E-01	2.65E-01	3.59E-01	
1.556E+03	20	6.69E-03	9.54E-03	1.35E-02	2.08E-02	3.06E-02	4.09E-02	5.23E-02	7.10E-02	1.04E-01	1.52E-01	2.00E-01	
1.525E+03	19	3.51E-03	5.02E-03	7.06E-03	1.07E-02	1.57E-02	2.10E-02	2.68E-02	3.59E-02	5.07E-02	7.21E-02	9.20E-02	
1.495E+03	18	1.91E-03	2.57E-03	3.42E-03	4.87E-03	6.96E-03	9.20E-03	1.16E-02	1.51E-02	1.99E-02	2.67E-02	3.26E-02	
1.464E+03	17	6.64E-04	8.54E-04	1.09E-03	1.44E-03	2.06E-03	2.88E-03	3.60E-03	4.44E-03	5.19E-03	6.54E-03	7.64E-03	
1.434E+03	16	1.09E-04	1.38E-04	1.75E-04	2.20E-04	2.81E-04	3.98E-04	5.38E-04	6.75E-04	7.62E-04	9.39E-04	1.00E-03	
1.403E+03	15	1.01E-05	1.28E-05	1.63E-05	2.07E-05	2.65E-05	3.82E-05	5.36E-05	6.67E-05	7.05E-05	8.35E-05	6.26E-05	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 34 35 36 37 38 39 40 41 42 43 44

X = 1.49E+03 1.52E+03 1.56E+03 1.59E+03 1.62E+03 1.65E+03 1.68E+03 1.71E+03 1.77E+03 1.83E+03 1.89E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	5.21E-42	5.65E-07	6.15E-07	5.64E-07	6.10E-07	6.66E-07	1.99E-07	6.09E-08	1.53E-08	3.70E-09	
2.501E+03	40	6.67E-31	4.66E-35	3.76E-36	1.80E-40	1.39E-05	1.43E-05	1.46E-05	1.62E-06	3.30E-07	1.19E-07	3.31E-08	
2.379E+03	39	7.03E-23	6.33E-27	4.49E-31	4.48E-35	1.47E-04	1.50E-04	1.50E-04	1.38E-04	1.86E-05	4.47E-06	1.50E-06	
2.257E+03	38	4.73E-17	4.86E-21	4.25E-25	1.61E-28	1.41E-32	2.34E-10	1.11E-03	1.60E-03	6.60E-05	1.12E-05	2.93E-06	
2.196E+03	37	7.70E-12	6.64E-16	4.90E-20	3.59E-24	2.01E-28	9.50E-16	1.55E-02	2.41E-02	7.87E-04	1.04E-04	2.39E-05	
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.35E-02	7.60E-02	1.93E-03	2.19E-04	4.83E-05	
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.36E-04	6.65E-05	
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.40E-44	0.00E+00	0.00E+00	6.85E-01	3.40E-02	5.72E-03	
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.14E-40	4.76E-43	0.00E+00	2.04E+00	8.40E-02	1.21E-02	
1.922E+03	32	1.41E-01	1.82E-01	0.00E+00	0.00E+00	0.00E+00	3.37E-35	1.64E-38	1.22E-41	2.64E+00	8.32E-02	1.09E-02	
1.891E+03	31	2.74E-01	3.17E-01	4.33E-03	0.00E+00	0.00E+00	6.59E-31	3.47E-34	3.78E-37	3.02E+00	5.41E-02	6.42E-03	
1.861E+03	30	4.40E-01	5.85E-01	1.42E-02	0.00E+00	0.00E+00	1.40E-26	6.31E-30	9.51E-34	8.25E-38	1.16E-01	1.05E-02	
1.830E+03	29	6.10E-01	7.99E-01	4.27E-02	0.00E+00	0.00E+00	2.74E-22	1.08E-25	1.19E-29	1.26E-33	3.14E+00	2.33E-01	
1.800E+03	28	8.01E-01	1.03E+00	2.74E-01	0.00E+00	0.00E+00	4.50E-18	1.50E-21	1.42E-25	2.12E-29	3.66E+00	2.80E-01	
1.769E+03	27	9.95E-01	1.25E+00	4.99E-01	1.67E-04	3.49E-08	5.66E-14	1.35E-17	1.03E-21	3.67E-26	3.24E+00	2.19E-01	
1.739E+03	26	1.16E+00	1.44E+00	6.16E-01	1.69E-04	3.36E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.89E+00	1.71E-01	
1.708E+03	25	1.22E+00	1.52E+00	5.26E-01	1.28E-04	2.52E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.41E+00	1.18E-01	
1.678E+03	24	1.11E+00	1.43E+00	1.53E+00	1.57E+00	2.56E-03	1.01E-06	0.00E+00	0.00E+00	0.00E+00	1.91E+00	7.59E-02	
1.647E+03	23	9.48E-01	1.21E+00	1.42E+00	1.42E+00	2.86E-03	1.17E-06	0.00E+00	0.00E+00	0.00E+00	1.42E+00	5.52E-01	
1.617E+03	22	7.04E-01	8.58E-01	1.01E+00	9.75E-01	1.08E+00	1.12E+00	0.00E+00	0.00E+00	0.00E+00	9.98E-01	1.08E+00	
1.586E+03	21	4.53E-01	5.41E-01	6.26E-01	6.05E-01	6.79E-01	6.93E-01	5.66E-04	3.37E-08	2.42E-12	7.01E-01	7.23E-01	
1.556E+03	20	2.46E-01	2.88E-01	3.25E-01	3.23E-01	3.53E-01	3.44E-01	3.64E-04	2.24E-08	1.65E-12	3.60E-01	3.76E-01	
1.525E+03	19	1.10E-01	1.26E-01	1.31E-01	1.41E-01	1.43E-01	1.34E-01	2.03E-04	1.29E-08	9.74E-13	1.42E-01	1.53E-01	
1.495E+03	18	3.79E-02	4.24E-02	3.61E-02	3.86E-02	3.96E-02	3.61E-02	3.69E-02	3.36E-02	3.65E-02	4.34E-02	5.01E-02	
1.464E+03	17	8.59E-03	9.40E-03	7.92E-03	8.31E-03	8.39E-03	7.51E-03	7.88E-03	7.67E-03	9.11E-03	1.14E-02	1.39E-02	
1.434E+03	16	1.05E-03	1.09E-03	9.15E-04	9.34E-04	9.12E-04	7.90E-04	8.28E-04	8.44E-04	1.13E-03	1.59E-03	2.09E-03	
1.403E+03	15	4.63E-05	3.62E-05	2.99E-05	3.32E-05	3.04E-05	2.27E-05	2.31E-05	2.77E-05	4.82E-05	8.06E-05	1.50E-04	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.54E-30	1.01E-05	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.33E-35	5.55E-07	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.46E-38	3.64E-39	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-39	3.79E-40	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.51E-41	2.95E-41	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.08E-42	2.06E-42	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.40E-44	1.14E-43	

9 3 1 2 3 5 2 0 9 2 9

1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.20E-45
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.85E-18
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.20E-19
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.26E-20
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	45	46	47	48	49	50	51	52	53	54	55
X =	1.95E+03	2.01E+03	2.07E+03	2.13E+03	2.20E+03	2.26E+03	2.32E+03	2.38E+03	2.50E+03	2.62E+03	2.74E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	8.38E-10	1.20E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	5.37E-07	3.63E-06	9.67E-07	1.95E-07	5.70E-08	2.19E-08	1.05E-08	6.35E-09	6.01E-09	0.00E+00	
2.379E+03	39	5.30E-07	2.63E-05	1.13E-05	3.95E-06	1.48E-06	6.33E-07	3.21E-07	2.03E-07	1.71E-07	0.00E+00	
2.257E+03	38	7.70E-07	7.61E-05	5.71E-05	2.58E-05	1.07E-05	4.99E-06	2.51E-06	1.54E-06	1.35E-06	0.00E+00	
2.196E+03	37	5.24E-06	7.94E-05	7.45E-05	5.52E-05	2.69E-05	1.33E-05	6.85E-06	4.10E-06	3.08E-06	0.00E+00	
2.135E+03	36	1.07E-05	1.61E-05	2.26E-04	1.86E-04	8.56E-05	4.17E-05	2.19E-05	1.24E-05	1.34E-05	0.00E+00	
2.074E+03	35	1.49E-05	3.87E-06	7.80E-04	8.81E-04	3.67E-04	1.59E-04	7.76E-05	3.80E-05	2.59E-05	0.00E+00	
2.013E+03	34	9.85E-04	1.57E-03	9.21E-03	3.73E-03	1.55E-03	6.56E-04	2.96E-04	1.19E-04	1.87E-04	0.00E+00	
1.952E+03	33	2.03E-03	4.49E-03	2.56E-02	9.58E-03	3.93E-03	1.65E-03	6.86E-04	2.38E-04	1.95E-04	0.00E+00	
1.922E+03	32	1.88E-03	6.21E-03	4.21E-02	1.66E-02	6.85E-03	2.89E-03	1.11E-03	2.88E-03	9.06E-05	0.00E+00	
1.891E+03	31	1.19E-03	5.03E-03	6.28E-02	2.80E-02	1.17E-02	5.09E-03	1.86E-03	2.91E-03	9.07E-05	0.00E+00	
1.861E+03	30	2.17E-03	1.03E-03	6.27E-02	4.56E-02	1.98E-02	9.07E-03	9.54E-03	4.47E-12	5.63E-14	0.00E+00	
1.830E+03	29	4.33E-02	7.08E-03	7.52E-02	7.18E-02	3.24E-02	1.57E-02	1.65E-02	2.83E-12	6.28E-18	0.00E+00	
1.800E+03	28	5.38E-02	1.06E-02	1.19E-01	1.09E-01	5.12E-02	2.59E-02	3.76E-02	6.64E-05	1.66E-08	0.00E+00	
1.769E+03	27	4.18E-02	9.63E-03	1.40E-01	1.54E-01	7.67E-02	4.04E-02	3.90E-02	6.73E-05	1.72E-08	0.00E+00	
1.739E+03	26	3.04E-02	7.95E-03	1.40E-01	2.05E-01	1.09E-01	6.02E-02	6.24E-02	9.02E-12	1.83E-17	0.00E+00	
1.708E+03	25	1.96E-02	5.60E-03	9.78E-02	2.55E-01	1.45E-01	8.45E-02	1.29E-01	1.57E-04	3.38E-08	0.00E+00	
1.678E+03	24	1.10E-02	3.06E-03	6.13E-02	2.99E-01	1.83E-01	1.11E-01	1.27E-01	1.59E-04	3.54E-08	0.00E+00	
1.647E+03	23	7.46E-02	1.63E-02	3.46E-02	3.29E-01	2.19E-01	1.40E-01	1.44E-01	1.81E-11	2.59E-17	0.00E+00	
1.617E+03	22	1.47E-01	2.88E-02	1.13E-02	3.42E-01	2.48E-01	1.68E-01	2.73E-01	2.30E-04	4.32E-08	0.00E+00	
1.586E+03	21	4.08E-01	2.01E-01	1.58E-01	3.42E-01	2.71E-01	1.93E-01	2.63E-01	2.35E-04	4.54E-08	0.00E+00	
1.556E+03	20	3.89E-01	2.87E-01	2.51E-01	3.28E-01	2.84E-01	2.15E-01	2.21E-01	2.44E-11	2.25E-17	0.00E+00	
1.525E+03	19	1.48E-01	1.83E-01	2.19E-01	3.01E-01	2.89E-01	2.31E-01	3.86E-01	1.88E-04	2.93E-08	0.00E+00	
1.495E+03	18	4.86E-03	2.47E-02	7.43E-02	2.64E-01	2.85E-01	2.42E-01	3.74E-01	1.94E-04	3.12E-08	0.00E+00	
1.464E+03	17	1.90E-03	4.06E-03	3.16E-02	2.27E-01	2.73E-01	2.49E-01	2.81E-01	2.38E-11	8.65E-18	0.00E+00	
1.434E+03	16	3.89E-04	6.35E-04	1.60E-02	1.90E-01	2.57E-01	2.45E-01	2.98E-04	5.28E-08	6.04E-12	0.00E+00	
1.403E+03	15	4.30E-05	8.97E-05	9.26E-03	1.56E-01	2.37E-01	2.46E-01	3.02E-04	5.56E-08	6.58E-12	0.00E+00	
1.373E+03	14	4.44E-06	1.23E-05	6.08E-03	1.27E-01	2.14E-01	2.15E-01	1.87E-11	1.98E-17	1.90E-21	0.00E+00	
1.342E+03	13	5.22E-07	1.85E-06	3.24E-03	1.06E-01	1.94E-01	2.86E-01	1.33E-04	1.99E-08	2.31E-12	0.00E+00	
1.312E+03	12	3.88E-08	4.10E-07	1.54E-03	9.68E-02	1.80E-01	2.73E-01	1.38E-04	2.12E-08	2.51E-12	0.00E+00	
1.281E+03	11	3.29E-09	5.02E-07	4.83E-04	1.12E-01	1.72E-01	1.72E-01	1.28E-11	4.11E-18	4.35E-22	0.00E+00	
1.220E+03	10	3.79E-10	3.18E-07	7.90E-05	8.67E-02	1.69E-01	7.65E-02	2.01E-05	4.22E-09	7.60E-13	0.00E+00	
1.159E+03	9	6.16E-11	2.67E-07	1.37E-05	3.91E-02	1.45E-01	8.49E-02	2.21E-05	4.55E-09	8.33E-13	0.00E+00	
1.098E+03	8	1.67E-11	1.32E-07	6.57E-05	1.32E-02	9.34E-02	9.32E-02	5.64E-12	4.21E-19	6.75E-23	0.00E+00	
1.037E+03	7	3.74E-11	3.69E-08	5.84E-05	9.53E-03	6.48E-02	3.84E-02	1.12E-05	2.55E-09	4.95E-13	0.00E+00	
9.760E+02	6	6.50E-12	4.34E-09	3.93E-05	5.79E-03	4.10E-02	3.83E-02	1.26E-05	2.86E-09	5.70E-13	0.00E+00	
8.540E+02	5	4.89E-13	3.09E-10	2.55E-05	3.00E-03	2.05E-02	1.37E-02	7.16E-06	3.01E-09	1.05E-12	0.00E+00	
7.320E+02	4	2.50E-14	2.00E-11	4.73E-06	1.48E-03	1.26E-02	1.34E-02	7.55E-06	3.31E-09	1.19E-12	0.00E+00	
5.490E+02	3	1.04E-15	9.96E-13	2.06E-07	7.65E-04	1.46E-02	1.21E-02	7.25E-06	3.24E-09	1.17E-12	0.00E+00	
3.050E+02	2	1.30E-17	1.23E-10	3.30E-06	5.91E-04	1.51E-02	9.70E-03	5.74E-06	2.48E-09	8.65E-13	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I =	56	57	58	59	60	61	62	63	64	65
X =	2.87E+03	2.99E+03	3.11E+03	3.23E+03	3.35E+03	3.48E+03	3.60E+03	3.72E+03	3.84E+03	3.96E+03

--*-*-*-*-*-*-*-*- C - SPECIES CONCENTRATION..... FOR PLANE K = 9 AT STEP 6601, TIME= 1.6223E+04 -*-*-*-*-*-*-*-*-*-*-

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 2 3 9 3 0

1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I = 1 2 3 4 5 6 7 8 9 10 11
X = 0.00E+00 1.83E+02 3.66E+02 4.88E+02 5.49E+02 6.10E+02 6.71E+02 7.02E+02 7.32E+02 7.63E+02 7.93E+02

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E-11	3.47E-11	2.42E-10	
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.73E-10	4.37E-10	7.97E-09	
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.85E-09	3.70E-08	1.37E-07	
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.22E-08	2.09E-07	6.81E-07	
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-07	6.82E-07	2.03E-06	
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.63E-07	1.40E-06	4.25E-06	
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.31E-07	2.97E-06	8.33E-06	
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.11E-06	6.14E-06	1.70E-05	
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-02	7.16E-06	2.58E-05	
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.36E-06	1.22E-05	
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.14E-05	1.58E-05	
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E-05	1.83E-05	
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E-01	
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.22E+00	
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I = 12 13 14 15 16 17 18 19 20 21 22
X = 8.24E+02 8.54E+02 8.85E+02 9.15E+02 9.46E+02 9.76E+02 1.01E+03 1.04E+03 1.07E+03 1.10E+03 1.13E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.379E+03	39	0.00E+00	0.00E+00	1.98E-10	4.77E-10	1.11E-09	3.60E-09	1.29E-08	4.02E-08	1.27E-07	3.41E-07	9.21E-07	
2.257E+03	38	0.00E+00	0.00E+00	6.03E-09	1.18E-08	2.33E-08	8.02E-08	2.65E-07	7.52E-07	2.00E-06	4.25E-06	8.62E-06	
2.196E+03	37	2.88E-09	1.51E-08	5.93E-08	1.62E-07	4.00E-07	1.08E-06	2.47E-06	5.09E-06	9.83E-06	1.81E-05	3.22E-05	
2.135E+03	36	4.73E-08	1.54E-07	4.18E-07	1.02E-06	2.32E-06	5.19E-06	1.01E-05	1.85E-05	3.25E-05	5.53E-05	9.15E-05	
2.074E+03	35	3.83E-07	9.18E-07	2.01E-06	4.11E-06	8.02E-06	1.52E-05	2.75E-05	4.91E-05	8.55E-05	1.44E-04	2.35E-04	
2.013E+03	34	1.69E-06	3.65E-06	7.26E-06	1.36E-05	2.42E-05	4.19E-05	7.39E-05	1.29E-04	2.19E-04	3.60E-04	5.73E-04	
1.952E+03	33	4.75E-06	9.84E-06	1.90E-05	3.47E-05	6.12E-05	1.06E-04	1.87E-04	3.14E-04	5.06E-04	7.92E-04	1.22E-03	
1.922E+03	32	9.85E-06	1.99E-05	3.72E-05	6.66E-05	1.17E-04	2.05E-04	3.48E-04	5.62E-04	8.82E-04	1.36E-03	2.11E-03	
1.891E+03	31	1.77E-05	3.31E-05	5.91E-05	1.03E-04	1.77E-04	3.08E-04	5.20E-04	8.44E-04	1.34E-03	2.06E-03	3.18E-03	
1.861E+03	30	3.23E-05	5.53E-05	9.39E-05	1.60E-04	2.75E-04	4.73E-04	7.88E-04	1.28E-03	2.04E-03	3.08E-03	4.66E-03	
1.830E+03	29	4.43E-05	7.52E-05	1.32E-04	2.34E-04	4.11E-04	7.16E-04	1.19E-03	1.93E-03	3.06E-03	4.49E-03	6.61E-03	
1.800E+03	28	3.26E-05	8.14E-05	1.78E-04	3.47E-04	6.28E-04	1.09E-03	1.78E-03	2.81E-03	4.24E-03	6.05E-03	8.72E-03	
1.769E+03	27	5.13E-05	1.58E-04	3.55E-04	6.65E-04	1.12E-03	1.80E-03	2.75E-03	4.08E-03	5.82E-03	8.15E-03	1.16E-02	
1.739E+03	26	9.95E-05	4.11E-04	8.67E-04	1.43E-03	2.13E-03	3.04E-03	4.25E-03	5.88E-03	8.16E-03	1.13E-02	1.57E-02	
1.708E+03	25	1.51E-04	1.18E-03	2.07E-03	2.84E-03	3.59E-03	4.56E-03	5.84E-03	7.62E-03	1.02E-02	1.38E-02	1.90E-02	
1.678E+03	24	2.44E-04	1.74E-03	2.66E-03	3.37E-03	3.80E-03	4.58E-03	5.78E-03	7.57E-03	1.02E-02	1.42E-02	2.01E-02	
1.647E+03	23	1.25E-04	2.20E-04	3.77E-04	6.18E-04	1.23E-03	2.19E-03	3.62E-03	5.65E-03	8.49E-03	1.25E-02	1.79E-02	
1.617E+03	22	1.08E-04	1.88E-04	3.21E-04	5.09E-04	1.11E-03	2.00E-03	3.29E-03	5.16E-03	7.65E-03	1.10E-02	1.55E-02	
1.586E+03	21	9.46E-05	1.64E-04	2.75E-04	4.07E-04	8.40E-04	1.50E-03	2.44E-03	3.77E-03	5.54E-03	7.89E-03	1.10E-02	
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	3.34E-04	4.64E-04	8.93E-04	1.48E-03	2.29E-03	3.36E-03	4.77E-03	6.60E-03	
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	1.72E-04	2.33E-04	4.39E-04	7.29E-04	1.14E-03	1.68E-03	2.42E-03	3.38E-03	

9 3 1 2 3 5 2 3 9 3 1

1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	7.31E-05	9.67E-05	1.82E-04	3.07E-04	4.90E-04	7.55E-04	1.12E-03	1.60E-03
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	2.52E-05	3.15E-05	6.29E-05	1.07E-04	1.67E-04	2.66E-04	3.89E-04	5.44E-04
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.93E-05	2.66E-05	3.54E-05	5.63E-05	8.18E-05
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.97E-06	2.66E-06	3.45E-06	5.37E-06	7.72E-06
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	I =	23	24	25	26	27	28	29	30	31	32	33
	X =	1.16E+03	1.19E+03	1.22E+03	1.25E+03	1.28E+03	1.31E+03	1.34E+03	1.37E+03	1.40E+03	1.43E+03	1.46E+03
Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.91E-37
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.61E-28
2.379E+03	39	1.96E-06	3.62E-06	6.15E-06	9.94E-06	1.60E-05	2.61E-05	3.83E-05	0.00E+00	0.00E+00	0.00E+00	2.30E-18
2.257E+03	38	1.54E-05	2.56E-05	4.12E-05	6.53E-05	1.03E-04	1.59E-04	2.11E-04	3.21E-04	0.00E+00	0.00E+00	9.65E-13
2.196E+03	37	5.44E-05	8.80E-05	1.40E-04	2.22E-04	3.43E-04	5.12E-04	7.26E-04	1.14E-03	5.95E-04	7.12E-04	1.41E-07
2.135E+03	36	1.45E-04	2.24E-04	3.57E-04	5.62E-04	8.57E-04	1.26E-03	1.78E-03	2.84E-03	1.44E-03	1.55E-03	2.53E-07
2.074E+03	35	3.71E-04	5.71E-04	9.27E-04	1.43E-03	2.11E-03	2.99E-03	4.08E-03	6.33E-03	9.62E-03	1.11E-02	1.79E-02
2.013E+03	34	8.88E-04	1.39E-03	2.22E-03	3.38E-03	4.90E-03	6.80E-03	9.03E-03	1.33E-02	2.09E-02	3.21E-02	4.63E-02
1.952E+03	33	1.85E-03	2.94E-03	4.62E-03	6.93E-03	9.78E-03	1.26E-02	1.59E-02	2.14E-02	3.31E-02	5.20E-02	7.95E-02
1.922E+03	32	3.29E-03	5.37E-03	8.29E-03	1.19E-02	1.61E-02	2.01E-02	2.46E-02	3.20E-02	4.80E-02	7.49E-02	1.22E-01
1.891E+03	31	4.84E-03	7.57E-03	1.13E-02	1.49E-02	1.95E-02	2.49E-02	2.84E-02	3.93E-02	6.27E-02	1.12E-01	1.87E-01
1.861E+03	30	6.97E-03	9.97E-03	1.44E-02	1.68E-02	2.20E-02	2.88E-02	3.65E-02	5.23E-02	8.56E-02	1.58E-01	2.77E-01
1.830E+03	29	1.00E-02	1.44E-02	2.03E-02	2.36E-02	3.06E-02	4.00E-02	5.14E-02	7.36E-02	1.21E-01	2.23E-01	3.97E-01
1.800E+03	28	1.29E-02	1.95E-02	2.77E-02	3.70E-02	4.78E-02	6.04E-02	7.55E-02	1.04E-01	1.66E-01	2.99E-01	5.42E-01
1.769E+03	27	1.72E-02	2.52E-02	3.42E-02	4.36E-02	5.55E-02	7.00E-02	8.80E-02	1.24E-01	2.07E-01	3.81E-01	7.14E-01
1.739E+03	26	2.16E-02	3.01E-02	3.72E-02	4.22E-02	5.58E-02	7.40E-02	9.74E-02	1.47E-01	2.58E-01	4.81E-01	8.78E-01
1.708E+03	25	2.54E-02	3.49E-02	4.51E-02	5.26E-02	7.02E-02	9.39E-02	1.24E-01	1.86E-01	3.23E-01	5.74E-01	9.88E-01
1.678E+03	24	2.69E-02	3.62E-02	4.89E-02	6.54E-02	8.89E-02	1.18E-01	1.55E-01	2.24E-01	3.71E-01	6.13E-01	9.82E-01
1.647E+03	23	2.47E-02	3.43E-02	4.73E-02	6.78E-02	9.32E-02	1.24E-01	1.60E-01	2.28E-01	3.65E-01	5.71E-01	8.67E-01
1.617E+03	22	2.12E-02	2.92E-02	4.00E-02	5.74E-02	7.87E-02	1.04E-01	1.34E-01	1.90E-01	3.00E-01	4.52E-01	6.59E-01
1.586E+03	21	1.50E-02	2.06E-02	2.80E-02	3.98E-02	5.46E-02	7.23E-02	9.30E-02	1.30E-01	2.00E-01	3.10E-01	4.35E-01
1.556E+03	20	8.99E-03	1.23E-02	1.67E-02	2.35E-02	3.22E-02	4.25E-02	5.47E-02	7.60E-02	1.14E-01	1.77E-01	2.41E-01
1.525E+03	19	4.64E-03	6.35E-03	8.61E-03	1.19E-02	1.63E-02	2.15E-02	2.77E-02	3.82E-02	5.57E-02	8.40E-02	1.11E-01
1.495E+03	18	2.21E-03	2.99E-03	3.96E-03	5.16E-03	6.98E-03	9.21E-03	1.18E-02	1.59E-02	2.19E-02	3.11E-02	3.93E-02
1.464E+03	17	7.36E-04	9.70E-04	1.24E-03	1.51E-03	2.00E-03	2.74E-03	3.53E-03	4.68E-03	5.89E-03	7.80E-03	9.36E-03
1.434E+03	16	1.13E-04	1.52E-04	1.99E-04	2.54E-04	3.26E-04	4.28E-04	5.57E-04	7.27E-04	8.72E-04	1.13E-03	1.26E-03
1.403E+03	15	1.07E-05	1.43E-05	1.87E-05	2.41E-05	3.10E-05	4.14E-05	5.61E-05	7.21E-05	8.06E-05	1.00E-04	9.38E-05
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	I =	34	35	36	37	38	39	40	41	42	43	44
	X =	1.49E+03	1.52E+03	1.56E+03	1.59E+03	1.62E+03	1.65E+03	1.68E+03	1.71E+03	1.77E+03	1.83E+03	1.89E+03
Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	3.51E-40	3.66E-43	5.23E-07	5.82E-07	5.01E-07	5.50E-07	6.25E-07	2.58E-07	9.36E-08	2.68E-08	7.34E-09
2.501E+03	40	4.33E-32	8.06E-36	1.33E-05	1.38E-05	1.35E-05	1.41E-05	1.43E-05	2.45E-06	6.05E-07	2.49E-07	7.75E-08
2.379E+03	39	5.24E-22	6.49E-26	7.66E-30	1.43E-04	1.41E-04	1.49E-04	1.53E-04	1.39E-04	2.75E-05	8.41E-06	3.19E-06
2.257E+03	38	2.74E-16	4.75E-20	7.01E-24	1.29E-03	1.31E-03	1.30E-03	1.31E-03	1.72E-03	1.59E-04	4.30E-05	1.47E-05
2.196E+03	37	2.48E-11	3.71E-15	4.92E-19	6.74E-23	8.03E-27	8.28E-03	1.11E-02	2.62E-02	1.89E-03	3.93E-04	1.23E-04
2.135E+03	36	2.36E-10	6.97E-14	1.68E-17	3.26E-21	4.08E-25	3.42E-02	4.71E-02	1.09E-01	5.52E-03	9.52E-04	2.78E-04
2.074E+03	35	5.85E-06	1.75E-09	3.07E-13	5.05E-17	7.39E-21	9.32E-02	1.07E-01	3.64E-01	7.47E-03	2.00E-03	5.14E-04
2.013E+03	34	1.39E-05	4.07E-09	6.98E-13	1.99E-16	1.18E-19	3.65E-23	7.29E-27	1.14E+00	1.05E+00	9.78E-02	2.37E-02
1.952E+03	33	4.54E-05	1.46E-08	6.63E-11	3.66E-12	4.21E-15	1.09E-18	1.91E-22	1.97E+00	2.32E+00	2.00E-01	4.41E-02
1.922E+03	32	1.21E-02	3.21E-02	5.06E-06	7.40E-08	7.04E-11	1.52E-14	2.35E-18	2.66E+00	3.13E+00	2.04E-01	4.05E-02
1.891E+03	31	3.09E-01	3.59E-01	5.35E-01	6.65E-04	2.27E-07	5.60E-11	8.61E-15	2.98E+00	3.71E+00	1.48E-01	2.60E-02
1.861E+03	30	4.89E-01	6.42E-01	8.84E-01	1.09E-03	3.66E-07	9.08E-11	1.39E-14	7.54E-19	4.21E+00	1.25E+00	1.45E-01
1.830E+03	29	6.88E-01	8.83E-01	1.20E+00	1.52E-03	5.15E-07	1.41E-10	2.54E-14	1.62E-18	4.64E+00	4.38E+00	6.17E-01
1.800E+03	28	9.14E-01	1.14E+00	1.54E+00	2.21E-03	7.59E-07	1.76E-07	6.96E-11	6.50E-15	4.87E+00	4.62E+00	6.95E-01
1.769E+03	27	1.15E+00	1.41E+00	1.95E+00	2.42E+00	2.77E+00	1.71E-03	5.25E-07	4.18E-11	1.82E-15	4.08E+00	5.44E-01
1.739E+03	26	1.35E+00	1.63E+00	2.22E+00	2.68E+00	2.98E+00	1.89E-03	5.91E-07	4.74E-11	2.02E-15	3.66E+00	4.27E-01
1.708E+03	25	1.44E+00	1.75E+00	2.23E+00	2.46E+00	2.69E+00	2.06E-03	6.57E-07	5.45E-11	2.40E-15	3.12E+00	3.01E-01
1.678E+03	24	1.36E+00	1.74E+00	1.81E+00	1.77E+00	2.06E+00	2.25E+00	1.38E-04	1.01E-08	7.10E-13	2.53E+00	2.09E-01
1.647E+03	23	1.17E+00	1.47E+00	1.71E+00	1.65E+00	1.85E+00	1.95E+00	1.85E-04	1.32E-08	9.36E-13	1.86E+00	8.91E-01

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1.617E+03	22	8.64E-01	1.05E+00	1.22E+00	1.20E+00	1.28E+00	1.31E+00	4.31E-04	3.01E-08	2.15E-12	1.26E+00	1.20E+00	
1.586E+03	21	5.54E-01	6.62E-01	7.55E-01	7.45E-01	8.00E-01	8.00E-01	8.49E-01	8.30E-01	8.34E-01	8.49E-01	8.01E-01	
1.556E+03	20	3.00E-01	3.52E-01	3.92E-01	3.95E-01	4.15E-01	3.98E-01	4.22E-01	4.26E-01	4.33E-01	4.37E-01	4.16E-01	
1.525E+03	19	1.34E-01	1.54E-01	1.63E-01	1.72E-01	1.72E-01	1.55E-01	1.60E-01	1.60E-01	1.66E-01	1.72E-01	1.69E-01	
1.495E+03	18	4.62E-02	5.17E-02	4.92E-02	5.09E-02	5.00E-02	4.47E-02	4.52E-02	4.50E-02	4.73E-02	5.13E-02	5.46E-02	
1.464E+03	17	1.06E-02	1.16E-02	1.09E-02	1.10E-02	1.07E-02	9.39E-03	9.58E-03	1.01E-02	1.16E-02	1.33E-02	1.50E-02	
1.434E+03	16	1.35E-03	1.42E-03	1.30E-03	1.30E-03	1.21E-03	1.02E-03	1.03E-03	1.12E-03	1.44E-03	1.84E-03	2.24E-03	
1.403E+03	15	8.06E-05	6.78E-05	5.75E-05	5.75E-05	4.82E-05	3.55E-05	3.38E-05	3.93E-05	6.29E-05	9.43E-05	1.60E-04	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.25E-30	1.06E-05
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.30E-35	6.32E-07
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.29E-38	5.29E-39
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.44E-39	6.87E-40
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.59E-41	6.62E-41
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.74E-42	5.63E-42
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.48E-44	3.70E-43
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-44
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.42E-17
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.73E-18
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.42E-19
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	45	46	47	48	49	50	51	52	53	54	55
X =	1.95E+03	2.01E+03	2.07E+03	2.13E+03	2.20E+03	2.26E+03	2.32E+03	2.38E+03	2.50E+03	2.62E+03	2.74E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	4.01E-08	2.31E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.501E+03	40	6.58E-06	5.24E-06	1.42E-06	2.79E-07	7.81E-08	2.88E-08	1.33E-08	7.86E-09	7.31E-09	0.00E+00	
2.379E+03	39	2.49E-06	4.13E-05	1.66E-05	5.65E-06	2.03E-06	8.36E-07	4.10E-07	2.52E-07	2.10E-07	0.00E+00	
2.257E+03	38	4.60E-06	1.70E-04	9.29E-05	3.87E-05	1.52E-05	6.64E-06	3.21E-06	1.91E-06	1.64E-06	0.00E+00	
2.196E+03	37	3.44E-05	3.22E-04	1.51E-04	9.41E-05	4.12E-05	1.88E-05	9.13E-06	5.24E-06	3.84E-06	0.00E+00	
2.135E+03	36	7.74E-05	1.53E-04	6.33E-04	3.50E-04	1.43E-04	6.32E-05	3.05E-05	1.64E-05	1.73E-05	0.00E+00	
2.074E+03	35	1.43E-04	4.63E-05	2.43E-03	1.58E-03	6.03E-04	2.45E-04	1.11E-04	5.21E-05	3.43E-05	0.00E+00	
2.013E+03	34	5.52E-03	4.90E-03	1.35E-02	6.37E-03	2.44E-03	9.83E-04	4.18E-04	1.64E-04	2.42E-04	0.00E+00	
1.952E+03	33	1.03E-02	1.27E-02	3.68E-02	1.57E-02	6.02E-03	2.41E-03	9.61E-04	3.26E-04	2.51E-04	0.00E+00	
1.922E+03	32	9.86E-03	1.71E-02	5.91E-02	2.65E-02	1.03E-02	4.17E-03	1.56E-03	3.68E-03	1.05E-04	0.00E+00	
1.891E+03	31	6.74E-03	1.28E-02	8.71E-02	4.30E-02	1.73E-02	7.22E-03	2.60E-03	3.69E-03	1.05E-04	0.00E+00	
1.861E+03	30	3.38E-02	8.55E-03	1.09E-01	6.79E-02	2.86E-02	1.27E-02	1.29E-02	5.90E-12	6.71E-14	0.00E+00	
1.830E+03	29	1.65E-01	3.60E-02	1.51E-01	1.04E-01	4.57E-02	2.15E-02	2.19E-02	3.77E-12	7.08E-18	0.00E+00	
1.800E+03	28	1.97E-01	5.22E-02	2.23E-01	1.51E-01	7.05E-02	3.50E-02	4.85E-02	7.67E-05	1.84E-08	0.00E+00	
1.769E+03	27	1.56E-01	4.85E-02	2.68E-01	2.06E-01	1.03E-01	5.34E-02	5.00E-02	7.75E-05	1.91E-08	0.00E+00	
1.739E+03	26	1.16E-01	4.11E-02	2.88E-01	2.61E-01	1.41E-01	7.77E-02	7.85E-02	1.14E-11	2.03E-17	0.00E+00	
1.708E+03	25	7.67E-02	3.01E-02	2.47E-01	3.08E-01	1.81E-01	1.06E-01	1.57E-01	1.76E-04	3.68E-08	0.00E+00	
1.678E+03	24	4.61E-02	1.77E-02	1.97E-01	3.40E-01	2.20E-01	1.36E-01	1.53E-01	1.78E-04	3.85E-08	0.00E+00	
1.647E+03	23	1.82E-01	5.22E-02	1.51E-01	3.53E-01	2.53E-01	1.67E-01	1.68E-01	2.14E-11	2.80E-17	0.00E+00	
1.617E+03	22	2.53E-01	6.97E-02	7.35E-02	3.47E-01	2.77E-01	1.95E-01	3.08E-01	2.49E-04	4.57E-08	0.00E+00	
1.586E+03	21	5.08E-01	2.72E-01	2.38E-01	3.28E-01	2.91E-01	2.18E-01	2.95E-01	2.53E-04	4.80E-08	0.00E+00	
1.556E+03	20	4.25E-01	3.24E-01	2.81E-01	2.98E-01	2.95E-01	2.36E-01	2.41E-01	2.71E-11	2.37E-17	0.00E+00	
1.525E+03	19	1.72E-01	2.05E-01	2.27E-01	2.58E-01	2.89E-01	2.48E-01	4.09E-01	1.96E-04	3.02E-08	0.00E+00	
1.495E+03	18	1.11E-02	4.19E-02	1.12E-01	2.14E-01	2.75E-01	2.55E-01	3.96E-01	2.02E-04	3.20E-08	0.00E+00	
1.464E+03	17	4.19E-03	8.95E-03	5.89E-02	1.74E-01	2.56E-01	2.56E-01	2.91E-01	2.51E-11	8.96E-18	0.00E+00	
1.434E+03	16	8.81E-04	1.72E-03	3.23E-02	1.36E-01	2.33E-01	2.47E-01	3.03E-04	5.33E-08	6.07E-12	0.00E+00	
1.403E+03	15	1.05E-04	2.90E-04	1.81E-02	1.03E-01	2.08E-01	2.44E-01	3.06E-04	5.62E-08	6.60E-12	0.00E+00	
1.373E+03	14	1.09E-05	4.56E-05	1.02E-02	7.67E-02	1.83E-01	1.88E-01	1.66E-11	1.96E-17	1.87E-21	0.00E+00	
1.342E+03	13	1.42E-06	7.74E-06	5.76E-03	5.99E-02	1.62E-01	2.52E-01	1.20E-04	1.81E-08	2.11E-12	0.00E+00	
1.312E+03	12	1.46E-07	1.65E-06	3.11E-03	5.32E-02	1.49E-01	2.40E-01	1.24E-04	1.93E-08	2.29E-12	0.00E+00	
1.281E+03	11	1.55E-08	3.24E-06	1.26E-03	6.90E-02	1.44E-01	1.48E-01	1.11E-11	3.75E-18	4.01E-22	0.00E+00	
1.220E+03	10	1.69E-09	1.67E-06	3.65E-04	5.89E-02	1.44E-01	6.75E-02	1.94E-05	4.08E-09	7.32E-13	0.00E+00	
1.159E+03	9	2.20E-10	1.24E-06	3.85E-04	3.06E-02	1.16E-01	7.38E-02	2.11E-05	4.39E-09	8.01E-13	0.00E+00	
1.098E+03	8	5.50E-11	5.32E-07	2.76E-04	1.23E-02	8.03E-02	8.31E-02	5.10E-12	4.24E-19	6.77E-23	0.00E+00	
1.037E+03	7	9.54E-11	1.58E-07	1.84E-04	6.48E-03	5.90E-02	3.67E-02	1.17E-05	2.65E-09	5.11E-13	0.00E+00	
9.760E+02	6	1.55E-11	2.07E-08	1.04E-04	3.25E-03	3.92E-02	3.67E-02	1.31E-05	2.97E-09	5.87E-13	0.00E+00	
8.540E+02	5	1.28E-12	1.58E-09	4.43E-05	1.42E-03	1.93E-02	1.33E-02	7.50E-06	3.12E-09	1.08E-12	0.00E+00	
7.320E+02	4	6.60E-14	1.08E-10	1.97E-05	8.32E-04	1.11E-02	1.30E-02	7.89E-06	3.44E-09	1.23E-12	0.00E+00	
5.490E+02	3	2.66E-15	5.63E-12	6.49E-06	3.74E-04	1.34E-02	1.19E-02	7.59E-06	3.36E-09	1.21E-12	0.00E+00	
3.050E+02	2	3.32E-17	3.86E-10	5.28E-06	4.40E-04	1.43E-02	9.67E-03	6.04E-06	2.58E-09	8.93E-13	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

I =	56	57	58	59	60	61	62	63	64	65
X =	2.87E+03	2.99E+03	3.11E+03	3.23E+03	3.35E+03	3.48E+03	3.60E+03	3.72E+03	3.84E+03	3.96E+03

--*-*-*-*-*-*-*-*- C - SPECIES CONCENTRATION..... FOR PLANE K = 10 AT STEP 6601, TIME= 1.6223E+04 -*-*-*-*-*-*-*-*-*-*

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.96E-30	6.16E-27	1.80E-25	2.56E-24
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.96E-27	1.35E-24	3.92E-23	5.51E-22
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.67E-25	1.14E-22	3.29E-21	4.55E-20
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.92E-24	5.42E-21	1.53E-19	2.08E-18
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.22E-22	1.52E-19	4.21E-18	5.55E-17
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.65E-21	2.48E-18	6.68E-17	8.49E-16
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.18E-20	3.47E-17	8.96E-16	1.08E-14
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E-19	4.16E-16	1.01E-14	1.13E-13
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.96E-18	4.27E-15	9.31E-14	9.38E-13
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.65E-17	3.00E-14	5.49E-13	4.79E-12
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.62E-16	1.39E-13	1.98E-12	1.47E-11
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.55E-15	5.83E-13	6.01E-12	3.83E-11

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1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.39E-14	1.54E-12	1.50E-11	9.16E-11	
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.03E-14	3.02E-12	2.94E-11	1.79E-10	
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.41E-13	5.85E-12	5.60E-11	3.38E-10	
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.67E-13	9.28E-12	8.87E-11	5.30E-10	
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.22E-13	1.27E-11	1.25E-10	7.40E-10	
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.62E-13	1.57E-11	1.63E-10	9.50E-10	
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.34E-13	2.00E-11	2.07E-10	1.14E-09	
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.15E-13	2.37E-11	2.48E-10	1.27E-09	
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.01E-13	2.57E-11	2.74E-10	1.28E-09	
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.25E-13	2.46E-11	3.13E-10	1.29E-09	
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.75E-13	2.03E-11	3.19E-10	1.14E-09	
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.04E-13	1.37E-11	2.41E-10	9.81E-10	
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.59E-13	8.16E-12	1.42E-10	6.10E-10	
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-13	3.69E-12	6.58E-11	3.11E-10	
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.96E-14	9.03E-13	1.77E-11	1.09E-10	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

	I =	1	2	3	4	5	6	7	8	9	10	11
	X =	0.00E+00	1.83E+02	3.66E+02	4.88E+02	5.49E+02	6.10E+02	6.71E+02	7.02E+02	7.32E+02	7.63E+02	7.93E+02
Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	2.36E-23	1.60E-22	8.51E-22	3.71E-21	1.40E-20	4.72E-20	1.46E-19	4.09E-19	1.01E-18	2.28E-18	5.79E-18
2.501E+03	40	5.01E-21	3.34E-20	1.74E-19	7.42E-19	2.76E-18	9.33E-18	2.90E-17	8.09E-17	1.91E-16	4.32E-16	1.39E-15
2.379E+03	39	4.05E-19	2.63E-18	1.33E-17	5.48E-17	2.00E-16	6.67E-16	2.04E-15	5.45E-15	1.12E-14	2.52E-14	1.16E-13
2.257E+03	38	1.81E-17	1.14E-16	5.60E-16	2.23E-15	8.01E-15	2.69E-14	8.07E-14	2.00E-13	2.97E-13	7.68E-13	5.63E-12
2.196E+03	37	4.69E-16	2.87E-15	1.36E-14	5.28E-14	1.93E-13	6.85E-13	2.17E-12	5.62E-12	9.89E-12	2.32E-11	2.09E-10
2.135E+03	36	6.88E-15	4.05E-14	1.84E-13	6.87E-13	2.64E-12	1.01E-11	3.40E-11	8.86E-11	1.19E-10	2.56E-10	5.31E-09
2.074E+03	35	8.28E-14	4.59E-13	1.95E-12	6.89E-12	2.87E-11	1.20E-10	4.35E-10	1.30E-09	2.27E-09	2.11E-08	9.66E-08
2.013E+03	34	8.02E-13	4.13E-12	1.60E-11	5.17E-11	2.39E-10	1.01E-09	3.47E-09	9.74E-09	1.57E-08	1.17E-07	4.61E-07
1.952E+03	33	6.12E-12	2.93E-11	1.05E-10	3.06E-10	1.61E-09	6.12E-09	1.80E-08	4.45E-08	6.20E-08	3.51E-07	1.21E-06
1.922E+03	32	2.84E-11	1.31E-10	5.17E-10	1.94E-09	7.66E-09	2.20E-08	5.44E-08	1.19E-07	1.36E-07	5.56E-07	2.03E-06
1.891E+03	31	7.90E-11	3.45E-10	1.35E-09	5.04E-09	1.73E-08	4.69E-08	1.13E-07	2.51E-07	3.41E-07	1.00E-06	3.28E-06
1.861E+03	30	1.88E-10	7.72E-10	2.80E-09	9.58E-09	2.99E-08	8.07E-08	1.96E-07	4.42E-07	7.11E-07	1.66E-06	5.45E-06
1.830E+03	29	4.33E-10	1.71E-09	5.93E-09	1.85E-08	5.22E-08	1.34E-07	3.17E-07	7.16E-07	1.69E-06	2.02E-06	5.95E-06
1.800E+03	28	8.28E-10	3.18E-09	1.07E-08	3.19E-08	8.50E-08	2.08E-07	4.79E-07	1.06E-06	2.32E-06	3.05E-06	5.01E-06
1.769E+03	27	1.55E-09	5.86E-09	1.93E-08	5.55E-08	1.41E-07	3.33E-07	7.50E-07	1.64E-06	3.50E-06	4.71E-06	7.62E-06
1.739E+03	26	2.40E-09	8.99E-09	2.91E-08	8.04E-08	1.95E-07	4.47E-07	9.99E-07	2.21E-06	4.79E-06	7.36E-06	1.31E-05
1.708E+03	25	3.31E-09	1.22E-08	3.87E-08	1.01E-07	2.36E-07	5.40E-07	1.23E-06	2.81E-06	6.34E-06	1.41E-05	3.15E-05
1.678E+03	24	4.18E-09	1.49E-08	4.61E-08	1.09E-07	2.44E-07	5.69E-07	1.35E-06	3.16E-06	7.31E-06	1.66E-05	3.66E-05
1.647E+03	23	4.87E-09	1.64E-08	4.82E-08	1.16E-07	2.61E-07	6.10E-07	1.46E-06	3.43E-06	7.90E-06	1.77E-05	3.66E-05
1.617E+03	22	5.22E-09	1.62E-08	4.43E-08	1.12E-07	2.62E-07	6.22E-07	1.48E-06	3.43E-06	7.74E-06	1.71E-05	3.43E-05
1.586E+03	21	4.91E-09	1.39E-08	3.51E-08	9.15E-08	2.30E-07	5.58E-07	1.31E-06	2.97E-06	6.51E-06	1.38E-05	2.81E-05
1.556E+03	20	4.28E-09	1.26E-08	3.15E-08	7.89E-08	1.95E-07	4.66E-07	1.07E-06	2.34E-06	4.95E-06	1.01E-05	1.96E-05
1.525E+03	19	3.28E-09	9.50E-09	2.53E-08	6.32E-08	1.51E-07	3.47E-07	7.62E-07	1.61E-06	3.26E-06	6.37E-06	1.20E-05
1.495E+03	18	2.61E-09	6.77E-09	1.71E-08	4.14E-08	9.57E-08	2.12E-07	4.49E-07	9.10E-07	1.77E-06	3.32E-06	6.01E-06
1.464E+03	17	1.63E-09	4.04E-09	9.67E-09	2.23E-08	4.93E-08	1.04E-07	2.11E-07	4.08E-07	7.58E-07	1.36E-06	2.35E-06
1.434E+03	16	8.36E-10	1.91E-09	4.19E-09	8.97E-09	1.86E-08	3.72E-08	7.11E-08	1.30E-07	2.27E-07	3.85E-07	6.34E-07
1.403E+03	15	2.91E-10	5.46E-10	1.03E-09	2.01E-09	3.88E-09	7.22E-09	1.28E-08	2.18E-08	3.56E-08	5.65E-08	8.82E-08
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	I =	12	13	14	15	16	17	18	19	20	21	22
	X =	8.24E+02	8.54E+02	8.85E+02	9.15E+02	9.46E+02	9.76E+02	1.01E+03	1.04E+03	1.07E+03	1.10E+03	1.13E+03
Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	2.76E-17	1.41E-16	4.57E-16	2.75E-15	8.39E-15	9.57E-15	1.09E-14	1.22E-14	1.36E-14	1.50E-14	3.49E-11
2.501E+03	40	1.08E-14	6.60E-14	2.22E-13	2.38E-12	1.16E-11	5.55E-11	2.48E-10	8.98E-10	3.15E-09	1.06E-08	3.99E-08
2.379E+03	39	1.26E-12	7.87E-12	3.88E-11	2.62E-10	8.48E-10	3.41E-09	1.32E-08	4.01E-08	1.25E-07	3.49E-07	9.75E-07
2.257E+03	38	6.92E-11	3.70E-10	1.98E-09	7.66E-09	1.92E-08	7.97E-08	2.72E-07	7.04E-07	1.85E-06	4.21E-06	8.84E-06
2.196E+03	37	2.38E-09	1.17E-08	4.76E-08	1.49E-07	4.04E-07	1.14E-06	2.58E-06	5.20E-06	9.86E-06	1.83E-05	3.26E-05
2.135E+03	36	3.46E-08	1.26E-07	3.65E-07	9.57E-07	2.31E-06	5.29E-06	1.04E-05	1.91E-05	3.35E-05	5.70E-05	9.37E-05
2.074E+03	35	2.98E-07	7.58E-07	1.72E-06	3.64E-06	7.47E-06	1.47E-05	2.80E-05	5.10E-05	8.92E-05	1.50E-04	2.42E-04
2.013E+03	34	1.26E-06	2.91E-06	6.11E-06	1.20E-05	2.23E-05	4.05E-05	7.48E-05	1.33E-04	2.25E-04	3.68E-04	5.79E-04

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1.952E+03	33	3.16E-06	7.15E-06	1.47E-05	2.85E-05	5.38E-05	1.02E-04	1.87E-04	3.16E-04	5.13E-04	8.06E-04	1.23E-03	
1.922E+03	32	5.53E-06	1.26E-05	2.58E-05	4.99E-05	9.48E-05	1.85E-04	3.42E-04	5.89E-04	9.70E-04	1.53E-03	2.31E-03	
1.891E+03	31	8.40E-06	1.84E-05	3.71E-05	7.16E-05	1.34E-04	2.58E-04	4.88E-04	8.68E-04	1.46E-03	2.31E-03	3.47E-03	
1.861E+03	30	1.34E-05	2.88E-05	5.81E-05	1.14E-04	2.17E-04	4.05E-04	7.52E-04	1.34E-03	2.22E-03	3.45E-03	5.09E-03	
1.830E+03	29	1.43E-05	3.44E-05	7.64E-05	1.61E-04	3.21E-04	6.15E-04	1.15E-03	2.04E-03	3.22E-03	4.88E-03	7.25E-03	
1.800E+03	28	9.42E-06	3.17E-05	8.93E-05	2.11E-04	4.43E-04	8.60E-04	1.60E-03	2.78E-03	3.64E-03	5.55E-03	8.52E-03	
1.769E+03	27	1.32E-05	5.04E-05	1.49E-04	3.48E-04	7.03E-04	1.30E-03	2.32E-03	3.86E-03	4.96E-03	7.53E-03	1.16E-02	
1.739E+03	26	1.90E-05	9.16E-05	2.79E-04	6.13E-04	1.14E-03	1.97E-03	3.30E-03	5.30E-03	8.16E-03	1.20E-02	1.73E-02	
1.708E+03	25	3.05E-05	1.61E-04	4.85E-04	9.62E-04	1.62E-03	2.60E-03	4.17E-03	6.51E-03	9.93E-03	1.48E-02	2.10E-02	
1.678E+03	24	4.72E-05	1.95E-04	5.12E-04	9.75E-04	1.53E-03	2.48E-03	4.07E-03	6.47E-03	1.01E-02	1.53E-02	1.99E-02	
1.647E+03	23	5.67E-05	1.41E-04	2.96E-04	4.80E-04	7.20E-04	1.39E-03	2.74E-03	4.92E-03	8.25E-03	1.31E-02	2.00E-02	
1.617E+03	22	5.10E-05	1.20E-04	2.45E-04	3.91E-04	7.90E-04	1.50E-03	2.70E-03	4.58E-03	7.44E-03	1.15E-02	1.72E-02	
1.586E+03	21	4.93E-05	1.01E-04	1.90E-04	2.98E-04	5.78E-04	1.09E-03	1.95E-03	3.28E-03	5.28E-03	8.13E-03	1.20E-02	
1.556E+03	20	3.64E-05	6.58E-05	1.15E-04	1.85E-04	3.03E-04	5.97E-04	1.10E-03	1.89E-03	3.07E-03	4.74E-03	7.02E-03	
1.525E+03	19	2.16E-05	3.79E-05	6.44E-05	9.99E-05	1.57E-04	2.98E-04	5.43E-04	9.27E-04	1.51E-03	2.33E-03	3.47E-03	
1.495E+03	18	1.05E-05	1.78E-05	2.91E-05	4.36E-05	6.52E-05	1.19E-04	2.13E-04	3.63E-04	5.94E-04	9.34E-04	1.41E-03	
1.464E+03	17	3.95E-06	6.43E-06	1.01E-05	1.38E-05	1.87E-05	2.94E-05	5.49E-05	9.57E-05	1.66E-04	2.71E-04	4.16E-04	
1.434E+03	16	1.02E-06	1.60E-06	2.46E-06	3.66E-06	5.46E-06	8.20E-06	1.19E-05	1.97E-05	2.76E-05	4.37E-05	6.66E-05	
1.403E+03	15	1.35E-07	2.04E-07	3.03E-07	4.45E-07	6.48E-07	9.41E-07	1.31E-06	2.07E-06	2.79E-06	4.29E-06	6.43E-06	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 23 24 25 26 27 28 29 30 31 32 33
X = 1.16E+03 1.19E+03 1.22E+03 1.25E+03 1.28E+03 1.31E+03 1.34E+03 1.37E+03 1.40E+03 1.43E+03 1.46E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	7.30E-10	3.45E-09	1.09E-08	2.73E-08	5.66E-08	1.12E-07	1.88E-07	3.45E-07	5.63E-07	6.57E-07	7.15E-07	
2.501E+03	40	1.03E-07	2.20E-07	4.16E-07	7.49E-07	1.35E-06	2.46E-06	4.03E-06	6.99E-06	1.14E-05	1.41E-05	1.54E-05	
2.379E+03	39	2.08E-06	3.83E-06	6.52E-06	1.07E-05	1.76E-05	2.91E-05	4.17E-05	6.66E-05	1.04E-04	1.41E-04	1.67E-04	
2.257E+03	38	1.58E-05	2.63E-05	4.24E-05	6.84E-05	1.09E-04	1.70E-04	2.30E-04	3.44E-04	5.15E-04	7.67E-04	1.05E-03	
2.196E+03	37	5.49E-05	8.86E-05	1.41E-04	2.21E-04	3.41E-04	5.06E-04	7.33E-04	1.18E-03	2.17E-03	3.42E-03	4.66E-03	
2.135E+03	36	1.48E-04	2.28E-04	3.60E-04	5.56E-04	8.28E-04	1.19E-03	1.71E-03	2.87E-03	5.27E-03	8.16E-03	1.12E-02	
2.074E+03	35	3.82E-04	6.07E-04	9.46E-04	1.39E-03	1.98E-03	2.72E-03	3.65E-03	6.05E-03	1.04E-02	1.38E-02	2.05E-02	
2.013E+03	34	8.90E-04	1.41E-03	2.16E-03	3.16E-03	4.47E-03	5.93E-03	7.83E-03	1.20E-02	2.04E-02	3.40E-02	4.97E-02	
1.952E+03	33	1.75E-03	2.67E-03	4.09E-03	6.01E-03	8.40E-03	9.31E-03	1.19E-02	1.56E-02	2.91E-02	5.26E-02	8.34E-02	
1.922E+03	32	3.03E-03	4.62E-03	7.05E-03	9.78E-03	1.34E-02	1.51E-02	1.82E-02	2.40E-02	4.36E-02	7.79E-02	1.29E-01	
1.891E+03	31	4.32E-03	5.96E-03	8.88E-03	9.99E-03	1.35E-02	1.79E-02	1.76E-02	2.90E-02	5.67E-02	1.12E-01	2.00E-01	
1.861E+03	30	6.22E-03	6.80E-03	9.92E-03	8.94E-03	1.27E-02	1.85E-02	2.56E-02	4.30E-02	8.18E-02	1.63E-01	3.01E-01	
1.830E+03	29	9.46E-03	1.10E-02	1.57E-02	1.41E-02	1.97E-02	2.87E-02	4.04E-02	6.59E-02	1.21E-01	2.37E-01	4.40E-01	
1.800E+03	28	1.17E-02	1.74E-02	2.47E-02	3.31E-02	4.32E-02	5.54E-02	7.09E-02	1.03E-01	1.74E-01	3.25E-01	6.08E-01	
1.769E+03	27	1.60E-02	2.34E-02	2.97E-02	3.71E-02	4.72E-02	6.05E-02	7.82E-02	1.18E-01	2.12E-01	4.12E-01	7.90E-01	
1.739E+03	26	2.39E-02	3.21E-02	2.92E-02	3.02E-02	4.06E-02	5.62E-02	7.84E-02	1.32E-01	2.58E-01	5.17E-01	9.78E-01	
1.708E+03	25	2.90E-02	3.97E-02	3.96E-02	4.13E-02	5.58E-02	7.74E-02	1.07E-01	1.76E-01	3.31E-01	6.32E-01	1.13E+00	
1.678E+03	24	2.74E-02	3.81E-02	5.10E-02	6.26E-02	8.39E-02	1.12E-01	1.50E-01	2.27E-01	3.94E-01	6.90E-01	1.15E+00	
1.647E+03	23	2.89E-02	4.05E-02	5.53E-02	7.25E-02	9.69E-02	1.27E-01	1.65E-01	2.39E-01	3.94E-01	6.47E-01	1.02E+00	
1.617E+03	22	2.47E-02	3.44E-02	4.68E-02	6.14E-02	8.19E-02	1.07E-01	1.39E-01	2.00E-01	3.24E-01	5.12E-01	7.72E-01	
1.586E+03	21	1.72E-02	2.39E-02	3.24E-02	4.23E-02	5.65E-02	7.39E-02	9.53E-02	1.36E-01	2.14E-01	3.50E-01	5.05E-01	
1.556E+03	20	1.00E-02	1.39E-02	1.89E-02	2.45E-02	3.27E-02	4.28E-02	5.52E-02	7.86E-02	1.22E-01	1.99E-01	2.79E-01	
1.525E+03	19	4.97E-03	6.92E-03	9.37E-03	1.20E-02	1.60E-02	2.10E-02	2.72E-02	3.87E-02	5.86E-02	9.35E-02	1.27E-01	
1.495E+03	18	2.05E-03	2.87E-03	3.87E-03	4.82E-03	6.40E-03	8.46E-03	1.10E-02	1.56E-02	2.28E-02	3.44E-02	4.49E-02	
1.464E+03	17	6.09E-04	8.52E-04	1.14E-03	1.37E-03	1.79E-03	2.40E-03	3.16E-03	4.48E-03	6.13E-03	8.70E-03	1.09E-02	
1.434E+03	16	9.73E-05	1.38E-04	1.88E-04	2.48E-04	3.25E-04	4.10E-04	5.40E-04	7.35E-04	9.30E-04	1.28E-03	1.52E-03	
1.403E+03	15	9.34E-06	1.31E-05	1.79E-05	2.39E-05	3.15E-05	4.03E-05	5.60E-05	7.43E-05	8.63E-05	1.14E-04	1.23E-04	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 34 35 36 37 38 39 40 41 42 43 44
X = 1.49E+03 1.52E+03 1.56E+03 1.59E+03 1.62E+03 1.65E+03 1.68E+03 1.71E+03 1.77E+03 1.83E+03 1.89E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	6.57E-07	6.47E-07	4.78E-07	5.00E-07	3.94E-07	4.31E-07	5.20E-07	3.08E-07	1.33E-07	4.38E-08	1.42E-08	
2.501E+03	40	1.53E-05	1.45E-05	1.21E-05	1.25E-05	1.13E-05	1.26E-05	1.31E-05	3.37E-06	1.01E-06	4.94E-07	1.92E-07	
2.379E+03	39	1.72E-04	1.72E-04	1.64E-04	1.31E-04	1.15E-04	1.29E-04	1.41E-04	1.30E-04	3.74E-05	1.51E-05	6.54E-06	
2.257E+03	38	1.30E-03	1.46E-03	1.43E-03	1.16E-03	1.19E-03	1.25E-03	1.29E-03	1.80E-03	2.83E-04	1.09E-04	4.61E-05	

9 3 1 2 3 3 2 0 9 3 5

2.196E+03	37	5.89E-03	6.81E-03	6.95E-03	7.14E-03	7.17E-03	7.37E-03	1.02E-02	2.77E-02	3.34E-03	9.57E-04	3.76E-04	
2.135E+03	36	1.46E-02	1.73E-02	1.75E-02	1.82E-02	1.89E-02	2.33E-02	4.04E-02	1.17E-01	1.04E-02	2.45E-03	9.04E-04	
2.074E+03	35	2.75E-02	3.55E-02	4.42E-02	5.34E-02	6.44E-02	7.98E-02	1.22E-01	3.43E-01	1.68E-02	4.85E-03	1.67E-03	
2.013E+03	34	6.34E-02	8.57E-02	1.15E-01	1.48E-01	1.86E-01	2.45E-01	3.55E-01	7.10E-01	1.13E+00	1.77E-01	5.74E-02	
1.952E+03	33	1.36E-01	2.05E-01	2.81E-01	3.59E-01	4.43E-01	5.65E-01	7.80E-01	1.40E+00	2.03E+00	3.18E-01	9.64E-02	
1.922E+03	32	2.39E-01	3.56E-01	4.79E-01	6.07E-01	7.46E-01	9.45E-01	1.29E+00	2.15E+00	2.86E+00	3.37E-01	9.21E-02	
1.891E+03	31	3.46E-01	4.14E-01	5.90E-01	8.16E-01	1.03E+00	1.32E+00	1.79E+00	2.81E+00	3.47E+00	2.66E-01	6.37E-02	
1.861E+03	30	5.42E-01	7.17E-01	9.62E-01	1.25E+00	1.52E+00	1.89E+00	2.46E+00	3.77E+00	4.18E+00	1.92E+00	3.76E-01	
1.830E+03	29	7.71E-01	9.99E-01	1.31E+00	1.68E+00	2.03E+00	2.47E+00	3.15E+00	4.50E+00	4.68E+00	4.71E+00	1.08E+00	
1.800E+03	28	1.03E+00	1.30E+00	1.69E+00	2.16E+00	2.59E+00	3.08E+00	3.79E+00	5.05E+00	4.86E+00	4.70E+00	1.16E+00	
1.769E+03	27	1.29E+00	1.62E+00	2.16E+00	2.67E+00	3.02E+00	3.51E+00	4.19E+00	5.24E+00	5.14E+00	3.94E+00	8.97E-01	
1.739E+03	26	1.53E+00	1.89E+00	2.46E+00	2.93E+00	3.25E+00	3.65E+00	4.21E+00	4.98E+00	4.77E+00	3.53E+00	7.09E-01	
1.708E+03	25	1.68E+00	2.07E+00	2.54E+00	2.81E+00	3.01E+00	3.26E+00	3.67E+00	4.27E+00	4.08E+00	3.06E+00	5.06E-01	
1.678E+03	24	1.63E+00	2.08E+00	2.23E+00	2.14E+00	2.43E+00	2.54E+00	2.94E+00	3.41E+00	3.28E+00	2.57E+00	3.81E-01	
1.647E+03	23	1.39E+00	1.74E+00	2.04E+00	1.98E+00	2.18E+00	2.21E+00	2.47E+00	2.69E+00	2.51E+00	1.89E+00	1.18E+00	
1.617E+03	22	1.02E+00	1.25E+00	1.44E+00	1.47E+00	1.57E+00	1.49E+00	1.64E+00	1.79E+00	1.68E+00	1.26E+00	1.15E+00	
1.586E+03	21	6.51E-01	7.79E-01	8.85E-01	9.09E-01	9.67E-01	9.41E-01	9.90E-01	1.09E+00	1.04E+00	8.53E-01	7.68E-01	
1.556E+03	20	3.51E-01	4.12E-01	4.59E-01	4.81E-01	5.02E-01	4.72E-01	4.97E-01	5.44E-01	5.18E-01	4.34E-01	3.97E-01	
1.525E+03	19	1.56E-01	1.80E-01	1.94E-01	2.06E-01	2.10E-01	1.85E-01	1.90E-01	2.05E-01	2.00E-01	1.74E-01	1.63E-01	
1.495E+03	18	5.37E-02	6.06E-02	6.28E-02	6.46E-02	6.43E-02	5.63E-02	5.46E-02	5.87E-02	5.99E-02	5.79E-02	5.48E-02	
1.464E+03	17	1.26E-02	1.39E-02	1.42E-02	1.43E-02	1.39E-02	1.20E-02	1.16E-02	1.29E-02	1.41E-02	1.46E-02	1.45E-02	
1.434E+03	16	1.70E-03	1.83E-03	1.82E-03	1.81E-03	1.69E-03	1.38E-03	1.30E-03	1.48E-03	1.77E-03	2.03E-03	2.15E-03	
1.403E+03	15	1.23E-04	1.18E-04	1.11E-04	1.05E-04	8.91E-05	6.19E-05	5.23E-05	6.02E-05	8.41E-05	1.10E-04	1.58E-04	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.54E-31	1.04E-05
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.10E-35	8.36E-07
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.10E-38	6.71E-39
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-39	1.02E-39
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E-40	1.17E-40
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.54E-42	1.18E-41
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.14E-43	9.07E-43
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.90E-44
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.21E-16
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-17
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.84E-19
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	45	46	47	48	49	50	51	52	53	54	55
X =	1.95E+03	2.01E+03	2.07E+03	2.13E+03	2.20E+03	2.26E+03	2.32E+03	2.38E+03	2.50E+03	2.62E+03	2.74E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	7.90E-08	3.18E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	2.38E-05	7.37E-06	2.21E-06	4.28E-07	1.15E-07	4.06E-08	1.80E-08	1.03E-08	9.38E-09	0.00E+00	
2.379E+03	39	4.99E-05	6.28E-05	2.56E-05	8.57E-06	2.96E-06	1.17E-06	5.54E-07	3.29E-07	2.69E-07	0.00E+00	
2.257E+03	38	2.10E-04	2.92E-04	1.46E-04	5.96E-05	2.25E-05	9.26E-06	4.29E-06	2.47E-06	2.07E-06	0.00E+00	
2.196E+03	37	5.75E-04	1.07E-03	4.01E-04	1.87E-04	7.10E-05	2.89E-05	1.30E-05	7.09E-06	5.04E-06	0.00E+00	
2.135E+03	36	1.58E-03	2.60E-03	1.60E-03	7.05E-04	2.64E-04	1.05E-04	4.60E-05	2.32E-05	2.38E-05	0.00E+00	
2.074E+03	35	7.26E-04	9.90E-04	5.67E-03	2.79E-03	1.04E-03	4.04E-04	1.70E-04	7.59E-05	4.81E-05	0.00E+00	
2.013E+03	34	1.72E-02	2.52E-02	2.06E-02	1.04E-02	3.94E-03	1.54E-03	6.18E-04	2.36E-04	3.28E-04	0.00E+00	
1.952E+03	33	2.95E-02	5.51E-02	4.52E-02	2.38E-02	9.24E-03	3.63E-03	1.40E-03	4.65E-04	3.36E-04	0.00E+00	
1.922E+03	32	2.94E-02	7.88E-02	7.11E-02	3.88E-02	1.54E-02	6.15E-03	2.27E-03	4.85E-03	1.26E-04	0.00E+00	
1.891E+03	31	2.16E-02	9.26E-02	1.06E-01	6.08E-02	2.51E-02	1.04E-02	3.73E-03	4.84E-03	1.25E-04	0.00E+00	
1.861E+03	30	1.16E-01	4.49E-02	1.53E-01	9.30E-02	4.03E-02	1.78E-02	1.77E-02	8.02E-12	8.25E-14	0.00E+00	
1.830E+03	29	3.77E-01	1.06E-01	2.20E-01	1.38E-01	6.28E-02	2.96E-02	2.95E-02	5.12E-12	8.15E-18	0.00E+00	
1.800E+03	28	4.41E-01	1.68E-01	3.02E-01	1.95E-01	9.41E-02	4.70E-02	6.32E-02	9.09E-05	2.09E-08	0.00E+00	
1.769E+03	27	3.56E-01	1.90E-01	3.74E-01	2.54E-01	1.32E-01	6.98E-02	6.49E-02	9.16E-05	2.17E-08	0.00E+00	
1.739E+03	26	2.66E-01	2.17E-01	4.29E-01	3.07E-01	1.75E-01	9.83E-02	9.79E-02	1.44E-11	2.28E-17	0.00E+00	
1.708E+03	25	1.81E-01	2.09E-01	4.41E-01	3.44E-01	2.16E-01	1.30E-01	1.88E-01	2.00E-04	4.04E-08	0.00E+00	
1.678E+03	24	1.16E-01	1.41E-01	4.18E-01	3.58E-01	2.50E-01	1.61E-01	1.83E-01	2.02E-04	4.22E-08	0.00E+00	
1.647E+03	23	3.34E-01	1.65E-01	3.80E-01	3.51E-01	2.75E-01	1.91E-01	1.91E-01	2.49E-11	3.03E-17	0.00E+00	
1.617E+03	22	3.70E-01	1.52E-01	3.28E-01	3.29E-01	2.89E-01	2.15E-01	3.40E-01	2.68E-04	4.81E-08	0.00E+00	
1.586E+03	21	5.79E-01	3.25E-01	2.95E-01	2.97E-01	2.92E-01	2.34E-01	3.23E-01	2.72E-04	5.04E-08	0.00E+00	
1.556E+03	20	3.97E-01	2.90E-01	2.47E-01	2.56E-01	2.84E-01	2.46E-01	2.51E-01	2.92E-11	2.46E-17	0.00E+00	
1.525E+03	19	1.88E-01	1.80E-01	1.87E-01	2.10E-01	2.68E-01	2.52E-01	4.21E-01	2.00E-04	3.04E-08	0.00E+00	
1.495E+03	18	1.89E-02	5.69E-02	1.25E-01	1.63E-01	2.46E-01	2.52E-01	4.05E-01	2.05E-04	3.22E-08	0.00E+00	
1.464E+03	17	6.47E-03	1.56E-02	7.68E-02	1.25E-01	2.20E-01	2.48E-01	2.84E-01	2.54E-11	9.06E-18	0.00E+00	
1.434E+03	16	1.38E-03	3.65E-03	4.43E-02	9.12E-02	1.93E-01	2.34E-01	2.97E-04	5.22E-08	5.91E-12	0.00E+00	
1.403E+03	15	1.73E-04	8.39E-04	2.38E-02	6.37E-02	1.67E-01	2.25E-01	2.99E-04	5.49E-08	6.43E-12	0.00E+00	
1.373E+03	14	1.74E-05	2.82E-04	1.17E-02	4.37E-02	1.41E-01	1.47E-01	1.35E-11	1.86E-17	1.76E-21	0.00E+00	
1.342E+03	13	2.54E-06	2.20E-04	7.15E-03	3.11E-02	1.21E-01	1.98E-01	9.77E-05	1.50E-08	1.76E-12	0.00E+00	
1.312E+03	12	3.34E-07	1.68E-04	4.44E-03	2.29E-02	1.09E-01	1.88E-01	1.01E-04	1.59E-08	1.91E-12	0.00E+00	
1.281E+03	11	4.10E-08	5.64E-05	2.43E-03	2.56E-02	1.09E-01	1.14E-01	8.67E-12	3.10E-18	3.36E-22	0.00E+00	
1.220E+03	10	5.19E-09	1.50E-05	1.25E-03	2.20E-02	1.12E-01	5.03E-02	1.60E-05	3.54E-09	6.52E-13	0.00E+00	
1.159E+03	9	7.87E-10	5.00E-06	4.99E-04	1.59E-02	8.59E-02	5.33E-02	1.72E-05	3.81E-09	7.14E-13	0.00E+00	
1.098E+03	8	2.98E-10	1.74E-06	2.35E-04	6.92E-03	5.79E-02	6.03E-02	3.88E-12	3.89E-19	6.40E-23	0.00E+00	
1.037E+03	7	2.85E-10	5.81E-07	1.18E-04	3.68E-03	4.45E-02	3.16E-02	1.12E-05	2.63E-09	5.13E-13	0.00E+00	
9.760E+02	6	5.04E-11	9.09E-08	5.30E-05	1.76E-03	3.18E-02	3.15E-02	1.25E-05	2.95E-09	5.89E-13	0.00E+00	
8.540E+02	5	4.19E-12	7.97E-09	1.61E-05	6.01E-04	1.55E-02	1.19E-02	7.55E-06	3.22E-09	1.12E-12	0.00E+00	
7.320E+02	4	2.20E-13	7.80E-10	8.41E-06	3.62E-04	9.24E-03	1.17E-02	7.93E-06	3.53E-09	1.27E-12	0.00E+00	
5.490E+02	3	9.09E-15	4.75E-11	3.57E-06	1.60E-04	1.14E-02	1.09E-02	7.63E-06	3.43E-09	1.24E-12	0.00E+00	
3.050E+02	2	1.09E-16	3.70E-10	3.54E-06	2.36E-04	1.25E-02	9.08E-03	6.10E-06	2.63E-09	9.11E-13	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	56	57	58	59	60	61	62	63	64	65
X =	2.87E+03	2.99E+03	3.11E+03	3.23E+03	3.35E+03	3.48E+03	3.60E+03	3.72E+03	3.84E+03	3.96E+03

9 3 1 2 3 . 2 0 9 3 6

--*-*-*-*-*-*-*-*-*- C - SPECIES CONCENTRATION..... FOR PLANE K = 11 AT STEP 6601, TIME= 1.6223E+04 -*-*-*-*-*-*-*-*-*-*-*

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.30E-30	6.63E-27	1.94E-25	2.75E-24
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.00E-27	1.44E-24	4.17E-23	5.87E-22
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-25	1.21E-22	3.46E-21	4.78E-20
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.82E-24	5.64E-21	1.59E-19	2.15E-18
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E-22	1.54E-19	4.26E-18	5.61E-17
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.40E-21	2.47E-18	6.61E-17	8.37E-16
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.65E-20	3.37E-17	8.61E-16	1.03E-14
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.47E-19	3.91E-16	9.32E-15	1.04E-13
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.61E-18	3.85E-15	8.20E-14	8.19E-13
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.15E-17	2.54E-14	4.47E-13	3.85E-12
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.37E-16	1.09E-13	1.47E-12	1.07E-11
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.72E-15	4.15E-13	3.93E-12	2.43E-11
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.23E-14	9.47E-13	8.75E-12	5.27E-11
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.69E-14	1.33E-12	1.25E-11	7.53E-11
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.07E-13	2.71E-12	2.53E-11	1.51E-10
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.88E-13	4.24E-12	3.96E-11	2.36E-10
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.57E-13	5.74E-12	5.52E-11	3.29E-10
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.48E-13	7.06E-12	7.09E-11	4.22E-10
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.32E-13	9.09E-12	8.66E-11	5.17E-10
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.76E-13	1.11E-11	9.50E-11	6.28E-10
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.84E-13	1.27E-11	8.21E-11	6.06E-10
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.68E-13	1.33E-11	1.12E-10	5.45E-10
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.46E-13	1.36E-11	1.63E-10	3.27E-10
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.75E-13	1.19E-11	2.14E-10	3.86E-10
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.77E-13	7.11E-12	1.26E-10	2.33E-10
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.28E-14	3.20E-12	5.86E-11	1.16E-10
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.04E-14	7.93E-13	1.58E-11	4.04E-11
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	1	2	3	4	5	6	7	8	9	10	11
X =	0.00E+00	1.83E+02	3.66E+02	4.88E+02	5.49E+02	6.10E+02	6.71E+02	7.02E+02	7.32E+02	7.63E+02	7.93E+02

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	2.53E-23	1.72E-22	9.13E-22	3.98E-21	1.50E-20	5.06E-20	1.56E-19	4.36E-19	1.08E-18	2.43E-18	5.93E-18
2.501E+03	40	5.34E-21	3.56E-20	1.85E-19	7.91E-19	2.94E-18	9.93E-18	3.07E-17	8.55E-17	2.03E-16	4.56E-16	1.35E-15
2.379E+03	39	4.25E-19	2.76E-18	1.40E-17	5.78E-17	2.10E-16	7.01E-16	2.13E-15	5.67E-15	1.20E-14	2.60E-14	1.02E-13
2.257E+03	38	1.87E-17	1.18E-16	5.80E-16	2.32E-15	8.31E-15	2.77E-14	8.28E-14	2.04E-13	3.33E-13	7.32E-13	4.32E-12
2.196E+03	37	4.74E-16	2.90E-15	1.38E-14	5.36E-14	1.95E-13	6.86E-13	2.15E-12	5.43E-12	8.38E-12	1.63E-11	1.36E-10
2.135E+03	36	6.79E-15	3.99E-14	1.82E-13	6.82E-13	2.60E-12	9.83E-12	3.26E-11	8.16E-11	1.00E-10	1.49E-10	2.89E-09
2.074E+03	35	7.92E-14	4.38E-13	1.87E-12	6.64E-12	2.73E-11	1.12E-10	3.97E-10	1.11E-09	1.62E-09	1.44E-08	6.01E-08
2.013E+03	34	7.36E-13	3.77E-12	1.48E-11	4.79E-11	2.18E-10	8.98E-10	2.99E-09	7.79E-09	1.04E-08	7.63E-08	2.71E-07
1.952E+03	33	5.30E-12	2.51E-11	9.16E-11	2.69E-10	1.40E-09	5.09E-09	1.44E-08	3.27E-08	3.65E-08	1.94E-07	5.89E-07
1.922E+03	32	2.25E-11	1.02E-10	4.20E-10	1.76E-09	6.34E-09	1.68E-08	3.94E-08	7.74E-08	6.33E-08	1.70E-07	6.54E-07
1.891E+03	31	5.62E-11	2.39E-10	9.57E-10	4.05E-09	1.33E-08	3.49E-08	8.21E-08	1.69E-07	1.72E-07	2.53E-07	7.51E-07
1.861E+03	30	1.17E-10	4.69E-10	1.66E-09	6.08E-09	1.94E-08	5.32E-08	1.29E-07	2.72E-07	3.33E-07	4.59E-07	1.32E-06
1.830E+03	29	2.47E-10	9.67E-10	3.31E-09	1.03E-08	2.91E-08	7.48E-08	1.76E-07	3.87E-07	8.57E-07	7.30E-07	1.31E-06
1.800E+03	28	3.47E-10	1.33E-09	4.44E-09	1.31E-08	3.48E-08	8.50E-08	1.96E-07	4.27E-07	9.49E-07	9.67E-07	1.22E-06
1.769E+03	27	6.91E-10	2.61E-09	8.61E-09	2.46E-08	6.28E-08	1.49E-07	3.38E-07	7.46E-07	1.54E-06	1.62E-06	2.17E-06
1.739E+03	26	1.07E-09	3.99E-09	1.29E-08	3.49E-08	8.65E-08	2.04E-07	4.70E-07	1.07E-06	2.30E-06	3.01E-06	4.82E-06
1.708E+03	25	1.48E-09	5.43E-09	1.74E-08	4.18E-08	1.11E-07	2.80E-07	6.90E-07	1.66E-06	3.86E-06	8.50E-06	1.66E-05
1.678E+03	24	1.90E-09	6.73E-09	2.14E-08	3.62E-08	1.15E-07	3.55E-07	9.74E-07	2.48E-06	5.98E-06	1.38E-05	2.73E-05
1.647E+03	23	2.33E-09	7.71E-09	2.36E-08	4.29E-08	1.36E-07	4.20E-07	1.15E-06	2.92E-06	7.01E-06	1.60E-05	3.00E-05
1.617E+03	22	2.95E-09	8.34E-09	2.63E-08	5.75E-08	1.79E-07	5.23E-07	1.37E-06	3.35E-06	7.77E-06	1.74E-05	2.62E-05
1.586E+03	21	3.17E-09	5.95E-09	2.04E-08	6.85E-08	1.97E-07	5.16E-07	1.27E-06	2.98E-06	6.65E-06	1.43E-05	2.89E-05
1.556E+03	20	2.73E-09	6.55E-09	2.02E-08	6.22E-08	1.72E-07	4.37E-07	1.04E-06	2.34E-06	5.04E-06	1.04E-05	2.03E-05
1.525E+03	19	1.62E-09	6.48E-09	2.01E-08	5.50E-08	1.40E-07	3.33E-07	7.52E-07	1.62E-06	3.33E-06	6.56E-06	1.24E-05
1.495E+03	18	1.34E-09	4.54E-09	1.34E-08	3.55E-08	8.74E-08	2.02E-07	4.39E-07	9.10E-07	1.80E-06	3.41E-06	6.20E-06
1.464E+03	17	8.30E-10	2.68E-09	7.47E-09	1.89E-08	4.45E-08	9.82E-08	2.05E-07	4.06E-07	7.66E-07	1.38E-06	2.41E-06
1.434E+03	16	4.22E-10	1.24E-09	3.16E-09	7.44E-09	1.65E-08	3.45E-08	6.81E-08	1.27E-07	2.27E-07	3.90E-07	6.49E-07
1.403E+03	15	1.43E-10	3.25E-10	7.26E-10	1.59E-09	3.31E-09	6.51E-09	1.21E-08	2.11E-08	3.51E-08	5.66E-08	8.91E-08
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 5 2 1 9 3 7

0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	I =	12	13	14	15	16	17	18	19	20	21	22
	X =	8.24E+02	8.54E+02	8.85E+02	9.15E+02	9.46E+02	9.76E+02	1.01E+03	1.04E+03	1.07E+03	1.10E+03	1.13E+03

Y	J													
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	2.50E-17	1.20E-16	3.90E-16	2.03E-15	6.32E-15	7.58E-15	8.93E-15	1.03E-14	1.18E-14	1.32E-14	3.05E-11		
2.501E+03	40	9.06E-15	5.29E-14	1.80E-13	1.55E-12	8.02E-12	4.29E-11	1.98E-10	7.02E-10	2.54E-09	9.66E-09	3.53E-08		
2.379E+03	39	9.71E-13	5.81E-12	2.24E-11	1.43E-10	5.33E-10	2.55E-09	1.01E-08	2.93E-08	9.50E-08	3.08E-07	8.32E-07		
2.257E+03	38	4.84E-11	2.51E-10	1.11E-09	4.56E-09	1.26E-08	6.19E-08	2.06E-07	4.66E-07	1.31E-06	3.52E-06	7.12E-06		
2.196E+03	37	1.44E-09	6.49E-09	2.86E-08	1.05E-07	3.52E-07	9.47E-07	1.98E-06	3.66E-06	6.61E-06	1.26E-05	2.26E-05		
2.135E+03	36	1.99E-08	7.50E-08	2.24E-07	6.43E-07	1.87E-06	4.08E-06	7.66E-06	1.36E-05	2.35E-05	3.95E-05	6.43E-05		
2.074E+03	35	1.76E-07	4.39E-07	9.96E-07	2.12E-06	4.65E-06	9.65E-06	1.90E-05	3.46E-05	5.97E-05	9.90E-05	1.58E-04		
2.013E+03	34	7.14E-07	1.66E-06	3.55E-06	7.15E-06	1.37E-05	2.65E-05	4.83E-05	8.21E-05	1.34E-04	2.14E-04	3.28E-04		
1.952E+03	33	1.52E-06	3.54E-06	7.57E-06	1.52E-05	3.01E-05	7.12E-05	1.02E-04	1.51E-04	2.28E-04	3.45E-04	5.05E-04		
1.922E+03	32	1.95E-06	4.81E-06	1.05E-05	2.15E-05	4.34E-05	1.13E-04	1.77E-04	2.89E-04	4.73E-04	7.45E-04	1.06E-03		
1.891E+03	31	2.08E-06	4.98E-06	1.09E-05	2.26E-05	4.44E-05	1.00E-04	2.13E-04	4.07E-04	7.09E-04	1.14E-03	1.61E-03		
1.861E+03	30	3.54E-06	8.73E-06	1.97E-05	4.27E-05	8.72E-05	1.75E-04	3.57E-04	6.78E-04	1.14E-03	1.80E-03	2.55E-03		
1.830E+03	29	3.21E-06	1.05E-05	2.84E-05	6.86E-05	1.50E-04	3.13E-04	6.43E-04	1.23E-03	1.79E-03	2.95E-03	4.41E-03		
1.800E+03	28	1.48E-06	8.24E-06	3.35E-05	9.58E-05	2.28E-04	4.91E-04	1.01E-03	1.85E-03	1.64E-03	2.78E-03	4.97E-03		
1.769E+03	27	2.67E-06	1.26E-05	5.16E-05	1.47E-04	3.41E-04	7.09E-04	1.41E-03	2.51E-03	2.35E-03	3.92E-03	6.89E-03		
1.739E+03	26	5.37E-06	2.10E-05	8.57E-05	2.33E-04	5.11E-04	1.01E-03	1.93E-03	3.44E-03	5.60E-03	8.39E-03	1.19E-02		
1.708E+03	25	1.17E-05	3.34E-05	1.32E-04	3.29E-04	6.61E-04	1.26E-03	2.37E-03	4.21E-03	7.05E-03	1.12E-02	1.54E-02		
1.678E+03	24	2.73E-05	6.18E-05	1.65E-04	3.50E-04	6.04E-04	1.22E-03	2.43E-03	4.46E-03	7.68E-03	1.23E-02	1.18E-02		
1.647E+03	23	3.80E-05	8.73E-05	1.93E-04	2.84E-04	3.08E-04	6.59E-04	1.60E-03	3.31E-03	6.15E-03	1.06E-02	1.69E-02		
1.617E+03	22	3.37E-05	7.75E-05	1.65E-04	2.57E-04	5.10E-04	9.95E-04	1.88E-03	3.37E-03	5.79E-03	9.49E-03	1.49E-02		
1.586E+03	21	4.49E-05	8.43E-05	1.52E-04	2.26E-04	4.01E-04	7.48E-04	1.37E-03	2.41E-03	4.09E-03	6.62E-03	1.03E-02		
1.556E+03	20	3.74E-05	6.75E-05	1.17E-04	1.62E-04	2.36E-04	4.22E-04	7.75E-04	1.37E-03	2.33E-03	3.79E-03	5.87E-03		
1.525E+03	19	2.26E-05	3.96E-05	6.60E-05	8.83E-05	1.22E-04	2.11E-04	3.81E-04	6.65E-04	1.12E-03	1.81E-03	2.81E-03		
1.495E+03	18	1.09E-05	1.85E-05	2.98E-05	3.84E-05	5.07E-05	8.30E-05	1.44E-04	2.46E-04	4.11E-04	6.66E-04	1.04E-03		
1.464E+03	17	4.08E-06	6.65E-06	1.03E-05	1.25E-05	1.54E-05	2.25E-05	3.64E-05	6.08E-05	1.03E-04	1.72E-04	2.77E-04		
1.434E+03	16	1.05E-06	1.65E-06	2.53E-06	3.73E-06	5.51E-06	8.14E-06	1.05E-05	1.57E-05	2.06E-05	3.18E-05	4.90E-05		
1.403E+03	15	1.38E-07	2.09E-07	3.11E-07	4.58E-07	6.68E-07	9.55E-07	1.18E-06	1.69E-06	2.13E-06	3.17E-06	4.80E-06		
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	I =	23	24	25	26	27	28	29	30	31	32	33
	X =	1.16E+03	1.19E+03	1.22E+03	1.25E+03	1.28E+03	1.31E+03	1.34E+03	1.37E+03	1.40E+03	1.43E+03	1.46E+03

Y	J													
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	6.13E-10	2.91E-09	9.72E-09	2.56E-08	5.62E-08	1.09E-07	1.70E-07	2.78E-07	3.64E-07	3.86E-07	4.00E-07		
2.501E+03	40	8.65E-08	1.78E-07	3.35E-07	6.54E-07	1.28E-06	2.32E-06	3.63E-06	5.69E-06	7.39E-06	8.23E-06	8.54E-06		
2.379E+03	39	1.68E-06	3.00E-06	5.11E-06	9.28E-06	1.63E-05	2.74E-05	4.21E-05	5.94E-05	7.22E-05	8.51E-05	9.35E-05		
2.257E+03	38	1.22E-05	1.98E-05	3.23E-05	5.69E-05	9.68E-05	1.51E-04	2.21E-04	3.46E-04	3.83E-04	4.76E-04	5.90E-04		
2.196E+03	37	3.80E-05	6.18E-05	9.77E-05	1.53E-04	2.37E-04	3.50E-04	5.29E-04	1.10E-03	1.61E-03	2.07E-03	2.60E-03		
2.135E+03	36	1.01E-04	1.58E-04	2.40E-04	3.51E-04	5.01E-04	7.02E-04	1.04E-03	2.46E-03	3.72E-03	5.10E-03	6.71E-03		
2.074E+03	35	2.47E-04	4.54E-04	5.57E-04	6.99E-04	9.00E-04	1.16E-03	1.56E-03	3.16E-03	8.01E-03	1.36E-02	1.90E-02		
2.013E+03	34	4.98E-04	9.35E-04	1.15E-03	1.50E-03	1.99E-03	2.47E-03	3.40E-03	6.11E-03	1.40E-02	2.66E-02	4.09E-02		
1.952E+03	33	6.62E-04	1.05E-03	1.68E-03	2.50E-03	3.55E-03	2.93E-03	4.44E-03	6.10E-03	2.11E-02	4.78E-02	8.31E-02		
1.922E+03	32	1.10E-03	1.79E-03	3.01E-03	4.15E-03	6.22E-03	5.36E-03	7.12E-03	1.05E-02	3.36E-02	7.31E-02	1.31E-01		
1.891E+03	31	1.56E-03	2.04E-03	3.52E-03	3.08E-03	5.35E-03	8.51E-03	6.58E-03	1.64E-02	4.72E-02	1.04E-01	2.01E-01		
1.861E+03	30	2.47E-03	2.09E-03	3.16E-03	2.45E-03	4.32E-03	8.31E-03	1.36E-02	3.16E-02	7.39E-02	1.57E-01	3.07E-01		
1.830E+03	29	4.59E-03	4.08E-03	6.13E-03	4.38E-03	7.74E-03	1.48E-02	2.47E-02	5.26E-02	1.14E-01	2.34E-01	4.54E-01		
1.800E+03	28	6.51E-03	1.02E-02	1.52E-02	2.15E-02	2.95E-02	3.96E-02	5.36E-02	9.00E-02	1.69E-01	3.27E-01	6.24E-01		
1.769E+03	27	9.10E-03	1.35E-02	1.62E-02	2.07E-02	2.80E-02	3.84E-02	5.37E-02	9.84E-02	2.02E-01	4.17E-01	7.65E-01		
1.739E+03	26	1.58E-02	1.98E-02	1.25E-02	1.20E-02	1.86E-02	3.01E-02	4.84E-02	1.05E-01	2.44E-01	5.26E-01	9.49E-01		
1.708E+03	25	2.21E-02	2.99E-02	2.08E-02	1.98E-02	2.96E-02	4.68E-02	7.34E-02	1.49E-01	3.21E-01	6.53E-01	1.12E+00		
1.678E+03	24	1.69E-02	2.61E-02	3.56E-02	4.23E-02	5.93E-02	8.43E-02	1.20E-01	2.07E-01	3.94E-01	7.26E-01	1.17E+00		
1.647E+03	23	2.55E-02	3.67E-02	5.04E-02	6.22E-02	8.25E-02	1.10E-01	1.47E-01	2.30E-01	4.01E-01	6.84E-01	1.03E+00		
1.617E+03	22	2.22E-02	3.17E-02	4.31E-02	5.32E-02	7.03E-02	9.32E-02	1.24E-01	1.92E-01	3.31E-01	5.37E-01	7.74E-01		
1.586E+03	21	1.53E-02	2.17E-02	2.95E-02	3.64E-02	4.82E-02	6.38E-02	8.45E-02	1.30E-01	2.18E-01	3.56E-01	4.92E-01		
1.556E+03	20	8.73E-03	1.24E-02	1.69E-02	2.07E-02	2.74E-02	3.64E-02	4.82E-02	7.46E-02	1.23E-01	2.00E-01	2.68E-01		
1.525E+03	19	4.17E-03	5.95E-03	8.07E-03	9.81E-03	1.30E-02	1.73E-02	2.31E-02	3.61E-02	5.87E-02	9.29E-02	1.21E-01		
1.495E+03	18	1.57E-03	2.25E-03	3.07E-03	3.66E-03	4.88E-03	6.58E-03	8.87E-03	1.42E-02	2.25E-02	3.39E-02	4.28E-02		
1.464E+03	17	4.25E-04	6.22E-04	8.53E-04	1.00E-03	1.32E-03	1.79E-03	2.46E-03	3.98E-03	6.02E-03	8.59E-03	1.05E-02		
1.434E+03	16	7.31E-05	1.06E-04	1.49E-04	1.99E-04	2.65E-04	3.26E-04	4.45E-04	6.77E-04	9.32E-04	1.28E-03	1.55E-03		
1.403E+03	15	7.11E-06	1.03E-05	1.44E-05	1.97E-05	2.62E-05	3.26E-05	4.78E-05	6.94E-05	8.62E-05	1.14E-04	1.36E-04		
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 34 35 36 37 38 39 40 41 42 43 44

X = 1.49E+03 1.52E+03 1.56E+03 1.59E+03 1.62E+03 1.65E+03 1.68E+03 1.71E+03 1.77E+03 1.83E+03 1.89E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	3.21E-07	3.73E-07	2.76E-07	3.08E-07	2.38E-07	2.73E-07	3.72E-07	3.24E-07	1.62E-07	5.88E-08	5.98E-08
2.501E+03	40	8.05E-06	7.77E-06	6.32E-06	7.48E-06	6.73E-06	9.47E-06	1.04E-05	3.95E-06	1.36E-06	7.56E-07	1.88E-05
2.379E+03	39	9.27E-05	9.12E-05	8.42E-05	6.51E-05	5.65E-05	7.77E-05	1.01E-04	8.36E-05	4.26E-05	2.21E-05	1.68E-04
2.257E+03	38	6.97E-04	7.65E-04	7.14E-04	5.53E-04	6.72E-04	9.47E-04	1.15E-03	1.40E-03	3.68E-04	1.96E-04	8.91E-04
2.196E+03	37	3.14E-03	3.55E-03	3.48E-03	4.05E-03	4.56E-03	5.05E-03	8.80E-03	1.99E-02	4.21E-03	1.55E-03	4.51E-03
2.135E+03	36	8.25E-03	9.44E-03	8.91E-03	1.05E-02	1.21E-02	1.57E-02	3.45E-02	8.29E-02	1.33E-02	3.91E-03	1.35E-02
2.074E+03	35	1.86E-02	2.42E-02	3.18E-02	3.78E-02	4.23E-02	4.66E-02	1.07E-01	2.29E-01	2.72E-02	7.30E-03	3.14E-02
2.013E+03	34	4.11E-02	5.95E-02	8.61E-02	1.08E-01	1.27E-01	1.76E-01	3.18E-01	4.06E-01	8.20E-01	2.22E-01	1.39E-01
1.952E+03	33	1.27E-01	1.83E-01	2.44E-01	2.90E-01	3.22E-01	4.24E-01	7.10E-01	8.29E-01	1.12E+00	3.65E-01	2.38E-01
1.922E+03	32	2.26E-01	3.38E-01	4.55E-01	5.29E-01	5.76E-01	7.40E-01	1.20E+00	1.32E+00	1.58E+00	3.93E-01	2.99E-01
1.891E+03	31	3.59E-01	4.61E-01	6.48E-01	7.73E-01	8.38E-01	1.06E+00	1.68E+00	1.76E+00	1.89E+00	3.22E-01	3.05E-01
1.861E+03	30	5.34E-01	7.63E-01	1.03E+00	1.17E+00	1.22E+00	1.50E+00	2.30E+00	2.75E+00	2.34E+00	2.03E+00	6.48E-01
1.830E+03	29	7.54E-01	1.06E+00	1.41E+00	1.56E+00	1.62E+00	1.97E+00	2.95E+00	3.35E+00	2.61E+00	2.56E+00	9.93E-01
1.800E+03	28	9.94E-01	1.39E+00	1.80E+00	1.98E+00	2.13E+00	2.52E+00	3.60E+00	3.80E+00	2.67E+00	2.49E+00	1.06E+00
1.769E+03	27	1.21E+00	1.71E+00	2.11E+00	2.39E+00	2.94E+00	3.12E+00	4.10E+00	4.02E+00	3.31E+00	1.87E+00	9.71E-01
1.739E+03	26	1.44E+00	2.00E+00	2.38E+00	2.60E+00	3.11E+00	3.23E+00	4.12E+00	3.87E+00	3.14E+00	1.66E+00	8.15E-01
1.708E+03	25	1.61E+00	2.18E+00	2.53E+00	2.70E+00	2.94E+00	3.02E+00	3.69E+00	3.45E+00	2.77E+00	1.45E+00	6.06E-01
1.678E+03	24	1.58E+00	2.02E+00	2.40E+00	2.42E+00	2.33E+00	2.64E+00	3.11E+00	2.94E+00	2.30E+00	1.32E+00	4.49E-01
1.647E+03	23	1.35E+00	1.62E+00	1.93E+00	2.13E+00	1.99E+00	2.25E+00	2.58E+00	2.31E+00	1.76E+00	9.61E-01	1.03E+00
1.617E+03	22	9.79E-01	1.15E+00	1.31E+00	1.50E+00	1.45E+00	1.55E+00	1.74E+00	1.56E+00	1.19E+00	6.29E-01	5.34E-01
1.586E+03	21	6.11E-01	7.11E-01	7.94E-01	9.02E-01	8.55E-01	9.57E-01	1.04E+00	9.93E-01	7.80E-01	4.61E-01	3.55E-01
1.556E+03	20	3.26E-01	3.74E-01	4.09E-01	4.60E-01	4.36E-01	4.80E-01	5.20E-01	4.70E-01	3.59E-01	2.28E-01	1.78E-01
1.525E+03	19	1.44E-01	1.62E-01	1.76E-01	1.82E-01	1.82E-01	1.92E-01	2.02E-01	1.82E-01	1.40E-01	9.38E-02	7.36E-02
1.495E+03	18	4.96E-02	5.48E-02	6.03E-02	5.87E-02	5.64E-02	5.89E-02	5.91E-02	5.67E-02	4.54E-02	3.54E-02	2.61E-02
1.464E+03	17	1.18E-02	1.29E-02	1.40E-02	1.33E-02	1.23E-02	1.26E-02	1.26E-02	1.20E-02	1.02E-02	8.89E-03	6.77E-03
1.434E+03	16	1.73E-03	1.85E-03	1.94E-03	1.80E-03	1.59E-03	1.51E-03	1.45E-03	1.40E-03	1.29E-03	1.24E-03	9.92E-04
1.403E+03	15	1.46E-04	1.49E-04	1.45E-04	1.27E-04	1.01E-04	7.86E-05	6.52E-05	6.39E-05	6.58E-05	7.19E-05	7.69E-05
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.39E-32	5.76E-06
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.73E-36	6.84E-07
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.93E-38	1.27E-08
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.79E-39	4.69E-10
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.26E-40	2.41E-11
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.25E-42	3.24E-12
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.92E-43	2.21E-12
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.40E-13
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.02E-14
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.15E-15
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.61E-17
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.05E-18
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 45 46 47 48 49 50 51 52 53 54 55

X = 1.95E+03 2.01E+03 2.07E+03 2.13E+03 2.20E+03 2.26E+03 2.32E+03 2.38E+03 2.50E+03 2.62E+03 2.74E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	7.06E-08	4.54E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	1.72E-05	8.53E-06	3.38E-06	5.98E-07	1.50E-07	5.07E-08	2.18E-08	1.21E-08	1.09E-08	0.00E+00	
2.379E+03	39	1.41E-04	7.49E-05	3.75E-05	1.16E-05	3.82E-06	1.45E-06	6.65E-07	3.85E-07	3.09E-07	0.00E+00	
2.257E+03	38	7.05E-04	3.79E-04	2.10E-04	7.97E-05	2.86E-05	1.12E-05	5.04E-06	2.83E-06	2.34E-06	0.00E+00	
2.196E+03	37	3.29E-03	1.60E-03	7.78E-04	2.99E-04	1.02E-04	3.80E-05	1.61E-05	8.43E-06	5.87E-06	0.00E+00	
2.135E+03	36	1.06E-02	5.48E-03	2.89E-03	1.25E-03	4.10E-04	1.48E-04	5.98E-05	2.87E-05	2.86E-05	0.00E+00	
2.074E+03	35	2.66E-02	1.52E-02	9.02E-03	4.34E-03	1.50E-03	5.53E-04	2.19E-04	9.46E-05	5.86E-05	0.00E+00	
2.013E+03	34	1.04E-01	4.82E-02	2.87E-02	1.46E-02	5.29E-03	1.99E-03	7.72E-04	2.90E-04	3.86E-04	0.00E+00	
1.952E+03	33	1.87E-01	9.69E-02	6.01E-02	3.19E-02	1.20E-02	4.58E-03	1.73E-03	5.66E-04	3.93E-04	0.00E+00	
1.922E+03	32	2.51E-01	1.44E-01	9.27E-02	5.09E-02	1.96E-02	7.62E-03	2.77E-03	5.58E-03	1.36E-04	0.00E+00	
1.891E+03	31	2.88E-01	1.94E-01	1.34E-01	7.75E-02	3.12E-02	1.26E-02	4.53E-03	5.55E-03	1.35E-04	0.00E+00	
1.861E+03	30	4.77E-01	2.78E-01	1.94E-01	1.16E-01	4.90E-02	2.12E-02	2.06E-02	9.43E-12	9.10E-14	0.00E+00	
1.830E+03	29	6.86E-01	3.89E-01	2.74E-01	1.67E-01	7.46E-02	3.47E-02	3.39E-02	5.99E-12	8.56E-18	0.00E+00	
1.800E+03	28	7.65E-01	4.82E-01	3.58E-01	2.29E-01	1.09E-01	5.39E-02	7.10E-02	9.73E-05	2.18E-08	0.00E+00	
1.769E+03	27	7.55E-01	5.41E-01	4.29E-01	2.84E-01	1.47E-01	7.79E-02	7.25E-02	9.79E-05	2.25E-08	0.00E+00	
1.739E+03	26	6.65E-01	5.56E-01	4.72E-01	3.26E-01	1.86E-01	1.06E-01	1.05E-01	1.59E-11	2.34E-17	0.00E+00	
1.708E+03	25	5.41E-01	5.05E-01	4.53E-01	3.44E-01	2.21E-01	1.37E-01	1.97E-01	2.06E-04	4.09E-08	0.00E+00	
1.678E+03	24	3.87E-01	3.96E-01	4.08E-01	3.40E-01	2.46E-01	1.64E-01	1.90E-01	2.08E-04	4.26E-08	0.00E+00	
1.647E+03	23	3.83E-01	3.43E-01	3.58E-01	3.19E-01	2.62E-01	1.90E-01	1.90E-01	2.57E-11	3.01E-17	0.00E+00	
1.617E+03	22	3.45E-01	2.94E-01	3.05E-01	2.88E-01	2.67E-01	2.10E-01	3.34E-01	2.64E-04	4.69E-08	0.00E+00	
1.586E+03	21	2.70E-01	2.40E-01	2.50E-01	2.49E-01	2.61E-01	2.23E-01	3.17E-01	2.68E-04	4.92E-08	0.00E+00	
1.556E+03	20	1.63E-01	1.65E-01	1.91E-01	2.04E-01	2.48E-01	2.30E-01	2.35E-01	2.85E-11	2.38E-17	0.00E+00	
1.525E+03	19	7.96E-02	9.71E-02	1.35E-01	1.58E-01	2.27E-01	2.31E-01	3.95E-01	1.89E-04	2.86E-08	0.00E+00	
1.495E+03	18	2.29E-02	4.64E-02	9.09E-02	1.17E-01	2.02E-01	2.28E-01	3.80E-01	1.94E-04	3.03E-08	0.00E+00	
1.464E+03	17	5.43E-03	2.17E-02	4.85E-02	8.57E-02	1.77E-01	2.21E-01	2.54E-01	2.36E-11	8.52E-18	0.00E+00	
1.434E+03	16	1.40E-03	8.83E-03	2.20E-02	5.88E-02	1.51E-01	2.05E-01	2.71E-04	4.79E-08	5.42E-12	0.00E+00	
1.403E+03	15	3.10E-04	3.27E-03	1.04E-02	3.89E-02	1.27E-01	1.95E-01	2.73E-04	5.03E-08	5.88E-12	0.00E+00	
1.373E+03	14	3.25E-05	1.84E-03	5.13E-03	2.56E-02	1.05E-01	1.09E-01	1.06E-11	1.65E-17	1.56E-21	0.00E+00	
1.342E+03	13	4.16E-06	8.66E-04	3.00E-03	1.78E-02	8.90E-02	1.50E-01	7.59E-05	1.17E-08	1.39E-12	0.00E+00	
1.312E+03	12	7.39E-07	4.72E-04	1.68E-03	1.31E-02	7.95E-02	1.42E-01	7.84E-05	1.25E-08	1.51E-12	0.00E+00	
1.281E+03	11	1.18E-07	1.33E-04	8.40E-04	1.27E-02	8.44E-02	8.60E-02	6.77E-12	2.44E-18	2.67E-22	0.00E+00	
1.220E+03	10	2.49E-08	2.68E-05	3.53E-04	1.16E-02	7.11E-02	3.69E-02	1.29E-05	2.99E-09	5.68E-13	0.00E+00	

9 3 1 2 3 5 2 1 9 3 9

1.159E+03	9	6.67E-09	7.47E-06	1.25E-04	9.38E-03	6.07E-02	4.00E-02	1.40E-05	3.22E-09	6.22E-13	0.00E+00
1.098E+03	8	2.02E-09	2.46E-06	5.03E-05	3.88E-03	4.54E-02	4.30E-02	3.08E-12	3.46E-19	5.87E-23	0.00E+00
1.037E+03	7	6.75E-10	9.41E-07	2.15E-05	2.06E-03	3.76E-02	2.76E-02	1.04E-05	2.52E-09	4.99E-13	0.00E+00
9.760E+02	6	1.37E-10	1.95E-07	8.09E-06	9.75E-04	2.89E-02	2.75E-02	1.16E-05	2.82E-09	5.74E-13	0.00E+00
8.540E+02	5	1.17E-11	1.91E-08	2.15E-06	2.80E-04	1.29E-02	1.06E-02	7.34E-06	3.22E-09	1.14E-12	0.00E+00
7.320E+02	4	8.99E-13	7.98E-09	7.85E-07	1.62E-04	9.25E-03	1.05E-02	7.68E-06	3.52E-09	1.28E-12	0.00E+00
5.490E+02	3	5.91E-14	1.26E-09	3.43E-07	7.20E-05	9.34E-03	9.68E-03	7.26E-06	3.35E-09	1.22E-12	0.00E+00
3.050E+02	2	5.87E-16	4.80E-10	1.43E-06	1.19E-04	1.01E-02	7.98E-03	5.67E-06	2.49E-09	8.72E-13	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	56	57	58	59	60	61	62	63	64	65
X =	2.87E+03	2.99E+03	3.11E+03	3.23E+03	3.35E+03	3.48E+03	3.60E+03	3.72E+03	3.84E+03	3.96E+03

--*-*-*-*-*-*-*-*- C - SPECIES CONCENTRATION..... FOR PLANE K = 12 AT STEP 6601, TIME= 1.6223E+04 -*-*-*-*-*-*-*-*-*-*

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.76E-30	5.70E-27	1.66E-25	2.36E-24
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-27	1.23E-24	3.57E-23	5.02E-22
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.37E-25	1.02E-22	2.92E-21
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.27E-24	4.71E-21	1.32E-19
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.68E-22	1.28E-19	3.51E-18
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.60E-21	2.00E-18	5.33E-17
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.43E-20	2.65E-17	6.74E-16
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.83E-19	2.95E-16	6.97E-15
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.61E-18	2.73E-15	5.74E-14
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.32E-17	1.65E-14	2.85E-13
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.60E-17	6.04E-14	7.80E-13
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.05E-15	1.68E-13	1.43E-12
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.52E-14	3.19E-13	2.82E-12
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.36E-15	1.05E-13	1.00E-12
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.73E-14	2.05E-13	1.95E-12
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.72E-14	3.10E-13	2.98E-12
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.08E-14	4.11E-13	4.08E-12
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.66E-14	4.99E-13	5.17E-12
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.18E-14	6.38E-13	6.23E-12
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.43E-14	7.69E-13	6.81E-12
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E-14	8.81E-13	6.27E-12
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.45E-14	9.52E-13	9.26E-12
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.69E-14	1.19E-12	1.59E-11
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.29E-14	5.03E-12	9.37E-11
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.96E-14	3.41E-12	5.92E-11
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.33E-14	1.53E-12	2.77E-11
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.78E-15	3.79E-13	7.47E-12
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	1	2	3	4	5	6	7	8	9	10	11
X =	0.00E+00	1.83E+02	3.66E+02	4.88E+02	5.49E+02	6.10E+02	6.71E+02	7.02E+02	7.32E+02	7.63E+02	7.93E+02

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	2.18E-23	1.48E-22	7.87E-22	3.44E-21	1.29E-20	4.37E-20	1.35E-19	3.76E-19	9.29E-19	2.10E-18	4.99E-18
2.501E+03	40	4.58E-21	3.05E-20	1.59E-19	6.80E-19	2.53E-18	8.53E-18	2.63E-17	7.32E-17	1.75E-16	3.91E-16	1.09E-15
2.379E+03	39	3.60E-19	2.34E-18	1.19E-17	4.92E-17	1.79E-16	5.95E-16	1.80E-15	4.79E-15	1.02E-14	2.19E-14	7.68E-14
2.257E+03	38	1.56E-17	9.89E-17	4.87E-16	1.95E-15	6.99E-15	2.32E-14	6.90E-14	1.69E-13	2.84E-13	5.87E-13	2.94E-12
2.196E+03	37	3.91E-16	2.40E-15	1.14E-14	4.45E-14	1.62E-13	5.63E-13	1.75E-12	4.26E-12	5.70E-12	1.09E-11	8.07E-11
2.135E+03	36	5.49E-15	3.23E-14	1.48E-13	5.55E-13	2.10E-12	7.80E-12	2.54E-11	6.11E-11	6.60E-11	9.42E-11	1.42E-09
2.074E+03	35	6.20E-14	3.44E-13	1.48E-12	5.27E-12	2.12E-11	8.45E-11	2.92E-10	7.58E-10	8.66E-10	1.08E-08	3.06E-08
2.013E+03	34	5.51E-13	2.82E-12	1.11E-11	3.63E-11	1.58E-10	6.24E-10	2.02E-09	4.84E-09	5.05E-09	5.43E-08	1.35E-07
1.952E+03	33	3.70E-12	1.75E-11	6.43E-11	1.91E-10	9.05E-10	3.06E-09	8.31E-09	1.69E-08	1.47E-08	1.17E-07	2.53E-07
1.922E+03	32	1.41E-11	6.29E-11	2.75E-10	1.48E-09	3.33E-09	7.33E-09	1.58E-08	2.56E-08	1.60E-08	4.34E-08	1.74E-07
1.891E+03	31	2.89E-11	1.20E-10	5.04E-10	2.84E-09	6.61E-09	1.58E-08	3.57E-08	5.58E-08	2.83E-08	4.02E-08	8.46E-08
1.861E+03	30	4.05E-11	1.59E-10	5.42E-10	2.34E-09	7.74E-09	2.14E-08	5.13E-08	8.43E-08	5.27E-08	6.93E-08	1.37E-07
1.830E+03	29	7.96E-11	3.11E-10	1.06E-09	3.26E-09	9.32E-09	2.42E-08	5.67E-08	1.07E-07	1.27E-07	1.09E-07	1.59E-07
1.800E+03	28	3.07E-11	1.22E-10	4.27E-10	1.30E-09	3.58E-09	8.99E-09	2.14E-08	4.82E-08	1.06E-07	1.22E-07	1.71E-07
1.769E+03	27	5.85E-11	2.30E-10	7.86E-10	2.32E-09	6.11E-09	1.50E-08	3.53E-08	8.05E-08	1.71E-07	2.02E-07	2.95E-07
1.739E+03	26	8.82E-11	3.41E-10	1.15E-09	3.22E-09	8.30E-09	2.06E-08	4.99E-08	1.18E-07	2.65E-07	3.79E-07	6.26E-07
1.708E+03	25	1.21E-10	4.57E-10	1.53E-09	3.91E-09	1.10E-08	3.04E-08	8.00E-08	2.02E-07	4.86E-07	1.09E-06	2.09E-06
1.678E+03	24	1.55E-10	5.66E-10	1.87E-09	3.81E-09	2.75E-08	1.31E-07	4.00E-07	1.07E-06	2.63E-06	6.08E-06	1.09E-05
1.647E+03	23	2.00E-10	6.66E-10	2.18E-09	4.91E-09	3.64E-08	1.81E-07	5.58E-07	1.49E-06	3.63E-06	8.39E-06	1.37E-05
1.617E+03	22	2.94E-10	7.93E-10	2.99E-09	8.32E-09	6.61E-08	3.01E-07	8.74E-07	2.22E-06	5.23E-06	1.16E-05	1.11E-05
1.586E+03	21	1.20E-09	9.81E-10	7.74E-09	4.10E-08	1.40E-07	3.94E-07	1.01E-06	2.42E-06	5.48E-06	1.19E-05	2.37E-05
1.556E+03	20	1.30E-09	1.83E-09	9.34E-09	4.01E-08	1.25E-07	3.37E-07	8.29E-07	1.91E-06	4.16E-06	8.65E-06	1.70E-05
1.525E+03	19	5.99E-10	3.83E-09	1.37E-08	4.04E-08	1.07E-07	2.63E-07	6.08E-07	1.33E-06	2.77E-06	5.50E-06	1.04E-05
1.495E+03	18	4.84E-10	2.56E-09	8.89E-09	2.56E-08	6.63E-08	1.58E-07	3.53E-07	7.43E-07	1.49E-06	2.84E-06	5.21E-06
1.464E+03	17	3.01E-10	1.49E-09	4.89E-09	1.35E-08	3.34E-08	7.63E-08	1.63E-07	3.29E-07	6.28E-07	1.15E-06	2.02E-06

9 3 1 2 3 2 3 9 7 0

1.434E+03	16	1.52E-10	6.70E-10	2.00E-09	5.18E-09	1.22E-08	2.65E-08	5.37E-08	1.02E-07	1.85E-07	3.21E-07	5.38E-07	
1.403E+03	15	4.79E-11	1.53E-10	4.27E-10	1.05E-09	2.36E-09	4.87E-09	9.33E-09	1.67E-08	2.83E-08	4.62E-08	7.34E-08	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	12	13	14	15	16	17	18	19	20	21	22
X =	8.24E+02	8.54E+02	8.85E+02	9.15E+02	9.46E+02	9.76E+02	1.01E+03	1.04E+03	1.07E+03	1.10E+03	1.13E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	1.93E-17	8.81E-17	2.80E-16	1.36E-15	4.30E-15	5.32E-15	6.44E-15	7.62E-15	8.84E-15	1.01E-14	2.12E-11	
2.501E+03	40	6.57E-15	3.68E-14	1.20E-13	9.59E-13	5.21E-12	2.97E-11	1.38E-10	4.76E-10	1.77E-09	8.43E-09	2.29E-08	
2.379E+03	39	6.55E-13	3.71E-12	1.12E-11	8.06E-11	3.33E-10	1.72E-09	6.74E-09	1.85E-08	6.28E-08	2.60E-07	5.39E-07	
2.257E+03	38	3.01E-11	1.49E-10	5.50E-10	2.62E-09	7.91E-09	4.05E-08	1.24E-07	2.40E-07	7.45E-07	2.67E-06	4.30E-06	
2.196E+03	37	8.08E-10	3.40E-09	1.58E-08	6.76E-08	2.97E-07	5.89E-07	1.02E-06	1.66E-06	2.83E-06	5.69E-06	1.04E-05	
2.135E+03	36	9.94E-09	3.84E-08	1.16E-07	3.67E-07	1.40E-06	2.33E-06	3.84E-06	6.46E-06	1.09E-05	1.81E-05	2.93E-05	
2.074E+03	35	7.67E-08	1.79E-07	3.94E-07	8.27E-07	1.98E-06	4.22E-06	8.49E-06	1.55E-05	2.66E-05	4.39E-05	6.92E-05	
2.013E+03	34	3.12E-07	6.99E-07	1.49E-06	3.03E-06	5.81E-06	1.11E-05	1.99E-05	3.30E-05	5.31E-05	8.39E-05	1.27E-04	
1.952E+03	33	5.92E-07	1.35E-06	2.92E-06	5.94E-06	1.01E-05	1.54E-05	1.94E-05	2.70E-05	4.02E-05	6.14E-05	9.26E-05	
1.922E+03	32	5.40E-07	1.38E-06	3.13E-06	6.58E-06	1.22E-05	1.92E-05	2.68E-05	4.32E-05	7.23E-05	1.19E-04	1.79E-04	
1.891E+03	31	2.08E-07	5.06E-07	1.17E-06	2.62E-06	5.53E-06	1.25E-05	2.80E-05	5.73E-05	1.06E-04	1.79E-04	2.71E-04	
1.861E+03	30	3.24E-07	8.16E-07	1.99E-06	4.71E-06	1.04E-05	2.24E-05	4.86E-05	9.87E-05	1.73E-04	2.86E-04	4.33E-04	
1.830E+03	29	3.16E-07	9.82E-07	2.92E-06	7.81E-06	1.85E-05	4.12E-05	9.05E-05	1.83E-04	2.73E-04	4.77E-04	7.69E-04	
1.800E+03	28	2.72E-07	1.77E-06	1.05E-05	3.40E-05	8.56E-05	1.94E-04	4.21E-04	7.75E-04	4.23E-04	9.73E-04	2.32E-03	
1.769E+03	27	4.80E-07	2.77E-06	1.65E-05	5.30E-05	1.32E-04	2.92E-04	6.18E-04	1.12E-03	7.06E-04	1.44E-03	3.17E-03	
1.739E+03	26	9.73E-07	4.57E-06	2.64E-05	8.07E-05	1.93E-04	4.04E-04	8.39E-04	1.57E-03	2.56E-03	3.66E-03	4.91E-03	
1.708E+03	25	2.36E-06	7.59E-06	3.95E-05	1.10E-04	2.39E-04	4.99E-04	1.04E-03	1.98E-03	3.47E-03	5.60E-03	7.26E-03	
1.678E+03	24	8.27E-06	1.96E-05	5.69E-05	1.23E-04	2.13E-04	5.32E-04	1.23E-03	2.47E-03	4.46E-03	7.16E-03	4.52E-03	
1.647E+03	23	1.29E-05	3.88E-05	9.61E-05	1.23E-04	9.62E-05	2.82E-04	9.26E-04	2.18E-03	4.36E-03	7.89E-03	1.31E-02	
1.617E+03	22	1.43E-05	4.41E-05	1.04E-04	1.56E-04	3.21E-04	6.55E-04	1.29E-03	2.40E-03	4.30E-03	7.27E-03	1.17E-02	
1.586E+03	21	3.24E-05	6.06E-05	1.09E-04	1.45E-04	2.58E-04	4.99E-04	9.51E-04	1.72E-03	3.03E-03	5.07E-03	8.07E-03	
1.556E+03	20	3.09E-05	5.59E-05	9.53E-05	1.14E-04	1.51E-04	2.78E-04	5.32E-04	9.71E-04	1.71E-03	2.86E-03	4.56E-03	
1.525E+03	19	1.90E-05	3.34E-05	5.45E-05	6.26E-05	7.73E-05	1.37E-04	2.58E-04	4.64E-04	8.07E-04	1.35E-03	2.14E-03	
1.495E+03	18	9.19E-06	1.56E-05	2.46E-05	2.72E-05	3.18E-05	5.29E-05	9.42E-05	1.65E-04	2.82E-04	4.68E-04	7.50E-04	
1.464E+03	17	3.42E-06	5.60E-06	8.51E-06	8.99E-06	1.00E-05	1.48E-05	2.38E-05	3.99E-05	6.72E-05	1.15E-04	1.90E-04	
1.434E+03	16	8.75E-07	1.38E-06	2.13E-06	3.08E-06	4.47E-06	6.52E-06	7.44E-06	1.10E-05	1.38E-05	2.18E-05	3.47E-05	
1.403E+03	15	1.14E-07	1.74E-07	2.62E-07	3.86E-07	5.60E-07	7.90E-07	8.61E-07	1.20E-06	1.42E-06	2.16E-06	3.37E-06	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	23	24	25	26	27	28	29	30	31	32	33
X =	1.16E+03	1.19E+03	1.22E+03	1.25E+03	1.28E+03	1.31E+03	1.34E+03	1.37E+03	1.40E+03	1.43E+03	1.46E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	3.90E-10	1.86E-09	7.49E-09	1.85E-08	4.52E-08	7.27E-08	8.37E-08	1.05E-07	1.29E-07	1.36E-07	1.43E-07	
2.501E+03	40	4.89E-08	9.40E-08	1.77E-07	4.16E-07	9.90E-07	1.55E-06	1.85E-06	2.18E-06	2.65E-06	2.90E-06	3.03E-06	
2.379E+03	39	9.46E-07	1.59E-06	2.72E-06	6.13E-06	1.36E-05	2.00E-05	2.90E-05	2.43E-05	2.74E-05	3.15E-05	3.45E-05	
2.257E+03	38	6.56E-06	1.02E-05	1.68E-05	3.72E-05	7.67E-05	1.07E-04	1.41E-04	1.47E-04	1.49E-04	1.77E-04	2.16E-04	
2.196E+03	37	1.75E-05	2.84E-05	4.50E-05	7.13E-05	1.15E-04	1.71E-04	2.33E-04	5.23E-04	6.29E-04	7.54E-04	9.28E-04	
2.135E+03	36	4.48E-05	6.93E-05	1.04E-04	1.50E-04	2.13E-04	2.97E-04	4.05E-04	9.10E-04	1.20E-03	1.64E-03	2.24E-03	
2.074E+03	35	9.27E-05	1.16E-04	1.35E-04	1.66E-04	2.10E-04	2.70E-04	3.52E-04	6.65E-04	1.89E-03	3.86E-03	5.91E-03	
2.013E+03	34	1.70E-04	2.02E-04	2.37E-04	3.00E-04	3.96E-04	5.16E-04	6.70E-04	1.19E-03	3.18E-03	6.62E-03	1.12E-02	
1.952E+03	33	1.29E-04	1.93E-04	2.98E-04	4.46E-04	6.44E-04	7.87E-04	1.42E-03	1.98E-03	1.55E-02	4.09E-02	8.01E-02	
1.922E+03	32	2.23E-04	3.25E-04	5.10E-04	7.38E-04	1.08E-03	1.30E-03	2.24E-03	3.66E-03	2.58E-02	6.51E-02	1.28E-01	
1.891E+03	31	3.26E-04	4.19E-04	6.50E-04	8.00E-04	1.80E-03	3.54E-03	2.19E-03	9.58E-03	3.99E-02	9.17E-02	1.90E-01	
1.861E+03	30	5.08E-04	5.15E-04	7.63E-04	8.93E-04	1.71E-03	4.27E-03	7.95E-03	2.40E-02	6.69E-02	1.42E-01	2.81E-01	
1.830E+03	29	9.14E-04	8.99E-04	1.37E-03	1.44E-03	3.19E-03	8.30E-03	1.60E-02	4.23E-02	1.06E-01	2.15E-01	4.10E-01	
1.800E+03	28	3.12E-03	5.29E-03	8.51E-03	1.34E-02	1.95E-02	2.73E-02	3.91E-02	7.64E-02	1.60E-01	3.02E-01	5.36E-01	
1.769E+03	27	4.07E-03	6.30E-03	7.69E-03	1.07E-02	1.59E-02	2.36E-02	3.61E-02	8.03E-02	1.89E-01	3.87E-01	5.47E-01	
1.739E+03	26	6.22E-03	7.19E-03	3.59E-03	3.57E-03	8.00E-03	1.60E-02	3.01E-02	8.42E-02	2.28E-01	4.99E-01	6.79E-01	
1.708E+03	25	1.11E-02	1.47E-02	7.28E-03	6.72E-03	1.42E-02	2.73E-02	4.93E-02	1.24E-01	3.07E-01	6.33E-01	8.12E-01	
1.678E+03	24	7.75E-03	1.52E-02	2.19E-02	2.63E-02	3.91E-02	5.96E-02	9.11E-02	1.83E-01	3.84E-01	7.17E-01	8.65E-01	
1.647E+03	23	2.03E-02	2.96E-02	4.03E-02	4.71E-02	6.29E-02	8.62E-02	1.20E-01	2.10E-01	3.96E-01	6.73E-01	7.67E-01	
1.617E+03	22	1.79E-02	2.58E-02	3.48E-02	4.06E-02	5.39E-02	7.35E-02	1.02E-01	1.76E-01	3.28E-01	5.07E-01	5.59E-01	
1.586E+03	21	1.22E-02	1.76E-02	2.37E-02	2.76E-02	3.67E-02	4.99E-02	6.90E-02	1.20E-01	2.16E-01	2.79E-01	3.31E-01	

9 3 1 2 3 5 2 0 9 4 1

1.556E+03	20	6.93E-03	9.98E-03	1.34E-02	1.56E-02	2.07E-02	2.83E-02	3.91E-02	6.80E-02	1.21E-01	1.53E-01	1.77E-01	
1.525E+03	19	3.25E-03	4.68E-03	6.30E-03	7.28E-03	9.67E-03	1.32E-02	1.84E-02	3.25E-02	5.76E-02	7.07E-02	7.95E-02	
1.495E+03	18	1.15E-03	1.68E-03	2.29E-03	2.63E-03	3.52E-03	4.87E-03	6.87E-03	1.25E-02	2.18E-02	2.55E-02	2.78E-02	
1.464E+03	17	2.98E-04	4.46E-04	6.17E-04	7.10E-04	9.42E-04	1.30E-03	1.87E-03	3.47E-03	5.80E-03	6.45E-03	6.86E-03	
1.434E+03	16	5.31E-05	7.88E-05	1.12E-04	1.51E-04	2.01E-04	2.43E-04	3.45E-04	6.02E-04	9.09E-04	9.71E-04	1.06E-03	
1.403E+03	15	5.14E-06	7.60E-06	1.09E-05	1.51E-05	2.01E-05	2.44E-05	3.78E-05	6.19E-05	8.35E-05	8.60E-05	1.02E-04	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	34	35	36	37	38	39	40	41	42	43	44
X =	1.49E+03	1.52E+03	1.56E+03	1.59E+03	1.62E+03	1.65E+03	1.68E+03	1.71E+03	1.77E+03	1.83E+03	1.89E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	1.57E-07	2.20E-07	1.66E-07	1.98E-07	1.44E-07	1.77E-07	2.68E-07	3.24E-07	1.82E-07	9.63E-08	8.48E-08	
2.501E+03	40	3.46E-06	3.88E-06	3.54E-06	4.71E-06	4.18E-06	6.74E-06	6.70E-06	4.17E-06	1.83E-06	1.63E-05	2.42E-05	
2.379E+03	39	3.47E-05	3.53E-05	3.95E-05	3.59E-05	3.24E-05	4.10E-05	3.56E-05	2.92E-05	8.27E-05	2.10E-04	2.17E-04	
2.257E+03	38	2.56E-04	2.84E-04	3.22E-04	2.97E-04	3.61E-04	6.15E-04	6.07E-04	4.91E-04	8.08E-04	1.24E-03	1.10E-03	
2.196E+03	37	1.14E-03	1.31E-03	1.55E-03	2.01E-03	2.36E-03	2.78E-03	5.21E-03	6.82E-03	6.53E-03	6.72E-03	5.66E-03	
2.135E+03	36	3.01E-03	3.38E-03	3.92E-03	5.22E-03	6.28E-03	8.69E-03	2.08E-02	2.94E-02	2.15E-02	1.95E-02	1.70E-02	
2.074E+03	35	7.75E-03	1.17E-02	1.65E-02	1.78E-02	1.58E-02	2.04E-02	4.47E-02	8.18E-02	5.91E-02	4.47E-02	4.03E-02	
2.013E+03	34	1.51E-02	2.81E-02	4.54E-02	5.19E-02	5.04E-02	7.16E-02	1.31E-01	1.88E-01	2.74E-01	2.22E-01	1.54E-01	
1.952E+03	33	8.91E-02	1.14E-01	1.45E-01	1.50E-01	1.37E-01	1.84E-01	3.08E-01	3.94E-01	4.50E-01	3.74E-01	2.70E-01	
1.922E+03	32	1.63E-01	2.41E-01	3.12E-01	3.02E-01	2.62E-01	3.39E-01	5.37E-01	6.33E-01	6.64E-01	4.75E-01	3.60E-01	
1.891E+03	31	2.85E-01	4.70E-01	6.00E-01	4.96E-01	3.95E-01	4.95E-01	7.58E-01	8.47E-01	8.25E-01	5.09E-01	4.05E-01	
1.861E+03	30	3.90E-01	7.24E-01	9.06E-01	7.22E-01	5.45E-01	6.75E-01	1.02E+00	1.15E+00	1.00E+00	9.18E-01	6.32E-01	
1.830E+03	29	5.37E-01	9.75E-01	1.20E+00	9.43E-01	7.01E-01	8.67E-01	1.29E+00	1.37E+00	1.13E+00	9.43E-01	7.31E-01	
1.800E+03	28	6.85E-01	1.24E+00	1.45E+00	1.15E+00	8.92E-01	1.09E+00	1.57E+00	1.55E+00	1.22E+00	9.98E-01	7.66E-01	
1.769E+03	27	7.85E-01	1.46E+00	1.46E+00	1.33E+00	1.18E+00	1.35E+00	1.82E+00	1.65E+00	1.32E+00	9.97E-01	7.89E-01	
1.739E+03	26	9.37E-01	1.63E+00	1.58E+00	1.41E+00	1.22E+00	1.39E+00	1.83E+00	1.60E+00	1.24E+00	9.13E-01	7.07E-01	
1.708E+03	25	1.05E+00	1.62E+00	1.68E+00	1.57E+00	1.18E+00	1.34E+00	1.72E+00	1.47E+00	1.10E+00	7.77E-01	5.67E-01	
1.678E+03	24	1.04E+00	1.30E+00	1.82E+00	1.92E+00	1.03E+00	1.25E+00	1.52E+00	1.30E+00	9.36E-01	5.85E-01	4.40E-01	
1.647E+03	23	8.81E-01	9.94E-01	1.22E+00	1.50E+00	7.87E-01	9.85E-01	1.21E+00	9.91E-01	6.99E-01	4.22E-01	3.68E-01	
1.617E+03	22	6.27E-01	6.97E-01	7.80E-01	9.08E-01	5.17E-01	7.03E-01	8.39E-01	6.64E-01	4.61E-01	2.86E-01	2.26E-01	
1.586E+03	21	3.78E-01	4.21E-01	4.60E-01	5.20E-01	2.90E-01	3.81E-01	5.08E-01	4.03E-01	2.81E-01	1.76E-01	1.41E-01	
1.556E+03	20	2.00E-01	2.19E-01	2.36E-01	2.54E-01	1.41E-01	1.86E-01	2.46E-01	1.86E-01	1.27E-01	8.17E-02	6.67E-02	
1.525E+03	19	8.76E-02	9.45E-02	1.03E-01	9.24E-02	5.59E-02	7.93E-02	9.97E-02	7.31E-02	4.95E-02	3.27E-02	2.69E-02	
1.495E+03	18	2.99E-02	3.19E-02	3.73E-02	3.01E-02	1.72E-02	2.30E-02	3.02E-02	2.26E-02	1.56E-02	1.14E-02	9.36E-03	
1.464E+03	17	7.23E-03	7.58E-03	8.87E-03	6.86E-03	3.72E-03	4.83E-03	6.30E-03	4.68E-03	3.53E-03	3.02E-03	2.51E-03	
1.434E+03	16	1.12E-03	1.16E-03	1.28E-03	9.70E-04	4.92E-04	6.03E-04	7.52E-04	5.52E-04	4.41E-04	4.10E-04	3.59E-04	
1.403E+03	15	1.10E-04	1.11E-04	1.08E-04	7.48E-05	3.42E-05	3.69E-05	4.02E-05	2.87E-05	2.42E-05	2.47E-05	3.05E-05	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.23E-32	2.43E-06
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.97E-34	3.35E-07
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.02E-36	4.12E-08
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.24E-37	5.95E-09
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.97E-38	1.03E-09
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.41E-39	2.05E-10
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.67E-40	3.61E-11
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.94E-12
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.93E-13
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.68E-15
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.38E-16
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.84E-18
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	45	46	47	48	49	50	51	52	53	54	55
X =	1.95E+03	2.01E+03	2.07E+03	2.13E+03	2.20E+03	2.26E+03	2.32E+03	2.38E+03	2.50E+03	2.62E+03	2.74E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	7.50E-08	5.16E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	1.75E-05	1.02E-05	3.68E-06	6.49E-07	1.61E-07	5.34E-08	2.26E-08	1.25E-08	1.10E-08	0.00E+00	
2.379E+03	39	1.46E-04	8.90E-05	3.98E-05	1.24E-05	4.02E-06	1.51E-06	6.84E-07	3.92E-07	3.13E-07	0.00E+00	
2.257E+03	38	7.06E-04	4.40E-04	2.18E-04	8.29E-05	2.97E-05	1.15E-05	5.09E-06	2.83E-06	2.33E-06	0.00E+00	
2.196E+03	37	3.32E-03	1.94E-03	8.98E-04	3.30E-04	1.10E-04	4.00E-05	1.66E-05	8.56E-06	5.91E-06	0.00E+00	
2.135E+03	36	1.09E-02	6.73E-03	3.26E-03	1.31E-03	4.38E-04	1.57E-04	6.22E-05	2.96E-05	2.92E-05	0.00E+00	
2.074E+03	35	2.82E-02	1.84E-02	9.74E-03	4.38E-03	1.56E-03	5.78E-04	2.27E-04	9.73E-05	5.98E-05	0.00E+00	
2.013E+03	34	1.03E-01	5.17E-02	2.97E-02	1.43E-02	5.37E-03	2.05E-03	7.89E-04	2.96E-04	3.91E-04	0.00E+00	
1.952E+03	33	1.91E-01	1.03E-01	6.13E-02	3.10E-02	1.20E-02	4.64E-03	1.75E-03	5.75E-04	3.96E-04	0.00E+00	
1.922E+03	32	2.65E-01	1.52E-01	9.41E-02	4.91E-02	1.94E-02	7.67E-03	2.80E-03	5.60E-03	1.33E-04	0.00E+00	
1.891E+03	31	3.18E-01	2.05E-01	1.35E-01	7.43E-02	3.08E-02	1.26E-02	4.55E-03	5.56E-03	1.32E-04	0.00E+00	
1.861E+03	30	4.53E-01	2.82E-01	1.92E-01	1.09E-01	4.78E-02	2.10E-02	2.05E-02	9.55E-12	9.00E-14	0.00E+00	
1.830E+03	29	5.60E-01	3.65E-01	2.61E-01	1.55E-01	7.18E-02	3.40E-02	3.33E-02	6.03E-12	8.27E-18	0.00E+00	
1.800E+03	28	6.09E-01	4.33E-01	3.34E-01	2.08E-01	1.03E-01	5.23E-02	6.94E-02	9.46E-05	2.10E-08	0.00E+00	
1.769E+03	27	6.25E-01	4.61E-01	3.69E-01	2.30E-01	1.35E-01	7.42E-02	7.04E-02	9.51E-05	2.17E-08	0.00E+00	
1.739E+03	26	5.72E-01	4.74E-01	3.90E-01	2.54E-01	1.66E-01	9.98E-02	9.91E-02	1.55E-11	2.24E-17	0.00E+00	
1.708E+03	25	4.87E-01	4.38E-01	3.56E-01	2.65E-01	1.94E-01	1.26E-01	1.86E-01	1.96E-04	3.87E-08	0.00E+00	

9 3 1 2 3 2 0 9 2

1.678E+03	24	3.67E-01	3.56E-01	3.10E-01	2.63E-01	2.15E-01	1.51E-01	1.79E-01	1.98E-04	4.03E-08	0.00E+00
1.647E+03	23	2.98E-01	2.92E-01	2.61E-01	2.47E-01	2.26E-01	1.72E-01	1.73E-01	2.44E-11	2.84E-17	0.00E+00
1.617E+03	22	2.40E-01	2.37E-01	2.12E-01	2.21E-01	2.29E-01	1.89E-01	3.08E-01	2.46E-04	4.37E-08	0.00E+00
1.586E+03	21	1.58E-01	1.75E-01	1.62E-01	1.88E-01	2.22E-01	1.99E-01	2.91E-01	2.50E-04	4.57E-08	0.00E+00
1.556E+03	20	8.45E-02	1.14E-01	1.13E-01	1.52E-01	2.08E-01	2.03E-01	2.09E-01	2.64E-11	2.20E-17	0.00E+00
1.525E+03	19	3.78E-02	6.49E-02	7.25E-02	1.16E-01	1.89E-01	2.03E-01	3.57E-01	1.72E-04	2.61E-08	0.00E+00
1.495E+03	18	1.28E-02	3.24E-02	5.01E-02	8.50E-02	1.66E-01	1.99E-01	3.42E-01	1.77E-04	2.76E-08	0.00E+00
1.464E+03	17	2.84E-03	1.74E-02	2.89E-02	5.83E-02	1.43E-01	1.91E-01	2.22E-01	2.13E-11	7.79E-18	0.00E+00
1.434E+03	16	6.58E-04	7.96E-03	1.57E-02	3.84E-02	1.21E-01	1.77E-01	2.42E-04	4.30E-08	4.87E-12	0.00E+00
1.403E+03	15	1.38E-04	3.28E-03	8.37E-03	2.45E-02	1.01E-01	1.67E-01	2.44E-04	4.52E-08	5.29E-12	0.00E+00
1.373E+03	14	2.08E-05	1.42E-03	4.34E-03	1.55E-02	8.25E-02	8.63E-02	8.71E-12	1.47E-17	1.38E-21	0.00E+00
1.342E+03	13	3.93E-06	5.38E-04	2.61E-03	1.11E-02	6.92E-02	1.20E-01	6.20E-05	9.67E-09	1.15E-12	0.00E+00
1.312E+03	12	1.01E-06	2.50E-04	1.37E-03	8.33E-03	6.14E-02	1.14E-01	6.41E-05	1.03E-08	1.25E-12	0.00E+00
1.281E+03	11	2.30E-07	7.55E-05	5.00E-04	7.27E-03	6.26E-02	6.54E-02	5.33E-12	2.02E-18	2.23E-22	0.00E+00
1.220E+03	10	5.16E-08	2.08E-05	1.59E-04	8.06E-03	5.65E-02	3.09E-02	1.12E-05	2.65E-09	5.08E-13	0.00E+00
1.159E+03	9	1.29E-08	6.48E-06	5.42E-05	5.86E-03	4.58E-02	3.30E-02	1.21E-05	2.85E-09	5.57E-13	0.00E+00
1.098E+03	8	3.37E-09	2.24E-06	2.05E-05	2.49E-03	3.30E-02	3.30E-02	2.41E-12	2.97E-19	5.07E-23	0.00E+00
1.037E+03	7	7.65E-10	9.60E-07	8.66E-06	1.44E-03	2.51E-02	2.26E-02	8.61E-06	2.09E-09	4.14E-13	0.00E+00
9.760E+02	6	1.81E-10	3.85E-07	3.34E-06	6.70E-04	1.69E-02	2.18E-02	9.57E-06	2.34E-09	4.76E-13	0.00E+00
8.540E+02	5	2.90E-11	9.70E-08	9.91E-07	1.72E-04	3.34E-03	8.81E-03	6.40E-06	2.82E-09	9.95E-13	0.00E+00
7.320E+02	4	2.58E-12	1.86E-08	3.31E-07	9.33E-05	4.56E-03	8.85E-03	6.72E-06	3.08E-09	1.12E-12	0.00E+00
5.490E+02	3	1.79E-13	3.12E-09	7.86E-08	4.50E-05	6.82E-03	8.21E-03	6.32E-06	2.93E-09	1.07E-12	0.00E+00
3.050E+02	2	2.75E-15	6.99E-10	6.97E-07	7.29E-05	7.89E-03	6.82E-03	4.98E-06	2.21E-09	7.75E-13	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	56	57	58	59	60	61	62	63	64	65
X =	2.87E+03	2.99E+03	3.11E+03	3.23E+03	3.35E+03	3.48E+03	3.60E+03	3.72E+03	3.84E+03	3.96E+03

..*.*.*.*.*.*.*.*. C - SPECIES CONCENTRATION..... FOR PLANE K = 13 AT STEP 6601, TIME= 1.6223E+04 .*.*.*.*.*.*.*.*.*.*

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.89E-30	3.72E-27	1.08E-25	1.54E-24
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E-27	7.94E-25	2.30E-23	3.24E-22
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.39E-26	6.53E-23	1.87E-21	2.58E-20
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.77E-24	2.97E-21	8.35E-20	1.13E-18
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.81E-23	7.86E-20	2.16E-18	2.84E-17
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.47E-21	1.20E-18	3.18E-17	4.04E-16
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-20	1.53E-17	3.86E-16	4.64E-15
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.92E-19	1.61E-16	3.77E-15	4.19E-14
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.65E-18	1.37E-15	2.85E-14	2.83E-13
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.10E-18	7.11E-15	1.20E-13	1.02E-12
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.90E-17	1.87E-14	2.33E-13	1.65E-12
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.20E-15	1.05E-14	8.68E-14	5.45E-13
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.97E-15	2.06E-14	1.85E-13	1.18E-12
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.60E-17	2.41E-14	2.57E-13	1.70E-12
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.82E-17	4.04E-14	4.34E-13	2.85E-12
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.62E-16	6.02E-14	6.47E-13	4.24E-12
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.97E-16	8.06E-14	8.77E-13	5.73E-12
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.25E-15	1.03E-13	1.11E-12	7.26E-12
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.21E-15	1.31E-13	1.37E-12	8.74E-12
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.62E-15	1.56E-13	1.71E-12	9.57E-12
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.68E-15	1.77E-13	2.39E-12	1.28E-11
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.48E-15	1.84E-13	3.35E-12	1.12E-11
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.15E-15	1.77E-13	4.09E-12	5.25E-12
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.52E-15	2.03E-13	3.94E-12	4.04E-12
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.95E-15	1.52E-13	2.65E-12	2.61E-12
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.82E-15	6.68E-14	1.20E-12	1.18E-12
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.39E-16	1.61E-14	3.17E-13	3.39E-13
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	1	2	3	4	5	6	7	8	9	10	11
X =	0.00E+00	1.83E+02	3.66E+02	4.88E+02	5.49E+02	6.10E+02	6.71E+02	7.02E+02	7.32E+02	7.63E+02	7.93E+02

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	1.42E-23	9.67E-23	5.15E-22	2.26E-21	8.51E-21	2.87E-20	8.85E-20	2.47E-19	6.12E-19	1.38E-18	3.22E-18
2.501E+03	40	2.96E-21	1.97E-20	1.03E-19	4.42E-19	1.65E-18	5.56E-18	1.72E-17	4.77E-17	1.15E-16	2.56E-16	6.76E-16
2.379E+03	39	2.30E-19	1.50E-18	7.64E-18	3.17E-17	1.15E-16	3.83E-16	1.16E-15	3.07E-15	6.65E-15	1.40E-14	4.40E-14
2.257E+03	38	9.88E-18	6.28E-17	3.10E-16	1.25E-15	4.46E-15	1.47E-14	4.36E-14	1.06E-13	1.83E-13	3.61E-13	1.49E-12
2.196E+03	37	2.41E-16	1.49E-15	7.11E-15	2.78E-14	1.01E-13	3.47E-13	1.06E-12	2.50E-12	3.08E-12	5.72E-12	3.42E-11
2.135E+03	36	3.29E-15	1.95E-14	8.93E-14	3.37E-13	1.26E-12	4.60E-12	1.47E-11	3.37E-11	3.39E-11	4.68E-11	4.55E-10
2.074E+03	35	3.57E-14	1.99E-13	8.59E-13	3.07E-12	1.20E-11	4.62E-11	1.56E-10	3.75E-10	2.67E-10	2.50E-09	4.65E-09
2.013E+03	34	3.00E-13	1.55E-12	6.06E-12	1.98E-11	8.02E-11	3.02E-10	9.47E-10	2.10E-09	1.42E-09	1.00E-08	1.69E-08
1.952E+03	33	1.84E-12	8.68E-12	3.07E-11	8.86E-11	3.63E-10	1.14E-09	2.96E-09	5.54E-09	3.67E-09	1.61E-08	2.58E-08
1.922E+03	32	5.93E-12	2.59E-11	9.51E-11	3.01E-10	4.65E-10	8.36E-10	1.65E-09	2.74E-09	3.06E-09	6.45E-09	1.87E-08

9 3 1 2 3 5 2 9 4 3

1.891E+03	31	8.44E-12	3.41E-11	1.29E-10	3.91E-10	6.59E-10	1.40E-09	3.10E-09	4.91E-09	5.05E-09	1.32E-08	3.08E-08
1.861E+03	30	2.71E-12	1.13E-11	4.09E-11	1.70E-10	5.78E-10	1.65E-09	4.14E-09	7.07E-09	8.02E-09	2.04E-08	4.41E-08
1.830E+03	29	5.88E-12	2.43E-11	8.77E-11	2.83E-10	8.37E-10	2.24E-09	5.47E-09	1.08E-08	1.54E-08	3.32E-08	6.03E-08
1.800E+03	28	8.58E-12	3.56E-11	1.29E-10	4.10E-10	1.16E-09	2.99E-09	7.29E-09	1.70E-08	3.51E-08	5.43E-08	8.61E-08
1.769E+03	27	1.42E-11	5.79E-11	2.05E-10	6.27E-10	1.69E-09	4.27E-09	1.03E-08	2.43E-08	5.40E-08	8.71E-08	1.46E-07
1.739E+03	26	2.10E-11	8.39E-11	2.94E-10	8.75E-10	2.26E-09	5.68E-09	1.41E-08	3.45E-08	8.09E-08	1.50E-07	2.79E-07
1.708E+03	25	2.83E-11	1.11E-10	3.86E-10	1.16E-09	2.80E-09	7.28E-09	1.94E-08	5.07E-08	1.27E-07	2.97E-07	6.08E-07
1.678E+03	24	3.62E-11	1.36E-10	4.70E-10	1.61E-09	4.08E-09	1.07E-08	3.04E-08	8.31E-08	2.12E-07	5.10E-07	9.81E-07
1.647E+03	23	4.46E-11	1.51E-10	5.33E-10	2.12E-09	6.05E-09	1.75E-08	5.16E-08	1.41E-07	3.55E-07	8.46E-07	1.55E-06
1.617E+03	22	5.08E-11	1.32E-10	6.02E-10	3.24E-09	1.15E-08	3.56E-08	1.03E-07	2.71E-07	6.54E-07	1.47E-06	2.09E-06
1.586E+03	21	6.66E-11	1.08E-10	1.31E-09	1.56E-08	6.63E-08	2.03E-07	5.44E-07	1.34E-06	3.09E-06	6.78E-06	1.39E-05
1.556E+03	20	8.80E-11	1.90E-10	2.44E-09	1.87E-08	6.76E-08	1.94E-07	4.95E-07	1.17E-06	2.59E-06	5.42E-06	1.07E-05
1.525E+03	19	1.10E-10	1.54E-09	6.77E-09	2.18E-08	6.11E-08	1.55E-07	3.68E-07	8.20E-07	1.73E-06	3.47E-06	6.64E-06
1.495E+03	18	8.15E-11	9.89E-10	4.23E-09	1.35E-08	3.73E-08	9.27E-08	2.12E-07	4.56E-07	9.24E-07	1.78E-06	3.30E-06
1.464E+03	17	5.11E-11	5.64E-10	2.28E-09	7.00E-09	1.85E-08	4.42E-08	9.73E-08	2.00E-07	3.88E-07	7.16E-07	1.27E-06
1.434E+03	16	2.52E-11	2.43E-10	9.03E-10	2.62E-09	6.61E-09	1.51E-08	3.16E-08	6.16E-08	1.13E-07	1.99E-07	3.36E-07
1.403E+03	15	6.62E-12	4.03E-11	1.70E-10	4.99E-10	1.23E-09	2.69E-09	5.36E-09	9.89E-09	1.71E-08	2.83E-08	4.55E-08
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 12 13 14 15 16 17 18 19 20 21 22

X = 8.24E+02 8.54E+02 8.85E+02 9.15E+02 9.46E+02 9.76E+02 1.01E+03 1.04E+03 1.07E+03 1.10E+03 1.13E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	1.14E-17	4.88E-17	1.53E-16	6.86E-16	2.20E-15	2.83E-15	3.53E-15	4.28E-15	5.08E-15	5.90E-15	1.20E-11
2.501E+03	40	3.58E-15	1.89E-14	6.08E-14	4.43E-13	2.53E-12	1.53E-11	7.17E-11	2.40E-10	6.90E-10	3.68E-09	7.29E-09
2.379E+03	39	3.26E-13	1.74E-12	4.72E-12	3.35E-11	1.53E-10	8.46E-10	3.27E-09	8.60E-09	2.39E-08	8.90E-08	1.43E-07
2.257E+03	38	1.35E-11	6.44E-11	2.16E-10	1.03E-09	3.47E-09	1.84E-08	5.29E-08	9.41E-08	2.51E-07	6.56E-07	8.85E-07
2.196E+03	37	3.13E-10	1.26E-09	5.98E-09	2.39E-08	8.99E-08	1.35E-07	2.03E-07	3.14E-07	5.11E-07	9.05E-07	1.60E-06
2.135E+03	36	3.12E-09	1.23E-08	3.75E-08	1.12E-07	2.93E-07	3.88E-07	5.74E-07	9.18E-07	1.53E-06	2.56E-06	4.21E-06
2.074E+03	35	9.47E-09	2.03E-08	4.37E-08	9.29E-08	2.11E-07	4.49E-07	9.42E-07	1.84E-06	3.37E-06	5.85E-06	9.67E-06
2.013E+03	34	3.24E-08	6.70E-08	1.41E-07	2.91E-07	5.64E-07	1.04E-06	2.20E-06	4.23E-06	7.54E-06	1.28E-05	2.07E-05
1.952E+03	33	5.20E-08	1.14E-07	2.50E-07	5.26E-07	9.00E-07	9.94E-07	4.65E-06	9.42E-06	1.64E-05	2.70E-05	4.31E-05
1.922E+03	32	5.22E-08	1.32E-07	3.09E-07	6.87E-07	1.32E-06	1.83E-06	6.66E-06	1.41E-05	2.62E-05	4.58E-05	7.44E-05
1.891E+03	31	7.28E-08	1.72E-07	3.98E-07	9.14E-07	2.01E-06	4.23E-06	9.43E-06	2.00E-05	3.84E-05	6.79E-05	1.10E-04
1.861E+03	30	9.82E-08	2.27E-07	5.47E-07	1.33E-06	3.08E-06	6.90E-06	1.54E-05	3.26E-05	5.98E-05	1.02E-04	1.65E-04
1.830E+03	29	1.20E-07	2.57E-07	6.60E-07	1.78E-06	4.44E-06	1.04E-05	2.37E-05	4.96E-05	7.93E-05	1.37E-04	2.39E-04
1.800E+03	28	1.70E-07	3.43E-07	8.74E-07	2.54E-06	6.59E-06	1.57E-05	3.60E-05	7.14E-05	8.64E-05	1.94E-04	6.31E-04
1.769E+03	27	2.98E-07	5.77E-07	1.46E-06	4.14E-06	1.06E-05	2.47E-05	5.49E-05	1.07E-04	1.25E-04	2.94E-04	8.67E-04
1.739E+03	26	5.57E-07	9.80E-07	2.30E-06	6.16E-06	1.51E-05	3.34E-05	7.32E-05	1.47E-04	2.65E-04	4.24E-04	6.32E-04
1.708E+03	25	1.03E-06	1.59E-06	3.45E-06	8.42E-06	1.86E-05	4.07E-05	9.09E-05	1.88E-04	3.59E-04	6.31E-04	9.36E-04
1.678E+03	24	1.10E-06	2.05E-06	4.97E-06	1.04E-05	1.92E-05	4.68E-05	1.20E-04	2.69E-04	5.33E-04	9.28E-04	1.01E-03
1.647E+03	23	1.86E-06	4.12E-06	9.90E-06	1.49E-05	1.93E-05	7.85E-05	3.84E-04	1.04E-03	2.26E-03	4.35E-03	7.78E-03
1.617E+03	22	4.40E-06	1.82E-05	4.67E-05	7.01E-05	1.52E-04	3.31E-04	6.83E-04	1.33E-03	2.47E-03	4.34E-03	7.20E-03
1.586E+03	21	1.79E-05	3.32E-05	5.95E-05	7.60E-05	1.30E-04	2.57E-04	5.09E-04	9.56E-04	1.74E-03	3.02E-03	4.95E-03
1.556E+03	20	1.92E-05	3.47E-05	5.77E-05	6.27E-05	7.88E-05	1.44E-04	2.83E-04	5.33E-04	9.73E-04	1.68E-03	2.76E-03
1.525E+03	19	1.21E-05	2.12E-05	3.38E-05	3.48E-05	4.05E-05	7.01E-05	1.35E-04	2.51E-04	4.52E-04	7.78E-04	1.27E-03
1.495E+03	18	5.85E-06	9.93E-06	1.53E-05	1.52E-05	1.67E-05	2.68E-05	4.82E-05	8.65E-05	1.51E-04	2.57E-04	4.22E-04
1.464E+03	17	2.17E-06	3.56E-06	5.28E-06	5.09E-06	5.35E-06	7.72E-06	1.21E-05	2.05E-05	3.44E-05	5.97E-05	1.02E-04
1.434E+03	16	5.52E-07	8.78E-07	1.35E-06	1.91E-06	2.72E-06	3.89E-06	4.14E-06	5.95E-06	7.31E-06	1.16E-05	1.89E-05
1.403E+03	15	7.15E-08	1.10E-07	1.66E-07	2.45E-07	3.55E-07	4.88E-07	4.86E-07	6.54E-07	7.47E-07	1.14E-06	1.83E-06
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 23 24 25 26 27 28 29 30 31 32 33

X = 1.16E+03 1.19E+03 1.22E+03 1.25E+03 1.28E+03 1.31E+03 1.34E+03 1.37E+03 1.40E+03 1.43E+03 1.46E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	1.95E-10	7.46E-10	2.39E-09	4.75E-09	1.06E-08	1.75E-08	2.33E-08	2.71E-08	5.96E-08	7.53E-08	8.68E-08
2.501E+03	40	1.33E-08	2.31E-08	3.97E-08	8.49E-08	2.03E-07	3.41E-07	4.72E-07	5.45E-07	1.21E-06	1.60E-06	1.82E-06
2.379E+03	39	2.21E-07	3.39E-07	5.36E-07	1.11E-06	2.55E-06	3.99E-06	5.89E-06	6.06E-06	1.23E-05	1.74E-05	2.08E-05
2.257E+03	38	1.24E-06	1.82E-06	2.86E-06	5.94E-06	1.33E-05	1.94E-05	2.61E-05	3.10E-05	6.26E-05	9.60E-05	1.30E-04
2.196E+03	37	2.69E-06	4.32E-06	7.02E-06	1.14E-05	1.88E-05	2.89E-05	4.02E-05	9.99E-05	2.93E-04	4.25E-04	5.63E-04
2.135E+03	36	6.54E-06	9.61E-06	1.61E-05	2.63E-05	4.06E-05	5.95E-05	8.17E-05	1.86E-04	5.57E-04	8.89E-04	1.30E-03

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2.074E+03	35	1.38E-05	1.47E-05	3.94E-05	6.69E-05	9.86E-05	1.37E-04	1.85E-04	3.35E-04	9.22E-04	1.84E-03	3.03E-03
2.013E+03	34	2.97E-05	3.50E-05	7.52E-05	1.21E-04	1.77E-04	2.54E-04	3.34E-04	5.63E-04	1.50E-03	3.06E-03	5.78E-03
1.952E+03	33	6.43E-05	9.31E-05	1.38E-04	2.06E-04	2.98E-04	4.66E-04	5.61E-04	6.85E-04	6.86E-03	2.24E-02	2.86E-02
1.922E+03	32	1.07E-04	1.55E-04	2.28E-04	3.45E-04	4.70E-04	7.02E-04	8.22E-04	1.02E-03	1.29E-02	3.90E-02	5.01E-02
1.891E+03	31	1.56E-04	2.15E-04	2.99E-04	4.77E-04	6.04E-04	7.65E-04	7.96E-04	3.49E-03	3.04E-02	5.77E-02	7.03E-02
1.861E+03	30	2.30E-04	2.77E-04	4.68E-04	8.76E-04	1.50E-03	2.50E-03	4.29E-03	1.62E-02	5.63E-02	9.18E-02	1.03E-01
1.830E+03	29	3.38E-04	3.99E-04	7.96E-04	1.42E-03	2.76E-03	4.98E-03	9.14E-03	3.01E-02	9.17E-02	1.41E-01	1.45E-01
1.800E+03	28	9.22E-04	1.82E-03	3.33E-03	6.20E-03	9.71E-03	1.44E-02	2.22E-02	5.55E-02	1.41E-01	1.95E-01	1.81E-01
1.769E+03	27	1.19E-03	1.97E-03	2.71E-03	4.22E-03	6.86E-03	1.10E-02	1.87E-02	5.59E-02	1.65E-01	1.62E-01	1.90E-01
1.739E+03	26	8.79E-04	1.15E-03	1.29E-03	1.60E-03	3.24E-03	6.90E-03	1.47E-02	5.82E-02	2.00E-01	1.97E-01	2.30E-01
1.708E+03	25	1.43E-03	2.02E-03	2.13E-03	2.62E-03	5.91E-03	1.28E-02	2.62E-02	8.96E-02	2.75E-01	2.44E-01	2.70E-01
1.678E+03	24	2.32E-03	6.35E-03	1.01E-02	1.28E-02	2.01E-02	3.27E-02	5.46E-02	1.40E-01	3.53E-01	2.66E-01	2.78E-01
1.647E+03	23	1.25E-02	1.85E-02	2.50E-02	2.80E-02	3.74E-02	5.26E-02	7.77E-02	1.67E-01	3.67E-01	2.35E-01	2.34E-01
1.617E+03	22	1.12E-02	1.63E-02	2.18E-02	2.43E-02	3.22E-02	4.50E-02	6.60E-02	1.40E-01	2.83E-01	1.65E-01	1.60E-01
1.586E+03	21	7.67E-03	1.11E-02	1.48E-02	1.65E-02	2.18E-02	3.05E-02	4.45E-02	9.41E-02	1.07E-01	9.57E-02	9.20E-02
1.556E+03	20	4.29E-03	6.23E-03	8.31E-03	9.24E-03	1.22E-02	1.71E-02	2.49E-02	5.27E-02	5.50E-02	4.88E-02	4.64E-02
1.525E+03	19	1.96E-03	2.86E-03	3.82E-03	4.25E-03	5.63E-03	7.90E-03	1.16E-02	2.49E-02	2.44E-02	2.12E-02	1.98E-02
1.495E+03	18	6.61E-04	9.80E-04	1.33E-03	1.48E-03	1.99E-03	2.82E-03	4.19E-03	9.37E-03	8.63E-03	7.23E-03	6.59E-03
1.464E+03	17	1.64E-04	2.50E-04	3.49E-04	3.96E-04	5.27E-04	7.37E-04	1.12E-03	2.58E-03	2.15E-03	1.74E-03	1.56E-03
1.434E+03	16	2.99E-05	4.55E-05	6.59E-05	8.90E-05	1.19E-04	1.42E-04	2.10E-04	4.53E-04	3.23E-04	2.54E-04	2.30E-04
1.403E+03	15	2.87E-06	4.38E-06	6.41E-06	9.04E-06	1.21E-05	1.43E-05	2.30E-05	4.18E-05	2.57E-05	2.03E-05	2.02E-05
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	34	35	36	37	38	39	40	41	42	43	44
X =	1.49E+03	1.52E+03	1.56E+03	1.59E+03	1.62E+03	1.65E+03	1.68E+03	1.71E+03	1.77E+03	1.83E+03	1.89E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	1.12E-07	1.59E-07	1.10E-07	1.20E-07	8.70E-08	1.02E-07	1.60E-07	3.02E-07	1.57E-07	1.30E-07	8.40E-08
2.501E+03	40	2.31E-06	2.55E-06	2.49E-06	2.85E-06	2.17E-06	1.67E-06	1.64E-06	2.28E-06	1.85E-06	3.20E-05	2.72E-05
2.379E+03	39	2.19E-05	2.25E-05	2.73E-05	2.45E-05	2.15E-05	1.91E-05	1.57E-05	1.52E-05	1.33E-04	2.64E-04	2.25E-04
2.257E+03	38	1.61E-04	1.84E-04	2.24E-04	1.98E-04	1.79E-04	2.03E-04	2.37E-04	2.31E-04	1.02E-03	1.34E-03	1.08E-03
2.196E+03	37	7.19E-04	8.46E-04	1.08E-03	1.07E-03	1.01E-03	1.08E-03	1.93E-03	3.36E-03	6.98E-03	6.99E-03	5.53E-03
2.135E+03	36	1.87E-03	2.22E-03	2.75E-03	2.76E-03	2.69E-03	3.41E-03	8.51E-03	1.59E-02	2.31E-02	2.09E-02	1.68E-02
2.074E+03	35	4.86E-03	5.57E-03	6.26E-03	6.90E-03	6.99E-03	1.26E-02	3.04E-02	5.14E-02	5.73E-02	4.89E-02	4.02E-02
2.013E+03	34	9.82E-03	1.31E-02	1.70E-02	2.06E-02	2.23E-02	4.29E-02	9.09E-02	1.36E-01	1.65E-01	1.55E-01	1.28E-01
1.952E+03	33	3.29E-02	4.17E-02	5.35E-02	6.28E-02	6.54E-02	1.15E-01	2.16E-01	2.85E-01	2.97E-01	2.75E-01	2.30E-01
1.922E+03	32	6.02E-02	8.74E-02	1.18E-01	1.34E-01	1.34E-01	2.18E-01	3.79E-01	4.57E-01	4.43E-01	3.76E-01	3.20E-01
1.891E+03	31	9.36E-02	1.63E-01	2.14E-01	2.22E-01	2.10E-01	3.21E-01	5.29E-01	6.04E-01	5.53E-01	4.46E-01	3.78E-01
1.861E+03	30	1.29E-01	2.18E-01	2.91E-01	3.00E-01	2.79E-01	4.28E-01	6.92E-01	7.67E-01	6.64E-01	5.64E-01	4.90E-01
1.830E+03	29	1.74E-01	2.82E-01	3.69E-01	3.75E-01	3.47E-01	5.38E-01	8.59E-01	9.05E-01	7.50E-01	5.88E-01	5.30E-01
1.800E+03	28	2.13E-01	3.40E-01	4.28E-01	4.32E-01	4.07E-01	6.55E-01	1.02E+00	1.01E+00	8.23E-01	6.11E-01	5.47E-01
1.769E+03	27	2.36E-01	3.83E-01	4.37E-01	4.62E-01	4.70E-01	7.70E-01	1.15E+00	1.07E+00	9.05E-01	6.67E-01	5.23E-01
1.739E+03	26	2.79E-01	4.21E-01	4.67E-01	4.89E-01	4.91E-01	7.92E-01	1.15E+00	1.03E+00	8.42E-01	6.24E-01	4.73E-01
1.708E+03	25	3.10E-01	4.14E-01	4.69E-01	5.15E-01	4.98E-01	7.80E-01	1.11E+00	9.43E-01	7.23E-01	5.24E-01	3.81E-01
1.678E+03	24	3.01E-01	3.44E-01	4.47E-01	5.55E-01	4.75E-01	7.36E-01	1.02E+00	7.84E-01	5.90E-01	3.92E-01	2.92E-01
1.647E+03	23	2.44E-01	2.61E-01	2.99E-01	3.87E-01	3.31E-01	5.51E-01	7.80E-01	5.78E-01	4.32E-01	2.82E-01	2.10E-01
1.617E+03	22	1.64E-01	1.74E-01	1.89E-01	2.27E-01	1.99E-01	3.70E-01	5.28E-01	3.76E-01	2.79E-01	1.98E-01	1.48E-01
1.586E+03	21	9.40E-02	9.94E-02	1.07E-01	1.25E-01	1.09E-01	1.98E-01	3.04E-01	2.17E-01	1.61E-01	1.16E-01	9.05E-02
1.556E+03	20	4.70E-02	4.93E-02	5.27E-02	5.96E-02	5.14E-02	9.49E-02	1.46E-01	9.97E-02	7.29E-02	5.36E-02	4.24E-02
1.525E+03	19	1.97E-02	2.04E-02	2.21E-02	2.24E-02	1.96E-02	3.90E-02	5.87E-02	3.88E-02	2.83E-02	2.12E-02	1.69E-02
1.495E+03	18	6.45E-03	6.62E-03	7.49E-03	7.27E-03	6.16E-03	1.14E-02	1.76E-02	1.17E-02	8.71E-03	6.87E-03	5.63E-03
1.464E+03	17	1.51E-03	1.54E-03	1.75E-03	1.65E-03	1.36E-03	2.41E-03	3.65E-03	2.40E-03	1.90E-03	1.68E-03	1.48E-03
1.434E+03	16	2.27E-04	2.33E-04	2.58E-04	2.38E-04	1.90E-04	3.09E-04	4.46E-04	2.87E-04	2.39E-04	2.27E-04	2.10E-04
1.403E+03	15	2.14E-05	2.26E-05	2.36E-05	2.03E-05	1.52E-05	2.08E-05	2.61E-05	1.61E-05	1.38E-05	1.41E-05	1.86E-05
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.23E-33	1.58E-06
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.25E-34	2.25E-07
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.76E-36	3.96E-08
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E-36	6.64E-09
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.51E-37	1.14E-09
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.44E-38	2.25E-10
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.32E-39	3.90E-11
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.64E-12
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.85E-13
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.00E-15
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.46E-16
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.84E-18
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	45	46	47	48	49	50	51	52	53	54	55
X =	1.95E+03	2.01E+03	2.07E+03	2.13E+03	2.20E+03	2.26E+03	2.32E+03	2.38E+03	2.50E+03	2.62E+03	2.74E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	7.22E-08	4.98E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	1.92E-05	1.04E-05	3.62E-06	6.40E-07	1.57E-07	5.16E-08	2.17E-08	1.18E-08	1.04E-08	0.00E+00	

9 3 1 2 3 5 2 0 9 4 5

2.379E+03	39	1.57E-04	8.96E-05	3.84E-05	1.20E-05	3.88E-06	1.45E-06	6.50E-07	3.70E-07	2.94E-07	0.00E+00
2.257E+03	38	7.35E-04	4.30E-04	2.04E-04	7.81E-05	2.80E-05	1.07E-05	4.74E-06	2.62E-06	2.15E-06	0.00E+00
2.196E+03	37	3.55E-03	1.94E-03	8.90E-04	3.21E-04	1.06E-04	3.81E-05	1.56E-05	7.98E-06	5.48E-06	0.00E+00
2.135E+03	36	1.15E-02	6.75E-03	3.24E-03	1.25E-03	4.19E-04	1.50E-04	5.88E-05	2.78E-05	2.73E-05	0.00E+00
2.074E+03	35	2.94E-02	1.83E-02	9.48E-03	4.09E-03	1.47E-03	5.46E-04	2.13E-04	9.12E-05	5.59E-05	0.00E+00
2.013E+03	34	9.45E-02	5.60E-02	2.94E-02	1.34E-02	5.00E-03	1.91E-03	7.35E-04	2.76E-04	3.64E-04	0.00E+00
1.952E+03	33	1.73E-01	1.09E-01	6.00E-02	2.86E-02	1.10E-02	4.29E-03	1.62E-03	5.31E-04	3.67E-04	0.00E+00
1.922E+03	32	2.46E-01	1.60E-01	9.12E-02	4.48E-02	1.77E-02	7.01E-03	2.57E-03	5.18E-03	1.22E-04	0.00E+00
1.891E+03	31	3.03E-01	2.11E-01	1.30E-01	6.74E-02	2.79E-02	1.15E-02	4.14E-03	5.14E-03	1.21E-04	0.00E+00
1.861E+03	30	3.93E-01	2.79E-01	1.80E-01	9.81E-02	4.29E-02	1.90E-02	1.86E-02	8.94E-12	8.31E-14	0.00E+00
1.830E+03	29	4.50E-01	3.41E-01	2.37E-01	1.36E-01	6.36E-02	3.04E-02	3.00E-02	5.61E-12	7.48E-18	0.00E+00
1.800E+03	28	4.79E-01	3.87E-01	2.96E-01	1.80E-01	9.02E-02	4.63E-02	6.24E-02	8.58E-05	1.89E-08	0.00E+00
1.769E+03	27	4.71E-01	3.96E-01	3.21E-01	2.12E-01	1.18E-01	6.53E-02	6.30E-02	8.61E-05	1.95E-08	0.00E+00
1.739E+03	26	4.36E-01	3.86E-01	3.28E-01	2.33E-01	1.45E-01	8.70E-02	8.69E-02	1.42E-11	2.01E-17	0.00E+00
1.708E+03	25	3.72E-01	3.52E-01	3.12E-01	2.40E-01	1.67E-01	1.09E-01	1.64E-01	1.75E-04	3.45E-08	0.00E+00
1.678E+03	24	2.92E-01	2.95E-01	2.78E-01	2.33E-01	1.83E-01	1.29E-01	1.57E-01	1.77E-04	3.59E-08	0.00E+00
1.647E+03	23	2.20E-01	2.34E-01	2.34E-01	2.13E-01	1.90E-01	1.46E-01	1.48E-01	2.19E-11	2.52E-17	0.00E+00
1.617E+03	22	1.68E-01	1.82E-01	1.89E-01	1.86E-01	1.89E-01	1.58E-01	2.66E-01	2.16E-04	3.83E-08	0.00E+00
1.586E+03	21	1.08E-01	1.30E-01	1.43E-01	1.53E-01	1.81E-01	1.65E-01	2.51E-01	2.19E-04	4.01E-08	0.00E+00
1.556E+03	20	5.75E-02	8.19E-02	9.95E-02	1.19E-01	1.67E-01	1.68E-01	1.75E-01	2.32E-11	1.94E-17	0.00E+00
1.525E+03	19	2.49E-02	4.56E-02	6.32E-02	8.70E-02	1.49E-01	1.66E-01	3.04E-01	1.49E-04	2.26E-08	0.00E+00
1.495E+03	18	8.32E-03	2.26E-02	3.77E-02	6.02E-02	1.29E-01	1.61E-01	2.91E-01	1.52E-04	2.39E-08	0.00E+00
1.464E+03	17	1.59E-03	1.40E-02	2.31E-02	4.03E-02	1.10E-01	1.54E-01	1.82E-01	1.84E-11	6.80E-18	0.00E+00
1.434E+03	16	3.22E-04	7.37E-03	1.35E-02	2.59E-02	9.19E-02	1.41E-01	2.05E-04	3.67E-08	4.16E-12	0.00E+00
1.403E+03	15	6.03E-05	3.44E-03	7.50E-03	1.62E-02	7.56E-02	1.32E-01	2.07E-04	3.85E-08	4.52E-12	0.00E+00
1.373E+03	14	1.07E-05	1.50E-03	4.04E-03	9.87E-03	6.14E-02	6.50E-02	6.94E-12	1.25E-17	1.17E-21	0.00E+00
1.342E+03	13	2.27E-06	5.14E-04	2.39E-03	7.10E-03	5.08E-02	9.24E-02	4.88E-05	7.66E-09	9.12E-13	0.00E+00
1.312E+03	12	6.29E-07	1.76E-04	1.07E-03	5.17E-03	4.43E-02	8.75E-02	5.04E-05	8.17E-09	9.94E-13	0.00E+00
1.281E+03	11	1.51E-07	5.41E-05	3.69E-04	4.08E-03	4.21E-02	4.60E-02	3.95E-12	1.62E-18	1.80E-22	0.00E+00
1.220E+03	10	3.44E-08	1.54E-05	1.19E-04	3.74E-03	3.51E-02	2.43E-02	9.12E-06	2.20E-09	4.28E-13	0.00E+00
1.159E+03	9	8.62E-09	4.89E-06	4.10E-05	2.92E-03	2.76E-02	2.50E-02	9.89E-06	2.38E-09	4.70E-13	0.00E+00
1.098E+03	8	2.26E-09	1.72E-06	1.59E-05	1.99E-03	2.01E-02	2.22E-02	1.67E-12	2.23E-19	3.86E-23	0.00E+00
1.037E+03	7	5.02E-10	6.69E-07	6.92E-06	1.18E-03	1.57E-02	1.42E-02	5.48E-06	1.34E-09	2.65E-13	0.00E+00
9.760E+02	6	1.49E-10	2.98E-07	2.73E-06	4.65E-04	8.77E-03	1.32E-02	6.06E-06	1.49E-09	3.04E-13	0.00E+00
8.540E+02	5	3.13E-11	1.01E-07	8.42E-07	1.03E-04	2.15E-03	6.06E-03	4.76E-06	2.12E-09	7.48E-13	0.00E+00
7.320E+02	4	2.76E-12	2.28E-08	3.10E-07	5.06E-05	1.95E-03	6.22E-03	5.03E-06	2.33E-09	8.47E-13	0.00E+00
5.490E+02	3	1.93E-13	4.17E-09	7.49E-08	2.27E-05	4.32E-03	6.27E-03	5.01E-06	2.34E-09	8.55E-13	0.00E+00
3.050E+02	2	7.91E-15	7.65E-10	2.69E-07	4.23E-05	5.60E-03	5.40E-03	4.06E-06	1.82E-09	6.38E-13	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	56	57	58	59	60	61	62	63	64	65
X =	2.87E+03	2.99E+03	3.11E+03	3.23E+03	3.35E+03	3.48E+03	3.60E+03	3.72E+03	3.84E+03	3.96E+03

--*-*-*-*-*-*-*-*- C - SPECIES CONCENTRATION..... POR PLANE K = 14 AT STEP 6601, TIME= 1.6223E+04 -*-*-*-*-*-*-*-*-*-*

Y	J										
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.01E-31	1.53E-28	4.60E-27	6.73E-26
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.10E-29	3.18E-26	9.47E-25	1.37E-23
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.19E-27	2.52E-24	7.39E-23	1.05E-21
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.36E-25	1.10E-22	3.16E-21	4.40E-20
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.31E-24	2.72E-21	7.65E-20	1.04E-18
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.64E-23	3.91E-20	1.06E-18	1.39E-17
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.42E-22	4.67E-19	1.21E-17	1.49E-16
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.19E-21	4.57E-18	1.10E-16	1.25E-15
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.04E-20	3.61E-17	7.71E-16	7.85E-15
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.90E-19	1.69E-16	2.97E-15	2.64E-14
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.56E-19	4.69E-16	6.60E-15	5.06E-14
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.76E-20	9.71E-16	1.05E-14	7.19E-14
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.51E-19	1.63E-15	1.84E-14	1.26E-13
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.46E-18	2.22E-15	2.78E-14	1.96E-13
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.67E-18	3.30E-15	4.19E-14	2.93E-13
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E-17	4.90E-15	6.11E-14	4.24E-13
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.85E-17	6.79E-15	8.32E-14	5.69E-13
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.71E-16	9.21E-15	1.10E-13	7.16E-13
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.50E-16	1.17E-14	1.49E-13	8.58E-13
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.79E-16	1.39E-14	2.26E-13	9.92E-13
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.78E-16	1.57E-14	3.93E-13	1.54E-12
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.50E-16	1.53E-14	5.02E-13	1.63E-12
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.13E-16	1.27E-14	4.90E-13	1.69E-12
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.55E-16	1.50E-14	3.33E-13	1.27E-12
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.26E-16	1.10E-14	2.14E-13	8.00E-13
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.46E-16	4.72E-15	9.41E-14	3.56E-13
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.45E-17	1.12E-15	2.40E-14	9.71E-14
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

9 3 1 2 3 . 2 0 9 4 6

I =	1	2	3	4	5	6	7	8	9	10	11
X =	0.00E+00	1.83E+02	3.66E+02	4.88E+02	5.49E+02	6.10E+02	6.71E+02	7.02E+02	7.32E+02	7.63E+02	7.93E+02

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	6.42E-25	4.50E-24	2.48E-23	1.12E-22	4.37E-22	1.52E-21	4.83E-21	1.39E-20	3.57E-20	8.34E-20	1.95E-19
2.501E+03	40	1.29E-22	8.90E-22	4.80E-21	2.13E-20	8.20E-20	2.85E-19	9.04E-19	2.59E-18	6.45E-18	1.48E-17	3.82E-17
2.379E+03	39	9.68E-21	6.51E-20	3.41E-19	1.46E-18	5.49E-18	1.87E-17	5.80E-17	1.58E-16	3.58E-16	7.72E-16	2.24E-15
2.257E+03	38	3.95E-19	2.59E-18	1.32E-17	5.48E-17	2.01E-16	6.80E-16	2.05E-15	5.12E-15	9.37E-15	1.83E-14	6.63E-14
2.196E+03	37	9.05E-18	5.75E-17	2.83E-16	1.14E-15	4.24E-15	1.49E-14	4.60E-14	1.09E-13	1.34E-13	2.43E-13	1.35E-12
2.135E+03	36	1.16E-16	7.09E-16	3.34E-15	1.30E-14	4.95E-14	1.83E-13	5.92E-13	1.35E-12	1.47E-12	1.90E-12	1.92E-11
2.074E+03	35	1.18E-15	6.80E-15	2.98E-14	1.09E-13	4.35E-13	1.71E-12	5.79E-12	1.36E-11	1.75E-11	2.37E-11	4.11E-10
2.013E+03	34	9.25E-15	4.89E-14	1.91E-13	6.29E-13	2.70E-12	1.06E-11	3.43E-11	7.57E-11	9.60E-11	1.34E-10	1.36E-09
1.952E+03	33	5.27E-14	2.54E-13	8.04E-13	2.27E-12	1.28E-11	4.68E-11	1.31E-10	2.63E-10	3.31E-10	5.02E-10	2.37E-09
1.922E+03	32	1.59E-13	7.09E-13	1.02E-12	1.87E-12	4.35E-11	1.26E-10	2.91E-10	5.50E-10	7.59E-10	1.31E-09	3.17E-09
1.891E+03	31	2.78E-13	1.20E-12	2.78E-12	6.85E-12	5.59E-11	1.66E-10	4.09E-10	7.40E-10	8.61E-10	2.06E-09	5.11E-09
1.861E+03	30	3.83E-13	1.70E-12	6.54E-12	2.14E-11	7.19E-11	2.11E-10	5.48E-10	1.06E-09	1.35E-09	3.11E-09	7.14E-09
1.830E+03	29	6.63E-13	2.89E-12	1.09E-11	3.65E-11	1.11E-10	3.06E-10	7.75E-10	1.66E-09	2.55E-09	5.37E-09	1.10E-08
1.800E+03	28	1.04E-12	4.50E-12	1.70E-11	5.62E-11	1.64E-10	4.38E-10	1.10E-09	2.61E-09	5.32E-09	9.52E-09	1.76E-08
1.769E+03	27	1.53E-12	6.50E-12	2.39E-11	7.77E-11	2.17E-10	5.57E-10	1.38E-09	3.33E-09	7.63E-09	1.44E-08	2.80E-08
1.739E+03	26	2.20E-12	9.17E-12	3.35E-11	1.11E-10	2.92E-10	7.28E-10	1.81E-09	4.52E-09	1.09E-08	2.27E-08	4.78E-08
1.708E+03	25	2.93E-12	1.20E-11	4.35E-11	1.67E-10	3.93E-10	9.37E-10	2.40E-09	6.27E-09	1.60E-08	3.90E-08	8.81E-08
1.678E+03	24	3.67E-12	1.44E-11	5.28E-11	2.78E-10	6.47E-10	1.51E-09	4.00E-09	1.08E-08	2.81E-08	6.97E-08	1.57E-07
1.647E+03	23	4.27E-12	1.61E-11	5.58E-11	3.41E-10	8.64E-10	2.19E-09	6.06E-09	1.64E-08	4.22E-08	1.04E-07	2.70E-07
1.617E+03	22	4.52E-12	1.82E-11	5.03E-11	3.54E-10	1.03E-09	2.76E-09	7.59E-09	1.98E-08	4.90E-08	1.22E-07	4.72E-07
1.586E+03	21	6.43E-12	3.27E-11	9.76E-11	3.40E-10	1.30E-09	3.99E-09	1.09E-08	2.75E-08	6.53E-08	1.49E-07	3.31E-07
1.556E+03	20	5.58E-12	4.13E-11	1.61E-10	5.18E-10	1.70E-09	4.93E-09	1.29E-08	3.14E-08	7.14E-08	1.53E-07	3.11E-07
1.525E+03	19	6.12E-12	3.12E-11	1.50E-10	5.08E-10	1.48E-09	3.90E-09	9.52E-09	2.18E-08	4.73E-08	9.76E-08	1.92E-07
1.495E+03	18	5.27E-12	2.27E-11	9.19E-11	3.06E-10	8.80E-10	2.28E-09	5.37E-09	1.19E-08	2.48E-08	4.93E-08	9.43E-08
1.464E+03	17	3.27E-12	1.28E-11	4.81E-11	1.54E-10	4.23E-10	1.05E-09	2.40E-09	5.09E-09	1.02E-08	1.94E-08	3.56E-08
1.434E+03	16	1.54E-12	5.53E-12	1.88E-11	5.61E-11	1.47E-10	3.49E-10	7.57E-10	1.53E-09	2.90E-09	5.26E-09	9.20E-09
1.403E+03	15	4.34E-13	1.35E-12	3.83E-12	1.06E-11	2.65E-11	6.02E-11	1.24E-10	2.38E-10	4.27E-10	7.33E-10	1.22E-09
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	12	13	14	15	16	17	18	19	20	21	22
X =	8.24E+02	8.54E+02	8.85E+02	9.15E+02	9.46E+02	9.76E+02	1.01E+03	1.04E+03	1.07E+03	1.10E+03	1.13E+03

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	6.34E-19	2.56E-18	8.10E-18	3.29E-17	1.06E-16	1.46E-16	1.95E-16	2.53E-16	3.20E-16	3.96E-16	8.30E-13
2.501E+03	40	1.78E-16	9.02E-16	3.03E-15	1.86E-14	1.07E-13	7.51E-13	3.94E-12	1.42E-11	2.84E-11	6.24E-11	8.16E-10
2.379E+03	39	1.44E-14	7.53E-14	2.13E-13	1.20E-12	5.60E-12	3.97E-11	1.82E-10	5.47E-10	1.07E-09	2.24E-09	1.58E-08
2.257E+03	38	5.41E-13	2.66E-12	8.98E-12	3.18E-11	1.00E-10	8.84E-10	3.40E-09	8.15E-09	1.69E-08	3.33E-08	1.13E-07
2.196E+03	37	1.21E-11	5.27E-11	2.42E-10	4.75E-10	9.54E-10	1.30E-08	3.32E-08	6.50E-08	1.19E-07	2.04E-07	3.55E-07
2.135E+03	36	1.43E-10	5.85E-10	1.85E-09	3.73E-09	7.41E-09	3.75E-08	8.39E-08	1.59E-07	2.88E-07	5.07E-07	8.69E-07
2.074E+03	35	1.33E-09	3.34E-09	7.73E-09	1.71E-08	3.54E-08	7.28E-08	1.53E-07	3.13E-07	6.08E-07	1.12E-06	1.95E-06
2.013E+03	34	3.91E-09	9.12E-09	2.00E-08	4.24E-08	8.38E-08	1.52E-07	3.25E-07	6.85E-07	1.34E-06	2.47E-06	4.29E-06
1.952E+03	33	6.35E-09	1.50E-08	3.39E-08	7.33E-08	1.33E-07	1.71E-07	5.62E-07	1.38E-06	2.81E-06	5.16E-06	8.90E-06
1.922E+03	32	8.04E-09	1.96E-08	4.56E-08	1.03E-07	2.07E-07	3.19E-07	8.90E-07	2.09E-06	4.32E-06	8.11E-06	1.41E-05
1.891E+03	31	1.21E-08	2.76E-08	6.25E-08	1.42E-07	3.18E-07	6.47E-07	1.44E-06	3.14E-06	6.44E-06	1.19E-05	2.02E-05
1.861E+03	30	1.62E-08	3.46E-08	7.62E-08	1.77E-07	4.12E-07	9.43E-07	2.16E-06	4.78E-06	9.94E-06	1.73E-05	2.80E-05
1.830E+03	29	2.50E-08	4.73E-08	9.73E-08	2.28E-07	5.52E-07	1.32E-06	3.07E-06	6.81E-06	1.55E-05	2.29E-05	3.32E-05
1.800E+03	28	4.42E-08	8.01E-08	1.57E-07	3.69E-07	9.05E-07	2.16E-06	5.02E-06	1.09E-05	2.96E-05	3.82E-05	4.92E-05
1.769E+03	27	7.42E-08	1.32E-07	2.56E-07	5.90E-07	1.42E-06	3.28E-06	7.40E-06	1.57E-05	4.04E-05	5.59E-05	8.12E-05
1.739E+03	26	1.25E-07	2.14E-07	3.97E-07	8.69E-07	2.00E-06	4.40E-06	9.65E-06	2.02E-05	4.06E-05	7.66E-05	1.33E-04
1.708E+03	25	1.96E-07	3.17E-07	5.72E-07	1.18E-06	2.57E-06	5.33E-06	1.15E-05	2.44E-05	4.94E-05	9.43E-05	1.80E-04
1.678E+03	24	2.34E-07	3.83E-07	7.44E-07	1.45E-06	3.21E-06	5.78E-06	1.21E-05	2.67E-05	5.70E-05	1.16E-04	3.06E-04
1.647E+03	23	3.61E-07	5.49E-07	1.01E-06	1.62E-06	4.92E-06	7.93E-06	1.49E-05	3.34E-05	7.32E-05	1.50E-04	3.07E-04
1.617E+03	22	5.31E-07	6.98E-07	1.18E-06	1.35E-06	3.37E-06	8.94E-06	2.09E-05	4.43E-05	8.90E-05	1.67E-04	2.97E-04
1.586E+03	21	3.73E-07	7.70E-07	1.47E-06	1.62E-06	2.96E-06	6.78E-06	1.52E-05	3.11E-05	6.16E-05	1.14E-04	2.00E-04
1.556E+03	20	5.54E-07	1.03E-06	1.69E-06	1.55E-06	1.72E-06	3.55E-06	8.08E-06	1.68E-05	3.34E-05	6.19E-05	1.08E-04
1.525E+03	19	3.58E-07	6.43E-07	1.01E-06	8.96E-07	8.74E-07	1.67E-06	3.71E-06	7.61E-06	1.48E-05	2.74E-05	4.79E-05
1.495E+03	18	1.72E-07	2.98E-07	4.49E-07	3.91E-07	3.54E-07	6.11E-07	1.24E-06	2.45E-06	4.61E-06	8.43E-06	1.48E-05
1.464E+03	17	6.25E-08	1.05E-07	1.54E-07	1.34E-07	1.23E-07	1.77E-07	2.88E-07	5.32E-07	9.50E-07	1.80E-06	3.32E-06
1.434E+03	16	1.56E-08	2.55E-08	3.99E-08	5.56E-08	7.91E-08	1.13E-07	1.04E-07	1.54E-07	1.83E-07	3.22E-07	5.90E-07
1.403E+03	15	1.98E-09	3.13E-09	4.86E-09	7.35E-09	1.09E-08	1.48E-08	1.24E-08	1.66E-08	1.77E-08	3.01E-08	5.47E-08
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	

	I =	23	24	25	26	27	28	29	30	31	32	33
	X =	1.16E+03	1.19E+03	1.22E+03	1.25E+03	1.28E+03	1.31E+03	1.34E+03	1.37E+03	1.40E+03	1.43E+03	1.46E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	1.74E-11	6.96E-11	2.05E-10	9.96E-10	3.32E-09	5.17E-09	7.02E-09	8.82E-09	1.46E-08	1.86E-08	2.27E-08	
2.501E+03	40	2.44E-09	5.25E-09	9.94E-09	2.30E-08	6.34E-08	9.52E-08	1.29E-07	1.59E-07	2.73E-07	3.76E-07	4.57E-07	
2.379E+03	39	3.85E-08	7.19E-08	1.24E-07	2.76E-07	6.92E-07	9.60E-07	1.27E-06	1.44E-06	2.50E-06	3.86E-06	5.12E-06	
2.257E+03	38	2.25E-07	3.81E-07	6.33E-07	1.37E-06	3.18E-06	4.13E-06	5.19E-06	6.04E-06	1.14E-05	2.08E-05	3.20E-05	
2.196E+03	37	6.00E-07	9.70E-07	1.58E-06	2.60E-06	4.37E-06	6.92E-06	9.98E-06	2.18E-05	7.61E-05	1.10E-04	1.51E-04	
2.135E+03	36	1.40E-06	2.08E-06	3.40E-06	5.73E-06	9.33E-06	1.45E-05	2.10E-05	4.45E-05	1.49E-04	2.24E-04	3.26E-04	
2.074E+03	35	3.01E-06	3.67E-06	7.11E-06	1.30E-05	2.12E-05	3.25E-05	4.72E-05	9.69E-05	2.66E-04	4.25E-04	6.66E-04	
2.013E+03	34	6.70E-06	8.67E-06	1.53E-05	2.55E-05	3.97E-05	6.21E-05	8.77E-05	1.74E-04	4.65E-04	7.24E-04	1.14E-03	
1.952E+03	33	1.43E-05	2.18E-05	3.28E-05	4.99E-05	7.34E-05	1.28E-04	1.70E-04	3.20E-04	1.12E-03	1.65E-03	1.71E-03	
1.922E+03	32	2.23E-05	3.57E-05	5.36E-05	8.57E-05	1.19E-04	1.90E-04	2.55E-04	4.64E-04	2.18E-03	3.24E-03	3.43E-03	
1.891E+03	31	3.13E-05	5.34E-05	7.37E-05	1.33E-04	1.74E-04	2.18E-04	3.45E-04	6.97E-04	3.91E-03	5.31E-03	5.73E-03	
1.861E+03	30	4.20E-05	8.67E-05	1.07E-04	2.19E-04	2.68E-04	3.17E-04	4.21E-04	1.72E-03	7.28E-03	9.03E-03	9.55E-03	
1.830E+03	29	4.68E-05	1.02E-04	1.33E-04	3.05E-04	3.97E-04	5.00E-04	7.19E-04	3.16E-03	1.18E-02	1.38E-02	1.45E-02	
1.800E+03	28	6.04E-05	9.52E-05	1.70E-04	3.13E-04	4.98E-04	7.61E-04	1.24E-03	5.42E-03	1.69E-02	1.82E-02	2.10E-02	
1.769E+03	27	1.11E-04	1.69E-04	2.90E-04	3.80E-04	5.02E-04	7.03E-04	1.11E-03	5.37E-03	1.64E-02	1.62E-02	3.27E-02	
1.739E+03	26	2.04E-04	3.00E-04	5.78E-04	6.12E-04	6.56E-04	7.84E-04	1.14E-03	5.86E-03	2.02E-02	2.03E-02	4.04E-02	
1.708E+03	25	2.67E-04	3.92E-04	8.03E-04	8.40E-04	9.11E-04	1.16E-03	1.81E-03	9.09E-03	2.80E-02	2.70E-02	4.80E-02	
1.678E+03	24	3.94E-04	5.11E-04	6.99E-04	8.20E-04	1.16E-03	1.81E-03	3.11E-03	1.39E-02	3.52E-02	3.14E-02	4.94E-02	
1.647E+03	23	5.43E-04	8.59E-04	1.22E-03	1.40E-03	1.92E-03	2.82E-03	4.45E-03	1.65E-02	3.55E-02	2.92E-02	4.16E-02	
1.617E+03	22	4.92E-04	7.56E-04	1.05E-03	1.19E-03	1.62E-03	2.36E-03	3.69E-03	1.32E-02	2.60E-02	2.08E-02	2.83E-02	
1.586E+03	21	3.28E-04	5.01E-04	6.91E-04	7.82E-04	1.06E-03	1.55E-03	2.41E-03	6.45E-03	1.01E-02	1.43E-02	1.73E-02	
1.556E+03	20	1.79E-04	2.73E-04	3.76E-04	4.22E-04	5.71E-04	8.37E-04	1.31E-03	3.48E-03	4.24E-03	6.69E-03	8.21E-03	
1.525E+03	19	7.87E-05	1.20E-04	1.65E-04	1.84E-04	2.51E-04	3.70E-04	5.82E-04	1.59E-03	1.81E-03	2.80E-03	3.36E-03	
1.495E+03	18	2.47E-05	3.86E-05	5.42E-05	6.07E-05	8.38E-05	1.25E-04	2.01E-04	5.72E-04	6.19E-04	9.22E-04	1.08E-03	
1.464E+03	17	5.76E-06	9.32E-06	1.35E-05	1.55E-05	2.14E-05	3.14E-05	5.17E-05	1.53E-04	1.53E-04	2.16E-04	2.49E-04	
1.434E+03	16	1.01E-06	1.66E-06	2.55E-06	3.58E-06	4.96E-06	6.01E-06	9.52E-06	2.66E-05	2.41E-05	3.18E-05	3.61E-05	
1.403E+03	15	9.43E-08	1.56E-07	2.43E-07	3.62E-07	4.99E-07	5.84E-07	9.83E-07	2.64E-06	2.13E-06	2.58E-06	3.02E-06	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

	I =	34	35	36	37	38	39	40	41	42	43	44
	X =	1.49E+03	1.52E+03	1.56E+03	1.59E+03	1.62E+03	1.65E+03	1.68E+03	1.71E+03	1.77E+03	1.83E+03	1.89E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	
2.684E+03	41	4.29E-08	4.27E-08	3.77E-08	3.42E-08	3.03E-08	2.77E-08	2.71E-08	5.15E-08	4.99E-08	5.64E-08	4.68E-08	
2.501E+03	40	6.44E-07	9.12E-07	8.32E-07	7.44E-07	6.34E-07	5.37E-07	4.93E-07	7.55E-07	8.25E-07	2.59E-05	2.06E-05	
2.379E+03	39	5.84E-06	6.38E-06	8.16E-06	8.33E-06	8.11E-06	7.52E-06	6.50E-06	5.71E-06	5.16E-05	2.07E-04	1.65E-04	
2.257E+03	38	4.35E-05	5.28E-05	6.87E-05	6.99E-05	6.80E-05	6.96E-05	7.69E-05	7.77E-05	3.04E-04	6.33E-04	5.75E-04	
2.196E+03	37	2.02E-04	2.49E-04	3.37E-04	3.63E-04	3.69E-04	3.94E-04	7.08E-04	1.25E-03	2.60E-03	3.47E-03	3.02E-03	
2.135E+03	36	4.96E-04	6.38E-04	8.52E-04	9.39E-04	9.78E-04	1.23E-03	3.79E-03	6.77E-03	1.04E-02	1.13E-02	9.68E-03	
2.074E+03	35	1.22E-03	1.61E-03	1.99E-03	2.35E-03	2.53E-03	4.04E-03	1.39E-02	2.27E-02	3.02E-02	2.87E-02	2.45E-02	
2.013E+03	34	2.30E-03	3.52E-03	5.09E-03	6.78E-03	7.83E-03	1.33E-02	3.90E-02	5.65E-02	6.65E-02	6.63E-02	6.33E-02	
1.952E+03	33	4.96E-03	9.25E-03	1.45E-02	1.96E-02	2.24E-02	3.59E-02	8.77E-02	1.13E-01	1.22E-01	1.21E-01	1.16E-01	
1.922E+03	32	9.62E-03	1.93E-02	3.09E-02	4.07E-02	4.49E-02	6.85E-02	1.46E-01	1.73E-01	1.76E-01	1.70E-01	1.65E-01	
1.891E+03	31	1.54E-02	3.30E-02	5.13E-02	6.39E-02	6.75E-02	9.93E-02	1.94E-01	2.17E-01	2.13E-01	2.03E-01	1.97E-01	
1.861E+03	30	2.23E-02	4.44E-02	6.84E-02	8.41E-02	8.76E-02	1.29E-01	2.42E-01	2.60E-01	2.46E-01	2.28E-01	2.34E-01	
1.830E+03	29	3.09E-02	5.78E-02	8.61E-02	1.04E-01	1.07E-01	1.58E-01	2.87E-01	2.96E-01	2.71E-01	2.39E-01	2.50E-01	
1.800E+03	28	4.05E-02	7.12E-02	1.01E-01	1.19E-01	1.23E-01	1.85E-01	3.24E-01	3.19E-01	2.83E-01	2.35E-01	2.49E-01	
1.769E+03	27	5.18E-02	8.36E-02	1.09E-01	1.29E-01	1.35E-01	2.07E-01	3.46E-01	3.24E-01	2.82E-01	2.31E-01	2.16E-01	
1.739E+03	26	6.13E-02	9.26E-02	1.17E-01	1.36E-01	1.40E-01	2.13E-01	3.39E-01	3.04E-01	2.55E-01	2.11E-01	1.92E-01	
1.708E+03	25	6.77E-02	9.29E-02	1.15E-01	1.36E-01	1.38E-01	2.11E-01	3.11E-01	2.66E-01	2.13E-01	1.73E-01	1.54E-01	
1.678E+03	24	6.50E-02	8.04E-02	1.02E-01	1.27E-01	1.23E-01	2.03E-01	2.62E-01	2.08E-01	1.65E-01	1.29E-01	1.15E-01	
1.647E+03	23	5.18E-02	6.10E-02	7.15E-02	8.73E-02	8.35E-02	1.47E-01	1.95E-01	1.48E-01	1.16E-01	8.87E-02	7.44E-02	
1.617E+03	22	3.43E-02	3.95E-02	4.50E-02	5.24E-02	4.99E-02	9.53E-02	1.26E-01	9.25E-02	7.13E-02	5.60E-02	4.64E-02	
1.586E+03	21	1.98E-02	2.23E-02	2.49E-02	2.85E-02	2.68E-02	5.01E-02	6.91E-02	5.00E-02	3.85E-02	3.07E-02	2.65E-02	
1.556E+03	20	9.42E-03	1.06E-02	1.18E-02	1.32E-02	1.23E-02	2.35E-02	3.20E-02	2.27E-02	1.73E-02	1.39E-02	1.22E-02	
1.525E+03	19	3.80E-03	4.22E-03	4.71E-03	5.05E-03	4.65E-03	9.46E-03	1.26E-02	8.63E-03	6.57E-03	5.37E-03	4.74E-03	
1.495E+03	18	1.20E-03	1.32E-03	1.50E-03	1.58E-03	1.44E-03	2.77E-03	3.68E-03	2.50E-03	1.94E-03	1.64E-03	1.48E-03	
1.464E+03	17	2.73E-04	2.98E-04	3.39E-04	3.51E-04	3.12E-04	5.80E-04	7.50E-04	5.05E-04	4.10E-04	3.83E-04	3.73E-04	
1.434E+03	16	3.98E-05	4.38E-05	4.97E-05	5.04E-05	4.37E-05	7.61E-05	9.25E-05	6.16E-05	5.22E-05	5.18E-05	5.25E-05	
1.403E+03	15	3.49E-06	4.00E-06	4.50E-06	4.37E-06	3.62E-06	5.48E-06	5.81E-06	3.78E-06	3.28E-06	3.43E-06	5.02E-06	
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.51E-34	4.65E-07
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.95E-35	7.01E-08
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.86E-36	1.45E-08
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.04E-37	2.82E-09
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.92E-38	5.45E-10
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.38E-38	1.17E-10
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.94E-39	2.15E-11

9 3 1 2 3 2 0 9 4 8

1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.75E-12
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.06E-13
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.62E-15
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.02E-16
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.91E-18
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	45	46	47	48	49	50	51	52	53	54	55
X =	1.95E+03	2.01E+03	2.07E+03	2.13E+03	2.20E+03	2.26E+03	2.32E+03	2.38E+03	2.50E+03	2.62E+03	2.74E+03

Y	J										
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	4.19E-08	2.98E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	1.41E-05	7.42E-06	2.48E-06	4.31E-07	1.03E-07	3.34E-08	1.38E-08	7.44E-09	6.50E-09	0.00E+00
2.379E+03	39	1.13E-04	6.25E-05	2.60E-05	7.95E-06	2.52E-06	9.26E-07	4.10E-07	2.30E-07	1.82E-07	0.00E+00
2.257E+03	38	4.24E-04	2.57E-04	1.24E-04	4.77E-05	1.71E-05	6.55E-06	2.88E-06	1.58E-06	1.30E-06	0.00E+00
2.196E+03	37	2.07E-03	1.16E-03	5.38E-04	1.96E-04	6.50E-05	2.32E-05	9.49E-06	4.81E-06	3.29E-06	0.00E+00
2.135E+03	36	6.93E-03	4.13E-03	2.00E-03	7.71E-04	2.59E-04	9.21E-05	3.59E-05	1.69E-05	1.66E-05	0.00E+00
2.074E+03	35	1.83E-02	1.15E-02	5.95E-03	2.53E-03	9.06E-04	3.35E-04	1.30E-04	5.52E-05	3.36E-05	0.00E+00
2.013E+03	34	5.12E-02	3.24E-02	1.77E-02	8.05E-03	3.02E-03	1.15E-03	4.42E-04	1.66E-04	2.19E-04	0.00E+00
1.952E+03	33	9.46E-02	6.25E-02	3.55E-02	1.69E-02	6.57E-03	2.55E-03	9.59E-04	3.13E-04	2.20E-04	0.00E+00
1.922E+03	32	1.36E-01	9.21E-02	5.37E-02	2.63E-02	1.04E-02	4.11E-03	1.50E-03	3.12E-03	7.24E-05	0.00E+00
1.891E+03	31	1.69E-01	1.23E-01	7.65E-02	3.94E-02	1.63E-02	6.69E-03	2.40E-03	3.09E-03	7.16E-05	0.00E+00
1.861E+03	30	2.08E-01	1.57E-01	1.04E-01	5.68E-02	2.48E-02	1.10E-02	1.07E-02	5.54E-12	5.00E-14	0.00E+00
1.830E+03	29	2.33E-01	1.87E-01	1.34E-01	7.75E-02	3.63E-02	1.73E-02	1.71E-02	3.49E-12	4.41E-18	0.00E+00
1.800E+03	28	2.42E-01	2.08E-01	1.63E-01	1.00E-01	5.07E-02	2.60E-02	3.58E-02	5.05E-05	1.10E-08	0.00E+00
1.769E+03	27	2.28E-01	2.10E-01	1.78E-01	1.18E-01	6.60E-02	3.64E-02	3.58E-02	5.06E-05	1.14E-08	0.00E+00
1.739E+03	26	2.08E-01	2.03E-01	1.81E-01	1.31E-01	8.06E-02	4.81E-02	4.82E-02	8.66E-12	1.18E-17	0.00E+00
1.708E+03	25	1.77E-01	1.85E-01	1.73E-01	1.35E-01	9.26E-02	5.99E-02	9.20E-02	1.01E-04	1.99E-08	0.00E+00
1.678E+03	24	1.38E-01	1.55E-01	1.55E-01	1.31E-01	1.01E-01	7.03E-02	8.77E-02	1.02E-04	2.07E-08	0.00E+00
1.647E+03	23	9.92E-02	1.21E-01	1.30E-01	1.20E-01	1.04E-01	7.89E-02	8.02E-02	1.31E-11	1.46E-17	0.00E+00
1.617E+03	22	6.18E-02	8.78E-02	1.03E-01	1.04E-01	1.02E-01	8.48E-02	1.47E-01	1.23E-04	2.17E-08	0.00E+00
1.586E+03	21	3.51E-02	5.91E-02	7.56E-02	8.48E-02	9.67E-02	8.76E-02	1.38E-01	1.24E-04	2.27E-08	0.00E+00
1.556E+03	20	1.69E-02	3.60E-02	5.17E-02	6.53E-02	8.79E-02	8.80E-02	9.16E-02	1.35E-11	1.10E-17	0.00E+00
1.525E+03	19	6.82E-03	1.99E-02	3.28E-02	4.75E-02	7.72E-02	8.61E-02	1.65E-01	8.24E-05	1.25E-08	0.00E+00
1.495E+03	18	2.24E-03	9.99E-03	1.96E-02	3.28E-02	6.60E-02	8.27E-02	1.57E-01	8.44E-05	1.32E-08	0.00E+00
1.464E+03	17	4.97E-04	4.53E-03	1.13E-02	2.18E-02	5.51E-02	7.81E-02	9.31E-02	1.04E-11	3.82E-18	0.00E+00
1.434E+03	16	9.82E-05	1.91E-03	6.33E-03	1.39E-02	4.52E-02	7.10E-02	1.11E-04	2.00E-08	2.28E-12	0.00E+00
1.403E+03	15	1.73E-05	7.67E-04	3.44E-03	8.63E-03	3.65E-02	6.57E-02	1.11E-04	2.10E-08	2.47E-12	0.00E+00
1.373E+03	14	3.11E-06	3.19E-04	1.93E-03	5.28E-03	2.91E-02	3.06E-02	3.64E-12	6.84E-18	6.40E-22	0.00E+00
1.342E+03	13	6.73E-07	1.11E-04	1.01E-03	3.21E-03	2.35E-02	4.44E-02	2.40E-05	3.81E-09	4.54E-13	0.00E+00
1.312E+03	12	1.88E-07	4.31E-05	5.16E-04	1.91E-03	1.98E-02	4.19E-02	2.48E-05	4.05E-09	4.94E-13	0.00E+00
1.281E+03	11	4.67E-08	1.44E-05	2.13E-04	1.05E-03	1.71E-02	1.90E-02	1.81E-12	8.18E-19	9.10E-23	0.00E+00
1.220E+03	10	1.11E-08	4.44E-06	7.39E-05	7.21E-04	1.34E-02	1.15E-02	4.55E-06	1.13E-09	2.25E-13	0.00E+00
1.159E+03	9	2.86E-09	1.52E-06	2.80E-05	5.21E-04	1.03E-02	1.14E-02	4.93E-06	1.23E-09	2.47E-13	0.00E+00
1.098E+03	8	7.62E-10	5.67E-07	1.12E-05	3.99E-04	8.14E-03	8.96E-03	7.18E-13	9.68E-20	1.70E-23	0.00E+00
1.037E+03	7	1.84E-10	2.29E-07	4.89E-06	2.48E-04	5.61E-03	4.06E-03	1.56E-06	3.83E-10	7.63E-14	0.00E+00
9.760E+02	6	7.79E-11	1.46E-07	1.91E-06	1.20E-04	3.22E-03	3.82E-03	1.72E-06	4.27E-10	8.76E-14	0.00E+00
8.540E+02	5	1.84E-11	8.17E-08	6.71E-07	4.57E-05	1.43E-03	2.25E-03	2.12E-06	9.51E-10	3.37E-13	0.00E+00
7.320E+02	4	1.74E-12	2.33E-08	2.83E-07	2.44E-05	9.43E-04	2.37E-03	2.22E-06	1.05E-09	3.82E-13	0.00E+00
5.490E+02	3	1.28E-13	3.96E-09	6.09E-08	9.01E-06	1.70E-03	2.72E-03	2.35E-06	1.12E-09	4.10E-13	0.00E+00
3.050E+02	2	6.25E-15	6.66E-10	9.39E-08	1.51E-05	2.30E-03	2.50E-03	1.98E-06	8.96E-10	3.17E-13	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	56	57	58	59	60	61	62	63	64	65
X =	2.87E+03	2.99E+03	3.11E+03	3.23E+03	3.35E+03	3.48E+03	3.60E+03	3.72E+03	3.84E+03	3.96E+03

--*-*-*-*-*-*-*-*-*-*-*- C - SPECIES CONCENTRATION..... FOR PLANE K = 15 AT STEP 6601, TIME= 1.6223E+04 -*-*-*-*-*-*-*-*-*-*-*-*-*

Y	J											
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 1 2 3 4 5 6 7 8 9 10 11

X = 0.00E+00 1.83E+02 3.66E+02 4.88E+02 5.49E+02 6.10E+02 6.71E+02 7.02E+02 7.32E+02 7.63E+02 7.93E+02

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I = 12 13 14 15 16 17 18 19 20 21 22

X = 8.24E+02 8.54E+02 8.85E+02 9.15E+02 9.46E+02 9.76E+02 1.01E+03 1.04E+03 1.07E+03 1.10E+03 1.13E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

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1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	23	24	25	26	27	28	29	30	31	32	33
X =	1.16E+03	1.19E+03	1.22E+03	1.25E+03	1.28E+03	1.31E+03	1.34E+03	1.37E+03	1.40E+03	1.43E+03	1.46E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	34	35	36	37	38	39	40	41	42	43	44
X =	1.49E+03	1.52E+03	1.56E+03	1.59E+03	1.62E+03	1.65E+03	1.68E+03	1.71E+03	1.77E+03	1.83E+03	1.89E+03

Y	J												
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.220E+03	10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
7.320E+02	4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
0.000E+00	1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

I =	45	46	47	48	49	50	51	52	53	54	55
X =	1.95E+03	2.01E+03	2.07E+03	2.13E+03	2.20E+03	2.26E+03	2.32E+03	2.38E+03	2.50E+03	2.62E+03	2.74E+03

Y	J										
2.928E+03	42	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.684E+03	41	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.501E+03	40	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.379E+03	39	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.257E+03	38	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.196E+03	37	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.135E+03	36	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.074E+03	35	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
2.013E+03	34	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.952E+03	33	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.922E+03	32	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.891E+03	31	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.861E+03	30	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.830E+03	29	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.800E+03	28	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.769E+03	27	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.739E+03	26	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.708E+03	25	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.678E+03	24	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.647E+03	23	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.617E+03	22	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.586E+03	21	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.556E+03	20	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.525E+03	19	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.495E+03	18	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.464E+03	17	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.434E+03	16	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.403E+03	15	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.373E+03	14	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.342E+03	13	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.312E+03	12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.281E+03	11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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1.159E+03	9	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.098E+03	8	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
1.037E+03	7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
9.760E+02	6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
8.540E+02	5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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5.490E+02	3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3.050E+02	2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
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I =	56	57	58	59	60	61	62	63	64	65
X =	2.87E+03	2.99E+03	3.11E+03	3.23E+03	3.35E+03	3.48E+03	3.60E+03	3.72E+03	3.84E+03	3.96E+03

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---> SIMULATION TIME OF STORED DATA: 1.622E+04
---> STEP NUMBER AT WHICH GENERATED: 6601

---> WRITING VARIABLE: P - PRESSURE OR PRESSURE HEAD
---> WRITING VARIABLE: C - SPECIES CONCENTRATION.....

====> DATA SET NUMBER: 2 WRITTEN TO c:\pfo\3z402020.arc

1100-EM-1 Groundwater Model

SYMBOL	NAME	MIN. VALUE	MAX. VALUE	SCALE
X	TIME	0.000E+00	1.622E+04	3.000E+03

9 3 1 2 3 2 0 9 1 2

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  1  C( 10, 17, 10)   0.000E+00  9.330E+02
  2  C( 24, 19, 10)   0.000E+00  1.206E+02
  3  C( 36, 21, 10)   0.000E+00  5.863E+01
  4  C( 10, 17, 11)   0.000E+00  9.455E+02
     ALL Y-AXES       0.000E+00  9.455E+02  2.000E+02

NOTES: 1. ACTUAL VALUE = MIN. VALUE + PRINTED VALUE * SCALE
       2. SCALE IS IN UNITS PER INCH

        0.0      1.0      2.0      3.0      4.0      5.0      6.0
X 0.000  4........+.........+.........+.........+.........+.........+.
X 0.167  4                                                        .
X 0.333  4                                                        .
X 0.500  3                                14        4             .
X 0.667  32          4       4                                    .
X 0.833  3 22    41      4                                        .
X 1.000  3   22    4  4                                           +
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X 1.667  .33 4244 44                                               .
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X 2.167  4  32                                                    .
X 2.333  4  3                                                     .
X 2.500  4 23                                                     .
X 2.667  423                                                      .
X 2.833  423                                                      .
X 3.000  423                                                      +
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FOR TRANSIENT OR STEADY STATE ANALYSIS OF
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IN VARIABLY SATURATED POROUS OR FRACTURED MEDIA

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DATE OF RUN: 10/20/92 - TIME OF RUN: 13:04:31.6

ELAPSED TIME FOR THIS CASE : 27.06 MINUTES
TIME PER GRID NODE PER STEP: 0.49 MILLISECONDS
TIME PER NODE-STEP-EQUATION: 0.24 MILLISECONDS
2 EQUATIONS SOLVED AT 40950 NODES FOR 81 STEPS

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APPENDIX I

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U.S. Bureau of Land Management

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Washington Department of Ecology
Washington Department of Wildlife
Washington Department of Health
Washington State Historic Preservation Officer
Nuclear Waste Advisory Council

Honorable Slade Gorton, U.S. Senate
Honorable (1) , U.S. Senate
Honorable (1) , U.S. House of Representatives

Honorable (1) , Washington State Representative
Honorable (1) , Washington State Representative
Honorable (1) , Washington State Senate

Benton County Commissioners
Benton County Planning Commission

City of Richland
City of Kennewick

Confederated Tribes of the Warm Springs
Nez Perce Tribe
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Confederated Tribes of the Umatilla Indian Reservation

Tri-City Herald

(1) Individuals receiving the report will be dependent upon the outcome of local elections.

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APPENDIX J

LAND USE

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1.0 INTRODUCTION

The land within the boundary of the 1100-EM-1 Operable Unit is currently used for industrial-related purposes and forms the center of a larger industrial complex (the Tri-Cities Science and Technology Park). The land use and facility planning process that the Department of Energy (DOE) undertakes at Hanford has identified a continuing and long-range industrial use for the land within the 1100-EM-1 Operable Unit. This planning process is detailed and systematic, as described in the subsequent sections, and may be relied upon as accurately reflecting the use of the land for the next 20 years. The planning by DOE is consistent with the long-range planning by the local governments, as described in the following sections. In the event that DOE surpluses the property, the land use would remain industrial because of its location within a much larger industrial area.

2.0 DESCRIPTION OF 1100-EM-1 AND ADJACENT LAND

The land within the 1100-EM-1 Operable Unit is used for vehicle maintenance and warehouse activities. The majority of the land is undeveloped. Immediately to the east of the 1100-EM-1 are the Battelle Pacific Northwest Laboratory office complex, Kaiser offices, lay-down yard and staging areas (part of the DOE 3000 Area), and several office buildings (principally used by Westinghouse Hanford Company). Farther to the east is a well-established development with numerous professional, research, utility, and manufacturing firms including offices for the Port of Benton, Washington Public Power Supply System, and Westinghouse Hanford Company. To the west of the 1100-EM-1 Operable Unit is an area of mixed types of industrial and commercial uses which includes light industrial, commercial, the Richland Airport, Siemens Power Corporation (reactor fuel rod fabrication facility), and the Richland sanitary landfill. The adjacent property to the east and west has significant areas of vacant or undeveloped land. The Hanford Reservation extends from the 1100 Area to the north. The south tip of the 1100 Area touches on the boundary of a residential area.

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3.0 SITE DEVELOPMENT PLANNING PROCESS

3.1 GENERAL

The ultimate disposition of land in the 1100-EM-1 Operable Unit will depend upon the results of a Hanford Remedial Action Environmental Impact Statement. The completion of this process is not anticipated until the year 1995. In this report, the available data from the City of Richland and DOE's Hanford planning functions will be used to assess future land use because information from the Hanford Remedial Action Environmental Impact Statement is not yet available. Land use and future development of sites within Hanford are controlled through a systematic process that considers the needs for Pacific Northwest Laboratory, Kaiser Engineers Hanford, and Hanford Environmental Health Foundation. It also considers the needs of all work activities such as cleanup, solid and liquid waste disposal, waste processing, research and development, transportation, and utilities. Facility and utility location is coordinated with the Hanford Site Selection Review Team (also see appendix O). State and local agency development plans are an integral part of the land

use development. Key agencies consulted in the plan development include the Benton-Franklin Governmental Conference, the Washington State Department of Transportation, the Port of Benton, the City of Richland, and Benton and Franklin Counties. Because of its adjoining property and ongoing planning activities for these areas, the City of Richland has played an especially important role in the planning for the 1100 Area.

3.2 HANFORD SITE DEVELOPMENT PLANNING

Physical development at the Hanford Site is guided by area development plans. These plans address the present conditions, projected activities for the next 5 years, and future vision for the next 20 years at Hanford. These development plans are updated annually to reflect changing land use, developmental conditions, and new concepts. Planning for the 300 Area is guided by the *Draft Hanford 300 Area Development Plan*, DOE/RL-91-09 (DOE-RL, 1991), which contains specific details of future facility development of the 300 Area. Site planning in this document includes the area downgradient from Horn Rapids Landfill. Land use plans for the Horn Rapids Landfill and 1100 Area west of Stevens Drive are described in the *Draft Hanford Site Development Plan*, DOE/RL-92-20 (DOE-RL, 1992). This document shows the planned use of these areas. A development plan is being written to address detailed plans for the 1100 Area east of Stevens Drive. This plan is scheduled to be submitted to DOE for review in December 1992.

Presently, land use plans are developed by the Westinghouse Hanford Site Planning Group with review and approvals from Westinghouse Hanford Company, Pacific Northwest Laboratory, Kaiser Engineers Hanford, Hanford Environmental Health Foundation and the RL Site Infrastructure Division in accordance with DOE Order 4320.1B, Site Development Planning. Site-selection activities (location of development) are coordinated through the Hanford Site Selection Review Team, which is composed of representatives from each Hanford site contractor and from a number of departments within the operating contractor's organization. The development and administration of these activities is performed by the Westinghouse Hanford Site Planning Group under the jurisdiction of the RL Site Infrastructure Division.

3.3 STATE AND LOCAL AGENCY PLANNING

Several City of Richland planning activities involve planning for the areas adjacent to the 300 and 1100 Areas. These activities include participation in the Tri-Cities Science and Technology Park, zoning and conceptual planning, and implementation of the Washington State Growth Management Act. Land use planning for these adjacent areas is important in the evaluation of land use at Hanford because it shows the 1100 Area as located within a larger industrial area. Also, in the event that DOE surpluses property in the 1100 Area, the land use would continue to be industrial in accordance with the use of adjacent property.

4.0 PRESENT AND FUTURE LAND USE

4.1 HANFORD 300 AREA DEVELOPMENT PLAN

4.1.1 Existing Missions and Land Use

Future land use of the 300 Area is based, to a significant degree, upon present land use and mission. The area considered in this planning includes the south part of the 300 Area which is the area directly downgradient of the Horn Rapids Landfill. Presently, the 300 Area is integral to two primary missions (DOE/RL, 1991):

- To clean up the Hanford Site, eliminate potential risks to the public, and serve as the DOE's model in environmental restoration.
- To provide facilities for research, development, demonstration, testing, and evaluation to support the following:
  - Hanford Site environmental restoration and waste management programs.
  - National environmental restoration and waste management programs.
  - Molecular programs on waste and ecological processes.
  - Environmental programs on subsurface and global processes.
  - National energy strategy programs on energy efficiency.
  - Fluid dynamics programs.
  - Space power and transmission programs.

All of the current uses are consistent with industrial land use.

4.1.2 Five-Year Projects

Projects that will require construction of a new facility or significantly affect land use development in the 300 Area during the next 5 years consist of the following (DOE/RL, 1991):

- Research and Development of Office of Environmental Restoration and Waste Management Projects.
- Research and Development of Programmatic Projects.
- Research and Development of Multiprogram Energy Laboratories-Facilities Support Projects.

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- Landlord Program Projects.
- Solid and Liquid Waste Remediation Projects.

A detailed list of 300 Area projects is provided in the *Draft Hanford 300 Area Development Plan*, DOE/RL-91-09 (DOE-RL, 1991). All 5-year projects are consistent with industrial land use.

4.1.3 Long-Range Projects

The long-range projects identified in the *Draft Hanford 300 Area Development Plan* have varying degrees of probability and programmatic clarity. The listing of a project does not mean or imply that it has or will have the approval of the DOE or a DOE contractor. The following list of speculative projects is only for envisioning the long-range development in the 300 Area (DOE-RL, 1991):

- Engineering Test Laboratory.
- Environmental Research Laboratory.
- Special Analysis Facility.
- Waste Systems Performance Analysis Center.
- George Washington Way Road Improvements.
- Advanced Reactor Development Laboratory.
- Space Power Generator Development.
- Q Avenue Road Extension.
- East-West Road Creation.
- Material Sciences and Thin Film Membranes.
- Chemical Sciences Laboratory.
- Isotope Production and Packaging Facility.
- Port of Benton Boulevard Extension.

Facility location and associated transportation development is shown on figure J-1. All long-range land use of the 300 Area is consistent with industrial use.

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Figure J-1. 300 Area Master Plan

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4.2 HANFORD 600 AREA DEVELOPMENT PLAN

The 600 Area, for site planning purposes, included the Horn Rapids Landfill area. Future use of the Horn Rapids Landfill is anticipated to be for research and development (DOE-RL, 1992) and is consistent with industrial use (figure J-2).

4.3 DRAFT 1100 AREA SITE DEVELOPMENT PLAN

The 1100 Area is defined, for site planning purposes, as the area south of Horn Rapids Road and west of Stevens Drive. It presently serves as an industrial area for shipping, receiving, and vehicle maintenance activities. The long-range vision for this area is an operations support (industrial) use (figure J-2). Long-range operations are anticipated to be industrial in nature.

The site development plan for the 1100 Area is in progress and is scheduled for DOE review in December 1992. Work to date on this plan indicates that the present, 5-year, and future use of this land will be industrial. Assembly of a list of the construction projects to be initiated during the next 5 years is at a preliminary stage, but includes the following for the 1100 Area:

- Power supply substation for the Environmental and Molecular Sciences Laboratory.
- Repairing of roadways.
- Demolition 1166 building.
- Modernization of bus lot.
- Bus sweep rack (cleaning facility).
- Upgrade railroad tracks.

The list of long-range construction projects is incomplete at this time, but includes the following:

- Connection with City of Richland street extensions (figure J-3).
- Traffic light installation for City of Richland street extensions.

The present bus and warehouse activities are anticipated to continue into the future and will continue to determine DOE's industrial use of the 1100 Area.

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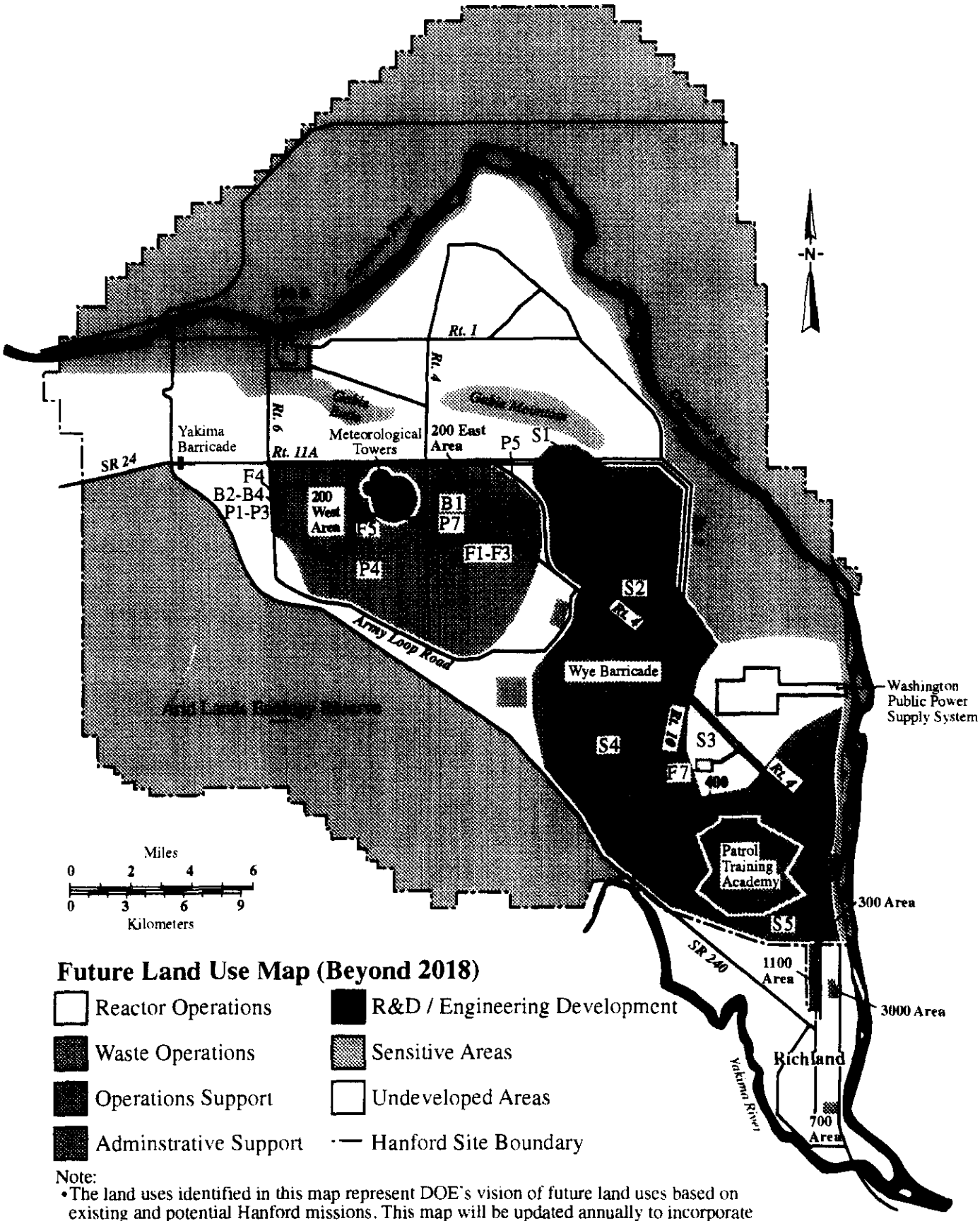

Future Land Use Map (Beyond 2018)

- Reactor Operations
- Waste Operations
- Operations Support
- Adminstrative Support
- R&D / Engineering Development
- Sensitive Areas
- Undeveloped Areas
- Hanford Site Boundary

Note:
- The land uses identified in this map represent DOE's vision of future land uses based on existing and potential Hanford missions. This map will be updated annually to incorporate decisions made by the Hanford Remedial Action Environmental Impact Statement, other NEPA or regulatory decision documents, mission changes, and other sources as appropriate.

Figure J-2. Draft Hanford Site Development Plan

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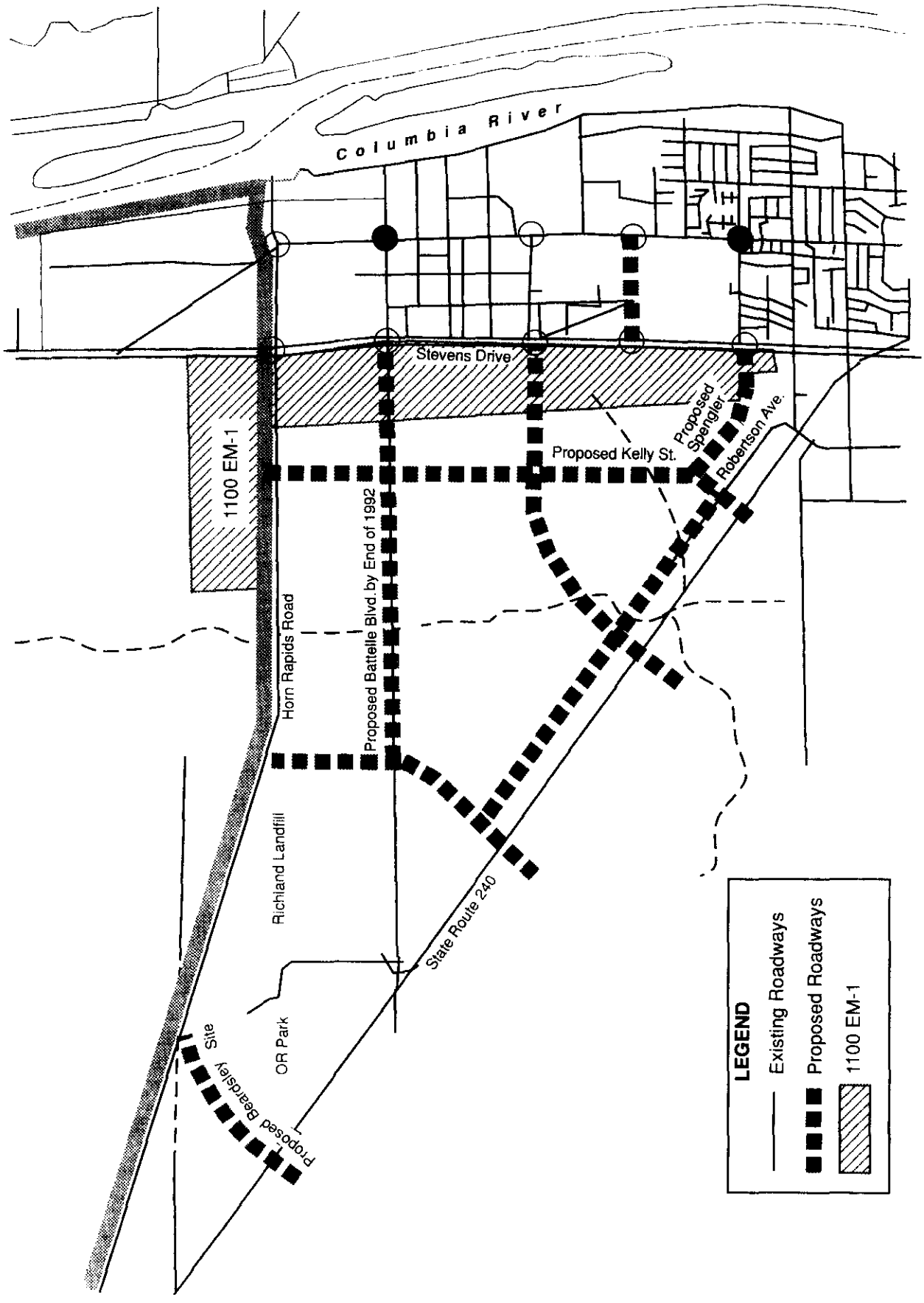

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Figure J-3. City of Richland Street Extension Map

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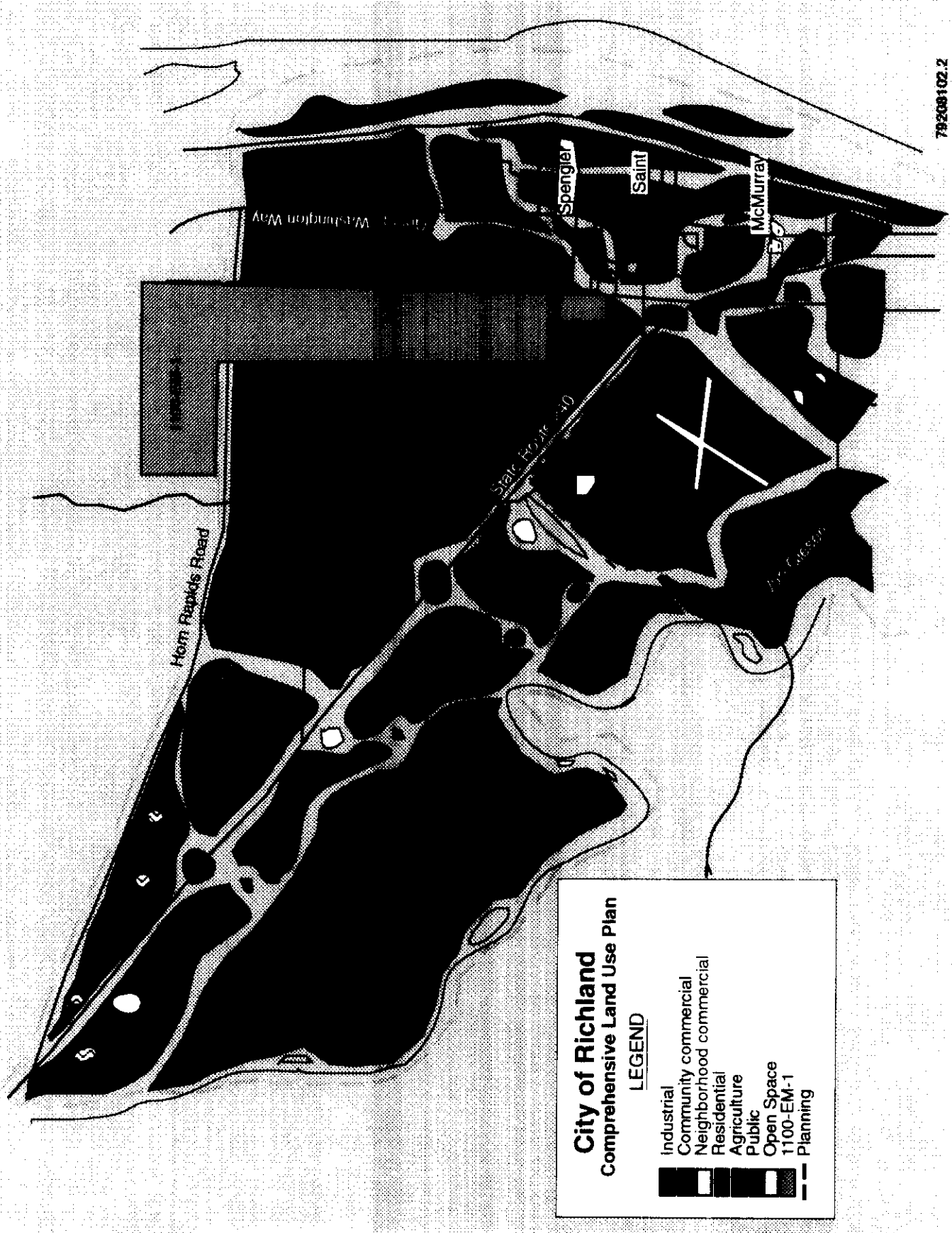

Figure J-4. City of Richland Comprehensive Plan

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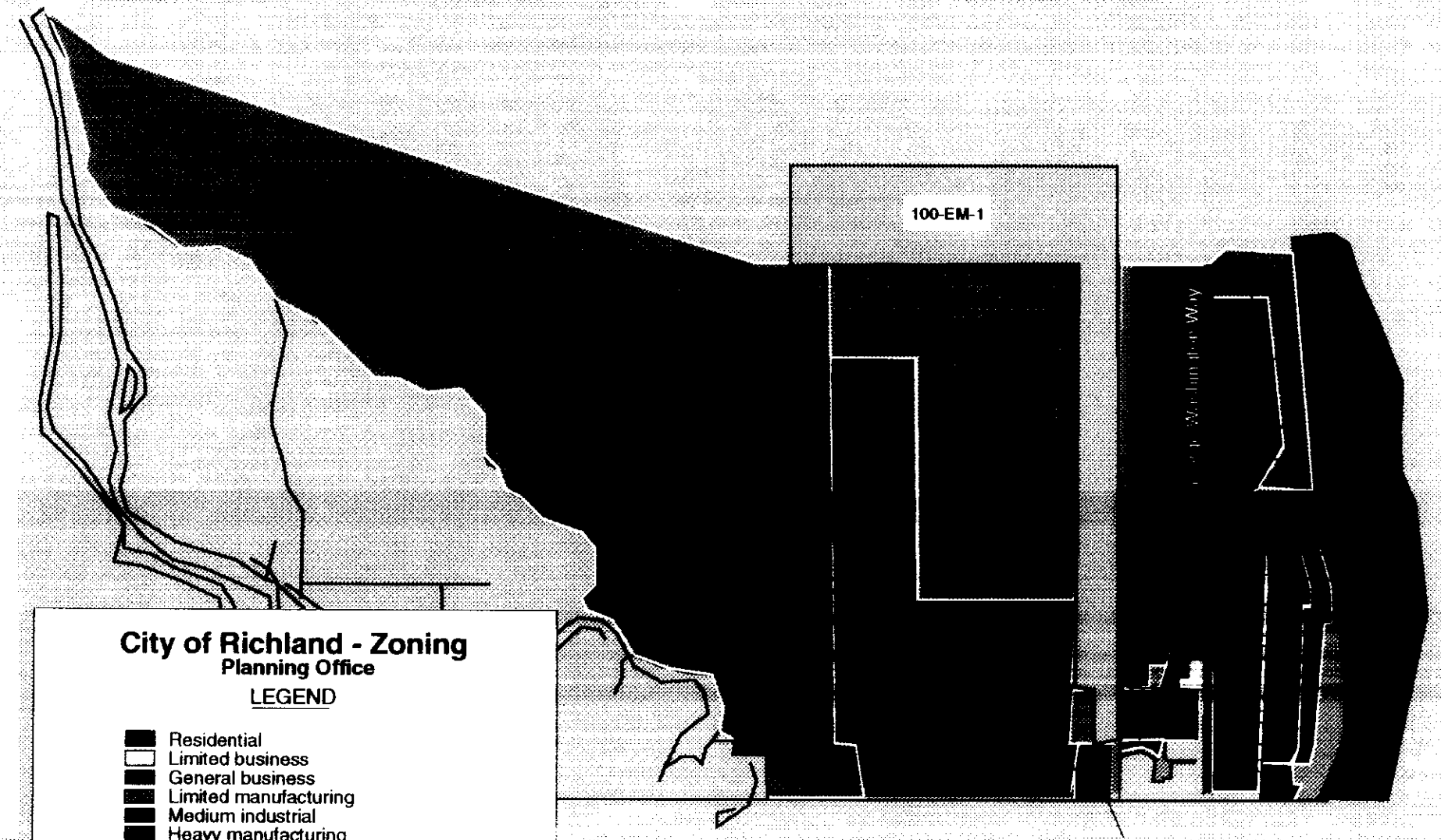

Figure J-5. City of Richland Land Use Zoning

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4.4 LAND USE AND PLANNING FOR ADJACENT PROPERTY

4.4.1 Washington State Growth Management Act

The City of Richland is currently changing its planning to conform to Washington State Growth Management Act requirements (WSGMA). The present land use comprehensive plan is shown on figure J-4 and, according to Herb Everet (Richland Planning and Inspection Supervisor, Community Development Department), is not anticipated to be changed significantly by future Visioning Meetings (the public participation process portion of the Growth Management Act). Land use and public opinion surveys are being conducted by the city as part of the WSGMA planning process. The information collected to date does not suggest any changes to the North Richland portion of the present comprehensive land use plan. By law, the comprehensive plan should be adopted by July 1, 1993. The WSGMA requires that the city zoning be consistent with the comprehensive plan.

4.4.2 City of Richland Land Use Zoning

Non-Federal property in the North Richland area has been zoned by the City of Richland for industrial-type activities as shown on figure J-5. Zoning of property adjacent to the 1100 Area includes heavy manufacturing, medium industrial, and limited manufacturing. This industrial land use can be assumed to continue into the future because of long-range goals associated with the Tri-Cities Science and Technology Park as shown on figure J-6. The city is deeply committed to development of the Tri-Cities Science and Technology Park, and every aspect of their planning, including zoning, is consistent with this development. The City of Richland and DOE Field Office, Richland, are negotiating the annexation of the 1100 Area (Tri-City Herald, 1992a and 1992b). Annexation would provide for DOE retention of the land with the City of Richland providing many of the services to the area. As a part of the agreement, the City of Richland would extend its industrial zoning to cover this area.

4.4.3 Tri-Cities Science and Technology Park

The City of Richland is a member of the Tri-Cities Science and Technology Park Association and is developing a market and promotional strategy for the Tri-Cities Science and Technology Park. Plans for this development include construction of administrative offices, research facilities, and commercial and light manufacturing operations. The City of Richland owns most of the property adjacent to the east side of the 1100 Area (figure 7). The city intends to sell this property to commercial firms to encourage the development of an industrial park. The city is presently leasing some of this land for agricultural use. The contractual arrangement of the lease allows the city to terminate this activity at any time based upon the city's intent to market this area as an industrial park. According to Herb Everet, the city does not intend this agricultural activity to continue over a prolonged period. Planning has begun on extending a number of streets in the area west of Stevens Drive and north of SR-240 (see figure J-3). A portion of the Battelle Boulevard extension is planned for 1992. The intent of this planning is to serve future commercial development in this area better and demonstrate the city's intent to promote the industrial park.

5.0 FUTURE LAND USE

An industrial type of land use is identified for the 1100 and 300 Areas for at least the next 20 years. The long range needs for the Hanford mission require these areas to serve as operation support and research facility functions. Additionally, the 1100-EM-1 Operable Unit is at the heart of a large industrial complex for which the City of Richland, and other participants in the Tri-Cities Science and Technology Park Association, are developing long range plans for commercial/industrial development. Proposed planning by the City of Richland indicates an industrial zone for the 1100 Area government-owned land. The city is proposing this zoning in the event that the Federal government releases jurisdiction of the property. The 1100 Area and adjacent areas zoned by the City of Richland are industrial based upon DOE's and the City of Richland's existing development and future land use plans. Therefore, residential development and long-term agricultural uses are inconsistent with all available land use plans and are not anticipated in the future.

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REFERENCES

DOE-RL, 1991, *Draft Hanford 300 Area Development Plan*, DOE/RL-91-09, U.S. Department of Energy Field Office, Richland, Washington.

DOE-RL, 1992, *Draft Hanford Site Development Plan*, DOE/RL-92-20, U.S. Department of Energy Field Office, Richland, Washington.

Tri-City Herald, 1992a, *Richland Eyes Hanford Areas*, Tri-City Herald, September 5, 1992, Kennewick, Washington.

Tri-City Herald, 1992b, *Richland Moves to Annex Hanford Areas*, Tri-City Herald, September 9, 1992, Kennewick, Washington.

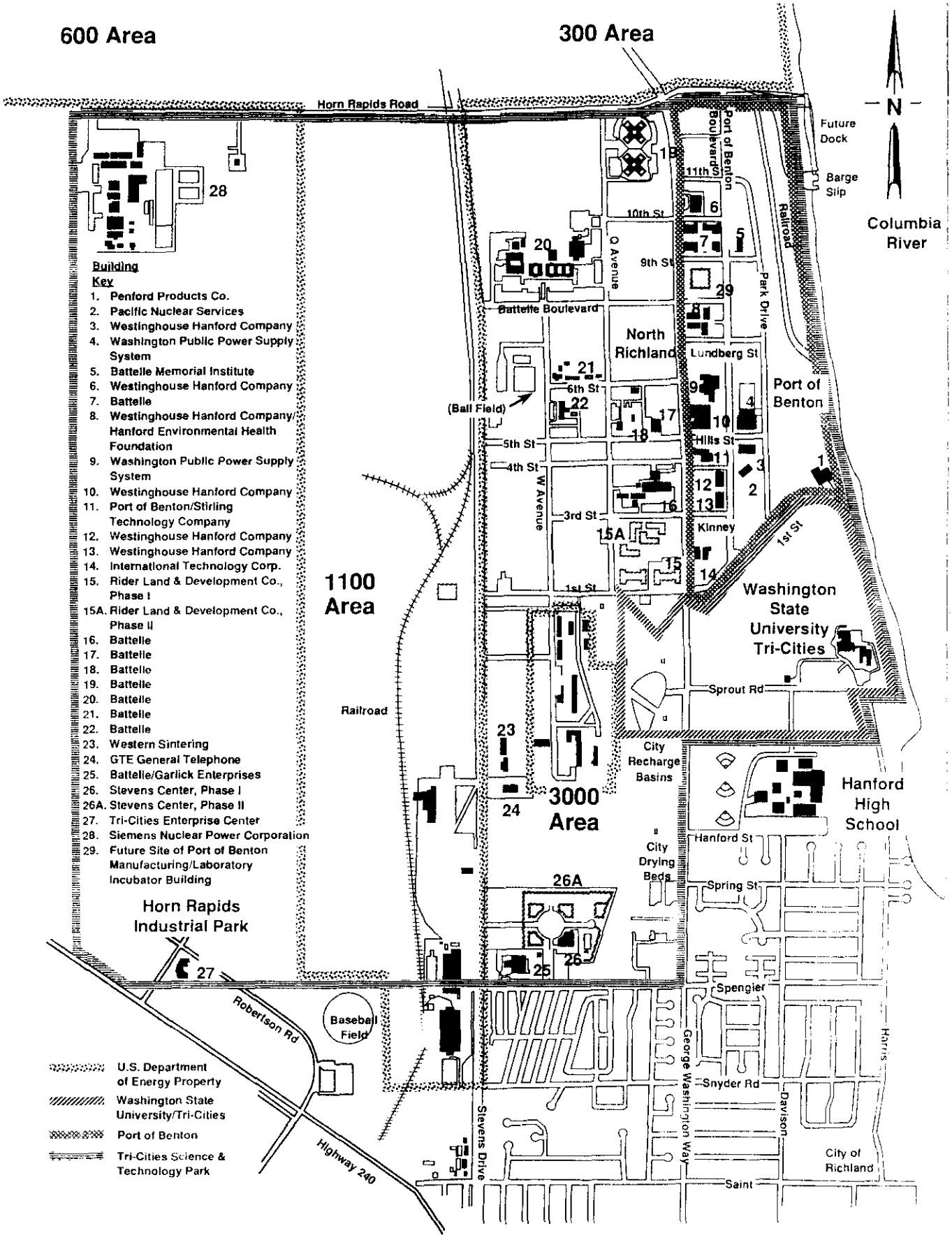

Figure J-6. Tri-Cities Science and Technology Park

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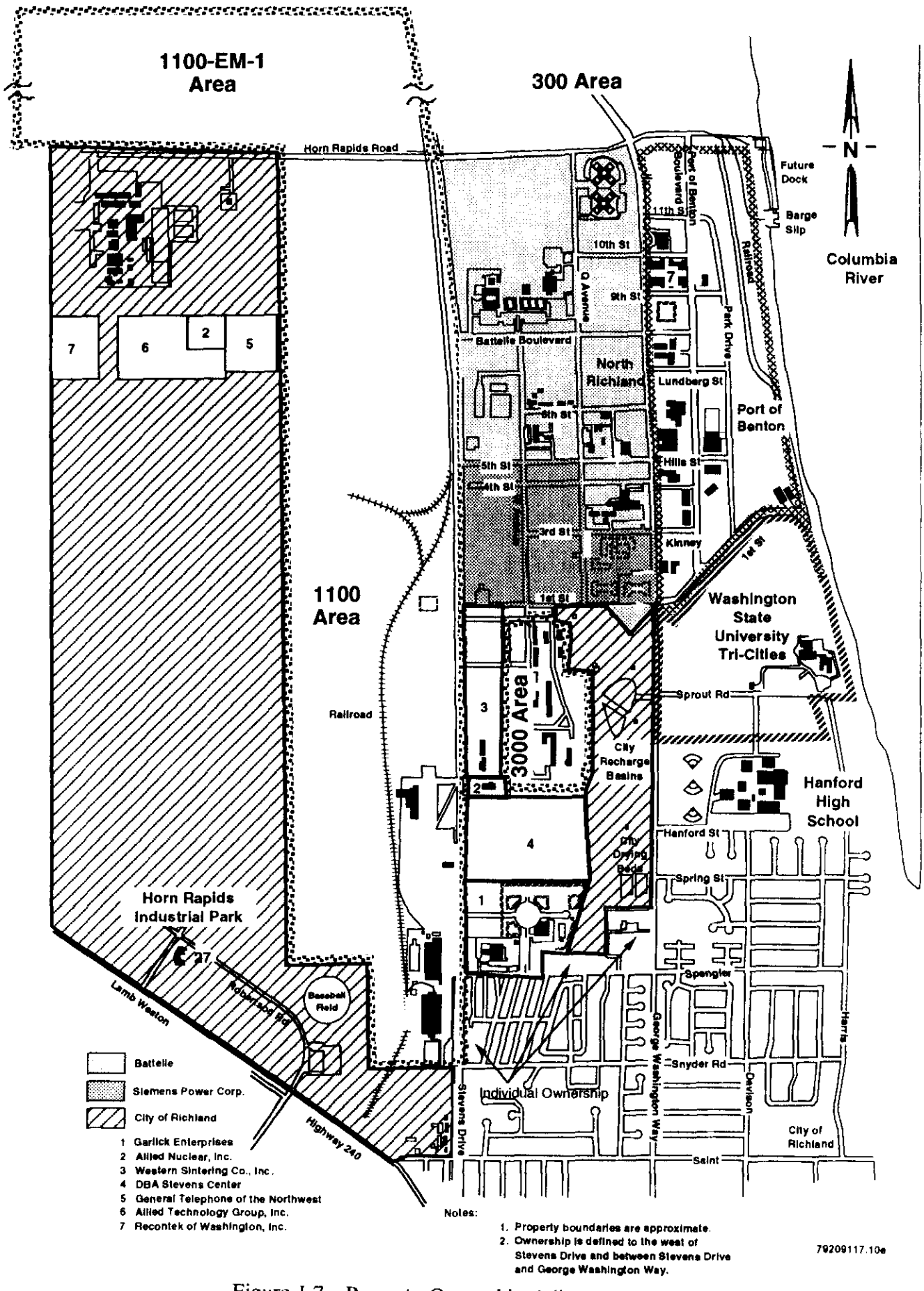

Figure J-7. Property Ownership Adjacent to 1100 Area

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APPENDIX K

RISK ASSESSMENT

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1.0 INTRODUCTION

The 1100-EM-1 Operable Unit is one of four hazardous substance response project units associated with the 1100 Area of the U. S. Department of Energy's (DOE's) Hanford Site. In July 1989, the U. S. Environmental Protection Agency (EPA) placed the 1100 Area on the National Priorities List (NPL). The Phase I Remedial Investigation (RI) Report for the 1100-EM-1 Operable Unit (DOE/RL-90-18) was issued in August, 1990, and a Phase I and II Feasibility Study (FS) Report (DOE/RL-90-32) issued in August, 1991. Phase II RI activities have been conducted since these earlier reports. The data obtained from these activities have been evaluated to characterize further the operable unit, and to develop and evaluate remedial alternatives.

This section sets forth the general purpose, scope, and organization of the 1100-EM-1 Baseline Industrial Scenario Risk Assessment (BISRA) and Baseline Residential Scenario Risk Assessment (BRSRA). A brief description of the operable unit is also provided. Additional information regarding the 1100-EM-1 Operable Unit was presented in the Phase I Report (DOE/RL-90-18).

1.1 PURPOSE AND SCOPE OF THE BISRA AND BRSRA

Pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601 and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR § 300, a site-specific baseline risk assessment was conducted "to characterize the current and potential threats to human health and the environment... The results of the baseline risk assessment will help establish acceptable exposure levels for use in developing remedial alternatives in the FS..."[40 CFR §300(d)(4)].

The 1100-EM-1 Operable Unit is located in an area designated as industrial and is surrounded by areas zoned by the city of Richland for industrial and commercial use (appendix J of the main document). Consequently, there are no residents at any of the 1100-EM-1 subunits. However, at the direction of EPA [(Einan, 1991), and appendix I], Department of Energy, Richland Field Office (DOE-RL) agreed to provide a BRSRA for selected subunits of the 1100-EM-1 Operable Unit [(Wisness, 1991), and appendix I]. A BRSRA was submitted to fulfill the agreement made between DOE-RL, EPA, and state of Washington Department of Ecology (Ecology). This baseline risk assessment document combines both the BRSRA and BISRA.

1.1.1 PURPOSE AND SCOPE OF THE BISRA

The purpose of this BISRA is to evaluate potential threats to industrial workers posed by contaminants detected at each of seven subunits identified in the 1100-EM-1 Operable Unit. These subunits are:

- 1100-1 (Battery Acid Pit)
- 1100-2 (Paint and Solvent Pit)
- 1100-3 (Antifreeze and Degreaser Pit)
- 1100-4 (Antifreeze Tank Site)
- UN-1100-6 subunit (Discolored Soil Site)
- Horn Rapids Landfill (HRL)
- Ephemeral Pool

The scope of the BISRA is limited to the evaluation of an industrial scenario, as presented in the Hanford Site Baseline Risk Assessment Methodology (HSBRAM), (DOE-RL-91-45, Revision 1) utilizing soil data from Phase I and Phase II RI sampling. Sampling for two subunits, HRL and the Ephemeral Pool, was conducted as part of Phase II site investigation activities. A summary of the Phase II soil sampling data is provided in appendix D. Phase I data is provided in appendix I of the Phase I Report (DOE/RL-90-18). Phase I and Phase II data are used to identify the contaminants at the subunits. Because the scope of the BISRA is focused on the soil contamination present in the subunits, only exposure pathways directly related to the soil are evaluated. These pathways include soil ingestion, dermal exposure, and inhalation of fugitive dust.

The contaminants were evaluated in a two-step process to minimize statistical analysis and allow comparison of maximum value concentrations and 95-percent upper confidence limit (UCL) concentrations. Maximum concentrations were used not only for preliminary risk-based screening, but also for the initial risk-based assessment calculations. If a health risk was indicated, 95-percent UCL concentrations were used in the calculations for comparison.

As indicated above, the list of contaminants and maximum contaminant concentration evaluated in this BISRA is a compilation of sampling data from the Phase I and Phase II RI's. The data represent maximum concentrations. They do not generally reflect the spatial distribution of the contaminants at the operable subunits or the frequency of detection. Therefore, the maximum concentration may not be representative of actual subunit conditions, and may be very conservative, especially for large areas, such as HRL.

This BISRA evaluates the potential human health threats to an industrial worker at each subunit. Currently, no workers are assigned to tasks at any of the subunits on a regular basis. However, this BISRA conservatively assumes that industrial workers could exist in the future. This BISRA assumes that personnel are assigned to the 1100 Area for the purposes other than remediation.

1.1.2 PURPOSE AND SCOPE OF THE BRSRA

The purpose of this BRSRA is to evaluate potential threats to onsite residents at each of five 1100-EM-1 subunits, as defined in Einan, 1991 (see appendix I), and Einan, 1992 (see appendix I). These subunits are:

- 1100-2 (Paint and Solvent Pit);
- 1100-3 (Antifreeze and Degreaser Pit);
- UN-1100-6 subunit (Discolored Soil Site);
- HRL; and
- Ephemeral Pool.

The scope of the BRSRA includes evaluation of specific contaminants of potential concern and specific exposure pathways.

1.2 REPORT ORGANIZATION

The BISRA and BRSRA are organized in a format consistent with that recommended in the Risk Assessment Guidance for Superfund (RAGS), Volume 1: Human Health Evaluation Manual, part A (EPA, 1989a) and HSBRAM.

The remainder of Chapter 1 provides background information on the 1100-EM-1 Operable Unit and the specific subunits outlined above.

The identification of contaminants of potential concern is discussed in Chapter 2. Contaminants detected at the 1100-EM-1 Operable Unit are compared to risk-based benchmark screening concentrations. This comparison yields a list of contaminants of potential concern that are further evaluated in the exposure assessment and toxicity assessment of the BISRA.

The exposure assessment is presented in Chapter 3. The exposure assessment determines the magnitude of the exposures through potential exposure pathways. As indicated above, the only receptor populations considered in the BISRA are onsite industrial workers; and BRSRA onsite residents at each individual subunit.

The toxicity assessment is presented in Chapter 4. The toxicity assessment is supplemented by toxicity profiles for the contaminants of potential concern that are presented in appendix II. The characterization of risk associated with the operable subunits is presented in Chapter 5. A summary of the BISRA is provided in Chapter 6. References cited in the risk assessment are provided in Chapter 7.

Appendixes are used to present letters and memoranda cited (appendix I); toxicological profiles (appendix II); example calculations (appendix III); statistical information (appendix IV); and the results of the Uptake/Biokinetic (UBK) Model for Lead (appendix V). Published information that is readily available to Hanford Site and regulator personnel is incorporated by reference.

1.3 1100-EM-1 OPERABLE UNIT HISTORY AND DESCRIPTION

The Hanford Site is a 150,000 hectares (ha) (560 mi^2) reservation operated by the Federal Government since 1943. The Hanford Site is located along the Columbia River in southeastern Washington and covers portions of Benton, Grant, Franklin, and Adams Counties. The 1100 Area (see figure 1-1), which is adjacent to the city of Richland in Benton County, comprises the southeastern-most portion of the Hanford Site.

The 1100 Area is a central warehousing, vehicle maintenance, and transportation distribution center. It is the main portal to the Hanford Site. The 1100-EM-1 Operable Unit is one of four operable units assigned to the 1100 Area.

A brief description of the five subunits evaluated in these BISRA and BRSRA is provided in section 3 of the RI/FS report. Figure 1-2 illustrates the operable subunits within the 1100-EM-1 Operable Unit.

9 3 1 2 3 5 2 0 9 3 4

9 3 1 2 3 2 0 9 3 5

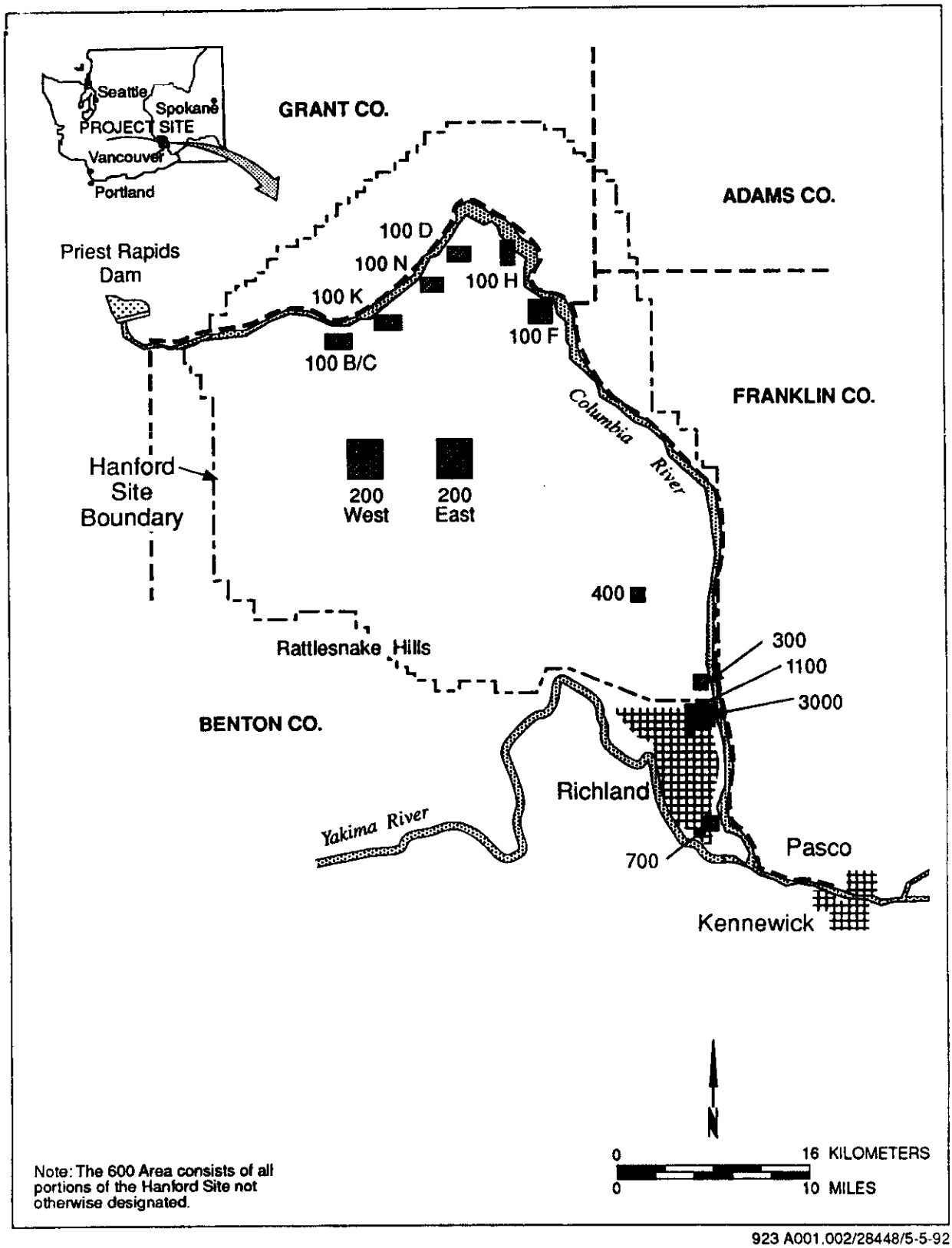

Figure 1-1. Hanford Site.

2 3 1 2 3 3 2 2 9 3 6

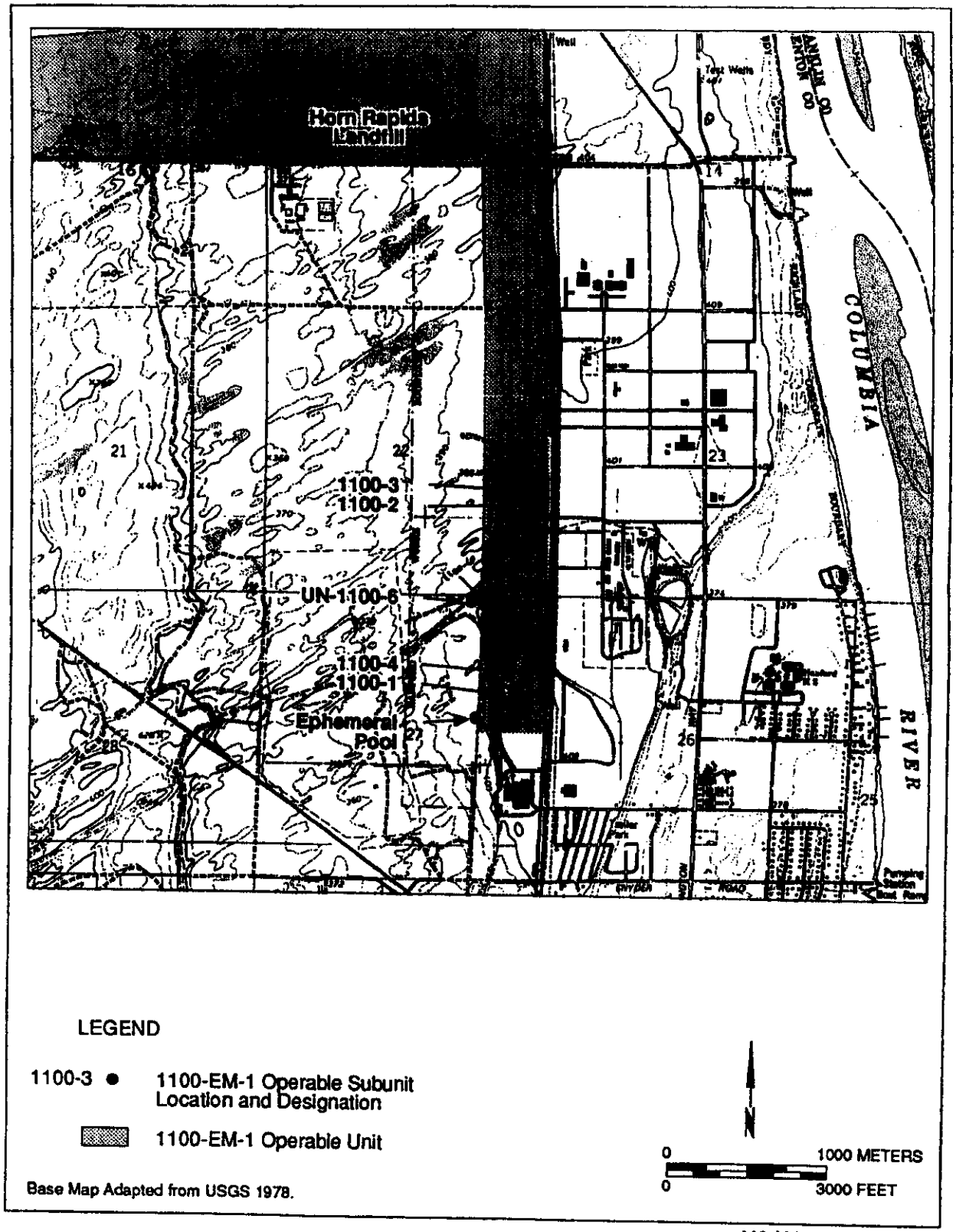

Figure 1-2. Operable Subunits within the 1100-EM-1 Operable Unit.

2.0 IDENTIFICATION OF CONTAMINANTS OF POTENTIAL CONCERN (COPC) FOR BISRA AND BRSRA

This chapter presents the process for evaluating the available data to identify COPC for the BISRA and BRSRA. For the BISRA, the process is conducted as described in the HSBRAM (DOE/RL-91-45). The BRSRA is based on EPA selected COPC, as discussed in Einan, 1991 and Einan, 1992 (see appendix I).

2.1 IDENTIFICATION OF COPC FOR BISRA

2.1.1 1100-EM-1 CONTAMINANTS FOR BISRA

2 3 1 2 0 9 3 7

A large number of waste materials in varying quantities were potentially disposed of in the soil at the operable subunits. As part of the Phase I RI, the sampling data were evaluated for each of the subunits. As part of the Phase II RI, additional soil sampling data were collected from the Ephemeral Pool and HRL. The maximum concentrations of all detected contaminants from both Phase I and Phase II sampling are used to identify COPC for this BISRA.

The first step in the identification of COPC for a risk assessment is the comparison of the maximum parameter concentrations to project-specific control concentrations (*i.e.*, control screening), as recommended in the HSBRAM (DOE/RL-91-45). The upper tolerance limit (UTL) values, as defined in appendix IV, are used as the project-specific control distribution. For control screening, if the parameter concentration in soil at a specific subunit is not greater than the UTL, it is eliminated from further evaluation in the risk assessment. A contaminant is retained for further evaluation in the preliminary risk screening if the maximum concentration is greater than UTL. Additional information on the calculation of the UTLs is presented in appendix IV.

For this BISRA, control screening for Phase I and Phase II data was conducted with the data presented in appendix IV. The Phase I data were tabulated in appendix I (DOE-RL- 90-18) and the Phase II data were in appendix I. The contaminants and maximum concentrations identified in soil samples are provided in table 2-1 of this risk assessment.

For the purposes of this report, several conservative assumptions are used with respect to the contaminants:

- All Arochlors detected (*e.g.*, Arochlor 1248, 1254, or 1260) are combined and evaluated as total polychlorinated biphenyls (PCB's).

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Table 2-1. Summary of 1100-EM-1 Operable Unit Soil Contaminants and Maximum Contaminant Concentrations. (sheet 1 of 1)

Contaminant	1100-1 (mg/kg)	1100-2 (mg/kg)	1100-3 (mg/kg)	1100-4 (mg/kg)	UN-1100-6 (mg/kg)	Horn Rapids Landfill (mg/kg)	Ephemeral Pool (mg/kg)
Antimony	--	--	--	--	--	15.6	--
Arsenic	3.2	--	--	5.8	--	6.8	--
Barium	--	--	--	--	--	1,320	--
Beryllium	--	--	--	0.93	--	1.3	--
Cadmium	--	--	--	--	--	2.4	--
Chromium	--	16.8	14	--	--	1,250	--
Cobalt	--	--	17.8	--	--	42.5	--
Copper	37.9	24.4	31.7	19.8	--	1,280	--
Cyanide	--	--	--	--	--	0.56	--
Lead	266	94.6	26.4	5.7	22.1	854	54.2
Manganese	--	368	436	--	--	501	--
Mercury	0.39	--	--	--	--	1.3	--
Nickel	20.9	--	--	--	--	557	--
Selenium	--	--	--	--	--	0.97	--
Silver	--	--	.	2	--	7.7	
Thallium	--	0.48	0.4	0.48	--	3.1	--
Vanadium	118	--	--	--	--	101	--
Zinc	100	58.6	60	63.8	111	3,160	67.5
BEHP	--	--	--	--	25,000	--	--
Beta-HCH	--	--	--	--	--	0.084	--
Chlordane	--	--	--	--	1.86	--	2.8
Chlorobenzene	--	0.006	--	--	--	--	--
DDT	--	0.16	--	--	0.17	1.98	--
Endosulfan II	--	--	--	--	--	0.11	0.16
Endrin	--	--	--	--	--	0.42	0.039
Heptachlor	--	--	--	--	0.065	0.02	0.029
2-Hexanone	--	--	--	--	0.053	--	--
Naphthalene	--	--	--	--	--	8.2	--
PCB's	--	--	--	--		100	42
Tetrachloroethene	--	0.035	--	--	--	0.006	--
Trichloroethene	--	0.006	--	--	--	--	--
1,1,1-Trichloroethane	--	--	--	--	0.035	--	--

. Indicates not a contaminant at this subunit
Note: This table includes data from the Phase I RI and Phase II RI.

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- 1,1,1-trichloro-2,2-bis-(p-chlorophenyl)ethane (DDT) is defined as the sum of 4,4'-DDT, 4,4'-DDD, and 4,4'-DDE.

- Di-n-octyl-phthalate is combined and evaluated with the carcinogen bis(2-ethylhexyl)phthalate (BEHP) because there are insufficient data to develop toxicity values for di-n-octyl-phthalate.

- The alpha- and gamma-isomers of chlordane are combined for evaluation as total chlordane.

- 2-methylnaphthalene and naphthalene are combined for evaluation as naphthalene because toxicity values are not available. This assumption is conservative because naphthalene is more toxic than 2-methylnaphthalene.

- Endrin and endrin ketone are combined and evaluated as endrin.

- All chromium is assumed to be chromium(VI), which is the most toxic valence state of chromium. Insufficient data are available to ascertain specification of chromium at the subunits at this time. This assumption provides a conservative evaluation of the potential toxicity associated with chromium present in soil at 1100-EM-1 subunits.

Several contaminants have been eliminated from further evaluation in this BISRA using procedures recommended in RAGS (EPA, 1989a), the EPA Region 10 (EPA-10) Supplemental RAGS (EPA-10, 1991), and the HSBRAM (DOE/RL-90-18). These contaminants are aluminum, calcium, iron, magnesium, potassium, and sodium. As discussed in Chapter 4 of DOE/RL-90-18, these contaminants have a low potential for toxicity under environmental conditions and most are essential elements for humans. Additionally, the concentrations detected in Phase I and Phase II RI samples are within the normal range for soils within the United States (DOE/RL-90-18).

Copper and cobalt were eliminated from evaluation in the Phase I RI Report because they are essential elements for humans. Initially, the toxicity data available were insufficient to establish a chronic reference dose (RfD), and the maximum concentrations encountered did not exceed the normal range in soils within the United States (DOE/RL-90-18). Currently, however, EPA-10 provides interim RfD's for both of these elements (see appendix I). Copper and cobalt are included in the preliminary risk-based screening to define COPC for the 1100-EM-1 subunits.

2.2 1100-EM-1 COPC FOR BISRA

The next step in the identification of COPC is a risk-based screening process that focuses on the list of contaminants and identifies contaminants that contribute most significantly to the overall risk at a site. The risk-based screening process is conducted as discussed in the HSBRAM (DOE/RL-91-45). The procedure involves the calculation of risk-based benchmark concentrations against which the maximum concentration of a contaminant is compared. Any contaminants that do not exceed the risk-based benchmark screening concentrations can be eliminated from further consideration in the risk assessment. The screening process provides a high degree of confidence that these contaminants pose only an insignificant risk to human health or the environment.

Exceeding a conservative benchmark screening concentration does not necessarily establish the existence of a significant risk. At this point in the overall analysis, it simply indicates the need to retain the contaminant for further evaluation in the risk assessment. As a supplement to the risk-based screening, potential contaminant-specific soil cleanup regulations are also compared to the maximum detected concentrations. Any contaminants exceeding potential regulatory cleanup guidelines are also retained for further evaluation in the risk assessment. The preliminary risk-based screening process and the results of the 1100-EM-1 risk-based screening are discussed in the following subsections.

2.2.1 Preliminary Risk-Based Screening Process for BISRA

As recommended in the HSBRAM (DOE/RL-91-45), all preliminary risk-based benchmark screening concentrations are calculated using onsite residential exposure assumptions. Onsite residential exposure assumptions are utilized for preliminary screening because they are more conservative than industrial exposure assumptions. In Chapter 3 of this risk assessment, an onsite industrial scenario is used to estimate contaminant intakes. Contaminants that may represent a significant risk (concentrations above benchmark screening levels) are retained for further evaluation in the BISRA.

The calculation of the preliminary risk-based benchmark concentrations considers both noncarcinogenic effects (*i.e.*, systemic toxicity) and carcinogenic effects. Risk-based benchmark concentrations are calculated for soil concentrations that would be equivalent to exposures at a hazard quotient (HQ) of 0.1 for contaminants with noncarcinogenic effects. A concentration equivalent to an incremental lifetime cancer risk (ICR) of 1E-07 is used for contaminants with carcinogenic effects.

For carcinogenic contaminants, the screening equation is:

$$C = \frac{TR \times BW \times AT}{SF \times IR \times EF \times ED}$$

where:

C	=	risk-based benchmark concentration in soil (mg/kg)
TR	=	target excess individual lifetime cancer risk (1E-07)
BW	=	body weight (kg)
AT	=	averaging time (365 d/yr x 70 yr)
SF	=	contaminant-specific slope factor $(mg/kg\text{-}d)^{-1}$
IR	=	intake rate (mg/d or for soil or m^3/d for air)
EF	=	exposure frequency (d/yr)
ED	=	exposure duration (yr)

Appropriate conversion factors are used, as necessary.

For noncarcinogenic effects, the equation is:

$$C = \frac{THQ \times RfD \times BW \times AT}{IR \times EF \times ED}$$

where:

C	=	risk-based benchmark concentration in soil (mg/kg)
THQ	=	target hazard quotient (0.1)
RfD	=	contaminant-specific chronic reference does (mg/kg-d)
BW	=	body weight (kg)
AT	=	averaging time (365 d/yr x 70 yr)
IR	=	intake rate (mg/d or m^3/d for soil or air, respectively)
EF	=	exposure frequency (d/yr)
ED	=	exposure duration (yr)

Appropriate conversion factors are used, as necessary.

Two soil exposure pathways are used in calculating preliminary risk-based benchmark concentrations, as recommended in the HSBRAM (DOE/RL-91-45) and by EPA-10 (EPA-10, 1991). These exposure pathways are soil ingestion and inhalation of fugitive dust. The exposure assumptions for each pathway are discussed below and summarized in table 2-2. Example calculations are provided in appendix III.

2.2.1.1 Soil Ingestion. All soil ingestion risk-based benchmark concentrations are derived using onsite residential exposure assumptions from the HSBRAM (DOE/RL-91-45). The residential exposure assumptions of the HSBRAM are based on EPA-10, 1991 and the Washington State Model Toxics Control Act Cleanup Regulations (MTCACR), Washington Administrative Code (WAC) 173-340. For carcinogens, the exposure assumptions are based on a child and an adult exposure. The child exposure factors are a body weight of 16 kg, a

Table 2-2. Preliminary Risk-Based Screening Exposure Factors

Exposure Factor	HSBRAM Reasonable Maximum Exposure [a]
Intake Rate - Soil Ingestion Adult Child	 100 mg/d 200 mg/d
Intake Rate - Inhalation Adult Child	 20 m^3/d 10 m^3/d
Exposure Frequency	365 d/yr
Exposure Duration Adult Child Total	 24 yr 6 yr 30 yr
Body Weight Adult Child	 70 kg 16 kg
Averaging Time Carcinogens Noncarcinogens	 70 yr x 365 d/yr 6 yr x 365 d/yr (child) or 30 yr x 365 d/yr (adult)
Particulate Emission Factor	8E07 m^3/kg[b]
[a]DOE/RL-91-45; Factors based on EPA-10, 1991 and WAC 173-340 [b]Calculated factor; see chapter 2, paragraph 2.2.1	

daily intake rate of 200 mg/d, and exposure frequency of 365 d/yr, and an exposure duration of 6 yrs. The adult exposure factors are a body weight of 70 kg, a daily intake rate of 100 mg/d, an exposure frequency of 365 d/yr, and an exposure duration of 24 years. For oral soil ingestion of contaminants with noncarcinogenic effects, the exposure assumptions are based only on exposures for a child. The exposure factors, therefore, are a body weight of 16 kg, a soil ingestion contact rate of 200 mg/d, and exposure frequency of 365 d/yr, and an exposure duration of 6 yrs. A conversion factor of 1E06 mg/kg is used.

2.2.1.2 Air Inhalation. Soil criteria are similarly derived for the inhalation of fugitive dust generated by contaminated soil. For carcinogens, the intake assumptions are a body weight of 70 kg, an inhalation intake rate of 20 m^3/d, an exposure duration of 30 years, and an exposure frequency of 365 d/yr. The risk-based benchmark concentration in soil for noncarcinogenic effects by the fugitive dust inhalation pathway is calculated using exposure parameters for a child with an intake rate of 10 m^3/d, an exposure frequency of 365 d/yr, and an exposure duration of 6 yr.

For purposes of screening, several assumptions are made to determine a particulate emission factor that relates the contaminant concentration in soil with the concentration of respirable particles in the air due to fugitive dust from the contaminated site. For screening, a particulate emission factor of 8E07 m^3/kg is used in the screening equations. This factor has been derived by conservatively assuming the concentration of airborne particulates is at the maximum annual air quality standard of 0.050 mg/m^3 (40 CFR 50). It is also assumed that the concentration of contaminant in the dust suspended in the air is directly related to the concentration of contaminant in the parent soil and that all air particulates are derived entirely from the parent soil. In accordance with Cowherd *et al.* (1985), 25 percent of the respirable fraction (*i.e.*, 0.0125 mg/m^3) is assumed to be retained in the lung and absorbed.

Lead does not have any published numerical toxicity values such as slope factors (SF's) or chronic reference doses (RfD's) that can be used to calculate risk-based benchmark concentrations. The regulatory criteria for lead is a soil concentration of 500-1,000 mg/kg (EPA 1989b). Concentrations below 500 mg/kg have not been shown to cause increases in blood lead levels in the sensitive subpopulation, children (EPA, 1989b). Therefore, for the BISRA, lead is not evaluated further at a subunit if the concentration detected is below 500 mg/kg.

2.2.2 Preliminary Risk-Based Screening Results

The results of the risk-based screening are presented in tables 2-3 through 2-9. Contaminants present at lower concentrations than risk-based benchmark screening concentrations are eliminated from further evaluation in the risk assessment. These contaminants are not likely to result in adverse effects, based on a conservative evaluation of potential exposures. Contaminants that exceed risk-based benchmark concentrations are considered COPC's. These contaminants are indicated by shading in tables 2-3 through 2-9. They are also retained, for further evaluation, in the BISRA.

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Table 2-3. Preliminary Risk-Based Screening for Soil Contaminants at the 1100-1 Subunit.

Parameter	Maximum Detected Soil Concentration (mg/kg)	Oral RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Inhalation RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Oral SF $(mg/kg\text{-}d)^{-1}$	Soil Concentration at Oral ICR = 1E-07 (mg/kg)	Inhalation SF $(mg/kg\text{-}d)^{-1}$	Soil Concentration at Inhalation ICR = 1E-07 (mg/kg)	Regulatory Soil Cleanup Guidelines (mg/kg)
Arsenic	3.2	3.0E-04[a]	2.4	--	--	1.7E+00[e]	0.038	5.0E+01[e,h]	4.3	--
Copper	37.9	4.0E-02[f]	320	--	--	--	--	--	--	--
Lead	266	ND	--	ND	--	ND	--	ND	--	500-1,000[d]
Mercury	0.39	3.0E-04[b]	2.4	8.5E-05[b]	1,100	--	--	--	--	--
Nickel	20.9	2.0E-02[a]	160	--	--	--	--	8.4E-01[a]	78	--
Vanadium	118	7.0E-03[b]	56	--	--	--	--	--	--	--
Zinc	100	2.0E-01[b]	1,600	--	--	--	--	--	--	--

[a]Integrated Risk Information System (IRIS), (EPA, 1992a)
[b]Health Effects Assessment Summary Tables (HEAST), (EPA, 1992b)
[c]Based on 30% absorption of inhaled arsenic (EPA, 1992b)
[d]EPA, 1989b
[e]Surrogate based on proposed arsenic unit of risk of 5E-05 $\mu g/L$ (EPA, 1991).
[f]EPA Region-10 (see appendix I)
-- Indicates not available
ND Not Determined
Note: Shaded areas indicate screening criterion exceeded

Table 2-4. Preliminary Risk-Based Screening for Soil Contaminants at the 1100-2 Subunit.

Parameter	Maximum Detected Soil Concentration (mg/kg)	Oral RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Inhalation RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Oral SF (mg/kg-d)$^{-1}$	Soil Concentration at Oral ICR = 1E-07 (mg/kg)	Inhalation SF (mg/kg-d)$^{-1}$	Soil Concentration at Inhalation ICR = 1E-07 (mg/kg)	Regulatory Soil Cleanup Guidelines (mg/kg)
Chromium	16.8	5.0E-03[a]	40	--	--	--	--	4.1E+01[a]	1.6	--
Copper	24.4	4.0E-02	320	--	--	--	--	--	--	--
Lead	94.6	ND	--	ND	--	ND	--	ND	--	500-1000[c]
Manganese	386	1.0E-01[a]	800	1.1E-04[d]	1,400	--	--	--	--	--
Thallium	0.48	7.0E-05[b]	0.56	--	--	--	--	--	--	--
Zinc	56.6	2.0E-01[b]	1,600	--	--	--	--	--	--	--
Chlorobenzene	0.006	2.0E-02[a]	160	5E-03[b]	65,000	--	--	--	--	--
DDT	0.16	5.0E-04[a]	4.0	--	--	3.4E-01[a]	0.19	3.4E-01[a]	190	--
Tetrachloroethene	0.035	1.0E-02[a]	80	--	--	5.2E-02[d]	1.2	2E-03[d]	33,000	--
Trichloroethene	0.006	--	--	--	--	1.1E-02	5.8	6.0E-03	11,000	--

[a]Integrated Risk Information System (IRIS), (EPA, 1992a)
[b]Health Effects Assessment Summary Tables (HEAST), (EPA, 1992b)
[c]EPA, 1989b
[d]EPA-Region 10 (see appendix I)
-- Indicates not available
ND Not Determined
Note: Shaded areas indicate screening criterion exceeded

Table 2-5. Preliminary Risk-Based Screening for Soil Contaminants at the 1100-3 Subunit.

Parameter	Maximum Detected Soil Concentration (mg/kg)	Oral RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Inhalation RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Oral SF (mg/kg-d)$^{-1}$	Soil Concentration at Oral ICR = 1E-07 (mg/kg)	Inhalation SF (mg/kg-d)$^{-1}$	Soil Concentration at Inhalation ICR = 1E-07 (mg/kg)	Regulatory Soil Cleanup Guidelines (mg/kg)
Chromium	14	5.0E-03[a]	40	--	--	--	--	4.1E+01[a]	1.6	--
Cobalt	17.8	6.0E-02[c]	480	--	--	--	--	--	--	--
Copper	31.7	4.0E-02[d]	320	--	--	--	--	--	--	--
Lead	26.4	ND	--	ND	--	ND	--	ND	--	500-1,000[d]
Manganese	436	1.0E-01[a]	800	1.1E-04[a]	1,400	--	--	--	--	--
Zinc	60	2.0E-01[b]	1,600	--	--	--	--	--	--	--

[a]Integrated Risk Information System (IRIS), (EPA, 1992a)
[b]Health Effects Assessment Summary Tables (HEAST), (EPA, 1992b)
[c]Based on 30% absorption of inhaled arsenic (EPA, 1992b)
[d]EPA, 1989b
[e]Surrogate based on proposed arsenic unit of risk of 5E-05 μg/L (EPA, 1991)
[f]EPA Region-10 (see appendix I)
-- Indicates not available
ND Not Determined
Note: Shaded areas indicate screening criterion exceeded

Table 2-6. Preliminary Risk-Based Screening for Soil Contaminants at the 1100-4 Subunit.

Parameter	Maximum Detected Soil Concentration (mg/kg)	Oral RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Inhalation RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Oral SF $(mg/kg\text{-}d)^{-1}$	Soil Concentration at Oral ICR = 1E-07 (mg/kg)	Inhalation SF $(mg/kg\text{-}d)^{-1}$	Soil Concentration at Inhalation ICR = 1E-07 (mg/kg)	Regulatory Soil Cleanup Guidelines (mg/kg)
Arsenic	5.8	3.0E-04[a]	2.4	--	--	1.7E+00[e]	0.038	5.0E+01[f]	4.3[c]	--
Beryllium	0.93	5.0E-03[a]	40	--	--	4.3E+00[e]	0.015	8.4E+00[e]	7.8	--
Copper	19.8	4.0E-02[d]	320	--	--	--	--	--	--	--
Lead	5.7	ND	--	ND	--	ND	--	ND	--	500-1000[g]
Silver	2	5.0E-03[a]	40	--	--	--	--	--	--	--
Thallium	0.48	7.0E-05[b]	0.56	--	--	--	--	--	--	--
Zinc	63.8	2.0E-01[b]	1,600	--	--	--	--	--	--	--

[a] Integrated Risk Information System (IRIS), (EPA, 1992a)
[b] Health Effects Assessment Summary Tables (HEAST), (EPA, 1992b)
[c] Based on 30% absorption of inhaled arsenic (EPA, 1992b)
[d] EPA, 1989b
[e] Surrogate based on proposed arsenic unit of risk of 5E-05 $\mu m/L$ (EPA, 1991)
[f] EPA Region-10 (see appendix I)
-- Indicates not available
ND Not Determined
Note: Shaded area indicate screening criterion exceeded

Table 2-7. Preliminary Risk-Based Screening for Soil Contaminants at the UN-1100-6 Subunit.

Parameter	Maximum Detected Soil Concentration (mg/kg)	Oral RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Inhalation RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Oral SF $(mg/kg\text{-}d)^{-1}$	Soil Concentration at Oral ICR = 1E-07 (mg/kg)	Inhalation SF $(mg/kg\text{-}d)^{-1}$	Soil Concentration at Inhalation ICR = 1E-07 (mg/kg)	Regulatory Soil Cleanup Guidelines (mg/kg)
Lead	22.1	ND	--	ND	--	ND	--	ND	--	500-1,000[c]
Zinc	111	2.0E-01[b]	1,600	--	--	--	--	--	--	--
BEHP	25,000	2.0E-02[b]	160	--	--	1.4E-02[e]	4.5	1.4E-02[d]	4,600	--
Chlordane	1.86	6.0E-05[b]	0.48	--	--	1.3E+00[a]	0.049	1.3E+00[a]	51	--
DDT	0.17	5.0E-04[b]	4.0	--	--	3.4E-01[a]	0.19	3.4E-01[a]	190	--
Heptachlor	0.065	5.0E-04[b]	4.0	--	--	4.5E+00[a]	0.014	4.5E+00[a]	14	--
2-hexanone	0.053	5.0E-02[f]	400	9.0E-02[f]	1,000,000	--	--	--	--	--
1,1,1-trichloroethane	0.035	9.0E-02	720	3E-01	4,000,000	--	--	--	--	--

[a]Integrated Risk Information System (IRIS), (EPA, 1992a)
[b]Health Effects Assessment Summary Tables (HEAST), (EPA, 1992b)
[c]EPA, 1989b
[d]Surrogate inhalation SF assumed to equal BEHP oral SF
[e]Surrogate based on proposed arsenic unit of risk of 5E-05 $\mu m/L$ (EPA, 1991)
[f]Surrogate based on 2-butanone (HEAST), (EPA, 1992b)
- indicates not available
ND Not Determined
Note: Shaded areas indicate screening criterion exceeded

Table 2-8. Preliminary Risk-Based Screening for Soil Contaminants at the Horn Rapids Landfill. (sheet 1 of 2)

Parameter	Maximum Detected Soil Concentration (mg/kg)	Oral RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Inhalation RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Oral SF $(mg/kg\text{-}d)^{-1}$	Soil Concentration at Oral ICR = 1E-07 (mg/kg)	Inhalation SF $(mg/kg\text{-}d)^{-1}$	Soil Concentration at Inhalation ICR = 1E-07 (mg/kg)	Regulatory Soil Cleanup Guidelines (mg/kg)
Antimony	15.6	4.0E-04[a]	3.2	--	--	--	--	--	--	--
Arsenic	6.6	3.0E-04[a]	2.4	--	--	1.7E+00[c]	0.038	5.0E+01[a]	4.3[a]	--
Barium	1320	7.0E-02[a]	560	1.0E-04[b]	1,300	--	--	--	--	--
Beryllium	1.3	5.0E-03	41	--	--	4.3E+00[a]	0.015	8.4E+00[a]	7.8	--
Cadmium	2.4	1.0E-03[a]	8.0	--	--	--	--	6.1E+00[a]	10	--
Chromium	1250	5.0E-03[a]	40	--	--	--	--	4.1E+01[a]	1.6	--
Cobalt	42.5	6.0E-02[f]	480	--	--	--	--	--	--	--
Copper	1280	4.0E-02[f]	320	--	--	--	--	--	--	--
Cyanide	0.56	2.0E-02[a]	160	--	--	--	--	--	--	--
Lead	854	ND	--	ND	--	ND	--	ND	--	500-1,000[d]
Manganese	501	1.0E-01[a]	800	1.1E-04[a]	1400	--	--	--	--	--
Mercury	1.3	3.0E-04[b]	2.4	8.6E-05[b]	1,100	--	--	--	--	--
Nickel	557	2.0E-02[a]	160	--	--	--	--	8.4E-01[b]	78	--
Selenium	0.97	5.0E-03[b]	44	--	--	--	--	--	--	--
Silver	7.7	5.0E-03[a]	40	--	--	--	--	--	--	--
Thallium	3.1	7.0E-05[a]	0.56	--	--	--	--	--	--	--
Vanadium	101	7.0E-03[b]	56	--	--	--	--	--	--	--
Zinc	3160	2.0E-01[b]	1,600	--	--	--	--	--	--	--
Beta-HCH	0.094	--	--	--	--	1.8E+00[a]	0.036	1.8E+00[a]	38	--
DDT	1.98	5.0E-04[a]	4.0	--	--	3.4E-01[a]	0.19	3.4E-01[a]	190	--
Endosulfan II	0.11	5.0E-05a	0.4	--	--	--	--	--	--	--

Table 2-8. Preliminary Risk-Based Screening for Soil Contaminants at the Horn Rapids Landfill. (sheet 2 of 2)

Parameter	Maximum Detected Soil Concentration (mg/kg)	Oral RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Inhalation RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Oral SF $(mg/kg\text{-}d)^{-1}$	Soil Concentration at Oral ICR = 1E-07 (mg/kg)	Inhalation SF $(mg/kg\text{-}d)^{-1}$	Soil Concentration at Inhalation ICR = 1E-07 (mg/kg)	Regulatory Soil Cleanup Guidelines (mg/kg)
Endrin	0.42	3.0E-04[a]	2.4	--	--	--	--	--	--	--
Heptachlor	0.02	5.0E-04[a]	4.0	--	--	4.5E+00[e]	0.014	4.5E+00[e]	14	--
Naphthalene	8.2	4.0E-02[b]	320	--	--	--	--	--	--	--
PCBs	102	--	--	--	--	7.7E+00[e]	0.008	7.7E+00[h]	8.5	1-25[i]
Tetrachloroethene	0.006	1.0E-02[a]	80	--	--	5.2E-02[f]	1.2	2.0E-03[f]	33,000	--

[a]Integrated Risk Information System (IRIS), (EPA, 1992a)
[b]Health Effects Assessment Summary Tables (HEAST), (EPA, 1991) or (EPA, 1992b)
[c]Based on 30% absorption of inhaled arsenic (EPA, 1992b)
[d]EPA, 1989b
[e]Surrogate inhalation SF assumed to equal BEHP oral SF
[f]EPA-Region 10 (see appendix I)
[g]Surrogate oral and inhalation RfDs based on 2-butanone (HEAST), (EPA, 1992b)
[h]Surrogate inhalation SF assumed to be equal to PCB oral SF
[i]40 CFR 761
[j]Surrogate based on proposed arsenic unit of risk of 5E-05 $\mu g/L$ (EPA, 1991)
- Indicates not available
ND - Not Determined
Note: Shaded areas indicate screening criterion exceeded

Table 2-9. Preliminary Risk-Based Screening for Soil Contaminants at the Ephemeral Pool.

Parameter	Maximum Detected Soil Concentration (mg/kg)	Oral RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Inhalation RfD (mg/kg-d)	Soil Concentration at HQ=0.1 (mg/kg)	Oral SF (mg/kg-d)$^{-1}$	Soil Concentration at Oral ICR = 1E-07 (mg/kg)	Inhalation SF (mg/kg-d)$^{-1}$	Soil Concentration at Inhalation ICR = 1E-07 (mg/kg)	Regulatory Soil Cleanup Guidelines (mg/kg)
Lead	54.2	ND	-	ND	-	ND	-	ND	-	500-1,000[e]
Zinc	67.5	2.0E-01[b]	1,600	-	-	-	-	-	-	-
Chlordane	2.8	6.0E-05[a]	0.48	-	-	1.3E+00[a]	0.049	1.3E+00[a]	50	-
Endosulfan II	0.16	5E-05[a]	0.4	-	-	-	-	-	-	-
Endrin	0.039	3E-04[a]	2.4	-	-	-	-	-	-	-
Heptachlor	0.029	5.0E-04[a]	4.0	-	-	4.5E+00[a]	0.014	4.5E+00[a]	14	-
PCBs	42	-	-	-	-	7.7E+00[a]	0.008	7.7E+00[c]	8.5	1-25[d]

[a]Integrated Risk Information System (IRIS), (EPA, 1992a)
[b]Health Effects Assessment Summary Tables (HEAST), (EPA, 1991)
[c]Surrogate inhalation SF assumed to be equal to PCB oral SF
[d]40 CFR 761
[e]EPA, 1989b
- Indicates not available
ND - Not determined
Note: Shaded areas indicate screening criterion exceeded

At the 1100-1 subunit, copper, mercury, nickel, and zinc are COPC, as indicated in table 2-3. Tables 2-4 and 2-5 show that chromium is the only COPC at the 1100-2 and 1100-3 subunits. Arsenic and beryllium are COPC at the 1100-4 subunit. At UN-1100-6, BEHP, chlordane, and heptachlor are COPC, as shown in table 2-7. The following are COPC at HRL: cadmium, cobalt, cyanide, manganese, mercury, selenium, silver, endosulfan II, endrin, nephthalene, and tetrachloroethene. These results are reported in table 2-8. Since lead exceeds the regulatory criteria (at 500 mg/kg, with a concentration of 854 mg/kg), it is retained as a contaminant of interest at HRL, and is discussed in chapter 5, paragraph 5.4.3. The contaminants chlordane, heptachlor, and PCB's are shown in table 2-9 as COPC for the Ephemeral Pool.

2.3 SUMMARY OF COPC IDENTIFICATION FOR BISRA

The COPC for the soil medium that have been identified following the risk-based screenings are listed in table 2-10 for each subunit. These COPC are evaluated further in the BISRA to estimate the magnitude of potential exposures (chapter 3) and risks associated with those exposures (chapter 5). Lead is retained as a contaminant of interest and discussed in chapter 5, paragraph 5.4.3.

2.4 IDENTIFICATION OF COPC FOR BRSRA

As part of the Phase I RI, the sampling data were evaluated for each of the subunits. Based on the results of the Phase I RI Report, EPA selected the following COPC, as discussed in Einan, 1991 and Einan, 1992 (see appendix I), and that are evaluated in this BRSRA:

	Subunit	Contaminant
•	1100-2	Tetrachloroethene
•	1100-3	Arsenic Chromium Lead
•	UN-1100-6 subunit	Bis (2-ethylhexyl) phthalate (BEHP) Chlordane

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Table 2-10. Summary of Contaminants of Potential Concern for the Baseline Industrial Scenario Risk Assessment 1100-EM-1 Operable Unit.

Contaminant	1100-1	1100-2	1100-3	1100-4	UN-1100-6	Horn Rapids Landfill	Ephemeral Pool
Antimony						X	
Arsenic	X			X		X	
Barium						X	
Beryllium				X		X	
Chromium		X	X			X	
Copper						X	
Lead*			*			*	
Nickel						X	
Thallium						X	
Vanadium	X					X	
Zinc						X	
BEHP					X		
Beta-HCH						X	
Chlordane					X		X
DDT						X	
Heptachlor					X	X	X
PCBs						X	X

*Contaminant of interest

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•	HRL	Arsenic Chromium PCB's Nitrate Tetrachloroethene Trichloroethene 1,1,1-Trichloroethane Lead
•	Ephemeral Pool	Chlordane PCB's

SF's were not available for beryllium when the Phase I RI report was prepared. Beryllium has been added as a COPC for the BRSRA because it is a probable carcinogen and a SF is now available.

Gross-alpha and gross-beta radioactivity has been detected in the groundwater in the vicinity of HRL. Although not considered COPC, a qualitative discussion is provided in chapter 5, paragraph 5.3.

As indicated in appendix I, table I-2, Einan, 1991 (see appendix I), 1,1,1-trichloroethane was identified as a contaminant to be evaluated in the soil at HRL. However, this compound was only detected in soil gas and groundwater at low concentrations. Therefore, no maximum concentration is presented in table 2-1. Because this contaminant was detected at low concentrations and because it is not highly toxic at low concentrations or known to be a carcinogen, no quantitative evaluation of 1,1,1-trichloroethane is provided.

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3.0 HUMAN EXPOSURE ASSESSMENT

The purpose of the human exposure assessment is to estimate the magnitude, frequency, duration, and route of exposure to the COPC. The exposure estimation is used with appropriate toxicity information to assess the nature and extent of health threats from the COPC. The exposure assessment identifies receptor populations and exposure pathways as discussed in paragraph 3.1 through 3.4 below. This information is integrated with measured or estimated contaminant concentrations to quantify contaminant exposures and is presented in paragraph 3.5. A summary of the exposure assessment is provided in paragraph 3.7. For the BRSRA, a separate discussion of the evaluation of the exposures to lead at 1100-2 and HRL is discussed in paragraph 3.6.

3.1 IDENTIFICATION OF HUMAN RECEPTOR POPULATIONS FOR BISRA

Identification of the human populations at risk from exposure to COPC at the 1100-EM-1 subunits is usually determined by present and future land and water use assumptions. For the purposes of the BISRA, it is assumed that future land and water use will remain similar to existing conditions. The geographic distribution of the individual subunits throughout the operable unit limits the potential for the same receptor to have long-term exposures at multiple subunits. Currently, no workers are assigned to tasks in any of the subunits on a regular basis. However, the BISRA conservatively assumes that such assignments could occur in the future because the 1100-EM-1 Operable Unit is located in an area designated for industrial use and is surrounded by areas zoned, by the city of Richland, for industrial and commercial use.

Onsite industrial workers are selected as both the current and the future receptor populations for the 1100-EM-1 Operable Unit. Industrial workers are assumed to work full-time at only one subunit where they could potentially be exposed to contaminants from that subunit alone. The BISRA also assumes that personnel are assigned to the 1100 Area for purposes other than remediation. It is expected that the city of Richland's water will continue to be available to potential industrial facilities at the operable unit.

3.2 IDENTIFICATION OF HUMAN RECEPTOR POPULATIONS FOR THE BRSRA

There is no current residential use of 1100-EM-1, and none is expected in the future. However, as indicated previously, the EPA has requested evaluation of residential receptors at five subunits.

Onsite residents are evaluated as the receptor population for the 1100-EM-1 Operable Unit. Residents are assumed to live at only one subunit where they could potentially be exposed to contaminants from that subunit alone. It is also assumed that availability of city of Richland water at all subunits continues except at HRL. The hypothetical residents at HRL are conservatively assumed to use groundwater as the only source of potable water.

3.3 IDENTIFICATION OF EXPOSURE PATHWAYS FOR BISRA

The HSBRAM (DOE/RL-91-45) provides the exposure pathways that are used to evaluate the industrial scenario. The BISRA for the 1100-EM-1 Operable Unit is confined to the soil contamination. Potential exposure to groundwater contamination is not evaluated in the BISRA because potable water at 1100 Area facilities is currently obtained from the city of Richland. Although soil contaminants can leach to the groundwater and be transported to the Columbia River, workers in the 1100 Area would not use surface water directly from the Columbia River during the work day. Modeling presented in DOE/RL-90-18 also indicates that the concentrations of contaminants currently found in the groundwater in the vicinity of the 1100-EM-1 Operable Unit would undergo extensive dilution upon entering the Columbia River. Therefore, potential exposures to groundwater and surface water are not evaluated in the BISRA.

Although a few volatile organic compounds have been detected in the soil and/or soil gas, the evaluation of these contaminants in the Phase I RI Report indicates the inhalation of volatiles at the concentrations detected does not pose a risk greater than 1E-06 (DOE/RL-90-18). The EPA has also indicated that soil gas surveys are used for field screening and data generated from soil gas surveys should not be used in risk assessment (Einan, EPA [Letter to R. Stewart, DOE/RL] January 16, 1992, see appendix I). Given the above information, and because most volatile contaminants have been found only in soil gas at very low concentrations, the potential volatilization of contaminants from the soil is not considered an operable exposure pathway for the BISRA.

The potential exposure pathways through which industrial workers may be exposed to soil contaminants at a specific 1100-EM-1 subunit, are:

- Soil ingestion;
- inhalation of fugitive dust; and
- dermal exposure.

3.4 IDENTIFICATION OF EXPOSURE PATHWAYS FOR BRSRA

As defined by EPA [Einan, 1991 (see appendix I)] and a followup letter of clarification [Einan, 1992 (see appendix I], the exposure pathways for the BRSRA have been focused on contaminated soil. The soil-related pathways for BRSRA, specified by EPA, include the ingestion of soil, dermal contact with soil, ingestion of garden produce, and inhalation of particulates (*i.e.*, fugitive dust). Other potential soil-related pathways (*e.g.*, animal or crop uptake as associated with an agricultural scenario) were not requested by EPA [Einan, 1992 (see appendix I)].

Of the COPC specified by EPA for evaluation, three are classified as volatile contaminants that would generally be evaluated via the inhalation pathway. These are tetrachloroethane, trichloroethane, and 1,1,1-trichloroethane. For reasons outlined in paragraph 3.3, these contaminants will not be quanitatively evaluated in the BRSRA. The volatilization of contaminants from soil will be qualitatively addressed in paragraph 5.4.

EPA has directed that potential exposures through pathways associated with the groundwater at HRL be evaluated in the BRSRA [Einan, 1991 and Einan, 1992 (see appendix I)]. Pathways are evaluated for both direct groundwater use and for exposures through transport of contaminants off the Hanford Site. Currently, contaminants present in the groundwater in the vicinity of HRL may be transported to the Columbia River in the future. In the Phase I RI, the concentration of TCE at the groundwater interface with the river was estimated to be approximately 0.05 mg/L and at the city of Richland water intake, approximately 6E-06 mg/L. Additional modeling for the Phase II RI indicates TCE at the groundwater interface with the river would be less than 0.001 mg/L, which is less than the maximum contaminant level (MCL) for this contaminant.

In addition to the evaluation of direct groundwater use in the vicinity of HRL, EPA [Einan, 1992 (see appendix I)] directed that an evaluation of trichloroethane be conducted to assess the potential contribution to exposures for subunit residents who may swim in the Columbia River or eat fish from the Columbia River. Groundwater and surface water modeling results (DOE/RL-90-18), although shown to be conservative based on recent modeling done during the Phase II RI, are used to estimate potential concentrations of trichloroethane in surface water and fish. These conservative analyses result in an overestimation of potential risks associated with this pathway.

Columbia River water is used to recharge the North Richland well field to supplement potable water production. Groundwater modeling of contaminant transport to the Columbia River was presented in the Phase I RI Report. Evaluation of the risk associated with the ingestion of Columbia River water as a drinking source, as presented in the Baseline Risk Assessment in the Phase I RI report, indicates that the incremental lifetime cancer risk is approximately 2E-09 (DOE/RL-90-18). Therefore, further evaluation of the exposures through use of Columbia River water or city of Richland water is not presented for the BRSRA.

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Given the above information, the soil-related exposure pathways evaluated in the BRSRA for onsite residential receptors at the five specified 1100-EM-1 subunits under consideration are:

- Soil ingestion;
- inhalation of fugitive dust;
- ingestion of garden produce; and
- dermal exposure to soil.

In addition, EPA specified groundwater exposure pathways for contaminants detected in groundwater in the vicinity of HRL include:

- Ingestion of groundwater;
- inhalation of volatiles from groundwater;
- ingestion of Columbia River fish; and
- dermal contact with Columbia River water during swimming.

The dermal route of exposure to potable water was also considered, but is not included in the exposure pathway because the dermal route has been reported as insignificant, tetrachloroethane (EPA 1985), and 1,1,1-trichloroethane (ATSDR 1988). It is not clear whether exposure to dermal nitrate is a concern. This issue is discussed in the uncertainty analysis paragraph 5.4.

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3.5 QUANTIFICATION OF EXPOSURES FOR BISRA AND BRSRA

The exposure assessment includes a quantification of exposures for the receptors via the exposure pathways that have been identified. An exposure concentration (*i.e.*, a concentration that is contacted over the exposure period) is estimated and used with population variables (*e.g.*, exposure parameters) and assessment variables (*e.g.*, averaging times) to determine an intake. The following paragraphs describe the assumptions, information, and calculations used to estimate exposure intakes for onsite residents and industrial workers. A detailed presentation of sample calculations is provided in appendix IV.

3.5.1 Exposure Concentrations

3.5.1.1 Soil Ingestion and Dermal Exposure Pathways for BRSRA and BISRA--The exposure concentrations for the soil ingestion and dermal exposure pathways are conservatively assumed to be the maximum concentrations of the COPC as determined from the Phase I RI Report or Phase II soil sampling (see tables 2-3 through 2-9). The use of the maximum concentration is generally conservative because it does not consider any actual or potential spatial distribution of the contaminant over the subunit (*i.e.*, it is highly likely that the concentration at the actual exposure location will be significantly less than the maximum). This assumption is also conservative because it assumes that the maximum

concentration is readily accessible for receptor contact even if the maximum concentration is actually located below the surface at considerable depth.

3.5.1.2 Inhalation - Fugitive Dust for BISRA and BRSRA--Exposure concentrations for the fugitive dust pathway are derived using subunit specific maximum soil concentrations and the subunit specific fugitive dust concentration in air at the receptor location. Exposure concentrations in air are not determined for the 1100-4 subunit because the contaminated soil is located beneath a cement floor, inside the 1171 Building.

The fugitive dust concentration is calculated by incorporating a subunit specific emission rate and deposition rate into EPA's FDM (version 91109 and Bowman Environmental Engineering, version 1.21). The FDM uses site-specific meteorological data and has the capability to directly compute the effect of wind speed on each source-specific emission rate during each meteorological averaging period. The site-specific meteorological data used by the FDM consists of 1 full year (1988) of hourly wind speed and direction data, (collected at a monitoring station located near the 1100-EM-1 operable unit), and hourly temperature, mixing height, and stability class data, (measured at the Hanford Meteorological Station). The FDM also accounts for deposition of suspended particulates during airborne travel.

Fugitive dust emission rates are calculated for each source using the Universal Soil Loss equation as simplified by Woodruff and Siddoway, 1965:

$$EF = AIKCL'V'$$

where EF is the emission factor (tons/acre-yr), A is that portion of total dust emissions that would be measured as suspended particulate matter and is typically defined as particles with a diameter less than 30 microns. The value of A is 0.041 (dimensionless), for fine soils (Baskett, 1983). I is the soil erodibility factor (tons/acre-yr), K is the surface roughness factor (dimensionless), C is a climatic factor (dimensionless), L' is the unsheltered field width factor (dimensionless), and V' is the vegetative cover factor (dimensionless).

The soil erodibility factor, I, is determined from table 3 of *Wind Erosion Forces In The United States and Their Use in Predicting Soil Loss* (Skidmore and Woodruff, 1968) and is based on the portion of surface soil retained by a No. 20 standard sieve with 0.84 mm (0.03 inches) square mesh. Conservatively biased estimates of the >0.84 mm (0.03 inches) fractions of the surface soils for the 1100-2, 1100-3, UN-1100-6 subunits, and HRL subunits are 35, 37, 5, and 29 percent, respectively. These data are obtained from paragraph 3.5.2.2 of the Phase I RI Report (DOE/RL-90-18), and convert to I values of 65, 62, 180, and 76 tons/acre-yr. For the Ephemeral Pool, grain size distribution data are not available. The fraction >0.84 mm (0.03 inches) at this subunit is conservatively assumed to be 5 percent (the same as UN-1100-6 subunit), resulting in an I value of 180 tons/acre-yr.

The surface roughness factor, K, accounts for the resistance to wind erosion provided by ridges and furrows and is conservatively assumed to be unity (*i.e.*, no reduction in resistance).

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An unsheltered field width factor, L, of .7 is typical for exposed areas about 305 m (1,000 feet) across (Baskett, 1983).

A vegetative cover factor of unity is conservatively assumed, making no allowance for reductions in emissions due to vegetation.

Wind velocity and soil moisture contribute significantly to windblown fugitive dust emission rates and relate to the climatic factor, C, as:

$$C = 0.345u^3/PE^2$$

where u^3 is the wind velocity in miles per hour and PE^2 is the site-specific Thornthwaite's precipitation-evaporation index. A PE^2 value of 29.1 was assumed (U.S. Weather Bureau and SCS 1962). Meteorological records were used to determine u^3.

Because the climatic factor varies as the cube of the wind velocity, windspeed greatly affects the emission rate. However, windspeed varies significantly with time. The FDM model has the capability to directly compute the effect of windspeed on the emission rate for each source during each meteorological averaging period. Therefore, the emission rate is entered into the model as a conservative source-specific coefficient with wind speed as the only variable:

$$EF = (0.041)I(0.7)(0.345)u^3/(29.1)^2$$

The entire suspended particulate fraction is conservatively regarded as respirable. These emission rates are used in the FDM to determine downwind air concentrations of respirable fugitive dust.

In order to estimate the concentration of fugitive dust at a receptor location, the FDM accounts for gravitational settling and particle disposition during airborne travel. A "default" particle size distribution in the FDM test input data, listed below, was used.

Particle Size Class	Particle Diameter (μm)	Fraction in Each Size Class
1	1.25	0.0262
2	3.75	0.0678
3	7.50	0.1704
4	12.50	0.1536
5	20.00	0.5820

A particle density of 2.5 g/cm^3 was used, which is consistent with the range for most mineral soils (Brady, 1984). Comparison of dust concentrations calculated by the FDM, with particle densities ranging from 0 to 2.5 g/cm^3, showed very little sensitivity to this parameter; dust concentrations typically varied only hundredths of a μg/kg between high and low particle densities.

The receptor location within each subunit was chosen as the point calculated by the FDM with the maximum fugitive dust concentration, based on a 25 meter grid system (50 m

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for HRL) that was centered on the middle of the subunit. The concentration of fugitive dust at each subunit as calculated by the FDM, is shown in table 3-1. The contaminant concentration in air is assumed to be directly proportional to the contaminant concentration in soil. Therefore, the fugitive dust concentrations were multiplied by the maximum soil contaminant concentrations (table 2-1), and appropriate conversion factors, to produce contaminant concentrations in air shown in table 3-2.

3.5.1.3 Garden Produce Pathway for BRSRA--The quantification of exposures from the ingestion of garden produce requires an estimation of the contaminant concentration in the produce. The amount of contaminant that is taken up by garden produce from the soil can be estimated using published or derived plant uptake factors for specific contaminants. The *Land Application and Distribution and Marketing of Sewage Sludge, Technical Support Document* (EPA, 1986a) provides plant-specific contaminant uptake factors for a number of contaminants. Uptake factors are available for both inorganic and organic contaminants for a variety of garden or agricultural plants. The relationship between the contaminant concentration in soil to a contaminant concentration in plants is:

$$\text{Plant concentration} = \text{Uptake factor} \times \text{soil concentration}$$

where the uptake factor is expressed as [μg/g tissue dry weight (μg/g soil)$^{-1}$] and the soil concentration is expressed as μg/g. All soil concentrations are expressed as dry weight. The evaluation takes into account only the contamination present in soil and does not include any potential contributions from irrigation water.

Four specific garden produce categories are evaluated in this BRSRA based on the direction provided by EPA [Einan, 1991; Einan, 1992 (see appendix I)]. The garden produce categories and corresponding vegetables evaluated are: root (*e.g.*, carrots), potatoes, leafy vegetables (*e.g.*, lettuce), and garden fruits (*e.g.*, tomatoes).

A summary of the plant uptake factors for the COPC is provided in table 3-3. Contaminant-specific uptake factors are available for arsenic, PCB's, and lead. The following assumptions were made in the absence of more appropriate data. The plant uptake factors for BEHP are conservatively assumed to be the same as for PCB's. The plant uptake factors for heptachlor are used as a conservative surrogate for chlordane. Chlordane is chemically similar to heptachlor and contains approximately 10 percent heptachlor (by weight). However, the root uptake factor for chlordane is conservatively derived as a 95 percent UCL for a variety of uptake factors for chlordane in sugar beets (EPA, 1986a).

Since uptake factors for chromium and beryllium are not reported in EPA, (1986a), uptake factors for arsenic, cadmium, lead, mercury, nickel, selenium, and zinc are used to derive a conservative estimate [*i.e.*, upper 95 percent confidence limit (UCL)] for each specific plant category. These values are used as a surrogate plant uptake factor for chromium and beryllium, except the uptake factor for chromium in leafy vegetables, which is published in Kabata-Pendias and Pendias, 1984.

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Table 3-1. Fugitive Dust Concentration for Specific 1100-EM-1 Operable Subunits[1].

Subunit	Fugitive Dust Concentration ($\mu g/m^3$)
1100-1	0.0032
1100-2	3.17
1100-3	2.37
UN-1100-6	1.58
Horn Rapids Landfill	9.93
Ephemeral Pool	4.23
[1] Based on the maximum concentration generated by the EPA Fugitive Dust model.	

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Table 3-2. Estimated Air Concentrations Based on Maximum Contaminant Concentrations.

Contaminant	1100-1	1100-2	1100-3	UN-1100-6	Horn Rapids Landfill	Ephemeral Pool
	Downwind Air Concentration (mg/m^3)	Downwind Air Concentration (mg/m^3)	Downwind Air Concentration (mg/m^3)	Downwind Air Concentration (mg/m^3)	Downwind Air Concentration (mg/m^3)	Downwind Air Concentration (mg/m^3)
Antimony	--	--	--	--	--*	--
Arsenic	1.0E-11	--	8.1E-09	--	6.8E-08	--
Barium	--	--	--	--	1.3E-05	--
Beryllium	--	--	--	--	1.1E-08	--
Chromium	--	5.3E-08	3.3E-08	--	1.2E-05	--
Copper	--	--	--	--	--*	--
Lead	--	--	6.3E-08	--	--	--
Nickel	--	--	--	--	5.5E-06	--
Thallium	--	--	--	--	--*	--
Vanadium	--*	--	--	--	--*	--
Zinc	--	--	--	--	--*	--
BEHP	--	--	--	4.0E-05	--	--
Beta-HCH	--	--	--	--	8.3E-10	--
Chlordane	--	--	--	2.9E-09	--	1.1E-08
DDT	--	--	--	--	2.0E-08	--
Heptachlor	--	--	--	1.0E-10	2.0E-10	1.2E-10
PCBs	--	--	--	--	1.0E-06	1.8E-07
Tetrachloroethane		1.1E-10			6.0E-11	

*Inhalation RfDs and SFs are not available with which to evaluate these contaminants of potential concern.
-- Indicates not a contaminant of potential concern for the air pathway at this subunit.

The potential exposure to volatile compounds through the garden scenario was not quantitatively evaluated in the BRSRA and volatile contaminants are not presented in table 3-3. Volatile compounds such as tetrachloroethane have short half-lives in soil, are not persistent in the soil, and are not expected to be readily taken up by plants or to bioaccumulate in plants (Ryan *et al.*, 1988). Based on the very low concentrations of volatile contaminants detected in the soil, plant uptake of these COPC is not considered an operable exposure route and the uptake of volatile contaminants from soil or soil gas is not evaluated further in this BRSRA.

A summary of contaminant concentrations for the garden pathway is provided in table 3-4. The 1100-2 subunit is not presented in this table because the only contaminant at this subunit (tetrachloroethane) is not evaluated for the garden pathway.

3.5.1.4 Groundwater Pathways for BRSRA--The exposure concentrations for the groundwater ingestion and inhalation of volatiles from groundwater pathways are the maximum concentrations of the COPC as determined from the Phase I and Phase II groundwater sampling at HRL (DOE/RL-90-18 and appendix 5). The concentrations are 0.11 mg/L and 61 mg/L for trichloroethane and nitrate as N, respectively. As directed, 1,1,1-trichloroethane was not evaluated [Einan, 1991 (see appendix I)].

3.5.4.5 Residential-Related Recreational Pathways for BRSRA--Two recreational exposures are evaluated for residents at HRL. Residents may swim in or consume fish from the Columbia River, which could be potentially impacted by groundwater from the vicinity of the 1100-EM-1 Operable Unit. Trichloroethane and nitrate are groundwater COPC that potentially could be transported to the Columbia River. Only trichloroethane is likely to be dermally absorbed. The estimated future concentration of trichloroethane in the Columbia River is conservatively assumed to be 6E-06 mg/L (DOE/RL-90-18), which is the value used in evaluating potential dermal exposures during swimming. By extrapolating observations of groundwater concentrations, the nitrate value at the Columbia River is estimated to be 0.003 mg/L. This is below the MCL of 10 mg/L for nitrate.

As trichloroethane may bioaccumulate in fish, with a bioconcentration factor of 17 L/kg on a wet weight basis (EPA, 1986b), the resulting contaminant concentration in the tissue of fish inhabiting the Columbia River in the vicinity of the city of Richland water intake is conservatively estimated to be 1E-04 mg/kg. Little information exists on the bioconcentration potential of nitrate in animals. However, because nitrate is readily metabolized, bioconcentration is unlikely. Therefore, nitrate is not evaluated for exposures through bioaccumulation in fish.

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Table 3-3. Summary of Plant Uptake Factors[a,b].

Contaminant	Leafy	Root	Garden Fruits	Potatoes
Arsenic	0.04	0.02	0.002	0.0006
BEHP[c]	0.38	0.36	0.02	0.02
Beryllium[d]	0.43	0.26	0.041	0.06
Chlordane	0.02[e]	2.02[f]	0.21[e]	0.3[e]
Chromium	0.2[g]	0.26[d]	0.041[d]	0.06[d]
Lead	0.008	0.003	0.002	0.0008
PCBs	0.38	0.36	0.02	0.02

[a]All uptake factors expressed as [μg/g tissue Dry Weight (μg/g soil)$^{-1}$]
[b]Source: EPA 1986a unless otherwise indicated
[c]PCB uptake factors used as surrogates for BEHP
[d]95% upper confidence limit of mean for uptake factors of As, Cd, Pb, Hg, Ni, Se, Zn (EPA 1986a)
[e]Heptachlor uptake factors used as surrogates for chlordane
[f]95% upper confidence limit of mean for uptake of chlordane by sugar beets
[g] Kabata - Pendias and Pendias 1984

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Table 3-4. Summary of Contaminant Concentrations for the Garden Pathway at Specific 1100-EM-1 Operable Subunits Based on Maximum Contaminant Concentrations.

	Leafy (lettuce) (mg/kg)	Root (carrots) (mg/kg)	Garden Fruits (tomatoes) (mg/kg)	Potatoes (mg/kg)
1100-3				
Arsenic	1.36E-01	6.8E-02	6.8E-03	2.0E-03
Chromium	2.8E+00	3.6E+00	5.7E-01	8.4E-01
Lead	2.11E-01	7.9E-02	5.3E-03	2.1E-02
UN-1100-6				
BEHP	9.5E+03	9.0E+03	5.0E+02	5.0E+02
Chlordane	3.7E-02	3.8E+00	3.9E-01	5.6E-01
Ephemeral Pool				
Chlordane	5.6E-02	5.7E+00	5.9E-01	8.4E-01
PCB	1.6E+01	1.5E+01	8.4E-01	8.4E-01
Horn Rapids Landfill				
Arsenic	2.6E-01	1.3E-01	1.3E-02	4.0E-03
Beryllium	5.6E-01	3.4E-01	5.3E-02	7.8E-02
Chromium	2.5E+02	3.2E+02	5.1E+01	7.5E+01
Lead	6.8E+00	2.6E+00	1.7E+00	6.8E-01
PCB	3.9E+01	3.7E+01	2.0E+00	2.0E+00

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3.5.2 Calculation of Contaminant Intakes

Standard EPA equations for calculation of intakes, as provided in RAGS (EPA, 1989a) and the HSBRAM (DOE/RL-91-45 1991) are used as the basis for all intake calculations. The table 3-4 basic equation for calculating intakes, normalized with respect to body weight, for ingestion or inhalation is:
where:

$$\text{Intake} = \frac{C \times IR \times EF \times ED \times CF}{BW \times AT}$$

Intake	=	chronic daily intake of the contaminant (mg/kg-d)
C	=	concentration of contaminant in the medium (*e.g.*, mg/kg or mg/m^3)
IR	=	intake rate (*e.g.*, mg/d or m^3/d)
EF	=	exposure frequency (d/yr)
ED	=	exposure duration (yr)
BW	=	body weight (kg)
AT	=	averaging time (d/yr x yr)
CF	=	conversion factor (as appropriate)

The exposure parameters (*i.e.* body weight, averaging time, contact rate, exposure frequency, and exposure duration) for the BISRA are those presented for the industrial scenario of the HSBRAM (DOE/RL-91-45), and are discussed below with conversion factors indicated, as appropriate. A summary of the industrial and residential exposure parameters are provided in table 3-5 and table 3-6, respectively. See appendix IV for specific BRSRA calculations, *e.g.*, in combining child and adult exposures.

3.5.2.1 Soil Ingestion for BISRA--

C	=	maximum contaminant concentration (mg/kg)
IR	=	intake rate (50 mg/d)
EF	=	exposure frequency (146 d/yr)
ED	=	exposure duration (20 yr)
BW	=	body weight (70 kg)
AT	=	averaging time (noncarcinogenic effects: 365 d/yr x 20 yr; carcinogenic effects: 365 d/yr x 70 yr)
CF	=	conversion factor (1E-06 kg/mg)

3.5.2.2 Soil Ingestion for BRSRA--All exposure parameters for the soil ingestion pathway are those presented for the residential scenario as discussed in *Supplemental Risk Assessment Guidance for Superfund*, (EPA-10, 1991). These factors are used as required by EPA [Einan, 1992 (see appendix I)]. For evaluating both carcinogens and noncarcinogens, the exposure assumptions are based on a child and an adult exposure.

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C	=	maximum contaminant concentration (mg/kg)
IR	=	intake rate (Child: 200 mg/d; Adult: 100 mg/d)
EF	=	exposure frequency (350 d/yr)
ED	=	exposure duration (Child: 6 yr; Adult: 24 yr)
BW	=	body weight (Child: 15 kg; Adult: 70 kg)
AT	=	averaging time (noncarcinogenic effects: 365 d/yr x 30 yr; carcinogenic effects: 365 d/yr x 70 yr)
CF	=	conversion factor (1E-06 kg/mg)

3.5.2.2 Inhalation of Fugitive Dust for BISRA--The following are exposure parameters used for the industrial scenario:

C	=	estimated air concentration (mg/m^3)
IR	=	intake rate (20 m^3/d)
EF	=	exposure frequency (250 d/yr)
ED	=	exposure duration (20 yr)
BW	=	body weight (70 kg)
AT	=	averaging time (noncarcinogenic effects: 365 d/yr x 20 yr; carcinogenic effects: 365 d/yr x 70 yr)

3.5.2.3 Inhalation of Fugitive Dust for BRSRA--All exposure parameters for the inhalation of fugitive dust pathway are those presented for the residential scenario, as discussed in EPA-Region 10 guidance (EPA-10 1991). For evaluating both carcinogens and noncarcinogens, the exposure assumptions are based on an adult exposure.

C	=	estimated air concentration (mg/m^3)
IR	=	intake rate (20 m^3/d)
EF	=	exposure frequency (350 d/yr)
ED	=	exposure duration (30 yr)
BW	=	body weight (70 kg)
AT	=	averaging time (noncarcinogenic effects: 365 d/yr x 30 yr; carcinogenic effects: 365 d/yr x 70 yr)

3.5.2.4 Dermal Exposure to Contaminated Soil for BISRA--The intake equation provided in paragraph 3.5.2 above, is modified to provide the absorbed dose equation for dermal exposures to contaminated soil. For the purpose of the BISRA, it is conservatively assumed that workers do not wear protective clothing that would limit dermal exposure. Exposure factors, as provided in the HSBRAM (DOE/RL-91-45 1992), are indicated.

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Table 3-5. Summary of Industrial Scenario Exposure Factors.

Exposure Factor	HSBRAM Reasonable Maximum Exposure[a]
Intake Rate	
Soil Ingestion	50 mg/d
Inhalation	20 m^3/d
Exposure Frequency	
Soil Ingestion	146 d/yr
Inhalation	250 d/yr
Dermal	146 d/yr
Exposure Duration	20 yr
Body Weight	70 kg
Averaging Time	
Carcinogens	70 yr x 365 d/yr
Noncarcinogens	20 yr x 365 d/yr
Skin Surface Area	5000 cm^2
Soil-to-Skin Adherence Factor	0.2 mg/cm^2/event
Absorption Factor	
Inorganics	0.001[c]
BEHP	0.0055[b]
All other organics	0.06[c]

[a]DOE-RL 1992; factors based on EPA-10 (1991), WAC 173-340, EPA (1992c)
[b]Calculated; see Subsection 3.5.3
[c]EPA (1992c)

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Table 3-6. Summary of Residential Scenario Exposure Factors.

Exposure Factor	Reasonable Maximum Exposure[a]
Intake Rate	
Ingestion	
Adult - Soil	100 mg/d
Child - Soil	200 mg/d
Adult - Groundwater	2 L/d
Inhalation	
Adult - Soil	20 m^3/d
Adult - Groundwater (volatiles)	15 m^3/d
Fish Ingestion[c]	54 g/d
Garden Produce[b]	
Root (e.g., carrots)	0.88 g/d
Leafy (e.g., lettuce)	1.1 g/d
Garden fruit (e.g., tomato)	2.2 g/d
Potato	9.1 g/d
Exposure Frequency	350 d/yr 2.6 hr/d, 7 d/yr (swimming)
Exposure Duration	
Soil Ingestion and Dermal	
Adult	24 yr
Child	6 yr
All other pathways	30 yr
Body Weight	
Adult	70 kg
Child	15 kg
Averaging Time	
Carcinogens	70 yr x 365 d/yr
Non-carcinogens	30 yr x 365 d/yr
Skin Surface Area	
Adult - Soil	5000 cm^2 (summer); 1900 cm^2 (winter)
Child - Soil	3900 cm^2
Adult - Swimming	20,000 cm^2
Soil to Skin Adherence Factor	1 mg/cm^2/d
Contaminant-Specific Absorption Factor	
Inorganics[d]	0.001
BEHP[e]	0.0055
All other organics[d]	0.06
Permeability Coefficient - Trichloroethene[d]	4E-01 cm/hr
Groundwater Volatilization Factor[e]	0.5 L/m^3

[a]Factors based on EPA-10 (1991) unless otherwise specified
[b]EPA (1986a)
[c]EPA (1991a)
[d]EPA (1992c)
[e]Calculated factor; see Section 3.5.3

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$$\text{Dermally absorbed dose} = \frac{CS \times SA \times AF \times ABS \times EF \times ED \times CF}{BW \times AT}$$

where:

Dermally absorbed dose = (mg/kg-d)

CS	=	maximum concentration of contaminant in soil (mg/kg)
SA	=	skin surface area available for contact (5000 cm^2)
AF	=	soil-to-skin adherence factor (0.2 mg/cm^2/event)
ABS	=	contaminant-specific absorption factor (unitless)
EF	=	event frequency (146 events/yr)
ED	=	exposure duration (20 yr)
CF	=	conversion factor (1E-06 kg/mg)
BW	=	body weight (70 kg)
AT	=	averaging time (noncarcinogenic effects: 365 d/yr x 20 yr; carcinogenic effects: 365 d/yr x 70 yr)

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The contaminant-specific absorption factor is a value that is either assumed or derived from published literature. Many factors influence the dermal absorption of contaminants from the soil. Some of these factors include the amount of soil adsorbed to the skin, the contact time of the soil with the skin (time between exposure and washing), chemical properties of the contaminants, and the condition of the skin. Contaminants bound to a soil matrix are less bioavailable than pure or dilute solutions of contaminants applied directly to skin. Specific information on dermal absorption for most of the COPC is limited.

For the inorganic COPC, a review of the published literature, including available toxicological profiles from the Agency for Toxic Substances and Disease Registry (ATSDR), indicates that uptake across intact skin is very limited for most metal ions. The average dermal absorption of cadmium from a soil matrix is estimated at 1.0 percent (*i.e.*, 0.01), as discussed in the *"Dermal Exposure Assessment: Principles and Applications"* (EPA, 1992c). Therefore, for the calculation of dermal intakes, it is assumed that the contaminant-specific absorption factor (ABS) is 0.01 for all inorganic COPC based on the available information for cadmium.

Several organic COPC are also present in the soil at UN-1100-6 subunit, HRL, and the Ephemeral Pool. A review of the literature provided little specific information on the absorption of the specific organic compounds of potential concern — beta-HCH, chlordane, DDT, heptachlor, and PCB's — from skin contact with contaminated soil. EPA (1992c) recommends the use of an upper bound estimate of 6 percent (*i.e.*, 0.06), as an absorption factor for PCB's based on studies of 3,3', 4,4' tetrachlorobiphenyl. A value of 0.06 is assumed to be an appropriate ABS for all organic COPC except BEHP.

For BEHP, data are available on potential dermal absorption that can be combined with assumptions of contact time with the soil and dermal bioavailability. Studies in rats have shown that 6.9 percent of BEHP, applied as pure product, is dermally absorbed (Life Systems, Inc. 1989). Ryan *et al.* (1987) suggest that only 10 percent of organic

contaminants in soil are generally bioavailable for dermal exposures. If the contact time with the soil is conservatively assumed to be 8 hr, 80 percent of the contaminant is estimated to be absorbed during this time period (Shu *et al.* 1988). This absorption information and dermal bioavailability information can be combined to estimate an absorption factor for BEHP of 0.55 percent (*i.e.*, 0.0055).

3.5.2.5 Dermal Exposure to Contaminated Soil for BRSRA--The equation and assumptions used for the BRSRA for dermally absorbed dose is the same as that used for the BISRA, as described above. The dermal exposure parameters for the contaminated soil pathway are those recommended by EPA (EPA-10, 1991). For evaluating both carcinogens and noncarcinogens, the exposure assumptions are based on a child and an adult exposure. The following parameters are different for the BRSRA:

SA	=	skin surface area available for contact (Child: 3900 cm^2, Adult: 5000 cm^2 - summer, 1900 cm^2 - winter)
AF	=	soil-to-skin adherence factor (1 mg/cm^2/event)
EF	=	event frequency (Child: 1/event/day, 350 d/yr; Adult: 1/event/day, 350 d/yr with 90 d as summer and 260 d as winter)
ED	=	exposure duration (Child: 6 yr; Adult: 24 yr)
BW	=	body weight (Child: 15 kg; Adult: 70 kg)

3.5.2.6 Ingestion of Garden Produce for BRSRA--The exposure parameters for the ingestion of garden produce [*i.e.*, dry weight (DW) consumption rates for each vegetable category) have been derived from EPA (1986a, 1989d, and 1990]. The percentage of homegrown vegetables and the remaining exposure factors are provided in EPA (1991a). The currently recommended parameters in EPA (1991a) are based on fresh weight and are for total vegetable consumption only. Therefore, they are not appropriate to evaluate individual vegetable categories or for use with plant uptake factors based on DW.

For evaluating both carcinogens and noncarcinogens, the exposure assumption is based on an adult exposure. The highest daily DW consumptions for a vegetable category provided in EPA (1986a, 1989d, and 1990) have been adjusted to represent the amount that is homegrown (*i.e.*, 40 percent), as recommended in EPA (1991a). The adjusted daily DW consumptions are:

- Root (*e.g.*, carrots) 0.88 g/d
- Leafy (*e.g.*, lettuce) 1.1 g/d
- Garden fruits (*e.g.*, tomatoes) 2.2 g/d
- Potatoes 9.1 g/d

The exposure parameters for the garden produce pathway are:

C	=	estimated plant concentration (mg/kg dry weight)
IR	=	intake rate (produce-specific g/d dry weight)
EF	=	exposure frequency (350 d/yr)
ED	=	exposure duration (30 yr)
BW	=	body weight (70 kg)
AT	=	averaging time (noncarcinogenic effects: 365 d/yr x 30 yr; carcinogenic effects: 365 d/yr x 70 yr)
CF	=	conversion factor (1E-03 kg/g)

3.5.2.7 Ingestion of Groundwater for BRSRA--The exposure parameters for the consumption of groundwater are those presented for the residential scenario, as discussed in EPA-Region 10 guidance (EPA-10, 1991). For evaluating both carcinogen and non-carcinogens, the exposure assumptions are based on an adult exposure.

CW	=	estimated concentration in groundwater (mg/L)
IR	=	intake rate (2 L/d)
EF	=	exposure frequency (350 d/yr)
ED	=	exposure duration (30 yr)
BW	=	body weight (70 kg)
AT	=	averaging time (noncarcinogenic effects: 365 d/yr x 30 yr; carcinogenic effects: 365 d/yr x 70 yr)

3.5.2.8 Inhalation of Volatiles from Groundwater for BRSRA--The potential inhalation of volatiles from the use of groundwater in a residence is evaluated as recommended in EPA-Region 10 guidance (EPA-10, 1991). Exposure assumptions are based on an adult exposure:

CW	=	estimated concentration in water (mg/L) x K volatilization factor (0.5 L/m^3)
IR	=	intake rate (15 m^3/d)
EF	=	exposure frequency (350 d/yr)
ED	=	exposure duration (30 yr)
BW	=	body weight (70 kg)
AT	=	averaging time (noncarcinogenic effects: 365 d/yr x 30 yr; carcinogenic effects: 365 d/yr x 70 yr)

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3.5.2.9 Fish Ingestion for BRSRA--The exposure parameters for the consumption of fish are those presented in EPA (1991a). Exposure assumptions are based on adult exposure:

C	=	estimated concentration in fish (mg/kg)
IR	=	intake rate (54 g/d)
EF	=	exposure frequency (350 d/yr)
ED	=	exposure duration (30 yr)
BW	=	body weight (70 kg)
AT	=	averaging time (noncarcinogenic effects: 365 d/yr x 30 yr; carcinogenic effects: 365 d/yr x 70 yr)
CF	=	conversion factor (1E-03 kg/g)

3.5.2.10 Dermal Contact with Columbia River Water for BRSRA--The intake equation provided above for ingestion is modified to provide the absorbed dose equation for dermal contact with Columbia River water. All exposure parameters for the dermal contact with water are those presented for the residential scenario as discussed in EPA-Region 10 guidance (EPA-10, 1991). For evaluating both carcinogens and noncarcinogens, the exposure assumptions are based on an adult exposure.

$$\text{Dermally absorbed dose} = \frac{CW \times SA \times K_p \times ET \times EF \times ED \times CF}{BW \times AT}$$

where :

Dermally absorbed dose = normalized with respect to bodyweight (mg/kg-d)

CW	=	maximum concentration of contaminant in water (mg/L)
SA	=	skin surface area available for contact (20,000 cm^2)
K_p	=	contaminant-specific permeability coefficient (cm/hr)
ET	=	event time (2.6 hr/d)
EF	=	event frequency (7 d/yr)
ED	=	exposure duration (30 yr)
CF	=	conversion factor (1 L/1000 cm^3)
BW	=	body weight (70 kg)
AT	=	averaging time (noncarcinogenic effects: 365 d/yr x 30 yr; carcinogenic effects: 365 d/yr x 70 yr)

The contaminant-specific permeability factor (K_p) is a value that is either assumed or can be derived from the literature if sufficient dermal absorption information is available. Trichloroethane is the only contaminant of potential concern that may impact the Columbia River that is evaluated for the BRSRA. The K_p for trichloroethane is 2E-01 cm/hr (0.08 in/hr) (EPA, 1992c).

3.5.3 Summary of Contaminant Intakes for BISRA

The estimated intakes of COPC for industrial workers are provided in tables 3-7 and 3-8. The intakes are provided for both noncarcinogenic effects and carcinogenic effects. Specific intakes are not presented if there is no RfD or SF for a contaminant, or if the SF is zero (*e.g.*, a contaminant is not carcinogenic by this pathway). It should be noted that the fugitive dust intake of arsenic is reduced by 30 percent because of absorption (EPA, 1992b).

3.5.4 Summary of Contaminant Intakes for BRSRA

The estimated intakes of COPC for onsite residents are provided in tables 3-9 through 3-12. As noted for the BISRA, specific intakes are not presented if there is no risk SF or RfD for a contaminant or if the slope factor is zero. Table 3-9 provides the intakes for the soil ingestion, inhalation of fugitive dust, and dermal contact pathways based on the maximum contaminant concentrations. As referenced for the BISRA, fugitive dust intake of arsenic is reduced by 30 percent because of absorption. The contaminant intakes from the consumption of garden produce are presented in table 3-10. The 1100-2 subunit is not presented in table 3-10 because the only contaminant at this subunit (tetrachloroethane) is not evaluated for the garden pathway. Volatile contaminants detected at HRL are not presented in this table. Contaminant intakes for the groundwater pathway are shown in table 3-11. The contaminant intakes from the residential-related recreational pathways (consumption of fish and dermal absorption through swimming) are presented in table 3-12. The intakes are provided for both noncarcinogenic effects and carcinogenic effects.

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3.6 EXPOSURE ASSESSMENT FOR LEAD IN BRSRA

EPA (see chapter 2 and appendix I) has indicated that lead is to be evaluated as a contaminant of potential concern at 1100-3 and at HRL, where it is detected in soil at a maximum concentration of 26.4 mg/kg, and 854 mg/kg, respectively. The EPA has also recommended the use of the Uptake/Biokinetic Model (UBK) for evaluating the potential residential exposures to lead at these two subunits.

EPA does not currently recommend numerical toxicity values for lead, in part, because there is no scientific consensus concerning the effects of lead at low doses. Data on blood-lead levels and various health effects indicate a spectrum of adverse health effects in populations having increased blood-lead levels. EPA has reviewed key studies relating to the toxicokinetics and health effects of lead in humans in its *Air Quality Criteria Document for Lead* (EPA, 1986c). Although a threshold for these effects has not been established, the available evidence suggests that it lies within 10 to 15 μg/dl. The evidence for adverse effects below this range of blood-lead is uncertain and remains controversial.

Table 3-7. Summary of Industrial Scenario Intakes Based on Maximum Contaminant Concentrations for 1100-1, 1100-2, 1100-3, 1100-4, UN-1100-6, and the Ephemeral Pool.

Contaminant	Pathway					
	Soil Ingestion (mg/kg-d)		Fugitive Dust Inhalation (mg/kg-d)		Dermal Exposure (mg/kg-d)	
	Noncarcinogenic	Carcinogenic	Noncarcinogenic	Carcinogenic	Noncarcinogenic	Carcinogenic
1100-1						
Arsenic	9.3E-07	2.6E-07	-	1.7E-13*	1.8E-08	5.2E-09
Vanadium	3.4E-05	-	-	-	6.7E-07	-
1100-2						
Chromium	4.8E-06	-	-	3.0E-09	9.5E-08	-
1100-3						
Chromium	4.0E-06	-	-	1.9E-09	7.9E-08	-
1100-4						
Arsenic	1.7E-06	4.7E-07	-	-	3.3E-08	9.4E-09
Beryllium	2.7E-07	7.6E-08	-	-	5.3E-09	1.5E-08
UN-1100-6						
BEHP	7.2E-03	2.0E-03	-	2.2E-06	7.9E-04	2.2E-04
Chlordane	5.3E-07	1.5E-07	-	1.6E-10	6.4E-07	1.8E-07
Heptachlor	1.9E-08	5.3E-09	-	5.8E-12	2.2E-08	6.4E-09
Ephemeral Pool						
Chlordane	8.1E-07	2.3E-07	-	6.6E-10	9.6E-07	2.7E-07
Heptachlor	8.4E-09	2.4E-09	-	6.9E-12	9.9E-09	2.8E-09
PCBs	-	3.4E-06	-	1.0E-08	-	4.1E-06

*Intakes adjusted based on 30% absorption of inhaled arsenic (EPA 1992b)
- = Not Applicable

Table 3-8. Summary of Industrial Scenario Intakes Based on Maximum Contaminant Concentrations for the Horn Rapids Landfill.

Contaminant	Pathway					
	Soil Ingestion (mg/kg-d)		Fugitive Dust Inhalation (mg/kg-d)		Dermal Exposure (mg/kg-d)	
	Noncarcinogenic	Carcinogenic	Noncarcinogenic	Carcinogenic	Noncarcinogenic	Carcinogenic
Antimony	4.5E-06	--	--	--	8.9E-08	--
Arsenic	1.9E-06	5.4E-07	--	1.1E-09*	3.7E-08	1.1E-08
Barium	3.8E-04	--	2.6E-06	NA	7.5E-06	--
Beryllium	3.7E-07	1.1E-07	--	7.2E-10	7.4E-09	2.1E-09
Chromium	3.6E-04	--	--	7.0E-07	7.1E-06	--
Copper	3.7E-04	--	--	--	7.3E-06	--
Nickel	1.8E-04	--	--	3.1E-07	3.2E-06	--
Thallium	8.9E-07	--	--	--	1.7E-08	--
Vanadium	2.9E-05	--	--	--	5.8E-07	--
Zinc	9.1E-04	--	--	--	1.8E-05	--
Beta-HCH	--	7.7E-09	--	5.2E-11	--	8.2E-09
DDT	5.7E-07	1.8E-07	--	1.1E-09	6.8E-07	1.9E-07
Heptachlor	5.8E-09	1.8E-09	--	1.1E-11	6.8E-09	1.9E-09
PCBs	--	8.4E-06	--	5.7E-08	--	1.0E-05

*Intakes adjusted based on 30% absorption of inhaled arsenic (EPA, 1992b)
-- = Not Applicable

Table 3-9. Summary of Residential Scenario Intakes Based on Maximum Contaminant Concentrations for the Soil Ingestion, Fugitive Dust Inhalation, and Dermal Exposure Pathways at Specific 1100-EM-1 Operable Subunits.

Contaminant	Pathway					
	Soil Ingestion (mg/kg-d)		Fugitive Dust Inhalation (mg/kg-d)		Dermal Exposure (mg/kg-d)	
	Noncarcinogenic	Carcinogenic	Noncarcinogenic	Carcinogenic	Noncarcinogenic	Carcinogenic
1100-2						
Tetrachloroethene	1.3E-07	5.6E-08	--[c]	1.3E-11	1.7E-07	7.2E-08
1100-3						
Arsenic	1.3E-05	5.4E-06	--[c]	2.9E-10[a]	2.7E-07	1.1E-07
Chromium	5.2E-05	--[b]	--[c]	4.0E-09	1.1E-06	--[b]
Lead	--[c]	--[d]	--[c]	--[d]	--[c]	--[d]
UN-1100-6						
BEHP	9.3E-02	4.0E-02	--[c]	4.7E-06	1.1E-02	4.7E-03
Chlordane	6.9E-06	2.9E-06	--[c]	3.5E-10	8.8E-06	3.8E-06
Ephemeral Pool						
Chlordane	1.0E-05	4.5E-06	--[c]	1.4E-09	1.3E-05	5.7E-06
PCBs	--[c]	6.6E-05	--[c]	2.1E-08	--[c]	8.6E-05
Hare Rapids Landfill						
Arsenic	2.4E-05	1.0E-5	--[c]	2.4E-09	5.2E-07	2.2E-07
Beryllium	4.8E-06	2.1E-06	--[c]	1.5E-09	1.0E-07	4.4E-08
Chromium	4.6E-03	--[b]	--[c]	1.5E-06	9.9E-05	--[b]
Lead	--[c]	--[d]	--[c]	--[d]	--[c]	--[d]
PCBs	--[c]	1.6E-04	--[c]	1.2E-07	--[c]	2.1E-04
Tetrachloroethene	2.2E-08	9.6E-09	--[c]	7.1E-12	2.8E-08	1.2E-08

[a]Intakes adjusted for 30% absorption of inhaled arsenic (EPA, 1992b)
[b]Not considered carcinogenic by this route of exposure or pathway
[c]RfD not available to evaluate intake for this pathway.
[d]SF not available to evaluate intake for this pathway.
-- Indicates not applicable

Table 3-10. Summary of Contaminant Intakes for Homegrown Vegetables in the Garden Pathway at Specific 1100-EM-1 Operable Subunits Based on the Maximum Contaminant Concentrations in Soil.

	Leafy (lettuce)[a] (mg/kg-d)		Root (carrots)[b] (mg/kg-d)		Garden Fruits (tomatoes)[c] (mg/kg-d)		Potatoes[d] (mg/kg-d)		Total Contaminant Intake (mg/kg-d)	
	Non-Carcinogenic	Carcinogenic	Non-Carcinogenic	Carcinogenic	Non-Carcinogenic	Carcinogenic	Non-Carcinogenic	Carcinogenic	Non-Carcinogenic	Carcinogenic
1100-3										
Arsenic	2.0E-06	–[e]	8.2E-07	–[e]	2.0E-07	–[e]	2.4E-07	–[e]	3.3E-06	–[e]
Chromium	4.2E-05	–[e]	4.3E-05	–[e]	1.7E-05	–[e]	1.0E-04	–[e]	2.0E-04	–[e]
Lead	–[f]	–[g]	–[f]	–[g]	–[f]	–[g]	–[f]	–[g]	–[f]	–[g]
UN-1100-2										
BEHP	1.4E-01	6.2E-02	1.1E-01	4.7E-02	1.5E-02	6.5E-03	6.4E-02	2.6E-02	3.3E-01	1.4E-01
Chlordane	5.6E-07	2.4E-07	4.6E-05	2.0E-05	1.2E-05	5.1E-06	7.1E-05	3.0E-05	1.2E-04	5.5E-05
Ephemeral Pool										
Chlordane	8.4E-07	3.6E-07	7.0E-05	3.0E-05	1.8E-05	7.8E-06	1.0E-04	4.5E-05	1.9E-04	8.3E-05
PCBs	–[f]	1.0E-04	–[f]	7.8E-05	–[f]	1.1E-05	–[f]	4.5E-05	–[f]	2.3E-04
Horn Rapids Landfill										
Arsenic	4.0E-06	–[e]	1.6E-06	–[e]	3.9E-07	–[e]	5.1E-07	–[e]	6.4E-06	–[e]
Beryllium	8.4E-06	3.6E-06	4.1E-06	1.8E-06	1.6E-06	6.9E-07	9.9E-06	4.2E-06	2.4E-05	1.0E-05
Chromium	3.8E-03	–[e]	3.8E-03	–[e]	1.5E-03	–[e]	9.6E-03	–[e]	1.8E-02	–[e]
Lead	1.0E-04	4.4E-05	3.1E-05	1.4E-05	5.1E-05	2.2E-05	8.7E-05	3.6E-05	2.6E-04	1.2E-04
PCBs	–[f]	2.5E-04	–[f]	1.9E-04	–[f]	2.6E-05	–[f]	1.1E-04	–[f]	5.8E-04

[a]Assumes intake of 1.1 g/d dry weight (EPA, 1986a)
[b]Assumes intake of .88 g/d dry weight (EPA, 1986a)
[c]Assumes intake of 2.2 g/d dry weight (EPA, 1986a)
[d]Assumes intake of 9.1 g/d dry weight (EPA, 1986a)
[e]Not considered carcinogenic by this route of exposure or pathway
[f]RfD not available to evaluate intake for this pathway.
[g]SF not available to evaluate intake for this pathway.
– Indicates not applicable

Table 3-11. Summary of Residential Scenario Intakes Based on the Maximum Contaminant Concentrations for the Groundwater Pathway at the Horn Rapids Landfill.

Contaminant	Pathway			
	Ingestion (mg/kg-d)		Volatile Inhalation (mg/kg-d)	
	Non-carcinogenic	Carcinogenic	Non-Carcinogenic	Carcinogenic
Nitrate	1.7E+00	--[a]	--[b]	--[a,b]
Trichloroethene	--[c]	1.3E-03	--[c]	4.8E-03

[a]Not considered to be a carcinogen
[b]Not a volatile contaminant
[c]RfD not available to evaluate intake for this pathway
-- Indicates not applicable

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EPA is developing the UBK model to estimate blood-lead levels due to overall exposure to lead in the environment (EPA, 1991c and 1991d). The model has not officially been released, but is available from EPA for limited evaluation and use. The current model (version 0.5) estimates lead uptake and blood-lead levels in children ages 0 to 6. Children at this age are a sensitive group of individuals, are potentially more susceptible to the adverse effects associated with lead exposures.

The UBK model uses default parameters or subunit-specific information on concentrations of lead in soil, dust, air, diet, or water to predict blood-lead levels in children. The UBK model conservatively predicts absorption (uptake) of lead by various routes and applies that uptake to a compartment kinetic model. This compartment kinetic model describes lead distribution in the body and integrates the effect of The lead uptake over time. Graphical results of the UBK model are used to show the percentages of children of specific age groups that may have blood-lead levels above or below a specified concentration. For this BRSRA, a value of 10 μg/dL has been selected as the blood-lead level of interest. The Centers for Disease Control currently recommends that blood-lead levels in children should not exceed 10 μg/dL in order to prevent potential adverse intellectual development. Based on this threshold, the model's default exposure parameters results in an acceptable soil concentration of approximately 500 mg/kg.

A discussion of the application of the UBK model at the 1100-3 subunit and HRL subunit is discussed below. The results of the UBK model are discussed in chapter 5, paragraph 5.1. Computer output for the model results is provided in appendix V.

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3.6.1 1100-3

The UBK model is run for two assumed residential scenarios at this subunit. First, to determine the predicted blood-lead level in children from 0 to 6 years of age, the model's default exposure parameters are used with the maximum concentration of lead detected at the 1100-3 subunit (*i.e.*, 26.4 mg/kg). This provides a subunit benchmark for each age for soil ingestion and dust inhalation based on the maximum subunit lead concentration in soil and assumes typical (default) diet, water, and air exposures.

The second scenario is to predict the blood lead level specifically in a 2-year old child (24 to 36 months) based on soil ingestion, dust inhalation, and dietary intake of lead from consumption of the four vegetable groups evaluated in the residential scenario, in conjunction with typical background. A 2-year old child has been selected because daily DW consumption for each vegetable group is readily available for this age group and young children are one of the most sensitive subpopulations for lead exposure. Additionally, this approach is consistent with the approach recommended in EPA (1986a).

To evaluate the dietary lead uptake for a 2-year old child, the daily dietary consumption of lead (as DW) via intake of subunit-grown potatoes, leafy vegetables, root vegetables, and garden fruits is determined for a 2-year old child. The concentration of lead in each of the four vegetable groups, presented in table 3-4, is multiplied by the child's DW

Table 3-12. Summary of Intakes from Residential-Related Recreational Pathways for the 1100-EM-1 Operable Unit.

Contaminant	Pathway			
	Swimming[a] (mg/kg-d)		Eating Fish (mg/kg-d)	
	Non-Carcinogenic	Carcinogenic	Non-Carcinogenic	Carcinogenic
Trichloroethene	--[b]	1.4E-08	--[b]	3.1E-08

[a]Indicates dermally absorbed dose
[b]RfD not available to evaluate intake for this pathway

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consumption of vegetables from each food group. The DW consumptions of a 2-year old child, as provided in EPA (1986a) are:

• Leafy vegetables (*e.g.*, lettuce)	0.485 g/d
• Root vegetables (*e.g.*, carrots)	0.668 g/d
• Garden fruits (*e.g.*, tomatoes)	1.669 g/d
• Potatoes	10.034 g/d

For children, potentially living at 1100-3 and consuming vegetables in these food groups that are homegrown at the subunit, the daily lead intake from these foods is estimated to be:

• Leafy vegetables (*e.g.*, lettuce)	0.1 μg/d
• Root vegetables (*e.g.*, carrots)	0.05 μg/d
• Garden fruits (*e.g.*, tomatoes)	0.009 μg/d
• Potatoes	0.21 μg/d
Total additional lead intake	0.37 μg/d

To complete this second scenario, the UBK model predicts the blood level in a 2-year old child by combining the above subunit specific total additional dietary lead intake data with the subunit specific benchmark data from the first scenario.

Model outputs for these two scenarios are discussed in chapter 5, paragraph 5.1 and provided in appendix V. The modelling results are conservative because of the assumption that all vegetables in these four food groups are homegrown and that the entire subunit is uniformly contaminated at the maximum concentration detected in the soil.

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3.6.2 HRL

The UBK model was run for the same two assumed residential scenarios at HRL as were performed for 1100-3. With the exception of the concentrations in the four vegetable groups the parameters are the same as for subunit 1100-3. For children, potentially living at HRL and consuming vegetables in these food groups that are all homegrown at the subunit, the daily additional lead intake from these foods was estimated as:

• Leafy vegetables (*e.g.*, lettuce)	3.3 μg/d
• Root vegetables (*e.g.*, carrots)	1.7 μg/d
• Garden fruits (*e.g.*, tomatoes)	2.8 μg/d
• Potatoes	6.8 μg/d
Total additional lead intake	14.6 μg/d

To complete this second scenario, the UBK model predicts the blood level in a 2-year old child by combining the subunit specific total additional dietary lead intake data, with the subunit specific data from the first scenario.

Model outputs for these two scenarios are also discussed in chapter 5, paragraph 5.1 and provided in appendix V. Again, the modelling results are conservative because of the assumption that all vegetables in these four food groups are homegrown and that the entire subunit is uniformly contaminated at the maximum concentration detected in the soil.

3.7 SUMMARY OF EXPOSURE ASSESSMENT

The exposure assessment for the BISRA and BRSRA quantifies potential exposures for industrial workers who would work at a specific subunit on a regular basis and onsite residents who would live at a specific subunit, respectively. The intakes, based on both carcinogenic and noncarcinogenic effects, are estimated for exposure pathways recommended in the HSBRAM (DOE/RL-91-45, 1992) for the industrial scenario and are as requested by EPA [Einan, 1991 (see appendix I)] for the residential scenario. It has been noted that the fugitive dust intake of arsenic is reduced by 30 percent because of absorption (EPA, 1992b). Pathways determined for the BISRA are only related to soil as discussed in paragraphs 3.3 and 3.5 above. Uncertainty in the estimated exposures is discussed in chapter 5, paragraph 5.4 as part of the overall uncertainty in the characterization of risks for the 1100-EM-1 Operable Unit.

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4.0 HUMAN HEALTH TOXICITY ASSESSMENT

The purpose of the toxicity assessment is to identify the potential adverse effects associated with exposure to site-related substances and to estimate, using numerical toxicity values, the likelihood that these adverse effects may occur based on the extent of the exposure. The toxicity assessment for the BISRA was conducted in accordance with RAGS (EPA, 1989a) and is discussed in the HSBRAM (DOE/RL-91-45).

The preparation of a toxicity assessment relies primarily on existing toxicity information, and does not usually involve development of toxicity information or dose-response relationships. Current toxicological information that has already been evaluated and summarized is available in a number of documents, databases, and other sources. Toxicological profiles for the COPC are provided in appendix II.

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4.1 TOXICITY INFORMATION FOR NONCARCINOGENIC EFFECTS

Systemic, toxic effects other than cancer can be associated with exposures to chemicals. The RfD is the toxicity value used to evaluate noncarcinogenic effects resulting from exposures to chemicals. The RfD has been developed based on the concept that protective mechanisms exist that must be overcome before an adverse effect is manifested (*i.e.*, there is a threshold that must be reached before adverse effects occur). The RfD is developed to reflect the duration of exposure (*e.g.*, subchronic exposures - 2 weeks to 7 years and chronic exposures - 7 years to a lifetime) and the route of exposure (*e.g.*, inhalation, oral, *etc.*). In addition, RfD's are currently being developed, as appropriate, to evaluate specific critical effects such as developmental effects that may occur because of exposure to certain chemicals.

RfD's derived from data obtained from studies in animals or humans using modification and uncertainty factors that account for uncertainty in the information used to derive the RfD. Uncertainty factors are applied for extrapolation of the no-observed-effects-level (NOEL) in a study population to the RfD used in the risk assessment. A factor of 10 is usually applied to reflect the level of each of the sources of uncertainty listed below:

- Use of lowest observed effect level (LOEL) or other parameters that are less conservative than NOEL;
- Use of data from short-term exposure studies to extrapolate to long term exposure;
- use of data from animal studies to predict human effects; and
- use of data from homogeneous animal populations or healthy human populations to predict effects in the general population.

A modifying factor may also be incorporated into the RfD to reflect qualitative professional judgements regarding scientific uncertainties not considered by the uncertainty factor, such as the completeness of the data base and the number of animals in the study. Uncertainty factors and modifying factors, as published by EPA in IRIS or HEAST, are presented in table 4-1.

For purposes of these baseline risk assessments, the chronic RfD is utilized to evaluate potential noncarcinogenic effects. The chronic RfD is a daily exposure level that is not likely to cause an appreciable lifetime risk of deleterious effects to the general population, and sensitive subpopulations.

Table 4-1 summarizes the noncarcinogenic toxicity values for the COPC at the 1100-EM-1 Operable Units evaluated. Oral RfD's have been published for all of the COPC except for PCB's and trichloroethane. Confidence in these RfD's is low or medium for all COPC except nitrate. The confidence in the RfD for nitrate is high because the values are derived from human infant studies. An inhalation RfD is published for only two of the COPC, barium and 1,1,1-trichloroethane. However, 1,1,1-trichloroethane has only been detected in soil gas (DOE/RL-90-18); and, soil gas exposures are not evaluated, as indicated in chapter 3, paragraph 3.2. . The RfD for barium is based on a 4-month inhalation study in rats that resulted in fetotoxicity. Based on this reproductive study, an interim RfD is published in HEAST, but it is under review and the RfD is subject to change.

The noncarcinogenic effects for the COPC include a variety of effects such as altered blood chemistry profiles for antimony, gastrointestinal irritation for copper, or increased blood pressure for barium. Liver effects, such as increased liver weight, lesions in the liver, or changes in liver enzymes, are associated with thallium, BEHP, chlordane, DDT, heptachlor, and tetrachloroethane. Skin effects are associated with arsenic. No critical effects are identified for beryllium or chromium by the oral route. Nitrate is associated with changes in the capacity of the blood system to transport oxygen.

Additional information on the noncarcinogenic effects for each contaminant of potential concern is provided in the toxicity profiles presented in appendix III.

4.2 TOXICITY INFORMATION FOR CARCINOGENIC EFFECTS

Toxicity values have also been developed for evaluating potential human carcinogenic effects from exposures to chemicals. Potential human carcinogenic effects are evaluated using the chemical-specific SF and accompanying EPA weight-of evidence determination. The toxicity values (*i.e.*, SF's) for carcinogens have been derived based on the premise that for any exposure to a carcinogenic chemical there is always a carcinogenic response (*i.e.*, there is no threshold). The SF is used in risk assessment to estimate an upper-bound lifetime probability of an individual developing cancer as a result of exposure to a particular level of a potential carcinogen.

Table 4-1. Summary of Noncarcinogenic Toxicity Information for Contaminants of Potential Concern at the 1100-EM-1 Operable Unit.

Contaminant	ORAL						INHALATION					
	Oral Rfd (mg/kg-day)	Oral Rfd (basis/source)	Confidence Level	Critical Effect	Uncertainty Factors	Modifying Factors	Inhalation Rfd (mg/kg-d)	Inhalation Rfd (basis/source)	Confidence level	Critical effect	Uncertainty Factor	Modifying Factor
Antimony	4E-4	Water/IRIS	low	longevity, blood gluc.	1,000	1	--	--	--	--	--	--
Arsenic	3E-4	Food/IRIS	medium	hyperpigmentation keratosis	3	1	--	--	--	--	--	--
Barium	7E-2	Water/IRIS	medium	incr. blood press	3	1	1E-4	HEAST	--	--	1,000	--
Beryllium	5E-3	Water/IRIS	--	none observed	100	1	--	--	--	--	--	--
Chromium VI	5E-3	Water/IRIS	low	none	500	1	--	--	--	--	--	--
Copper	4E-02	EPA Region 10	--	GI irritation	--	--	--	--	--	--	--	--
Lead	ND	--	--	--	--	--	ND	--	--	--	--	--
Nickel	2E-2	Food/IRIS	medium	decrease body + organ weight	300	1	--	--	--	--	--	--
Thallium	6E-5 9E-5	-/IRIS	--	SGOT and serum LDH level	3,000	--	--	--	--	--	--	--
Vanadium	7E-3	Water/HEAST	--	none	100	--	--	--	--	--	--	--
Zinc	2E-1	HEAST	--	anemia	10	--	--	--	--	--	--	--
BEHP	2E-2	IRIS	low	liver weight	1000	1	--	--	--	--	--	--
Beta-HCH	--	--	--	--	--	--	--	--	--	--	--	--
Chlordane	6E-5	Food/IRIS	low	liver hypertrophy in mice	1,000	1	--	--	--	--	--	--
Heptachlor	5E-4	Food/IRIS	low	liver weight	300	1	--	--	--	--	--	--
PCBs	--	--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethane	1E-2	Gavage/IRIS HEAST 1991	medium	hepatotoxic in mice, weight gain rat	1,000	1	--	--	--	--	--	--
1,1,1-Trichloroethane	9E-2	Oral/HEAST	--	--	--	--	--	--	--	--	--	--
Trichloroethane	--	--	--	--	--	--	--	--	--	--	--	--

Sources:
IRIS (Integrated Risk Information System Access): July, 1992a (EPA, 1992a)
HEAST (Health Effects Assessment Summary Tables) (EPA,1992b) unless otherwise indicated

ND = Not determined
-- Indicates not available

In addition to identifying the SF, the likelihood that a substance is a human carcinogen is also considered. A weight-of-evidence classification is assigned to each substance based on the strength of evidence of carcinogenicity. The EPA weight-of-evidence classifications are:

- Group A - Human Carcinogen
- Group B - Probable Human Carcinogen
  - B1 - Limited evidence of carcinogenicity in humans
  - B2 - Sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans
- Group C - Possible Human Carcinogen
- Group D - Not Classifiable as to Human Carcinogenicity
- Group E - Evidence of Non-Carcinogenicity in Humans

The toxicity values and supporting information for carcinogenic substances carried through the BISRA are summarized in table 4-2. EPA has not published a SF for lead in either IRIS or HEAST. Eleven of the seventeen COPC are considered carcinogens. Arsenic, chromium (VI), and nickel are known human carcinogens (EPA weight-of-evidence classification A). Arsenic is associated with lung and skin cancer by both the oral and inhalation exposure routes. Chromium (VI) and nickel are considered carcinogenic only by the inhalation route of exposure, because no evidence is currently available to indicate that they are carcinogenic by the oral route of exposure.

Beryllium, lead, BEHP, chlordane, DDT, heptachlor, and PCB's are probable human carcinogens (EPA weight-of-evidence classification B2) with insufficient human data, but sufficient data in animals to suggest that they are carcinogens. Beta-HCH is an EPA weight-of-evidence classification C, possible human carcinogen. The weight-of-evidence classification for tetrachloroethane and trichloroethane are currently under review pending resolution of the differing opinions on the classification (see appendix I).

Additional information on the toxicity associated with these COPC is provided in appendix II.

Table 4-2. Summary of Carcinogenic Toxicity Information for the Contaminants of Potential Concern at the 1100-EM-1 Operable Unit.

Contaminant	Weight of Evidence Classification	Type of Cancer	Oral SF $(mg/kg\text{-}d)^{-1}$	Oral SF (source)	Inhalation SF $(mg/kg\text{-}d)^{-1}$	Inhalation SF (source)
Arsenic	A	Skin, Lung	1.75E+00[a]	Surrogate	5.0E+01	IRIS/HEAST
Beryllium	B2	–	4.3E+00	IRIS	8.4	HEAST
Chromium VI	A	Lung	NA[b]	NA	4.1E+01	IRIS/HEAST
Lead	B2	–	ND	NA	ND	NA
Nickel	A	Lung	NA[b]	NA	8.4E-01	IRIS
BEHP	B2	–	1.4E-02	IRIS	1.4E-02[e]	Surrogate
Beta-HCH	C	–	1.8E+00	IRIS	1.8E+00	IRIS
Chlordane	B2	–	1.3E+00	IRIS	1.3E+00	IRIS
DDT	B2	–	3.4E-01	IRIS	3.4E-01	IRIS
Heptachlor	B2	–	4.5E+00	IRIS	4.5E+00	IRIS
PCBs	B2	–	7.7E+00[a]	IRIS	7.7+00[c]	Surrogate
Tetrachloroethene	B2[c,d]	–	5.2E-02	Region-10[c]	2E-03	Region-10[c]
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA
Trichloroethane	B2[c,d]	–	1.1E-02	Region-10[c]	6.0E-03	Region-10[c]

[a] Based on proposed arsenic unit risk of 5E-05 $\mu g/L$ (EPA, 1991a)
[b] Not considered carcinogenic by oral route of exposure
[c] As recommended by Superfund Technical Support Center, April 1992 (EPA-10, see Appendix I)
[d] Weight-of-evidence classification under evaluation
[e] Surrogate; assumed same as oral SF
– Indicates not available; presented for Class A carcinogens only
ND – Not determined
NA – Not applicable

Sources: IRIS - Integrated Risk Information Access: July, 1992 (EPA, 1992a)
HEAST - Health Effects Assessment Summary Tables (EPA, 1992b), unless otherwise indicated

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5.0 RISK CHARACTERIZATION

The information from the exposure assessment and the toxicity assessment is used to characterize the human health risks. The risk characterization presents quantitative and qualitative descriptions of risk. The quantification of the noncarcinogenic risk is discussed in paragraph 5.1 and quantification of carcinogenic risk is discussed in paragraph 5.2. Based on the results of the risk assessment using the maximum contaminant concentrations, contaminants that are estimated to have a risk greater than 1E-06 are considered for evaluation using the 95 percent UCL values. A discussion of the estimated risks using the 95 percent UCL is provided in paragraph 5.3. A discussion of the uncertainty in the risk characterization is provided in paragraph 5.4.

5.1 QUANTIFICATION OF NONCARCINOGENIC RISK

Potential human health hazards associated with exposure to noncarcinogenic substances, or carcinogenic substances with systemic toxicities other than cancer, are evaluated separately from carcinogenic risks. The daily intake over a specified time period (*e.g.*, lifetime or some shorter time period) is compared to an RfD for a similar time period (*e.g.*, chronic RfD or subchronic RfD) to determine a ratio called the hazard quotient (HQ). Estimates of intakes for both the BISRA and BRSRA are based on chronic exposures. The nature of the contaminant sources and the low probability for sudden releases of contaminants from the subunits preclude short-term fluctuations in contaminant concentrations that might produce acute or subchronic effects.

The formula for estimation of the HQ is:

$$HQ = \frac{\text{Daily Intake}}{\text{RfD}}$$

If the HQ exceeds unity, the possibility exists for systemic toxic effects. The HQ is not a mathematical prediction of the severity or incidence of the effects, but rather is an indication that effects may occur, especially in sensitive subpopulations. If the HQ is less than unity, then the likelihood of adverse noncarcinogenic effects is small.

RfD's are route specific. Currently, all of the RfD's in IRIS are based on ingestion and inhalation; none have been based on dermal contact. As recommended by EPA, 1992c, until more appropriate dose-response factors are available, the oral RfD's should be used to evaluate dermal exposures. EPA further recommends using the oral RfD to evaluate dermal exposures, unadjusted for absorption, unless estimates of the gastrointestinal absorption fraction are available for the compound of interest in the appropriate vehicle (EPA, 1992c). The uncertainty regarding these assumptions is discussed in paragraph 5.4.

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Some contaminants do not have RfD's published in IRIS or HEAST. Therefore, the HQ cannot be calculated for these contaminants and the potential adverse effects are not evaluated. This lack of RfD's is most significant for the inhalation pathway where barium is the only contaminant of potential concern (COPC) with an inhalation RfD. It should be noted that the inhalation RfD for chromium has been withdrawn by EPA and inhalation issues are under review by the RfD/reference concentration (RfC) Work Group (EPA, 1992b). Chromium is evaluated for carcinogenicity via the inhalation pathway at subunits where it is a COPC (*e.g.*, 1100-2, 1100-3, and HRL), as discussed in paragraph 5.2.. The lack of toxicity values is discussed more fully in paragraph 5.4.

Inhalation RfD's for 1,1,1-trichloroethane have been published in IRIS or HEAST. As discussed in chapter 2 and chapter 3, paragraph 3.2; 1,1,1-trichloroethane has only been detected in soil gas and groundwater at low concentrations and has not been quantitatively evaluated. Consequently, the HQ's are not determined for any of the COPC in the inhalation pathway. All COPC have published SF's, used to estimate carcinogenic risk. Carcinogenic effects usually occur at levels significantly lower than those associated with systemic toxic effects; therefore, cancer is usually the predominant adverse effect for contaminants that produce carcinogenic as well as systemic toxic effects.

The HQ for all contaminants for a specific pathway or a scenario can be summed to provide a hazard index (HI) for that pathway or scenario.

Lead exposures have been evaluated for potential adverse impacts using the UBK Model. The results are presented in appendix V and summarized below for 1100-3 BRSRA and the HRL BRSRA.

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5.1.1 SUMMARY OF SYSTEMIC TOXIC EFFECTS FOR BISRA

5.1.1.1 1100-1 BISRA. The noncarcinogenic HQ's for the COPC are presented in table 5-1. The HI for the soil ingestion pathway and dermal exposure pathways is at least 2 orders of magnitude less than unity. Therefore, adverse systemic toxic health effects in industrial workers are not likely from ingestion or dermal exposure to the maximum concentrations of arsenic or vanadium detected at this subunit. Neither arsenic nor vanadium have inhalation RfD's; therefore, an HI is not calculated for this exposure pathway. Arsenic is evaluated for carcinogenicity via inhalation in paragraph 5.2.

5.1.1.2 1100-2 BISRA. Chromium is the only COPC at this subunit. The overall hazard index for exposure to chromium through the ingestion or dermal route of exposure is 0.001 as presented in table 5-1. Therefore, adverse systemic toxic health effects are not likely for industrial workers exposed to the COPC at 1100-2 via the ingestion or dermal pathways.

5.1.1.3 1100-3 BISRA. Chromium is the only COPC at this subunit. The noncarcinogenic HQ's for chromium are presented in table 5-1. The HI for the soil ingestion and dermal pathway is 0.0008. Adverse systemic toxic effects in industrial workers are not likely from ingestion or dermal exposure to chromium detected in soils at this subunit.

5.1.1.4 1100-4 BISRA. The noncarcinogenic HQ's for arsenic and beryllium, the two COPC at this subunit, are presented in table 5-1. As indicated in chapter 3, paragraph 3.3.1, the contaminated soils are located beneath a cement floor in a building, and hence the fugitive dust pathway is not evaluated. The quantitative evaluation of the soil ingestion and dermal pathways is provided for information purposes. Both the soil ingestion HI and the dermal exposure pathway HI are at least 2 orders of magnitude less than unity. If contact with the COPC were to occur by soil ingestion and dermal exposure, adverse systemic toxic effects in industrial workers are not likely.

5.1.1.5 UN-1100-6 Subunit BISRA. The HQ's for the COPC at this subunit are also presented in table 5-1. The HI for the soil ingestion pathway is 0.4 and is due primarily to the BEHP present in the soil at this site. The HI for the dermal exposure pathway is 0.05. Adverse systemic toxic effects in industrial workers are not likely from ingestion or dermal exposure to COPC detected at this subunit. None of the COPC have published inhalation RfD's, so no inhalation HQ's or HI's are presented, although they have all been evaluated for carcinogenity in paragraph 5.2.

5.1.1.6 Ephemeral Pool BISRA. The HQ's for the COPC at the Ephemeral Pool are presented in table 5-1. The soil ingestion HI is 0.01 and the dermal exposure pathway HI is 0.02. Adverse systemic toxic effects in industrial workers are not likely for soil ingestion or dermal exposure to COPC detected at this subunit. None of the COPC have published inhalation RfD's, so no inhalation HQ's or HI's are presented, although they have all been evaluated for carcinogenity in paragraph 5.2.

5.1.1.7 HRL BISRA. The HQ's for the COPC at HRL are presented in table 5-2. The soil ingestion pathway HI is 0.2, the fugitive dust inhalation pathway HI is 0.03, and the dermal exposure pathway HI is 0.003. The total subunit HI is 0.2. Consequently, adverse systemic toxic effects are not likely from potential exposures to the COPC for industrial workers at this subunit.

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5.1.2 SUMMARY OF SYSTEMIC TOXIC EFFECTS FOR BRSRA

5.1.2.1 1100-2 BRSRA. Tetrachloroethene is the only COPC at 1100-2. The individual HQ and overall HI for exposure to tetrachloroethene through the ingestion or dermal route of exposure is 5 orders of magnitude less than unity, as presented in table 5-3. The garden produce exposure pathway assessment for each subunit is presented in table 5-4, with the exception of 1100-2, because tetrachloroethene is not evaluated for the garden pathway. Adverse systemic toxic effects are unlikely for residents who may be exposed to tetrachloroethene in the soil at this subunit. As presented in table 5-7, HI estimated for this subunit is 0.00003.

5.1.2.2 1100-3 BRSRA. The HQ's via the ingestion and dermal pathways for the COPC at this subunit are presented in table 5-3. For soil ingestion and dermal exposure, the HQ's are all less than unity. The HI for the soil ingestion pathway is 0.05 and for the dermal exposure pathway is 0.001. Adverse systemic toxic effects in residents are not likely from exposure to the arsenic and chromium detected in soils at this subunit.

Table 5-1. Summary of the Baseline Industrial Scenario Risk Assessment for 1100-1, 1100-2, 1100-3, 1100-4, UN-1100-6, and the Ephemeral Pool. (Sheet 1 of 2)

Contaminant	Pathway						Contaminant Totals		Subunit Totals	
	Soil Ingestion		Fugitive Dust Inhalation		Dermal Exposure					
	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HI[c]	ICR[b]
1100-1										
Arsenic	0.003	4E-07	--	9E-12[d]	0.00006	9E-09	0.003	4E-07		
Vanadium	0.005	--	--	--	0.0001	--	0.005	--		
Pathway Totals	0.008	4E-07	--	9E-12	0.0002	9E-09			0.008	4E-07
1100-2										
Chromium	0.001	--	--	1E-07	0.00002	--	0.001	1E-07	0.001	1E-07
1100-3										
Chromium	0.0008	--	--	8E-08	0.00002	--	0.0008	8E-08	0.0008	8E-08
1100-4										
Arsenic	0.006	8E-07	--	--	0.0001	2E-08	0.006	8E-07		
Beryllium	0.0005	3E-07	--	--	0.000001	6E-09	0.0005	3E-07		
Pathway Totals	0.006	1E-06	--	--	0.0001	3E-08			0.006	1E-06
UN-1100-6										
BEHP	0.4	3E-05	--	3E-08	0.04	3E-06	0.4	3E-05		
Chlordane	0.009	2E-07	--	2E-10	0.01	2E-07	0.02	4E-07		
Heptachlor	0.0004	2E-08	--	3E-10	0.00004	3E-08	0.0004	5E-08		
Pathway Totals	0.4	3E-05	--	3E-08	0.05	3E-06			0.4	3E-05

Table 5-1. Summary of the Baseline Industrial Scenario Risk Assessment for 1100-1, 1100-2, 1100-3, 1100-4, UN-1100-6, and the Ephemeral Pool. (Sheet 2 of 2)

Contaminant	Pathway						Contaminant Totals		Subunit Totals	
	Soil Ingestion		Fugitive Dust Inhalation		Dermal Exposure					
	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HI[c]	ICR[b]
Ephemeral Pool										
Chlordane	0.01	3E-07	--	9E-10	0.02	3E-07	0.03	6E-07		
Heptachlor	0.00002	1E-08	--	3E-11	0.00002	1E-08	0.00004	2E-08		
PCBs	--	3E-05	--	8E-08	--	3E-05	--	6E-05		
Pathway Totals	0.01	3E-05	--	8E-08	0.02	3E-05			0.03	6E-05

[a]Hazard Quotient
[b]Lifetime Incremental Cancer Risk
[c]Hazard Index
[d]Based on 30% absorption of inhaled arsenic (EPA 1992b)
-- = Not Applicable

Table 5-2. Summary of the Baseline Industrial Scenario Risk Assessment Based on Maximum Contaminant Concentrations for the Horn Rapids Landfill.

Contaminant	Pathway						Contaminant Totals		Subunit Totals	
	Soil Ingestion		Fugitive Dust Inhalation		Dermal Exposure					
	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HI[c]	ICR[b]
Antimony	0.01	-	-	-	0.0004	-	0.01	-		
Arsenic	0.006	9E-07	-	6E-08[d]	0.0001	2E-08	0.006	1E-06		
Barium	0.005	-	0.03	-	0.00001	-	0.04	-		
Beryllium	0.00007	5E-07	-	6E-09	0.000002	9E-09	0.00007	5E-07		
Chromium	0.07	-	-	3E-05	0.001	-	0.07	3E-05		
Copper	0.009	-	-	-	0.0002	-	0.009	-		
Nickel	0.008	-	-	3E-07	0.0002	-	0.008	3E-07		
Thallium	0.01	-	-	-	0.0002	-	0.01	-		
Vanadium	0.004	-	-	-	0.00008	-	0.004	-		
Zinc	0.05	-	-	-	0.0009	-	0.05	-		
Beta-HCH	-	1E-08	-	9E-11	-	2E-08	-	3E-08		
DDT	0.001	5E-08	-	4E-10	0.001	8E-08	0.002	1E-07		
Heptachlor	0.00001	7E-09	-	5E-11	0.00001	9E-09	0.00002	2E-08		
PCBs	-	6E-05	-	4E-07	-	8E-05	-	1E-04		
Pathway Totals	0.2	6E-05	0.03	3E-05	0.003	8E-05			0.2	2E-04

[a]Hazard Quotient
[b]Lifetime Incremental Cancer Risk
[c]Hazard Index
[d]Based on 30% absorption of inhaled arsenic (EPA 1992b)
- = Not Applicable

Table 5-1. Summary of Baseline Residental Scenario Risk Assessment Based on Maximum Contaminant Concentrations for the Soil Ingestion, Fugitive Dust Inhalation, and Dermal Exposure Pathways, for Specific 1100-EM-1 Operable Subunits. (Sheet 1 of 2)

Contaminant	Pathway						Contaminant Totals		Subunit Totals	
	Soil Ingestion		Fugitive Dust Inhalation		Dermal Exposure					
	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HQ[b]	ICR[b]	HI[c]	ICR[b]
1100-2										
Tetrachloroethene	0.00001	3E-09	--[e]	3E-14	0.00002	4E-09	0.00003	7E-09	0.00003	7E-09
1100-3										
Arsenic	0.04	9E-06	--[e]	1E-08[d]	0.0009	2E-07	0.04	9E-06		
Chromium	0.01	--[f]	--[e]	2E-07	0.0002	--[f]	0.01	2E-07		
Lead	--[e]	--[g]	--[e]	--[g]	--[e]	--[g]	ND	ND		
Pathway Totals	0.05	9E-06	--[e]	2E-07	0.001	2E-07			0.05	9E-06
UN-1100-6										
BEHP	4.6	6E-04	--[e]	7E-08	0.5	7E-05	5.1	7E-04		
Chlordane	0.1	4E-06	--[e]	5E-10	0.2	5E-06	0.3	9E-06		
Pathway Totals	4.7	6E-04	--[e]	7E-08	0.7	8E-05			5.4	7E-04
Ephemeral Pool										
Chlordane	0.2	4E-06	--[e]	2E-09	0.2	7E-06	0.4	1E-05		
PCBs	--[e]	5E-04	--[e]	2E-07	--[e]	7E-04	--[e]	1E-03		
Pathway Totals	0.2	5E-04	--[e]	2E-07	0.2	7E-04			0.4	5E-04

Table 5-1. Summary of Baseline Residental Scenario Risk Assessment Based on Maximum Contaminant Concentrations for the Soil Ingestion, Fugitive Dust Inhalation, and Dermal Exposure Pathways, for Specific 1100-EM-1 Operable Subunits. (Sheet 2 of 2)

Contaminant	Pathway						Contaminant Totals		Subunit Totals	
	Soil Ingestion		Fugitive Dust Inhalation		Dermal Exposure					
	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HI[c]	ICR[b]
Horn Rapids Landfill										
Arsenic	0.08	2E-05	--[e]	1E-07[d]	0.002	4E-07	0.08	2E-05		
Beryllium	0.001	9E-06	--[e]	1E-08	0.00002	2E-07	0.001	9E-06		
Chromium	0.9	--[f]	--[e]	6E-05	0.02	--[f]	0.9	6E-05		
Lead	--[e]	--[g]	--[e]	--[g]	--[e]	--[g]	ND	ND		
PCBs	--[e]	1E-03	--[e]	9E-07	--[e]	2E-03	--[e]	3E-03		
Tetrachloroethene	0.000002	5E-10	--[e]	1E-14	0.000003	6E-10	0.000005	1E-09		
Pathway Totals	1	1E-03	--[e]	6E-05	0.02	2E-03			1	3E-03

[a]Hazard Quotient
[b]Lifetime Incremental Cancer Risk
[c]Hazard Index
[d]Based on 30% absorption of inhaled arsenic (EPA, 1992b)
[e]RfD not available to evaluate this pathway
[f]Not considered carcinogenic by this route of exposure
[g]SF not available to evaluate this pathway
ND Not determined
-- Indicates not applicable

Table 5-4. Summary of Baseline Residential Scenario Risk Assessment for the Garden Pathway at Specific 1100-EM-1 Operable Subunits Based on Maximum Contaminant Concentration.

Contaminant	Pathway	
	Garden	
	HQ[b]	ICR[a]
1100-3		
Arsenic	0.01	--[d]
Chromium	0.04	--[d]
Lead	--[e]	--[f]
Total Pathway ICR	--	--
Total Pathway HI[c]	0.05	--
UN-1100-6		
BEHP	16.0	2E-03
Chlordane	2.0	7E-05
Total Pathway ICR	--	2E-03
Total Pathway HI[c]	18	--
Ephemeral Pool		
Chlordane	3.2	1E-04
PCBs	--[e]	2E-03
Total Pathway ICR	--	2E-03
Total Pathway HI[c]	3.2	--
Horn Rapids Landfill		
Arsenic	0.02	--[d]
Beryllium	0.005	4E-05
Chromium	3.6	--[d]
PCBs	--[e]	4E-03
Lead	--[e]	--[f]
Total Pathway ICR	--	4E-03
Total Pathway HI[c]	3.6	--

[a]Lifetime Incremental Cancer Risk
[b]Hazard Quotient
[c]Hazard Index
[d]Not considered carcinogenic by this route of exposure
[e]RfD not available to evaluate this pathway
[f]SF not available to evaluate this pathway
-- Indicates not applicable

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For the garden produce exposure pathway, the overall HI is 0.05, as presented in table 5-4. Adverse health effects from exposure to residents though this pathway are not likely.

The results of the UBK model for evaluating residential exposures for children indicate that adverse health effects from the exposure to lead, which was detected at the relatively low concentration of 26.4 mg/kg, would not occur. Based on soil ingestion, dust inhalation, and the ingestion of garden produce grown at the subunit, blood-lead levels are not likely to exceed 10 μg/dl for a 2-year old child (see appendix V).

5.1.2.3 UN-1100-6 Subunit BRSRA. The HQ's for the COPC at this subunit are presented in tables 5-3 and 5-4. The HI for the soil ingestion pathway is 4.7 and is almost entirely due to the BEHP present in the soil at this site. The HI for the dermal exposure pathway is 0.7. Adverse systemic toxic effects in residents may occur if there was exposure to the COPC detected at this subunit. None of the COPC have published inhalation RfD's, so HQ's and HI's are not presented for the inhalation pathway.

For the garden produce exposure pathway, the overall HI is 18. As presented in table 5-4, the HI is based on a HQ of 16 for BEHP and a HQ of 2 for chlordane. The garden pathway risk is calculated by using a surrogate uptake factor for BEHP based on PCB's. As summarized in table 5-7, the subunit HI for all pathways evaluated is 23.

5.1.2.4 Ephemeral Pool BRSRA. The HQ's for the COPC at the Ephemeral Pool are presented in tables 5-3 and 5-4. The soil ingestion HI is 0.2 and the dermal exposure pathway HI is 0.2. Adverse systemic toxic effects in residents for these two exposure routes are not likely for the COPC detected at this subunit.

RfD's are not published for PCB's for the oral, inhalation, or dermal routes of exposure. Thus, the pathway and subunit HI's may be an underestimation of the likelihood of adverse systemic toxic effects because PCB's are not included in the overall evaluation.

The HQ's and HI for the garden produce exposure pathway are presented in table 5-4. The HI for the garden pathway is 3.2 and is due entirely to the chlordane detected on the site. PCB's are not quantitatively evaluated because there is no published oral RfD for PCB's. As summarized in table 5-7, the subunit HI is 3.6 indicating a potential for adverse effects based on the assumptions used for the residential scenario.

5.1.2.5 HRL BRSRA. The HQ's for the COPC at HRL are presented in tables 5-3 through 5-6. The soil ingestion HI is 1 and the dermal exposure pathway HI is 0.02. The HI of 1 for the soil ingestion pathway is due primarily to the potential exposure to chromium in the soil. Although the HI for the soil ingestion pathway is 1, adverse systemic toxic effects in residents are not likely because of the conservative assumptions used to assess potential exposures. For example, it is assumed that exposure to the maximum concentration detected in the soil occurs. Based on the spatial distribution for chromium presented in DOE/RL-90-18, only a very small area of the soil may be contaminated with the maximum concentration.

For the garden produce pathway for residents at HRL, the estimated HI is 3.6. Chromium, with an HQ of 3.6, contributes the most to this value. Arsenic and beryllium all have HQ's much less than unity. PCB's and lead do not have published RfD's for the evaluation of oral ingestion. Thus, the pathway and subunit HI's may be an underestimation of the likelihood of adverse effects. However, it should be noted that PCB's are evaluated for carcinogenic effects (see paragraph 5.2). Lead is evaluated for adverse effects using the UBK model as discussed below. As discussed in chapter 3, paragraph 3.3.1, tetrachloroethene, although detected in soil, has a limited potential for uptake or accumulation in plants. Similarly, trichloroethene and 1,1,1-trichloroethane, detected in soil gas only, are not quantitatively evaluated for this pathway, and are not presented in table
5-4.

None of the COPC except 1,1,1-trichloroethane have published RfD's for the inhalation route of exposure. Therefore, neither HQ's nor HI's are provided for this potential exposure.

The results of the UBK model for evaluating residential exposures to lead for children are presented in appendix V. For the first scenario, based on the default model parameters and using the maximum concentration of lead detected in the soil at HRL (854 mg/kg), the geometric mean for a blood-lead level in 2-year old children (24 to 36 months) is predicted to be 5.8 μg/dl. As indicated in the graph presented in appendix V for the default parameters, based on the maximum concentration of lead detected at HRL and conservative UBK model parameters, the geometric mean and geometric standard deviation of the predicted blood-lead levels indicates that approximately 5 percent of the exposed children would be expected to have a blood-lead level greater than 10 μg/dl.

When the ingestion of lead, through the consumption of homegrown vegetables, is added to other intakes evaluated in this exposure pathway, the geometric mean for the blood-lead level in a 2-year old child is predicted to be 7.01 μg/dl. As indicated in the graph presented in appendix V for the default parameters, based on the maximum concentration of lead detected at HRL and conservative UBK model parameters, the geometric mean and geometric standard deviation indicates that approximately 14 percent of the 2-year old children would be expected to have a blood-lead level greater than 10 μg/dl. However, because of the conservatism in the analysis using the maximum concentration, the actual exposure is unlikely to produce toxic effects.

The results of the risk assessment for two contaminants detected in groundwater in the vicinity of HRL are presented in table 5-5. The HQ for nitrate, based on groundwater ingestion, is 1. No oral RfD is available for evaluating trichloroethene; therefore, a HQ is not presented for this compound. This may result in an underestimation of the HI for the groundwater pathway. As shown in table 5-7, the HI for HRL is 5.6.

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Table 5-5. Summary of Baseline Residential Scenario Risk Assessment Based on the Maximum Contaminant Concentrations for the Groundwater Pathway

Contaminant	Pathway			
	Groundwater Ingestion		Groundwater Inhalation	
	HQ[a]	ICR[b]	HQ[a]	ICR[b]
Nitrate	1	--[c]	--[d]	--[c,d]
Trichloroethene	--[e]	1E-05	--[e]	3E-05

[a]Hazard Quotient
[b]Lifetime Incremental Cancer Risk
[c]Not considered to be a carcinogen
[d]Not a volatile contaminant
[e]RfD not available to evaluate this pathway
-- Indicates not applicable

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Table 5-6. Summary of Baseline Risk Assessment for the Residential-Related Recreational Pathways for the 1100-EM-1 Operable Unit.

Contaminant	Pathway			
	Swimming		Eating Fish	
	HQ[a]	ICR[b]	HQ[a]	ICR[b]
Trichloroethene	--[c]	1E-10	--[c]	3E-10

[a]Hazard Quotient
[b]Lifetime Incremental Cancer Risk
[c]RfD not available to evaluate this pathway
-- Indicates not applicable

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Table 5-7. Summary of the Baseline Residential Scenario Risk Assessment for Specific 1100-EM-1 Operable Subunits Based on Maximum Contaminant Concentrations.

Subunit	Pathway	Pathway Totals		Subunit Totals	
		HI[a]	ICR[b]	HI[a]	ICR[b]
1100-2	Soil Ingestion	0.00001	3E-09		
	Fugitive Dust Inhalation	--	3E-14		
	Dermal Exposure	0.00002	4E-09		
	Garden Produce	--	--		
				0.00003	7E-09
1100-3	Soil Ingestion	0.05	9E-06		
	Fugitive Dust Inhalation	--	2E-07		
	Dermal Exposure	0.001	2E-07		
	Garden Produce	0.05	--		
				0.1	9E-06
UN-1100-6	Soil Ingestion	4.7	6E-04		
	Fugitive Dust Inhalation	--	7E-08		
	Dermal Exposure	0.7	8E-05		
	Garden Produce	18	2E-03		
				23	3E-03
Ephemeral Pool	Soil Ingestion	0.2	5E-04		
	Fugitive Dust Inhalation	--	2E-07		
	Dermal Exposure	0.2	7E-04		
	Garden Produce	3.2	2E-03		
				3.8	3E-03
Horn Rapids Landfill	Soil Ingestion	1	1E-03		
	Fugitive Dust Inhalation	--	6E-05		
	Dermal Exposure	0.02	2E-03		
	Garden Produce	3.8	4E-03		
	Groundwater Ingestion	1	1E-05		
	Inhalation of Volatiles from Groundwater	--	3E-05		
				5.8	7E-03
Recreational	Dermal Exposure while swimming	--	1E-10		
	Ingestion of Fish	--	3E-10		
				--	4E-10

[a]Hazard Index
[b]Lifetime Incremental Cancer Risk
-- Indicates not applicable

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5.1.2.6 Residential-Related Recreational Activities. As discussed in paragraph 3.2, modeling presented in DOE/RL 90-18 indicates that nitrate and trichloroethene, currently found in the groundwater in the vicinity of the 1100-EM-1 Operable Unit, would enter the Columbia River at concentrations less than their respective MCL's. Neither an oral nor a dermal RfD is published for trichloroethene. Trichloroethene, however, is evaluated quantitatively for potential carcinogenic effects, as discussed in paragraph 5.2. Nitrogen in the form of dissolved nitrate is an essential nutrient and does not bioaccumulate. Therefore, as summarized in tables 5-6 and 5-7, HQ's to evaluate noncarcinogenic adverse effects from potential exposures to nitrate or trichloroethene by subunit residents, who may swim in the Columbia River, or eat fish from the Columbia River are not calculated.

5.2 QUANTIFICATION OF CARCINOGENIC RISK

For carcinogens, risks are estimated as the likelihood of an individual developing cancer over a lifetime as a result of exposure to a potential carcinogen (*i.e.*, incremental or excess ICR). The equation for risk estimation is:

$$\text{ICR} = (\text{Chronic Daily Intake})\ (\text{Slope Factor})$$

This linear equation is only valid at low-risk levels (*i.e.*, below estimated risks of 1E-02), and is an upperbound estimate of the upper 95th percent confidence limit of the slope of the dose-response curve. Thus, one can be reasonably confident that the actual risk is likely to be less than that predicted. Cancer risk estimates are expressed using one significant figure only.

Contaminant-specific ICR's are assumed to be additive so that ICR's can be summed for pathways and contaminants to provide pathway, contaminant, or subunit ICR's.

ICR's are presented for those contaminants known to be carcinogenic by a specific route of exposure. For example, chromium is only carcinogenic by the inhalation route of table 5-2 exposure. Consequently, an ICR is presented only for the exposure to chromium through the inhalation of fugitive dust. All COPC that are classified as human carcinogens, or probable human carcinogens, have published inhalation and oral SF's with two exceptions:

- PCB's and BEHP do not have a published inhalation SF. For purposes of this BISRA, the inhalation SF is assumed to be the same as the oral SF.

- No SF's are published for lead. Therefore, this contaminant of interest is not evaluated for its potential contribution to the subunit total ICR. This may result in an underestimation of the ICR for a subunit. The potential exposures to lead are discussed in paragraph 5.4.

As discussed above in paragraph 5.1, all of the toxicity factors in IRIS are based on ingestion and inhalation. None of the toxicity factors have been based on dermal contact. As recommended by EPA (1992c), until more appropriate dose-response factors are

available, the oral SF's should be used to evaluate dermal exposures. The EPA further recommends using the oral SF unadjusted for absorption, unless estimates of the gastrointestinal absorption fraction are available for the compound of interest in the appropriate vehicle (EPA 1992c). For the BISRA and BRSRA, the oral SF's have not been modified for absorption efficiencies. The uncertainty regarding this assumption is discussed in paragraph 5.4.

Arsenic is approximately 30 percent absorbed when inhaled (EPA, 1991). The SF for arsenic is based on an absorbed intake, therefore, all intakes are adjusted by 30 percent to calculate the risks for arsenic inhalation exposures at 1100-1, 1100-4, and HRL.

The results of the risk characterization for carcinogenic effects are presented below by subunit and summarized in tables 5-1 and 5-2. These risk estimates are based on the maximum detected contaminant concentrations. EPA considers a 1E-06 risk level to be the point of departure for determining remediation goals for alternatives when applicable or relevant and appropriate requirements (ARAR's) are not available or not sufficiently protective [40 CFR §300.430(e)(2)(i)(A)(2)].

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5.2.1 SUMMARY OF CARCINOGENIC RISK FOR BISRA

5.2.1.1 1100-1 BISRA. The carcinogenic risk estimates for this subunit are presented in table 5-1. The estimated ICR for the soil ingestion pathway is 4E-07, for the fugitive dust inhalation pathway it is 9E-12, and for the dermal exposure pathway it is 9E-09. The total subunit ICR is estimated at 4E-07. Potential ingestion of arsenic contaminated soil contributes solely to this estimated risk.

5.2.1.2 1100--2 BISRA. Chromium is the only COPC at the 1100-2 subunit. Chromium, as chromium(VI), is carcinogenic only by the inhalation route of exposure. The inhalation pathway ICR for chromium, and then the total ICR, at this subunit is 1E-07 (see table 5-1). This ICR may be an overestimate of the risk because it is conservatively assumed that all chromium present in the soil is chromium(VI) and that the entire subunit is uniformly contaminated at the maximum concentration detected.

5.2.1.3 1100-3 BISRA. Again, chromium is the only COPC at this subunit. The estimated ICR's associated with chromium exposure at this subunit is presented in table 5-1. The estimated ICR for the inhalation pathway and the total subunit ICR is 8E-08.

5.2.1.4 1100-4 BISRA. The estimated ICR's associated with exposures at 1100-4 are presented in table 5-1. Arsenic and beryllium are the only two COPC at this subunit. The ICR associated with the ingestion pathway is 8E-07 for arsenic and 3E-07 for beryllium. The dermal exposure pathway also results in negligible ICR's of 2E-08 for arsenic and 6E-09 for beryllium. The inhalation of fugitive dust is not evaluated, as discussed previously, because of the location of the contamination. The ICR for the scenario (*i.e.*, sum of all individual contaminant and pathway ICR's) is negligible (*i.e.*, 1E-06). Actual risk would be much less than the estimated risks because of the limited area of this subunit, the use of the

maximum concentration of the COPC to calculate the ICR's, and the location of the contamination beneath a cement floor in an existing building.

5.2.1.5 UN-1100-6 Subunit BISRA. The estimated ICR's associated with the three exposure pathways at UN-1100-6 subunit are presented in table 5-1. The soil ingestion pathway ICR is 3E-05, the inhalation pathway ICR is 3E-08, and the dermal exposure pathway is 3E-06. All of the ICR's are associated primarily with potential exposures to BEHP at the high concentrations detected in the soil at this subunit. All other carcinogenic COPC are associated with negligible risks. The estimated subunit ICR for UN-1100-6 subunit is 3E-05, is due primarily to BEHP.

5.2.1.6 Ephemeral Pool BISRA. The estimated ICR's associated with the COPC at the Ephemeral Pool are presented in table 5-1. The soil ingestion pathway ICR is 3E-05; the fugitive dust inhalation pathway is 8E-08; and the dermal exposure pathway is 3E-05. The ICR's are due primarily to potential exposures to PCB's. ICR's for chlordane and heptachlor are less than 1E-06. The subunit ICR for all pathways is 6E-05.

5.2.1.7 HRL BISRA. The summary of ICR's for HRL, based on the maximum detected contaminant concentrations, is presented in table 5-2. The pathway-specific ICR for soil ingestion is 6E-05. PCB's detected in the soil have an ICR of 6E-05 for this pathway and are the primary COPC for this pathway. All other COPC are estimated to have negligible cancer risks by the soil ingestion pathway.

The fugitive dust pathway at HRL is estimated to have an ICR of 3E-05 due primarily to the potential exposure to chromium. This ICR may be an overestimate of the actual risk because it is conservatively assumed that all chromium present in the soil is chromium(VI) and that the entire subunit is contaminated at the maximum concentration detected. Under natural soil conditions, organic matter in the soil stimulates the reduction of chromium(VI) to the more stable, less mobile trivalent chromium (Kabata-Pendias and Pendias, 1984). As indicated in the Phase I RI report (DOE/RL-90-18), this maximum chromium concentration has been detected in only a single sample of HRL soil at a depth of 14.6 to 16.9 ft with the maximum concentration elsewhere less than 300 mg/kg and most detections less than 50 mg/kg.

For the other COPC, the ICR's for the inhalation pathway are all less than 1E-06. As with chromium, these risks are also likely to be overestimates because it is assumed that the entire landfill area is contaminated at the maximum concentration detected for each COPC.

The pathway-specific ICR for the dermal exposure pathway is 8E-05 and is associated primarily with PCB's. All other carcinogenic COPC are associated with low cancer risks by the dermal exposure pathway.

Contaminant-specific ICR's that are equal to or exceed 1E-06 at HRL are 1E-06 for arsenic, 3E-05 for chromium, and 1E-04 for PCB's.

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5.2.2 SUMMARY OF CARCINOGENIC RISK FOR BRSRA

5.2.2.1 1100-2 BRSRA. Tetrachloroethene is the only COPC at the 1100-2 subunit. The ICR for the subunit, based on soil ingestion, inhalation of fugitive dust, and dermal exposures, is 7E-09 (table 5-3). As discussed in chapter 3, paragraph 3.2 and summarized in table
5-4, tetrachloroethene is not a COPC through the garden produce pathway and an ICR has not been calculated for this exposure pathway. As summarized in table 5-7, the subunit ICR is also 7E-09.

5.2.2.2 1100-3 BRSRA. The estimated ICR's associated with soil ingestion, fugitive dust inhalation, and dermal exposures at this subunit are presented in table 5-3. Chromium is only evaluated for the inhalation pathway because it is not known to be carcinogenic by other routes of exposure as discussed in chapter 4, paragraph 4.2. The estimated ICR for the soil ingestion pathway is 9E-06 and is primarily associated with arsenic detected in the soil. The ICR for arsenic is 1E-08 and for chromium is 2E-07. The estimated ICR for the inhalation pathway is 2E-07. The estimated ICR for the dermal exposure pathway is 2E-07. For these three exposure pathways, the subunit ICR is 9E-06.

For the garden produce pathway (see table 5-4), an ICR is not presented. As discussed in chapter 4, paragraph 4.2, arsenic in plants is usually the less toxic organic form that is noncarcinogenic and there is no evidence that chromium is carcinogenic by the oral route of exposure. SF's are not published for evaluating the potential carcinogenicity of lead. This could result in an underestimation of the overall subunit ICR. However, the very low concentrations of lead detected in the soil suggest lead exposures would be very low.

5.2.2.3 UN-1100-6 Subunit BRSRA. The estimated ICR's associated with the exposure pathways at UN-1100-6 subunit are presented in tables 5-3 and 5-4. The soil ingestion pathway ICR is 6E-04, the inhalation pathway ICR is 7E-08, and the dermal exposure pathway is 8E-05. Potential exposures to BEHP at the concentrations detected in the soil at this subunit yield the greatest estimated ICR. Chlordane ICR's for the soil ingestion and dermal exposure pathways are also both greater than 1E-06.

For the garden produce pathway at this subunit, the total ICR is 2E-03. BEHP is estimated to have an ICR of 2E-03 and chlordane is estimated to have an ICR of 7E-05, as presented in table 5-4.

Further discussion of the risks estimated for BEHP and chlordane is provided in paragraph 5.3. As summarized in table 5-7, the subunit ICR is 3E-03.

5.2.2.4 Ephemeral Pool BRSRA. The estimated ICR's associated with the COPC at the Ephemeral Pool are presented in tables 5-3 and 5-4. The soil ingestion pathway ICR is 5E-04, the fugitive dust inhalation pathway is 2E-07, and the dermal exposure pathway is 7E-04. The ICR's are primarily the result of potential exposures to PCB's. However, chlordane is also estimated to have an ICR of 4E-06 via soil ingestion and 7E-06 via dermal exposure to soil.

For the garden produce pathway, the total ICR for the Ephemeral Pool is 2E-03. PCB's are associated with an estimated ICR of 2E-03 and chlordane is estimated to have an ICR of 1E-04.

Further discussion of the risks estimated for PCB's and chlordane detected at the Ephemeral Pool is provided in paragraph 5.3. As summarized in table 5-7, the subunit ICR, based on the maximum contaminant concentrations, is 3E-03.

5.2.2.5 HRL BRSRA. The summary of ICR's for HRL is presented in tables 5-3 through 5-6. The pathway-specific ICR for soil ingestion is 1E-03. PCB's detected in the soil contribute most of this risk. However, arsenic and beryllium are also associated with individual ICR's that exceed 1E-06.

The fugitive dust pathway at HRL is estimated to have an ICR of 6E-05, based on the potential exposure to chromium. This ICR may be an overestimate of the risk, as discussed above for BISRA.

The pathway-specific ICR for the dermal exposure pathway is 2E-03 and is associated primarily with PCB's. All other carcinogenic COPC are associated with low cancer risks for the dermal exposure pathway.

The estimated ICR's for the garden produce pathway at this subunit is presented in table 5-4. The total pathway ICR is 4E-03. Individual COPC ICR's are beryllium (4E-05) and PCB's (4E-03).

As summarized in table 5-5, trichloroethene detected in groundwater are evaluated for exposure through ingestion of groundwater and the inhalation of volatiles from groundwater use in a residence. Using the maximum concentration of trichloroethene detected, the ICR for groundwater ingestion is 1E-05. The risk due to inhalation of volatile trichloroethene from groundwater use is 3E-05. As summarized in table 5-7, the subunit total ICR is 7E-03 with the garden produce pathway contributing an ICR of 4E-03.

5.2.2.6 Residential-Related Recreational Pathways. Trichloroethene in groundwater may be transported to the Columbia River based on modeling presented in the Phase II RI (DOE/RL-90-18). The estimated ICR's for residents who may be exposed to trichloroethene through swimming in the Columbia River or ingesting fish from the Columbia River are 1E-10 and 3E-10, respectively, as presented in tables 5-6 and 5-7.

5.3 RISK CHARACTERIZATION BASED ON THE 95 PERCENT UCL

The HQ's and ICR's presented in paragraphs 5.2 and 5.3 are based on the maximum concentration of the contaminant detected in the soil or groundwater. Several COPC at 1100-3, UN-1100-6 subunit, the Ephemeral Pool, and HRL are all associated with ICR's estimated to be greater than 1E-06. Additional evaluation of these COPC detected at these sites was conducted to provide additional characterization of the risk. None of the contaminants evaluated at any of the 1100-EM-1 operable subunits are estimated to have

exposures resulting in HQ's that exceed 1 for the industrial or residential scenario based on the maximum detected contaminant concentration. Therefore, discussion of HQ's is not provided below, although the HQ's based on the 95 percent UCL of the mean contaminant concentration are presented. The results of the evaluation of potential risks related to cancer (*i.e.*, ICR's) are discussed in this paragraph for each subunit or both the industrial and residential scenarios.

The sampling data from both the Phase I and Phase II site investigations were used to calculate the 95 percent UCL of the mean contaminant concentration at these subunits. The procedure and data used to calculate the 95 percent UCL are presented in appendix IV. Data was used to calculate the 95 percent UCL that best represented the spatial distribution of contaminants. This provides a conservative estimate of the mean concentrations since low values and nondefects are not used. The 95 percent UCL is used to estimate contaminant intakes, HQ's, and ICR's.

5.3.1 SUMMARY OF RISK CHARACTERIZATION BASED ON THE 95 PERCENT UCL FOR BISRA

5.3.1.1 UN-1100-6 Subunit BISRA. BEHP detected in soil at UN-1100-6 subunit is estimated to have an ICR greater than 1E-06 when using the maximum detected contaminant concentration to calculate the ICR (see table 5-1). Although chlordane did not exceed an ICR of 1E-06, it was retained for evaluation based on the 95 percent UCL value because its distribution is similar to that of BEHP in the soil. The 95 percent UCL's for BEHP and chlordane are presented in table 5-8; the associated estimated contaminant intakes for the soil ingestion, fugitive dust inhalation, and dermal exposure pathways are presented in table 5-9; and the HQ's and ICR's for the soil ingestion, fugitive dust inhalation, and dermal exposure pathways are presented in table 5-10.

Exposure to BEHP via the soil ingestion route is associated with an ICR of 2E-05. Dermal exposure to BEHP is estimated to have an ICR of 2E-06. For chlordane, the soil ingestion ICR is 2E-07 and the dermal exposure ICR is 2E-07. The fugitive dust pathway is associated with negligible cancer risks for both contaminants. All ICR's are the same order of magnitude as those estimated using the maximum detected contaminant concentrations. The total ICR subunit is 2E-05.

5.3.1.2 Ephemeral Pool BISRA. PCB's detected in soil at the Ephemeral Pool are estimated to have an ICR greater than 1E-06 when using the maximum detected contaminant concentration to calculate the ICR (see table 5-1). Chlordane, although it is not estimated to have an ICR greater than 1E-06 for any industrial scenario pathway, is also evaluated for this subunit.

The 95 percent UCL's for chlordane and PCB's are presented in table 5-8; the estimated contaminant intakes for the soil ingestion, fugitive dust inhalation, and dermal exposure pathways are presented in table 5-9; and the HQ's and ICR's for the soil ingestion, fugitive dust inhalation, and dermal exposure pathways are presented in table 5-10.

Table 5-8. 95% UCL Concentrations for Soil Contaminants Evaluated in the Baseline Industrial Scenario Risk Assessment.

Contaminants	Horn Rapids Landfill mg/kg	UN-1100-6 mg/kg	Ephemeral Pool mg/kg
Arsenic	1.4	--	--
Chromium	83	--	--
BEHP	--	18,000	--
Chlordane	--	1.6	1.9
PCBs	38	--	15

UCL = Upper Confidence Limit
-- = Not applicable

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Table 5-9. Summary of Industrial Scenario Intakes Based on the 95% UCL for UN-1100-6, the Ephemeral Pool, and the Horn Rapids Landfill.

Contaminant	Pathway					
	Soil Ingestion (mg/kg-d)		Fugitive Dust Inhalation (mg/kg-d)		Dermal Exposure (mg/kg-d)	
	Noncarcinogenic	Carcinogenic	Noncarcinogenic	Carcinogenic	Noncarcinogenic	Carcinogenic
UN-1100-6						
BEHP	5.3E-03	1.5E-03	-	1.6E-06	6.0E-04	1.6E-04
Chlordane	4.5E-07	1.3E-07	-	1.4E-10	5.4E-07	1.5E-07
Ephemeral Pool						
Chlordane	5.5E-07	1.6E-07	-	4.5E-10	6.5E-07	1.9E-07
PCBs	-	1.2E-06	-	3.6E-09	-	1.5E-06
Horn Rapids Landfill						
Arsenic	4.0E-07	1.1E-07	-	2.3E-10	8.0E-08	2.3E-08
Chromium	2.4E-05	-	-	4.6E-08	4.7E-07	-
PCBs	-	3.1E-06	-	2.1E-08	-	3.7E-06

*Intakes adjusted based on 30% absorption of inhaled arsenic (EPA, 1992b)
- - Not Applicable

Table 5-10. Summary of the Baseline Industrial Scenario Risk Assessment
Based on the 95% UCL for UN-1100-6, the Ephemeral Pool, and the Horn Rapids Landfill.

Contaminant	Pathway						Contaminant Totals		Subunit Totals	
	Soil Ingestion		Fugitive Dust Inhalation		Dermal Exposure					
	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HI[c]	ICR[b]
UN-1100-6										
BEHP	0.3	2E-05	-	2E-08	0.03	2E-06	0.3	2E-05		
Chlordane	0.008	2E-07	-	2E-10	0.009	2E-07	0.01	4E-07		
Pathway Totals	0.3	2E-05	-	2E-08	0.04	2E-06			0.3	2E-05
Ephemeral Pool										
Chlordane	0.008	2E-07	-	8E-10	0.01	2E-07	0.02	4E-07		
PCBs	-	9E-06	-	3E-08	-	1E-05	-	2E-05		
Pathway Totals	0.009	9E-06	-	3E-08	0.01	1E-05			0.02	2E-05
Horn Rapids Landfill										
Arsenic	0.001	2E-07	-	1E-08	0.00003	4E-09	0.001	2E-07		
Chromium	0.005	-	-	2E-06	0.00009	-	0.005	2E-06		
PCBs	-	2E-05	-	2E-07	-	3E-05	-	5E-05		
Pathway Totals	0.007	2E-05	-	2E-06	0.0001	3E-05			0.007	5E-05

[a]Hazard Quotient
[b]Lifetime Incremental Cancer Risk
[c]Hazard Index
[d]Based on 30% absorption of inhaled arsenic (EPA, 1992b)
- = Not Applicable

The ICR's associated with the soil ingestion, fugitive dust, and dermal exposure pathways calculated using the 95 percent UCL for chlordane are 2E-07, 6E-10, and 2E-07, respectively. These are essentially the same as those estimated using the maximum detected contaminant concentrations. The ICR's for PCB's are 9E-06 and 1E-05 for the soil ingestion pathway and the dermal exposure pathway, respectively. The fugitive dust pathway is estimated to have an ICR of 3E-08 for PCB's. The total subunit ICR is 2E-05.

5.3.1.3 HRL BISRA. Three contaminants detected in the soil, arsenic, chromium, and PCB's, are estimated to have ICR's greater than 1E-06 when exposures are evaluated using the maximum detected concentrations of the contaminants. Further evaluation of these three contaminants is discussed below.

Arsenic, chromium, and PCB's, are evaluated using 95 percent UCL contaminant concentrations. As discussed in appendix IV, for arsenic, all Phase I and II sampling data are used to calculate the 95 percent UCL. The sampling for this contaminant indicates that it is evenly distributed throughout the subunit. Therefore, the 95 percent UCL represents the spatial distribution and frequency of detection for arsenic and should be representative of the potential contamination of the entire HRL. For chromium and PCB's, the site investigation and sampling data results identified some areas that appear to have generally higher concentrations of these two COPC's. Therefore, the 95 percent UCL's have been calculated based on only part of the sampling data collected at HRL. The use of the 95 percent UCL for estimating ICR's and HQ's associated with chromium and PCB's provides a hot spot evaluation.

The 95 percent UCL's for arsenic, chromium, and PCB's are presented in table 5-8; the estimated contaminant intakes for the soil ingestion, fugitive dust inhalation, and dermal exposure pathways are presented in table 5-9; and the HQ's and ICR's for the soil ingestion, fugitive dust inhalation, and dermal exposure pathways are presented in table 5-10.

For the soil ingestion pathway, ICR's are 2E-07 for arsenic and 2E-05 for PCB's using the 95 percent UCL. By comparison, based on the maximum detected contaminant concentration, the ICR for arsenic, and PCB are 9E-07 and 6E-05, respectively. Chromium is not considered carcinogenic by the oral route of exposure.

The ICR for chromium by the fugitive dust pathway is 2E-06 using the 95 percent UCL; whereas, for the maximum detected contaminant concentration the estimated ICR is 3E-05. The ICR's for all other COPC's are less than 1E-06 for the fugitive dust pathway.

The ICR for arsenic is less than 1E-06 for dermal exposure. PCB's are estimated to have an ICR of 3E-05 for the dermal exposure pathways, based on the 95 percent UCL, as compared to 8E-05 based on the maximum detected contaminant concentration. Chromium is not known to be carcinogenic by the dermal route. The total ICR, based on the 95 percent UCL's, is 5E-05 for HRL.

5.3.2 SUMMARY OF RISK CHARACTERIZATION BASED ON THE 95 PERCENT UCL FOR BRSRA

The results of risk characterization based on the 95 UCL are discussed in this paragraph.

As stated for BISRA, the sampling data from both the Phase I and Phase II site investigations were used to calculate the 95 percent UCL of the mean contaminant concentration at these subunits. The procedure and data used to calculate the 95 percent UCL are presented in appendix III. The 95 percent UCL provides a conservative estimate of the mean concentration. In order to provide an estimate of the potential risk due to the UN-1100-6 subunit and HRL, data from defined hot spots were used to develop a 95 percent UCL with a conservative bias. The 95 percent UCL contaminant concentration is used to estimate contaminant intakes, HQ's, and ICR's.

5.3.2.1 1100-3 BRSRA. The risk estimate for 1100-3 (9E-06) is associated with potential exposure to arsenic through the ingestion of soil, and is based on a maximum concentration of 3.4 mg/kg detected in a near surface sample. All other concentrations of arsenic were approximately one-half of that detected in the maximum, and are likely to represent typical background concentrations of arsenic in soil at this subunit. Given that the estimated risk represents a significant contribution from background arsenic in the soil and that even background concentrations may pose an ICR greater than 1E-06, no further evaluation of arsenic is made at this subunit. A characterization of risk at 1100-3 based on the 95 percent UCL is, therefore, unnecessary.

5.3.2.2 UN-1100-6 Subunit BRSRA. BEHP and chlordane detected in soil at UN-1100-6 subunit are both estimated to have ICR's greater than 1E-06 when using the maximum contaminant concentrations to calculate the ICR's (table 5-3).

The 95 percent UCL's for BEHP and chlordane are presented in table 5-11; the associated estimated contaminant intakes for the soil ingestion, fugitive dust inhalation, and dermal exposure pathways are presented in table 5-12; and the HQ's and ICR's for the soil ingestion, fugitive dust inhalation, and dermal exposure pathways are presented in table 5-13.

Exposure to BEHP via the soil ingestion route is associated with a HQ of 3 and an ICR of 4E-04. Dermal exposure to BEHP is estimated to have an ICR of 5E-05. For chlordane, the soil ingestion ICR is 3E-06 and the dermal exposure ICR is 4E-06. The fugitive dust pathway is associated with negligible cancer risks for both contaminants. All ICR's are within one order of magnitude of those estimated using the maximum contaminant concentrations.

The 95 percent UCL's for BEHP and chlordane in soil are also used to calculate intakes, ICR's, and HQ's, associated with the garden produce pathway. Table 5-14 presents a summary of the estimated contaminant concentrations in garden produce based on soil contaminated with BEHP and chlordane at the 95 percent UCL. A summary of the associated contaminant intakes is provided in table 5-15. A summary of the associated estimated ICR's and HQ's are provided in table 5-16. The ICR's and HQ's for BEHP and

chlordane are essentially the same whether the maximum contaminant concentration (table 5-3) or the 95 percent UCL (table 5-11) is used to evaluate potential garden produce exposures.

5.3.2.3 Ephemeral Pool BRSRA. Chlordane and PCB's detected in soil at the Ephemeral Pool are both estimated to have ICR's greater than 1E-06 when using the maximum contaminant concentrations to calculate the ICR's (table 5-3). Sampling data from both the Phase I and Phase II site investigations were used to calculate the 95 percent UCL for each contaminant at this subunit. The procedure and data used to calculate the 95 percent UCL are presented in appendix V.

The 95 percent UCL's for chlordane and PCB's are presented in table 5-11; the associated estimated contaminant intakes for the soil ingestion, fugitive dust inhalation, and dermal exposure pathways are presented in table 5-12; and the HQ's and ICR's for the soil ingestion, fugitive dust inhalation, and dermal exposure pathways are presented in table 5-13.

The ICR's associated with the soil ingestion, fugitive dust, and dermal exposure pathways calculated using the 95 percent UCL for chlordane are 4E-06, 1E-09, and 5E-06, respectively. These are essentially the same as those estimated using the maximum contaminant concentrations. The ICR's for PCB's are 2E-04 for both the soil ingestion pathway and the dermal exposure pathway. The fugitive dust pathway is estimated to have an ICR of 6E-08.

The 95 percent UCL's for chlordane and PCB's in soil are also used to calculate intakes, ICR's, and HQ's, associated with the garden produce pathway. Table 5-14 presents a summary of the estimated contaminant concentrations in garden produce based on soil contaminated with BEHP and chlordane at the 95 percent UCL. A summary of the contaminant intakes is provided in table 5-15. A summary of the associated estimated ICR's and associated HQ's are provided in table 5-16.

The overall garden pathway ICR, based on the 95 percent UCL is 8E-04. This is primarily attributable to the estimated ICR for PCB's, which is 7E-04.

5.3.2.4 HRL BRSRA. Contaminants detected in both the soil and the groundwater are associated with ICR's of greater than 1E-06 when exposures are evaluated using the maximum detected concentration of the contaminants (table 5-5). Further evaluation of these soil and groundwater contaminants are discussed below.

5.3.2.4.1 Soil--Four contaminants detected in soil at HRL, arsenic, beryllium, chromium, and PCB's, are evaluated using 95 percent UCL contaminant concentrations.

For beryllium, all sampling data are used to calculate the 95 percent UCL. The sampling for this contaminant indicates that the contaminant is evenly distributed throughout the subunit. Therefore, the 95 percent UCL represents the spatial distribution and frequency of detection for this contaminant and should be representative of the potential contamination of the entire HRL.

Table 5-11. 95% UCL Concentrations for Soil Contaminants Evaluated in the Baseline Residential Scenario Risk Assessment.

Contaminants	Horn Rapids Landfill mg/kg	UN-1100-6 mg/kg	Ephemeral Pool mg/kg
Arsenic	1.4	--	--
Beryllium	0.5	--	--
Chromium	83	--	--
BEHP	--	18,000	--
Chlordane	--	1.6	1.9
PCBs	38	--	15

UCL = Upper Confidence Limit
-- Indicates not applicable

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Table 5-12. Summary of Residential Scenario Intakes Based on the 95% UCL for UN-1100-6, the Ephemeral Pool, and the Horn Rapids Landfill.

Contaminant	Pathway					
	Soil Ingestion (mg/kg-d)		Fugitive Dust Inhalation (mg/kg-d)		Dermal Exposure (mg/kg-d)	
	Noncarcinogenic	Carcinogenic	Noncarcinogenic	Carcinogenic	Noncarcinogenic	Carcinogenic
UN-1100-6						
BEHP	6.7E-02	2.9E-02	–[c]	3.5E-08	8.0E-03	3.4E-03
Chlordane	5.8E-06	2.5E-06	–[c]	3.0E-10	7.5E-06	3.2E-06
Ephemeral Pool						
Chlordane	7.0E-06	3.0E-06	–[c]	9.6E-10	9.0E-06	3.9E-06
PCBs	–	2.4E-05	–[c]	7.7E-09	–[c]	3.1E-05
Horn Rapids Landfill						
Arsenic	5.1E-06	2.2E-06	–[c]	5.1E-10	1.1E-06	4.8E-08
Beryllium	2.0E-06	8.6E-07	–[c]	6.6E-10	4.4E-08	1.9E-08
Chromium	3.0E-04	–[b]	–[c]	9.9E-08	6.6E-06	–[b]
PCBs	–[c]	6.0E-05	–[c]	4.5E-08	–[c]	7.8E-05

[a]Intakes adjusted based on 30% absorption of inhaled arsenic (EPA, 1992b)
[b]Not considered carcinogenic by this route of exposure or pathway
[c]RfD not available to evalute intake for this pathway
[d]SF not available to evaluate intake for this pathway
UCL = Upper Confidence Limit
– Indicates not Applicable

Table 5-13. Summary of the Baseline Residential Scenario Risk Assessment Based on the 95% UCL for UN-1100-6, the Ephemeral Pool, and the Horn Rapids Landfill.

Contaminant	Pathway						Contaminant Totals		Subunit Totals	
	Soil Ingestion		Fugitive Dust Inhalation		Dermal Exposure					
	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HQ[a]	ICR[b]	HI[c]	ICR[b]
UN-1100-6										
BEHP	3	4E-04	--	5E-08	0.4	5E-05	3.4	4E-04		
Chlordane	0.1	3E-06	--	4E-10	0.1	4E-06	0.2	7E-06		
Pathway Total	3	4E-04	--	5E-08	0.5	5E-05			4	4E-04
Ephemeral Pool										
Chlordane	0.1	4E-06	--	1E-09	0.2	5E-06	0.3	9E-06		
PCBs	--	2E-04	--	6E-08	--	2E-04	--	4E-04		
Pathway Totals	0.1	2E-04	--	6E-08	0.2	2E-04			0.3	4E-04
Horn Rapids Landfill										
Arsenic	0.02	4E-06	--[e]	3E-08[d]	0.0004	9E-08	0.02	4E-06		
Beryllium	0.0004	4E-06	--[e]	6E-09	0.000009	8E-08	0.0004	4E-06		
Chromium	0.06	--[f]	--[e]	4E-06	0.001	--[f]	0.07	4E-06		
PCBs	--[e]	5E-04	--[e]	3E-07	--[e]	6E-04	--[e]	1E-03		
Pathway Total	0.08	5E-04	--[e]	4E-06	0.001	6E-04			0.08	1E-03

[a]Hazard Quotient
[b]Lifetime Incremental Cancer Risk
[c]Hazard Index
[d]Based on 30% absorption of inhaled arsenic (EPA, 1992b)
[e]RfD not available to evaluate this pathway
[f]Not considered carcinogenic by this route of exposure
[g]SF not available to evaluate this pathway
UCL = Upper Confidence Limit
-- Indicates not Applicable

Table 5-14. Summary of Contaminant Concentrations for the Garden Pathway at UN-1100-6, the Ephemeral Pool, and the Horn Rapids Landfill Based on the 95% UCL.

	Leafy (lettuce) (mg/kg)	Root (carrots) (mg/kg)	Garden Fruits (tomatoes) (mg/kg)	Potatoes (mg/kg)
UN-1100-6				
BEHP	7E+03	6.6E+03	3.7E+02	3.7E+02
Chlordane	3.2E-02	3.2E+00	3.3E-01	4.8E-01
Ephemeral Pool				
Chlordane	3.8E-02	3.8E+00	4.0E-01	5.7E-01
PCB	5.7E+00	5.4E+00	3.0E-01	3.0E-01
Horn Rapids Landfill				
Arsenic	5.6E-02	2.8E-02	2.8E-03	8.4E-04
Beryllium	2.4E-01	1.4E-01	2.3E-02	3.3E-02
Chromium	1.7E+01	2.2E+01	3.4E+00	5E+00
PCB	1.4E+01	1.4E+01	7.6E-01	7.6E-01
UCL = Upper Confidence Limit				

Table 5-15. Summary of Contaminant Intakes for Homegrown Vegetables in the Garden Pathway at UN-1100-6, the Ephemeral Pool, and the Horn Rapids Landfill Based on the 95% UCL.

	Leafy (lettuce)[a] (mg/kg-d)		Root (carrots)[b] (mg/kg-d)		Garden Fruits (tomatoes)[c] (mg/kg-d)		Potatoes[d] (mg/kg-d)		Total Contaminant Intake (mg/kg-d)	
	Non-Carcinogenic	Carcinogenic	Non-Carcinogenic	Carcinogenic	Non-Carcinogenic	Carcinogenic	Non-Carcinogenic	Carcinogenic	Non-Carcinogenic	Carcinogenic
UN-1100-6										
BEHP	1.1E-01	4.5E+02	8.1E-02	3.4E-02	1.1E-02	4.8E-03	4.7E-02	2.0E-02	2.5E-01	1.0E-01
Chlordane	5E-07	2.1E-07	3.9E-05	1.7E-05	1.0E-05	4.3E-06	8.1E-05	2.6E-05	1.1E-04	4.7E-05
Ephemeral Pool										
Chlordane	5.8E-07	2.5E-07	4.7E-05	2.0E-05	1.2E-05	5.2E-06	7.3E-05	3.1E-05	1.3E-04	5.6E-05
PCBs	-[f]	3.7E-05	-[f]	2.8E-05	-[f]	3.9E-06	-[f]	1.6E-05	-[f]	8.5E-05
Horn Rapids Landfill										
Arsenic	8.6E-07	-[e]	3.4E-07	-[e]	8.6E-06	-[e]	1.1E-07	-[e]	1.4E-06	-[e]
Beryllium	3.7E-06	1.6E-06	1.7E-06	7.3E-07	7.1E-07	3E-07	4.2E-06	1.8E-06	1.0E-05	4.4E-06
Chromium	2.6E-04	-[e]	2.7E-04	-[e]	1.0E-04	-[e]	8.4E-04	-[e]	1.3E-03	-[e]
PCBs	-[f]	9.1E-05	-[f]	7.3E-05	-[f]	9.9E-06	-[f]	4.1E-05	-[f]	2.2E-04

[a]Assumes intake of 0.88 g/d dry weight (EPA, 1986a)
[b]Assumes intake of 1.1 g/d dry weight (EPA, 1986a)
[c]Assumes intake of 2.2 g/d dry weight (EPA, 1986a)
[d]Assumes intake of 9.1 g/d dry weight (EPA, 1986a)
[e]Not considered carcinogenic by this route of exposure or pathway
[f]RfD not available to evaluate intake for this pathway
[g]SF not available to evaluate
UCL = Upper Condence Limit
- Indicates not applicable

Table 5-16. Summary of Baseline Residential Scenario Risk Assessment for the Garden Pathway at UN-1100-6, the Ephemeral Pool, and the Horn Rapids Landfill Based on the 95% UCL.

Contaminant	Pathway	
	Garden	
	HQ[b]	ICR[a]
UN-1100-6		
BEHP	13	2E-03
Chlordane	1.8	6E-05
Total Pathway ICR	--	2E-03
Total Pathway HI[c]	15	--
Ephemeral Pool		
Chlordane	2.2	7E-05
PCBs	--[e]	7E-04
Total Pathway ICR	--	8E-04
Total Pathway HI[c]	2.2	--
Horn Rapids Landfill		
Arsenic	0.005	--[d]
Beryllium	0.002	2E-05
Chromium	0.3	--[d]
PCBs	--[e]	2E-03
Total Pathway ICR	--	2E-03
Total Pathway HI[c]	0.3	--

[a]Lifetime Incremental Cancer Risk
[b]Hazard Quotient
[c]Hazard Index
[d]Not considered carcinogenic by this route of exposure
[e]RfD not available to evaluate this pathway
[f]SF not available to evaluate this pathway
UCL = Upper Confidence Limit
-- Indicates not applicable

The 95 percent UCL's for arsenic, beryllium, chromium, and PCB's are presented in table 5-11; the estimated associated contaminant intakes for the soil ingestion, fugitive dust inhalation, and dermal exposure pathways are presented in table 5-12; and the associated HQ's and ICR's for the soil ingestion, fugitive dust inhalation, and dermal exposure pathways are presented in table 5-13.

For the soil ingestion pathway, the ICR for beryllium (4E-06) exceeds 1E-06 (Table 5-13). By comparison, based on the maximum detected contaminant concentration, the ICR for beryllium is (9E-06) (table 5-1). The ICR for beryllium is less than 1E-06 for the fugitive dust pathway.

The 95 percent UCL's in soil are also used to calculate intakes, ICR's, and HQ's, associated with the garden produce pathway. Table 5-14 presents a summary of the estimated contaminant concentrations in garden produce based on soil contaminated with arsenic, beryllium, chromium, and PCB's at the 95 percent UCL concentration. A summary of the associated contaminant intakes is provided in table 5-15. A summary of the associated estimated ICR's and HQ's are provided in table 5-16.

For the garden produce pathway, beryllium is estimated to have an ICR of 2E-05 and PCB's are estimated to have an ICR of 2E-03.

5.3.2.4.2 Groundwater--Two contaminants detected in the groundwater in the vicinity of HRL are trichloroethene and nitrate. In addition to these contaminants, gross alpha and gross beta activity were detected at levels that exceed the drinking water criteria during some sampling rounds. Therefore, additional evaluation of the trichloroethene, nitrate, and elevated radioactivity based on the 95 percent UCL is presented.

Data from a select group of wells has been used to calculate the 95 percent UCL's for the contaminants. Further information on the wells selected and the data are provided in appendix IV. For trichloroethene, data from wells that have trichloroethene consistently detected above the MCL of 5 μg/L are used for the statistical calculation of the 95 percent UCL. For nitrate, wells with data exceeding the nitrate MCL of 10 mg/L are used for the calculations. The selection of these wells incorporates a conservative bias in the calculation of the ICR's and HQ's. The frequency of detection and the spatial distribution used to provide a 95 percent UCL is representative of the groundwater quality within the contaminant plume.

The 95 percent UCL's for trichloroethene and nitrate in groundwater are presented in table 5-17. A summary of the associated estimated intakes for these contaminants based on the 95 percent UCL's is provided in table 5-18. The associated estimated ICR's and HQ's are presented in table 5-19. The HQ estimated for potential ingestion of nitrate at the 95 percent UCL is 0.8, as compared to a HQ of 1 based on the maximum detected concentration (table 5-3). Trichloroethene is estimated to have an ICR of 1E-05 for the ingestion pathway and an ICR of 2E-05 for the inhalation of trichloroethene during groundwater use in a residence. The ICR's are essentially the same as those estimated for exposures to the maximum detected concentration detected in the groundwater where the ICR for ingestion is also 1E-05 and for inhalation is 3E-05 (table 5-3).

Table 5-17. 95% UCL Concentrations for Trichloroethene and Nitrate in Groundwater at the Horn Rapids Landfill.

Contaminant	Concentration (mg/L)
Nitrate	45
Trichloroethene	0.075
UCL = Upper Confidence Level	

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Table 5-18. Summary of Residential Scenario Intakes Based on the 95% UCL Concentrations for the Groundwater Pathway at the Horn Rapids Landfill.

Contaminant	Pathway			
	Ingestion (mg/kg-d)		Volatile Inhalation (mg/kg-d)	
	Noncarcinogenic	Carcinogenic	Noncarcinogenic	Carcinogenic
Nitrate	1.23E+00	--[a]	--[b]	--[a,b]
Trichloroethene	--[c]	8.8E-04	--[c]	3.3E-03

[a]Not considered to be a carcinogen
[b]Not a volatile contaminant
[c]RfD not available to evaluate intake for this pathway
UCL = Upper Confidence Level
-- Indicates not applicable

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Table 5-19. Summary of Baseline Residential Scenario Risk Assessment Based on the 95% UCL Concentrations for the Groundwater Pathway at the Horn Rapids Landfill.

Contaminant	Pathway			
	Groundwater Ingestion		Groundwater Inhalation	
	HQ[a]	ICR[b]	HQ[a]	ICR[b]
Nitrate	0.8	--[c]	--[d]	--[c,d]
Trichloroethene	--[e]	1E-05	--[e]	2E-05

[a]Hazard Quotient
[b]Lifetime Incremental Cancer Risk
[c]Not considered to be a carcinogen
[d]Not a volatile contaminant
[e]RfD not available to evaluate this pathway
UCL = Upper Confidence Level
-- Indicates not applicable

Gross alpha and gross beta activity has also been detected in the groundwater in the vicinity of HRL. The 95 percent UCL's for both gross alpha and gross beta are 5 pico Curie/liter (pCi/L) and 65 pCi/L, respectively. The current MCL for gross alpha activity (excluding radon and uranium) is 15 pCi/L. In addition, since the gross alpha measurement does not exceed 5 pCi/L, compliance with the MCL's for Ra-226 and Ra-228 may be assumed without further analysis. An MCL for gross beta activity has not been developed. However, compliance with individual MCL's for beta emitters may be assumed without further analysis if the average annual concentration of gross beta activity is less than 50 pCi/L. Since the gross beta activity exceeds this concentration, an analysis of the sample to identify the major radioactive constituents present is required and was performed (see below).

Although gross alpha and gross beta measurements can provide an indication of radioactive contamination, such values are of limited usefulness in risk assessment. This is because slope factors are radionuclide-specific, and associated risks cannot be calculated from gross alpha and gross beta measurements when the relative proportions of various sediments are known.

9 3 1 2 3 2 1 0 3 3

More specific analysis of the potential beta-contributing radionuclides was conducted. Technetium-99 appears to account for most, if not all, of this beta activity, and no other significant contributors to the total beta activity have been detected (Prentice *et al.*, 1992). Other analyses performed were tritium, Sr-90, liquid scintillation, and gamma spectrometry. Tc-99 is a fission product released to the environment mainly from recycling of nuclear fuels, and is very persistent with a half-life of 2.1E+05 yr. It has a relatively small ingestion slope factor (1.3E-12/pCi), indicating that this radionuclide poses a relatively small internal hazard. This is also indicated by the high proposed MCL for Tc-99 (3,800 pCi/L). The average Tc-99 concentration measured in the plume was 120 pCi/L. Under a residential scenario, the lifetime incremental cancer risk associated with this concentration in drinking water is approximately 3E-06.

A summary of the pathway and subunit ICR's and HQ's based on the 95 percent UCL is presented for UN-1100-6 subunit, the Ephemeral Pool, and HRL in table 5-20.

The subunit ICR for UN-1100-6 subunit is 2E-03 because of the potential risks associated with garden produce. At the Ephemeral Pool, the subunit ICR is 1E-03. The garden produce pathway contributes a pathway ICR of 8E-04. The soil ingestion and dermal exposure pathways are both estimated to have ICR's of 2E-04. The HRL subunit ICR is 3E-03. Again, the garden produce pathway (ICR = 2E-03) contributes most of the risk.

5.4 RISK CHARACTERIZATION UNCERTAINTY ANALYSIS

A human risk characterization examines the sources of the contaminant, its dispersion in the environment and resulting exposure to humans, and the toxicological effects of such exposure. The risks, both carcinogenic and noncarcinogenic, presented in this risk assessment are conditional estimates given multiple assumptions about exposures, toxicities,

and other variables. This discussion focuses on the uncertainties surrounding the projected risks and hazards due to uncertainty in these variables.

5.4.1 Uncertainty Associated with the Identification of COPC's

The soil sampling conducted under the Phase I and Phase II RI's provides confidence that the COPC's at the 1100-EM-1 Operable Unit have been identified. Phase II sampling confirmed sampling data from the earlier remedial investigation activities except as noted below. Additional COPC's have been identified and evaluated in the BISRA because of the more conservative risk-based screening procedure used relative to DOE/RL-90-18 (*e.g.*, ICR = 1E-07 and HQ = 0.1), the availability of new toxicity information (*e.g.*, regarding beryllium), and additional sampling data and maximum concentrations (*e.g.*, regarding PCB's). However, overall results are consistent with the results of the Phase I RI Report.

Two parameters were detected in the Phase II soil sampling at HRL that require additional consideration for the residential risk assessment. Dieldrin has been detected at a maximum concentration of 1.2 mg/kg. Recent data validation has revealed that concentrations reported for Dieldrin are "qualified," which indicates that the case narrative from the lab should be consulted. Upon review, the analysts's opinion is that Dieldrin is actually a part of the Arochlor pattern. Therefore, Dieldrin has not been evaluated as a COPC.

Alpha chlordane has also been detected at a maximum concentration of 0.78 mg/kg in the Phase II sampling at HRL, but is also qualified. It has also been detected at 0.41 mg/kg without any qualifiers nearby. Although not evaluated as a contaminant of concern, chlordane, at either of these concentrations, would not be associated with a risk greater than 1E-06 based on the industrial scenario evaluated in the BISRA. By comparison, the risks for chlordane at UN-1100-6 subunit (detected at about 1.9 mg/kg) are associated with a contaminant-specific ICR of 4E-07 (summary of chlordane ICR's presented in table 5-1 for UN-1100-6) for the soil ingestion, fugitive dust, and dermal exposure pathways. This would correspond approximately to an ICR of 2E-07 for a concentration of 0.78 mg/kg or 9E-08 for a concentration of 0.41 mg/kg. Consequently, there is uncertainty in the contribution of chlordane to the overall risk estimate for HRL, but it appears that the contribution to the overall subunit risk in the BISRA, would be low.

Although not evaluated as a contaminant of concern, chlordane at either of the above concentrations could be associated with a risk greater than 1E-06 based on the residential scenario evaluated in the BRSRA. As a comparison, the risks for chlordane at UN-1100-6 subunit (detected at 1.9 mg/kg) are associated with a contaminant-specific ICR of 8E-05 (summary of chlordane ICR's presented in tables 5-1 and 5-2 for UN-1100-6 subunit) for the soil ingestion, fugitive dust, dermal exposure, and garden pathways. This would correspond approximately to an ICR of 3E-05 for a concentration of 0.78 mg/kg or 2E-05 for a concentration of 0.41 mg/kg. Consequently, there is uncertainty in the contribution of chlordane to the overall risk in the BRSRA estimate for HRL.

Table 5-20. Summary of the Baseline Residential Scenario Risk Assessment for UN-1100-6, the Ephemeral Pool, and the Horn Rapids Landfill Based on the 95% UCL.

Subunit	Pathway	Pathway Totals		Subunit Totals	
		HI[a]	ICR[b]	HI[a]	ICR[b]
UN-1100-6	Soil Ingestion	3.0	4E-04		
	Fugitive Dust Inhalation	--	5E-08		
	Dermal Exposure	0.5	5E-05		
	Garden Produce	15	2E-03		
				18	2E-03
Ephemeral Pool	Soil Ingestion	0.1	2E-04		
	Fugitive Dust Inhalation	--	6E-08		
	Dermal Exposure	0.2	2E-04		
	Garden Produce	2.2	8E-04		
				2.5	1E-03
Horn Rapids Landfill	Soil Ingestion	0.08	5E-04		
	Fugitive Dust Inhalation	--	4E-06		
	Dermal Exposure	0.001	6E-04		
	Garden Produce	0.3	2E-03		
	Groundwater Ingestion	0.8	1E-05		
	Inhalation of Volatiles from Groundwater	--	2E-05		
				1.2	3E-03

[a]Hazard Index
[b]Lifetime Incremental Cancer Risk
-- Indicates not applicable

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Beryllium is a COPC that has been evaluated in the BRSRA for HRL because of new toxicity information that was not available when the Phase I RI was prepared.

5.4.2 Uncertainty Associated with the Exposure Assessment

The exposure assessment is based on a large number of assumptions regarding the physical setting of the 1100-EM-1 Operable Unit, and the exposure conditions of the receptor population. For the purpose of the BISRA, a conservative assumption is made that the COPC's being evaluated are readily accessible for worker contact via ingestion, inhalation and dermal exposure pathways. Actual site conditions, however, may substantially limit or preclude such exposures. In most cases, the maximum concentrations detected are not uniformly distributed in the soil and may be several feet below the surface. At subunit 1100-4, the contamination is located inside a building under a cement floor. For the purpose of the BRSRA, a conservative assumption is made that the COPC's being evaluated are readily accessible for receptor contact via ingestion, inhalation, dermal, and garden produce pathways. Actual site conditions, however, may substantially limit or preclude such exposures. For example, residential use of the area in the foreseeable future is unlikely.

The fugitive dust inhalation pathway utilizes a number of assumptions, including potential for soil erodability, soil grain-size distribution, length of each operable subunit relative to the prevailing wind, and other climatic factors. Conservative parameter values are chosen when site-specific information is not available. In general, use of FDM should provide appropriate, but conservative, estimates of fugitive dust because the model incorporates actual site meteorological data.

Uncertainty in the fugitive dust inhalation pathway is also present because of the lack of information relating the concentration of a contaminant with the particle size fraction. Concentrations may be greater in the fine fractions because of the greater surface area of these particles, resulting in selective partitioning of contaminants to the fine fractions.

Exposure parameters (*i.e.*, body weight, averaging time, contact rate, exposure frequency, and exposure duration) are generally conservative default parameters that represent reasonable maximum values as defined by EPA (EPA-10, 1991) and in the HSBRAM (DOE/RL-91-45), but may not reflect actual exposure conditions. For example, the soil ingestion exposure pathway uses the assumption that a resident or worker is present and ingesting dirt from the same site 350 d/yr for 30 years (residential scenario) or 146 d/yr for 20 years (industrial scenario).

Another example of conservative exposure parameter assumptions is found in the fugitive dust pathway. It is assumed that for the industrial scenario that workers are outside during the entire working lifetime and inhaling the estimated fugitive dust concentrations presented in table 3-1. In reality, current 1100 Area employees are inside various facilities and not working outside for 250 d/yr for 20 yr. Climatic conditions at the Hanford site would also limit such conservative assumptions from actually occurring. The assumption for residential scenario is that residents are outside during the entire 30 years and inhaling the estimated airborne concentrations presented in table 3-1. In reality, residents would be inside

homes, away at school or jobs, and not working or playing outside for a large portion of the 350 d/yr for 30 yr.

The choice of intake parameters for all exposure pathways is governed by the specific land use evaluated. Any land use change that would increase exposures by workers or indicate a different receptor population would result in a need to reevaluate the risks presented here.

The inhalation of volatile contaminants present in soil or soil gas has not been quantitatively evaluated in the BRSRA. Tetrachloroethene has been detected at very low concentrations in soil at 1100-2 and HRL. Tetrachloroethene, trichloroethene, and 1,1,1-trichloroethane have been detected in soil gas at HRL. Although inhalation of these volatile COPC's could occur if residents lived on the landfill, the low concentrations detected suggest that this would not result in unacceptable exposures. This is further supported by modelling performed in the Phase I RI report and the results of additional soil gas surveys during the Phase II RI. However, the lack of a quantified evaluation may result in an underestimate of the total site risk.

The garden produce pathway utilizes conservative uptake factors to estimate concentrations of contaminants in the plants. Actual subunit soil conditions could affect the uptake. In addition, the assumption that the garden is located at the site of the maximum contaminant concentration or the 95 percent UCL concentration is conservative since these areas usually represent only a portion of the entire subunit. The exceptions are UN-1100-6 subunit and the Ephemeral Pool.

The choice of intake parameters for all exposure pathways is governed by the specific land use evaluated. This assessment considers only an onsite residential scenario which assumes that there will be major changes in current land use at the Operable Unit. This seems improbable based on current land use, zoning, and restrictions related to the Hanford Site.

The spatial distribution of chromium from the Phase I RI suggests that high concentrations are confined to a small area of HRL and are not uniformly distributed in the soil. Estimations based on maximum concentrations and 95 percent UCL in general would overestimate actual risks, where use of data collected over the entire landfill may underestimate risks from exposure to hot spots. Natural background conditions are not considered in the evaluation of the estimated ICR's for any of the COPC's. In some cases, for example arsenic, natural background concentrations may be associated with risks that would be potentially unacceptable at a remediated NPL site.

In the control-screening process, parameters detected below project-specific background (*i.e.*, UTL) were not considered background. This process was approved for use according to the version of HSBRAM (DOE/RL-91-45,1992) followed for this risk assessment. The HSBRAM is currently undergoing revision, and the final form may not recommend control-screening in this manner for organic parameters. To determine if the organic parameters below UTL's would contribute significantly to the risk, EPA requested that maximum concentrations of these parameters be compared to risk-based concentrations

for soil ingestion. This was presented at the October 1992 Hanford site unit manager's meeting. Risk calculations performed for contaminants below background showed that these contaminants would not contribute to the overall risk.

Absorption factors of contaminants from soil have been derived to evaluate the dermal absorption pathway. Limited data are available on the absorption of chemicals from a soil matrix. Therefore, the assessment of risks may be an overestimation or an underestimation of the actual risk.

5.4.3 Uncertainty Associated with the Toxicity Assessment

Uncertainty is also associated with the toxicity values and toxicity information available to assess potential adverse effects. This uncertainty in the information and the lack of specific toxicity values for some COPC's contribute to uncertainty in the toxicity assessment.

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5.3.4.1 Uncertainty in Toxicity Values and Information. An understanding of the degree of uncertainty associated with toxicity values is an important part of interpreting and using those values. A high degree of uncertainty in the information used to derive a toxicity value contributes to less confidence in the assessment of risk associated with exposure to a substance.

The RfD's and SF's have multiple conservative calculations built into them that can contribute to overestimation of actual risk (*i.e.*, factors of 10 for up to four different levels of uncertainty for RfD's, and the use of a 95 percent upperbound confidence estimate derived from the linearized multi-stage carcinogenic model for SF's). For example, table 4-1 indicates that an uncertainty factor of 1,000 is used to calculate the RfD's for chlordane and tetrachloroethene. Table 4-2 shows that, while beryllium, BEHP, chlordane, and PCB's are evaluated as human carcinogens, the available information indicates that there is inadequate evidence of carcinogenicity in humans. The extrapolation of data from high-dose animal studies to low-dose environmental human exposures may overestimate the risk in the human population because of metabolic differences, repair mechanisms, or different susceptibilities.

An underestimation of systemic toxicity could be associated with the inhalation pathway because only one COPC, barium, has a published inhalation RfD. The RfD for barium is an interim number based on short term reproductive studies in rats and is under review.

5.4.3.2 Uncertainty in the Toxicity Assessment. Uncertainty is also present in the overall toxicity assessment for several reasons. First, substances have been evaluated qualitatively when there is a lack of toxicity values. Second, route specific toxicity values have been extrapolated from one route to another (*e.g.*, oral to dermal). Additionally, surrogate values are used and potential synergistic or antagonistic interactions of substances have not been evaluated.

Conservative assumptions are provided regarding the species of the contaminant present. For example, all chromium is assumed to be chromium(VI) which is carcinogenic.

Toxicity values are not available for several contaminants detected at the subunits (*e.g.*, lead can have significant toxic effects. In addition, the form of lead present may also affect the toxicity because some compounds are more bioavailable than others. Because many of the effects for lead toxicity are apparently without a threshold, the EPA does not provided numerical toxicity values. Lead has been evaluated using the UBK model, which is based on conservative assumptions of the form of lead that may be present, and consequently, assumes a form of lead that is very bioavailable. Lead was not retained as a COPC at any of the subunits because the maximum concentrations detected are within the range of the recommended soil cleanup guideline of 500 to 1,000 mg/kg (EPA, 1989b). However, lead is retained as a contaminant of interest at HRL because it exceeds the soil concentration (500 mg/kg) associated with increased blood levels in children. Children are a sensitive subpopulation for lead exposures. Lead at the concentrations detected is unlikely to pose an unacceptable hazard to workers under the industrial scenario. However, if the expected land use at the 1100 Area were to change, it may require more extensive evaluation might be warranted.

Some contaminants, such as PCB's, only have toxicity values for carcinogenic effects (*i.e.*, SF's), but do not have toxicity values for noncarcinogenic effects (*i.e.*, RfD's). These contaminants are known to produce systemic toxic effects in addition to cancer. Without an RfD, quantitative evaluation of these other effects is limited. However, the potential to cause cancer is usually the effect of most concern and is usually the effect that drives risks at most sites. As indicated, surrogates are used to evaluate COPC's when numerical toxicity values are not available. For all COPC's, the level of confidence that key effects have been evaluated is high.

The uncertainty surrounding dermal exposures and absorption from dermal exposure is another significant source of uncertainty. The lack of toxicity information to adequately determine RfD's and SF's for dermal exposures forces extrapolation from oral toxicity values, and increases the conservative bias associated with these calculations. This conservatism is reflected in the significant estimated risks associated with this pathway for some compounds, most notably PCB's. Conversely, the assumption that dermal toxicity values are the same as oral toxicity values could underestimate the risk for contaminants that are poorly absorbed in the gastrointestinal tract, but might well be absorbed dermally.

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6.0 SUMMARY OF THE BISRA AND THE BRSRA

The BISRA and the BRSRA have been conducted as recommended in the HSBRAM (DOE/RL-91-45), and the direction of EPA [Einan, 1991 (see appendix I)], respectively. The BISRA was prepared prior to completion of the Phase II RI for the 1100-EM-1 Operable Unit. The data from the Phase I RI, and additional sampling data from Phase II sampling at the Ephemeral Pool and HRL, were included in the BISRA. Contaminants have been determined by comparison of maximum detected concentrations of parameters to the UTL for that parameter. A BRSRA for an onsite residential scenario at each of five 1100-EM-1 operable subunits, as defined in letters [Einan, 1991, and Einan, 1992 (see appendix I)]. The scope of the BRSRA defined by these letters included evaluation of specific COPC and specific exposure pathways. The COPC derived from the comparisons for both the BISRA and the BRSRA are presented in table 2-1. The BISRA and the BRSRA initially were conducted independently and later were combined for the purposes of the RI/FS.

The maximum concentrations of COPC detected at each subunit are evaluated at each of the designated subunits. As discussed in chapter 5, paragraph 5.4, conservative assumptions have been made with respect to the species of the contaminant present. For three subunits, UN-1100-6 subunit, the Ephemeral Pool, and HRL, soil contaminants that are estimated to have an ICR greater than 1E-06, based on the maximum detected contaminant concentration, are also evaluated using a 95-percent UCL concentration. An overall pathway and subunit comparison based on the specific COPC that exceeded 1E-06 using the maximum detected contaminant concentration and the 95-percent UCL is provided in table 5.3.

As discussed in appendix IV, the 95-percent UCL for COPC at the Ephemeral Pool are based on all data for that subunit. The 95-percent UCL is used to evaluate chlordane and BEHP at UN-1100-6 subunit. At HRL, the 95-percent UCL for arsenic is based on data collected throughout the landfill. For chromium and PCB's, the 95-percent UCL concentrations reflect data selected to evaluate the areas of maximum contamination (*i.e.*, hot spots). Therefore, the 95-percent UCL's are not directly comparable between contaminants. Consequently, although a quantitative comparison is presented, the results should be carefully interpreted and emphasis should be placed on the qualitative nature of the results.

6.1 BISRA

Currently, no workers are assigned to work at any of the subunits on an ongoing basis. For purposes of the BISRA, it is assumed, based on current land use and zoning in the 1100 Area, that industrial workers are likely potential receptors at the subunits. The current and future receptor population that has been evaluated is onsite industrial workers who are assumed to work full time at only one subunit where they could potentially be exposed to contaminants from that subunit. The BISRA also assumes that personnel are assigned to the 1100 Area for purposes other than remediation.

The exposure pathways are those indicated for the industrial scenario defined in the HSBRAM (DOE/RL-91-45). The BISRA evaluates only pathways associated with exposure to soils (*i.e.*, soil ingestion, dermal exposure to soil, and fugitive dust inhalation). Potential exposures associated with groundwater and surface water are not evaluated in the BISRA. As discussed in chapter 3, paragraph 3.2, neither groundwater use nor direct use of surface water occurs because of the availability of city of Richland water services.

The air inhalation pathway assumes exposure to contaminated dust directly at each subunit. The EPA FDM is used to estimate concentrations of airborne particulates at a site based on conservative estimations of soil and climatic conditions. Chromium present in the soil at HRL is the only contaminant that may be associated with risks greater than 1E-06. However, all chromium is assumed to be chromium(VI) which is a conservative assumption as discussed in chapter 5, paragraph 5.4

Given the above considerations, the BISRA identifies and evaluates the contaminants that are most likely to pose a potential human health risk. A review of the results presented in tables 5-1 through 5-5, and summarized in table 6-1, is discussed below for each subunit.

6.3 BRSRA

The BRSRA has been conducted as recommended in RAGS (EPA, 1989a) and by (EPA-10, 1991). Currently there is no residential use of any of the subunits. The 1100-EM-1 Operable Unit is used for industrial purposes and is surrounded by land zoned by the city of Richland for industrial or commercial uses. For purposes of the BRSRA, as directed by EPA, it is assumed that residents are living at 1100-2, 1100-3, UN-1100-6 subunit, HRL, and the Ephemeral Pool. It is assumed that such individuals live only at one subunit where they could potentially be exposed to contaminants from that subunit.

As defined by EPA (Einan 1991) and a follow up letter of clarification [Einan, 1992 (see appendix I)], the exposure pathways are focused on contaminated soil. The pathways include the ingestion of soil, dermal contact with soil, ingestion of garden produce, and inhalation of particulates (*i.e.*, fugitive dust). Other pathways evaluated as discussed below, include ingestion of groundwater and recreational exposures through swimming in the Columbia River or eating fish from the Columbia River.

The dermal contact with soil pathway utilizes absorption factors to estimate the absorption of contaminants from soil through the skin of the receptor. The garden produce pathway, similarly, uses plant uptake factors to estimate the transport of contaminants from the soil to the plant. Discussions of the conservative assumptions for these pathways are provided in chapters 3 and 5, paragraphs 3.3.2 and 5.4, respectively. Both pathways are associated with relatively high ICR's (see tables 5-1, 5-2, 5-15, and 6-2). These pathways have a great deal of uncertainty associated with them because the transport of soil-bound contaminants across skin and the uptake of contaminants by plants are not well understood.

Table 6-1. Comparison of the Baseline Industrial Incremental Cancer Risk Assessment Results using the Maximum Contaminant Concentrations and 95% UCL for UN-1100-6, the Ephemeral Pool, and the Horn Rapids Landfill.

Subunit	Pathway	95% UCL Pathway Totals	Maximum Concentration Pathway Totals	95% UCL Subunit Totals	Maximum Concentration Subunit Totals
		ICR	ICR	ICR	ICR
UN-1100-6	Soil Ingestion	2E-05	3E-05		
	Fugitive Dust Inhalation	2E-08	3E-08		
	Dermal Exposure	2E-08	3E-06		
				2E-05	3E-05
Ephemeral Pool	Soil Ingestion	9E-06	3E-05		
	Fugitive Dust Inhalation	3E-08	8E-08		
	Dermal Exposure	1E-05	3E-05		
				2E-05	6E-05
Horn Rapids Landfill	Soil Ingestion	2E-05	8E-05		
	Fugitive Dust Inhalation	2E-08	3E-05		
	Dermal Exposure	3E-05	8E-05		
				5E-05	2E-04

Table 6-2. Comparison of the Baseline Residential Scenario Risk Assessment Results using the Maximum Contaminant Concentrations and 95% UCL for UN-1100-6, the Ephemeral Pool, and the Horn Rapids Landfill.

Subunit	Pathway	95% UCL Pathway Totals		Maximum Concentration Pathway Totals		95% UCL Subunit Totals		Maximum Concentration Subunit Totals	
		HI[a]	ICR[b]	HI[a]	ICR[b]	HI[a]	ICR[b]	HI[a]	ICR[b]
UN-1100-6	Soil Ingestion	3.0	4E-04	4.7	6E-04				
	Fugitive Dust Inhalation	-	5E-08	-	7E-08				
	Dermal Exposure	0.5	5E-05	0.7	8E-05				
	Garden Produce	15	2E-03	18	2E-03				
						18	2E-03	23	3E-03
Ephemeral Pool	Soil Ingestion	0.1	2E-04	0.2	5E-04				
	Fugitive Dust Inhalation	-	8E-08	-	2E-07				
	Dermal Exposure	0.2	2E-04	0.2	7E-04				
	Garden Produce	2.2	8E-04	3.2	2E-03				
						2.5	1E-03	3.6	3E-03
Horn Rapids Landfill	Soil Ingestion	0.08	5E-04	1	1E-03				
	Fugitive Dust Inhalation	-	4E-06	-	8E-05				
	Dermal Exposure	0.001	8E-04	0.02	2E-03				
	Garden Produce	0.3	2E-03	3.8	4E-03				
	Groundwater Ingestion	0.8	1E-05	1	1E-05				
	Inhalation of Volatiles from Groundwater	-	2E-05	-	3E-05				
						1.2	3E-03	5.8	7E-03

[a]Hazard Index
[b]Lifetime Incremental Cancer Risk
UCL Upper Confidence Limit
- Indicates not applicable

Consistent with the BISRA, the air inhalation pathway assumes exposure to contaminated dust directly at each subunit. The EPA FDM is used to estimate concentrations of airborne particulates at a site based on conservative estimations of soil and climatic conditions. Chromium present in the soil at HRL is the only contaminant that may be associated with risks greater than 1E-06. However, all chromium is assumed to be chromium(VI) which is a very conservative assumption as discussed in chapter 5, paragraph 5.4.

The EPA also directed that potential exposures through pathways associated with use of groundwater at HRL should be evaluated in the BRSRA. The evaluation of nitrate in the groundwater indicates a HQ of 0.8, if wells with nitrate detected over the MCL are evaluated, or a HQ of 1 if the maximum concentration of nitrate is evaluated for potential exposures through ingestion of groundwater. A HQ of unity indicates that there is a potential for adverse health effects. Because of the conservative assumptions used in the evaluation, however, the estimate of a HQ of 1 may be an overestimation of the actual hazard. Trichloroethane is present in the groundwater at concentrations that are estimated to have a ICR of 3E-05 (based on 95-percent UCL) or 4E-05 (based on maximum concentration) if lifetime exposures were to occur through ingestion of groundwater and inhalation of volatiles from groundwater use in the home.

Of the COPC specified, three are classified as volatile contaminants that would generally be evaluated via the inhalation of volatiles from soil. These are tetrachloroethane, trichloroethane, and 1,1,1-trichloroethane. Although the inhalation of volatile contaminants from soil was suggested as a potential exposure pathway. EPA directed [Einan, 1992 (see appendix I)] indicated that data generated from soil gas surveys should not be used in risk assessment. Because the majority of the volatile COPC from the specified subunits have only been detected in soil gas the potential exposures and associated risks are not quantitatively evaluated in the BRSRA. The volatilization of contaminants from soil is qualitatively addressed in chapter 5, paragraph 5.4.

Lead exposures, as directed by EPA [Einan, 1991 and Einan, 1992 (see appendix A)] are evaluated using the UBK model. The UBK model predicts blood-lead levels in children from potential exposure to lead through soil ingestion, dust inhalation, and dietary exposures. Lead exposures are evaluated at the 1100-3 subunit and HRL.

Recreational pathways associated with the Columbia River are also evaluated in the BRSRA. The two pathways considered are the dermal contact with potentially contaminated water through swimming and the ingestion of fish caught from the Columbia River.

Other pathways may also occur that have not been evaluated in the BRSRA, however, the potentially dominant risk driving pathways and those routinely evaluated for residential scenarios are included.

Given the above considerations, the BRSRA identifies and evaluates the contaminants that are most likely to pose a potential human health risk if residential use of the subunits

were to occur. The COPC that pose a potential for noncarcinogenic systemic toxic effects (*i.e.*, HQ > 1) or ICR of >1E-06 for each subunit are discussed below.

6.4 1100-1 SUBUNIT

6.4.1 BISRA

Arsenic and vanadium are the COPC at this subunit. The HI (0.008) and total ICR (4E-07) do not exceed unity or 1E-06, respectively, for the subunit. Consequently, potential worker exposures to the maximum detected COPC would not be likely to result in adverse health effects.

6.4.2 BRSRA

(Does not Apply)

6.5 1100-2 SUBUNIT

6.5.1 BISRA

Chromium is the only contaminant of potential concern at this subunit. The HI (0.001) and the total ICR (1E-07), for the subunit do not exceed unity or 1E-06, respectively. Consequently, potential worker exposures to the maximum detected concentration of chromium would not be likely to result in adverse health effects.

6.5.2 BRSRA

Tetrachloroethane is the only contaminant of potential concern at this subunit. Residential exposure to the concentrations of tetrachloroethane detected at this subunit are not likely to result in adverse health effects. The subunit HI for the exposure pathways evaluated is 0.00003 and the ICR is 7E-09 (table 5-1). Based on the BRSRA, no contaminants of concern are identified at 1100-2.

6.6 1100-3 SUBUNIT

6.6.1 BISRA

The contaminant of potential concern at the 1100-3 subunit is chromium. The HI (0.0008) and total ICR (8E-08) for this subunit do not exceed unity or 1E-06, respectively.

Therefore, adverse systemic health effects are not likely for industrial workers exposed to the maximum concentration of contaminants detected at this subunit.

6.6.2 BRSRA

Arsenic, chromium, and lead are the COPC at this subunit. The ICR for exposure to arsenic at this subunit is 9E-06, primarily due to the potential ingestion of arsenic-contaminated soil. This estimate, however, includes the contribution of potential risk from the background concentration of arsenic in the soil. The ICR for the inhalation of fugitive dust containing chromium is less than 1E-06. All individual HQ's and the HI for the subunit are less than unity.

An evaluation of lead using the UBK model indicates that children exposed to lead in the soil and ingestion of garden produce potentially contaminated with lead will not result in blood-lead levels that exceed the currently recommended level of concern.

Based on this BRSRA, arsenic is the only possible contaminant of concern for the 1100-3 subunit. The ingestion of soil is the exposure pathway associated with the greatest estimated risk. However, the background concentration of arsenic normally present in soil is included in the risk estimate and may contribute significantly to the overall ICR.

6.7 1100-4 SUBUNIT

6.7.1 BISRA

Arsenic and beryllium are the only two COPC identified at the 1100-4 subunit. The HI (0.006) for this subunit is less than unity. Therefore, adverse systemic health effects are not likely for industrial workers exposed to the maximum concentration of contaminants detected at this subunit.

Although individual contaminant ICR's are all negligible (*i.e.*, $<$1E-06), the soil ingestion pathway and subsequently the subunit-specific ICR is 1E-06. However, because the site of the subunit is located inside a building and under a cement floor, this risk estimate is considered to be an overestimation of actual risk. Hence, potential worker exposure to the maximum detected concentrations of contaminants are not likely to result in any adverse health effects.

6.7.2 BRSRA

(Does not Apply)

6.8 UN-1100-6 SUBUNIT

6.8.1 BISRA

BEHP, chlordane, and heptachlor are the COPC at this subunit. The HI (0.4) for this subunit is less than unity. Therefore, adverse systemic health effects are not likely for industrial workers exposed to the maximum concentration of contaminants detected at this subunit.

BEHP is the only COPC associated with ICR's greater than 1E-06. The ICR's for BEHP for the soil ingestion pathway, the fugitive dust pathway, and the dermal exposure pathway are 3E-05, 3E-08, and 3E-06, respectively, with a total ICR of 3E-05. Therefore, BEHP is the only contaminant of concern identified at the UN-1100-6 subunit.

An estimation of the ICR's for BEHP and chloride using the 95-percent UCL indicates no significant difference when compared to the ICR's estimated for the maximum detected concentrations. The ICR's for BEHP based on the 95-percent UCL for the soil ingestion pathway, the fugitive dust pathway, and the dermal exposure pathway are 2E-05, 2E-08, and 2E-06, respectively. The ICR's for chlordane based on the 95-percent UCL for the soil ingestion pathway, the fugitive dust pathway, and the dermal exposure pathway are 2E-07, 2E-10, and 2E-07, respectively. The total ICR for UN-1100-6 subunit is 3E-05 based on the maximum detected concentration, and 2E-05, based on the 95-percent UCL (see table 6-1).

6.8.2 BRSRA

The evaluation of potential exposures to BEHP and chlordane present in the soil at this subunit are associated with risks greater than 1E-06. The subunit HI for all pathways (table 6-1) is 23 (based on maximum contaminant concentrations) or 18 (based on the 95-percent UCL) indicating the potential for adverse systemic health effects in individuals that may ingest the soil from the site or eat produce grown at the site.

The subunit ICR is 3E-03 based on the maximum contaminant concentration and 2E-03 based on the 95-percent UCL. As with the HI, the potential ingestion of garden produce contributes the majority of the risk. Because of the conservative assumptions used in deriving the SF's and the conservative assumptions utilized in estimating the uptake of BEHP by plants, the actual risk may be less than the estimated risk.

The contaminants of concern at this subunit are:

Noncarcinogenic Effects:

- BEHP - Soil ingestion, Garden Produce Pathway
- Chlordane - Garden Produce Pathway

Carcinogenic Effects:

- BEHP - Soil ingestion, Dermal Exposure, Garden Produce Pathway
- Chlordane - Soil Ingestion, Dermal Exposure, Garden Produce Pathway

6.9 EPHEMERAL POOL

6.9.1 BISRA

Chlordane, heptachlor, and PCB's are COPC at the Ephemeral Pool. The estimated HI (= 0.03) for this subunit is less than unity. Therefore, adverse systemic health effects are not likely for industrial workers exposed to the maximum concentration of contaminants detected at this subunit.

PCB's are the only contaminant of potential concern associated with ICR's greater than 1E-06. The ICR's for PCB's are 3E-05, 8E-08, and 3E-05 for the soil ingestion pathway, the fugitive dust inhalation pathway, and the dermal exposure pathway, respectively, with a total subunit ICR of 3E-05 based on all COPC evaluated using the maximum contaminant concentrations.

An estimation of the ICR's for PCB's using the 95-percent UCL indicates similar results when compared to the ICR's estimated for the maximum detected concentrations. The ICR's for PCB's based on the 95-percent UCL for the soil ingestion pathway, the fugitive dust pathway, and the dermal exposure pathway are 9E-06, 3E-08, and 1E-05, respectively, with a total subunit ICR of 2E-05 (see table 6-1). Therefore, PCB's are the only contaminant of concern for the Ephemeral Pool.

6.9.2 BRSRA

Chlordane and PCB's are the COPC at this subunit. The subunit total HI is 3.6 (maximum contaminant concentration) or 2.5 (95-percent UCL concentration), related primarily to potential exposures to chlordane through the garden produce pathway. PCB's are not quantitatively evaluated for systemic toxic effects through the ingestion pathway because there are no published toxicity values for noncarcinogenic effects.

The subunit ICR is 3E-03 based on the maximum contaminant concentration and 1E-03 based on the 95-percent UCL. In both cases the risk is primarily due to the potential ingestion of PCB's through the garden produce pathway. Both chlordane and PCB's are contaminants of concern for this subunit as summarized below:

Noncarcinogenic Effects:

- Chlordane - Garden Produce Pathway

Carcinogenic Effects:

- Chlordane - Soil Ingestion, Dermal Exposure, Garden Produce Pathway
- PCB's - Soil ingestion, Dermal Exposure, Garden Produce Pathway

6.10 HRL

Fourteen COPC have been identified at HRL. The subunit HI for all pathways is (0.2) less than unity. Therefore, adverse systemic toxic effects are not likely based on the assumptions and maximum detected concentrations evaluated for the subunit.

The following are COPC with individual pathway ICR's that exceeded 1E-06 based on maximum detected contaminant concentrations, and therefore may be associated with adverse carcinogenic effects:

- Chromium - Fugitive Dust Inhalation
- PCB's - Soil Ingestion, Dermal Exposure

The inhalation of fugitive dust is associated with the greatest ICR, with a pathway ICR of 3E-05 associated primarily with chromium at the maximum detected concentration. The assumption that the entire landfill is uniformly contaminated with the maximum concentration of chromium detected and that all chromium is chromium(VI) results in an overestimation of actual risk. When chromium is evaluated using a conservatively biased 95-percent UCL based on the area where the highest concentrations of chromium were detected, the ICR is estimated as 2E-06 (see table 5-10). This risk estimate, however, would overestimate actual risks for most of the landfill.

PCB's are associated with the greatest risks for the soil ingestion pathway and the dermal exposure pathway, with pathway ICR's of 6E-05 and 8E-05, respectively, at the maximum detected concentrations. When evaluating the potential risks for PCB's based on a 95-percent UCL determined from the areas of greatest PCB detection, the estimated ICR's for the soil ingestion and dermal contact pathways are reduced by approximately a third, although they still exceed 1E-06.

Therefore, chromium and PCB's are the only contaminants of concern identified at HRL.

6.10.1 BRSRA

The subunit HI for all pathways evaluated at HRL is 5.6 based on the maximum detected contaminant concentration and 1.2 based on the 95-percent UCL. The total ICR for the subunit is 7E-03 based on the maximum detected concentration and 3E-03 for 95-percent UCL. The COPC identified at this subunit are:

Noncarcinogenic Effects:

- Nitrate - Groundwater Ingestion (however, nitrate would not be considered a contaminant of concern based on the 95-percent UCL contaminant concentration).

Carcinogenic Effects:

- Arsenic - Soil Ingestion
- Beryllium - Soil Ingestion, garden produce
- PCB's - Soil Ingestion, Dermal Exposure, Garden Produce Pathway
- Trichloroethane - Groundwater ingestion
- Chromium - Fugitive Dust Inhalation

6.11 RESIDENTIAL-RELATED RECREATIONAL PATHWAYS

As indicated in table 5-6, it is unlikely that adverse effects from exposure to trichloroethane would occur in residents who may swim in the Columbia River or ingest fish caught in the Columbia River. As discussed in chapter 3, trichloroethane may migrate to the river via the groundwater. The ICR's for both potential exposures are estimated as less than 4E-10.

6.12 SUMMARY

6.12.1 BISRA

The contaminants of concern for the individual subunits in the 1100-EM-1 Operable Unit as determined in this BISRA are:

- UN-1100-6 subunit
  BEHP

- Ephemeral Pool
  PCB's

- HRL
  Chromium
  PCB's

As discussed above, this list does not consider background conditions, and has been developed based on conservative industrial exposure parameters. The list of contaminants of concern assume that current land and water use for the 1100 Area will remain the same in the future and that onsite industrial workers are the primary receptors.

6.12.2 BRSRA

The contaminants of concern for the individual subunits in the 1100-EM-1 Operable Unit, based on this BRSRA, are:

- 1100-3

  Arsenic

- UN-1100-6 subunit

  BEHP
  Chlordane

- Ephemeral Pool

  Chlordane
  PCB's

- HRL

  Arsenic
  Beryllium
  Chromium
  Nitrate
  PCB's
  Trichloroethane

The BRSRA has been conducted at the direction of EPA. It should be noted that the residential use of any of the subunits at the 1100-EM-1 Operable Unit in the foreseeable future is improbable. The 1100-EM-1 Operable Unit is located in an area designated for industrial or commercial use, as zoned by the city of Richland. The subunits themselves are located immediately adjacent to actively used industrial sites such as the 1171 Building, railroad tracks, or parking lots. For HRL, it is also extremely unlikely that homes would be built immediately adjacent to the subunit, based on current regulations in the state of Washington. Consequently, the onsite residential exposure pathways that have been evaluated are not probable. As a result, the estimated risks presented in the BRSRA are very conservative estimates based on an unlikely scenario.

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APPENDIXES

I Letters and Memoranda

II Toxicity Profiles

III Risk Assessment Calculations

IV Statistical Information

V Uptake/Biokinetic Model for Lead

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APPENDIX I

LETTERS AND MEMORANDA

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ATTACHMENT 1

United States
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Region 10
Hanford Project Office
712 Swift Boulevard, Suite 5
Richland WA 99352

EPA

May 30, 1991

Robert K. Stewart
Unit Manager
U.S. Department of Energy
P.O. Box 550, A6-95
Richland, Washington 99352

Re: 1100-EM-1 Remedial Investigation

Dear Mr. Stewart:

This letter has several purposes. First, the enclosure to this letter should provide the clarifications requested by the U.S. Department of Energy (DOE) on February 28, 1991 (Ref: Letter, S. Wisness to P. Day).

Secondly, due to other commitments (e.g. Tri-Party Agreement negotiations) and internal communication problems, combined EPA and Ecology comments on the "Remedial Investigation Phase 2 Supplemental Work Plan for the Hanford Site 1100-EM-1 Operable Unit" and the "Phase I and II Feasibility Study Report for the Hanford Site 1100-EM-1 Operable Unit" will be delayed by not more than 30 days. I expect to send any comments on the above documents by June 28, 1991.

Finally, in response to the April 26, 1991 letter from Mr. Wisness to Mr. Day, I understand and agree that interim milestones M-15-01B (November 1991) and M-15-01C (April 1992) are in jeopardy. I will work with you to develop an aggressive and attainable schedule upon which to develop a change package.

If you have any questions, please call me at 376-3883.

Sincerely,

David R. Einan
Unit Manager

cc: R. Hibbard, Ecology
J. Stewart, USACE
T. Veneziano, WHC
Administrative Record (1100-EM-1)

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CLARIFICATION OF 1100-EM-1 REMEDIAL INVESTIGATION ISSUES RAISED BY U.S. DEPARTMENT OF ENERGY

May 24, 1991

1. Identification of land areas for agricultural/residential land use exposure scenarios

The 1100-EM-1 subunits that should be included in the evaluation of risk from residential exposures for the baseline risk assessment are shown in Table 1. The rationale for including or excluding each subunit is also presented in Table 1.

The quantitative risk assessment of a residential scenario will provide risk estimates that are protective of agricultural health threats because an exposure pathway including homegrown vegetables and fruits is required. Agricultural scenarios do not need to be included in the baseline risk assessment. In addition, the health risk to agricultural workers is adequately addressed in the industrial scenario as provided in the baseline risk assessment (U.S. DOE, 1990).

2. Residential exposure scenario for the 1100-EM-1 baseline risk assessment

A residence should be located directly adjacent to each subunit. For the Horn Rapids Landfill, the residence should be placed near monitoring well MW-12.

Receptor populations should include typical populations such as children, adults, and the elderly.

Table 2 shows each subunit with its associated contaminants, exposure medium, and exposure routes. The information presented in Table 2 assumes that exposure to contaminants includes the following pathways: inhalation of vapors and particulates, accidental ingestion of soil, ingestion of homegrown vegetables and fruits, ingestion of drinking water, dermal contact with potable water, inhalation of vapors during showering, and dermal contact with soil.

The existing data are sufficient for performing residential risk assessments for the subunits listed in Table 1. All subunits should address exposure pathways related to contaminated soil. The Horn Rapids Landfill, however, should also address exposure pathways related to groundwater. Potential groundwater health threats will be assessed for the other subunits in the Phase 2 remedial investigation if the data support the need to do so.

It is appropriate to present the residential risk assessment in the baseline risk assessment uncertainty section.

3. Reasonable maximum exposure

A table summarizing exposure parameters used, references for those parameters, and rationales for using each parameter should be included as part of the baseline risk assessment.

Example calculations for one contaminant in each pathway should be provided in an appendix. The appendix should include generic equations as well as example calculations.

Reasonable maximum exposure parameters as outlined in Region 10 guidance (U.S. EPA, 1990a) should be used. If Region 10 guidance for a particular parameter is not published or established, then reasonable maximum exposure parameters as provided by U.S. Environmental Protection Agency (EPA) headquarters (1989) should be used. If U.S. EPA guidance is not available, then exposure parameters found in open literature or developed using professional judgment should be used.

4. Toxicity screening

The preliminary toxicity screening first compares contaminant concentrations to background, then to calculated toxicity screening criteria. The first step is acceptable. The second step may eliminate chemicals that individually may not pose a health risk, but cumulatively might pose health risks. Not enough information is provided by U.S. Department of Energy (U.S. DOE) (1990) to determine this. A table summarizing critical effects for all potential contaminants of concern before implementing the screening should have been provided in the Phase 1 remedial investigation report. Therefore, the acceptability of the screening method cannot be determined at this time.

Based on available information, the preliminary toxicity screening contains the following technical flaws:

- It appears that the screening criteria for lead is an applicable or relevant and appropriate requirement (ARAR). It is not appropriate for screening purposes to use an ARAR. Therefore, lead should be included in the baseline risk assessment.

- The use of the Occupational Safety and Health Administration's permissible exposure limit for polynuclear aromatic hydrocarbons (PAHs) as the surrogate residential exposure limit development is not appropriate. U.S. EPA (1990b) recommends that critical toxicity values for benzo(a)pyrene be used in the absence of critical toxicity values for PAHs. However, because the sampled PAH level exceeds the surrogate residential exposure limit screening criterion, and PAHs were not eliminated from the risk assessment at that point, it is not necessary to develop a new preliminary toxicity screening criterion for PAHs based on benzo(a)pyrene information. In the future, the critical toxicity values for benzo(a)pyrene should be used for developing a PAH toxicity screening criterion.

TABLE 1
RATIONALE FOR INCLUDING 1100-EM-1 SUBUNITS
RESIDENTIAL SCENARIO RISK ASSESSMENT

Subunit	Decision to Include	Rationale
Battery Acid Pit (1100-1)	No	The lead found in soil samples is most likely associated with backfill materials. The arsenic levels are not significantly elevated above background levels.
Paint and Solvent Pit (1100-2)	Yes	Significant levels of tetrachloroethene was found in soil. (Tetrachloroethene may also pose a groundwater health threat, but inclusion in the risk assessment will be based on Phase 2 RI results.)
Antifreeze and Degreaser Pit (1100-3)	Yes	Significant levels of lead, arsenic, and chromium were found in surface soil. (Chromium may pose a groundwater health threat, but inclusion in the risk assessment will be based on Phase 2 RI results.)
Antifreeze Tank Site (1100-4)	No	The tank has been removed and the subunit is located in a building. (Alpha and beta radiation may pose groundwater health threats, but inclusion in the risk assessment will be based on Phase 2 RI results.)
Radiation Contamination Incident (UN-1100-5)	No	Contamination no longer exists.

TABLE 1
RATIONALE FOR INCLUDING 1100-EM-1 SUBUNITS
RESIDENTIAL SCENARIO RISK ASSESSMENT
(Continued)

Subunit	Decision to Include	Rationale
Discolored Soil Site (UN-1100-6)	Yes	Significant levels of BEHP and chlordane were found in surface soil. (1,1,1-trichloroethane may pose a health threat in groundwater, but inclusion in the risk assessment will be based upon Phase 2 RI results.)
Horn Rapids Landfill	Yes	Significant levels of arsenic, chromium, lead, PCBs, tetrachloroethene, trichloroethene, and 1,1,1-trichloroethane were found in soil. Trichloroethane was found in groundwater. (Tetrachloroethene and 1,1,1-trichloroethane may pose groundwater health threats, but inclusion in the risk assessment will be based on Phase 2 RI results.)
Pit 1	No	Pit 1 is an operational gravel pit.
Ephemeral Pool	Yes	Significant levels of PCB and chlordane were found in surface soil.

Definitions:

RI = Remedial Investigation
BEHP = Bis(2-ethylhexyl)phthalate
PCB = Polychlorinated biphenyl

TABLE 2
EXPOSURE MEDIA AND EXPOSURE ROUTES FOR 1100-EM-1
RISK ASSESSMENT RESIDENTIAL SCENARIO

Subunit	Contaminants of Concern	Exposure Medium	Exposure Route IHL	ING	D
Paint and Solvent Pit (1100-2)	Tetrachloroethene	Soil	C		
Antifreeze and Degreaser Pit (1100-3)	Arsenic	Soil	C,S	C,S	C,S
	Chromium	Soil	C	S	S
	Lead	Soil	S	S	
Discolored Soil Site (UN-1100-6)	BEHP	Soil	C	C,S	C,S
	Chlordane	Soil		C,S	C,S
Horn Rapids Landfill	Arsenic	Soil	C,S	C,S	C,S
	Chromium	Soil	C	S	S
	PCB	Soil	C	C	C
	Tetrachloroethene	Soil	C		
	Trichloroethene	Soil	C		
		Groundwater	C	C	
	1,1,1-Trichloroethane	Soil	S		
	Lead	Soil	S	S	
Ephemeral Pool	Chlordane	Soil		C,S	C,S
	PCB	Soil		C	C

Definitions:

IHL = Inhalation
ING = Ingestion
D = Dermal
C = Exhibits carcinogenic effects in exposure route indicated
S = Exhibits systemic noncarcinogenic effects in exposure route indicated
BEHP = Bis(2-ethylhexyl)phthalate
PCB = Polychlorinated biphenyl

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REFERENCES

U.S. DOE, August 1990. Phase 1 Remedial Investigation Report for the Hanford Site 1100-EM-1 Operable Unit. U.S. Department of Energy, Richland, WA.

U.S. EPA, December 1989. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A), Interim Final. EPA/540/1-89/002. U.S. Environmental Protection Agency, Washington, DC.

U.S. EPA, January 1990. Statement of Work RI/FS Risk Assessment Deliverables. U.S. Environmental Protection Agency, Region 10, Seattle, WA.

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United States
Environmental Protection
Agency

Region 10
Hanford Project Office
712 Swift Boulevard, Suite 5
Richland WA 99352

EPA

January 16, 1992

Robert K. Stewart
Unit Manager
U.S. Department of Energy
P.O. Box 550, A5-19
Richland, Washington 99352

Re: 1100-EM-1 Risk Assessment

Enclosed please find the additional clarifications requested by the U.S. Department of Energy in regards to the above subject. These clarifications were also informally transmitted to you by cc:Mail. Also transmitted informally was a copy of a Groundwater Risk Assessment for Hanford 1100-EM-1 Operable Unit, Richland, Washington prepared for the U.S. Environmental Protection Agency (EPA) by PRC Environmental Management, Inc. This document is provided to you for information, especially as an example for formatting the revised baseline risk assessment for 1100-EM-1.

If you have any questions, please call me at (509) 376-3883.

Sincerely

David R. Einan
Unit Manager

cc: D. Lacombe, PRC
R. Hibbard, Ecology (w/ Risk Assessment)
W. Greenwald, USACE
Administrative Record, 1100-EM-1

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ATTACHMENT 2

1100-EM-1 ON-SITE RESIDENTIAL BASELINE RISK ASSESSMENT ISSUES

What is the role of the Hanford Site Baseline Risk Assessment Methodology (DOE-RL-91-45)? If the residential scenario from DOE-RL-91-45 is used, we should have EPA specify which pathways will be evaluated at each operable subunit.

EPA RESPONSE

The 1100-EM-1 residential risk assessment should use the residential scenario and associated pathways presented in the Hanford Site Baseline Risk Assessment Methodology (DOE 1991).

The residential scenario should be used for the 1100-EM-1 operable unit. The residential scenario was originally chosen because 1) it is the most conservative, 2) residences are in close proximity, and 3) industrial zoning is not a permanent remedial solution. In addition, an agricultural worker scenario was not requested because the remedial investigation report (DOE 1990) dealt sufficiently with that type of risk.

Although the agricultural scenario as defined in DOE (1991) is the most conservative, an agricultural scenario does not need to be considered at this time because farm dwellings are not the typical residences in the immediate area.

1. GROUNDWATER QUESTIONS:

According to the May 30, 1991, EPA letter, the only groundwater contaminant to be evaluated under an on-site residential scenario is trichloroethene (TCE) at the Horn Rapids Landfill with a residence and water supply well located at MW-12.

a. Will we be considering other potential groundwater contaminants at the Horn Rapids Landfill? At least two additional rounds of groundwater monitoring data are now available. When this information is evaluated it may identify other contaminants of potential concern or may confirm that TCE is not a contaminant of potential concern attributable to the landfill.

b. Do we consider groundwater contaminants related to Siemens/ANF activities? This would be especially important for radionuclides, nitrates, and TCE. If specific radioactive isotopes are not yet available from the sampling, it may be prudent to defer evaluation of such substances until the Phase II

RI rather than make too many conservative assumptions at this time.

c. Do we assume groundwater use despite the fact that city service exists to industrial, commercial, and residential areas in the vicinity of 1100-EM-1?

d. There is a conflict between State law and the suggested location of the residence with respect to the Horn Rapids Landfill. Do we assume the presence of a drinking water well even though WAC 173-160-205(2) does not permit location of such a well within 1000 feet of solid waste landfills? A possibility may be that the site of the potential residence is moved at least 1000 feet from the landfill thus limiting the potential contact with Horn Rapids Landfill contamination by other pathways.

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EPA RESPONSE TO ITEM 1

a. The additional rounds of groundwater data should be evaluated. If the data indicate that contaminants other than trichloroethene are of concern (e.g. nitrate), those contaminants should be included in the risk assessment.

b. The risk assessment should consider contaminants related to Siemens/ANF activities because the issue is to understand the potential human health and environmental risks posed by the 1100-EM-1 operable unit irrespective of the original contaminant source. The risk assessment should focus only on chemical contaminants until adequate data is available for radionuclides.

c. The risk assessment should assume groundwater use.

d. The risk assessment should assume a drinking water well is located adjacent to the Horn Rapids Landfill. For an intrusion scenario, 1000 feet will not make much of a difference.

2. EXPOSURE PATHWAYS:

a. Are the residential exposure pathways only those outlined in Section 2, p. 1 of the May 30 letter? Should potential contamination of City of Richland water from groundwater reaching the Columbia River be considered? Where are the activities occurring for the pathways? (e.g., see 4a. and 5a. below)

b. Given the size of the landfill, the restricted area, and the distribution of the potential contaminants, what specific

assumptions should be made regarding access to the landfill by the assumed family located in the residence near the landfill (e.g., if the residence is located at MW-12)?

EPA RESPONSE TO ITEM 2

a. The risk assessment should include the exposure pathways as outlined in EPA (1991a), Section 2, page 1. In addition, the risk assessment should include additional contaminants or exposure pathways if new data indicate the need to do so.

   The risk assessment should consider the impact of groundwater on the Columbia River and the city of Richland well field.

b. Unrestricted access to the landfill should be assumed in the risk assessment because closure cannot be assumed at this time.

3. TOXICITY VALUES:

a. Should we assume that all toxicity values be updated to current values?

b. What RFD and slope factor should be used for lead?

EPA RESPONSE TO ITEM 3

a. Current toxicity values from the Integrated Risk Information System (IRIS) or the Health Effects Summary Tables (HEAST) should be used in the risk assessment.

b. Since no reference dose or slope factor is available for lead, the risk assessment should use the EPA Uptake/Biokinetic Model for determining site-specific risks from exposure to lead (EPA 1991b,c). The model predicts blood lead levels in the most sensitive population (children) via inhalation or ingestion.

4. EXPOSURE PARAMETERS:

What exposure parameters should be used? The May 30, 1991, letter recommends outdated reasonable maximum exposure parameters and does not consider new national standard default exposure parameters recommended in OSWER Directive 9285.6-03, March 25,

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1991. In addition, Region-10 now recommends new parameters in the EPA Region 10 Supplemental Risk Assessment Guidance for Superfund, August 16, 1991.

EPA RESPONSE TO ITEM 4

Current exposure parameters as specified by EPA headquarters or Region 10 should be used in the risk assessment.

5. HOME GROWN FRUITS AND VEGETABLES:

a. Where should gardens be located? Are supposed on-site residences to be placed directly adjacent to the subunits? Are the gardens on the subunits? Since some subunits are small, could all of the subunit be garden thus limiting any regular child exposure to the dirt?

b. What specific fruits and vegetables should be evaluated?

c. What bioaccumulation factors should be used?

EPA RESPONSE TO ITEM 5

a. Dwellings should be located adjacent to the subunit.

The Exposure Factors Handbook (EPA 1990) gives the median size of a vegetable garden as 325 square feet (approximately 18 feet by 18 feet). Therefore, assume gardens are also located adjacent to the subunit.

Even if the entire subunit is garden, a child's exposure would not be limited because a garden is not an impermeable cover.

b,c. The following strategy is presented for the selection of fruits and vegetables:

- Three plant categories should be included in the risk assessment: root, fruit, and leafy vegetable.
- The bioaccumulation factor for the contaminants of concern should be determined for the three categories listed above.
- At least one plant from each category should be included in the risk assessment. Additional

plants may be included based on information obtained from Pao, et al. (1982) or other informational sources.

The references below may be useful in locating bioaccumulation factors:

- A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides Through Agriculture. C.F. Base, R.D. Sharp, A.L. Sjoreen, and R.W. Shore. ORNL-5786. Oak Ridge National Laboratory. 1984.

- Bioconcentration of Organics in Beef, Milk, and Vegetation. 1988. C.C. Travis and A.D. Arms. Environmental Science and Technology 22: 271-274.

6. CONTAMINANT CONCENTRATIONS:

a. Will the residential scenario consider Model Toxics Control Act definition of surface soils as a depth of 15 ft?

b. Additional soil gas data are available for Horn Rapids Landfill, UN-1100-6, and the South Pit. Should these data be incorporated in the on-site residential risk assessment?

c. Additional soil data are available for Horn Rapids Landfill and the Ephemeral Pool. Should these data be incorporated?

EPA RESPONSE TO ITEM 6

a. The residential scenario should consider the Model Toxics Control Act (Ecology 1991) definition of surface soils as a depth of 15 feet inasmuch as the risk assessment needs to consider accessible soil contaminant concentrations. If it is determined that the site needs cleanup to residential levels, then the surface soil depth of 15 feet should be used in the calculation of cleanup levels.

b. Soil gas surveys are used for field screening. Data generated from soil gas surveys should not be used in the risk assessment.

c. Any available soil data should be evaluated. If the data indicate contaminants are of concern, those contaminants should be included in the risk assessment.

7. TIME OF FUTURE SCENARIO:

When should the residential scenario be applied, (i.e., now, 30 years in the future, etc.)?

EPA RESPONSE TO ITEM 7

- For the purposes of the "residence" located adjacent to the Horn Rapids Landfill, the time period should be now, i.e. use the concentrations found in the well.

REFERENCES

DOE 1990. Phase 1 Remedial Investigation Report for the Hanford Site 1100-EM-1 Operable Unit. DOE/RL-90-18. August 1990. U.S. Department of Energy.

DOE 1991. Hanford Site Baseline Risk Assessment Methodology. Decisional Draft. DOE/RL-91-45. September 1991. U.S. Department of Energy.

Ecology 1991. The Model Toxics Control Act Cleanup Regulations. Chapter 173-340 WAC. Department of Ecology. February 28, 1991.

EPA 1990. Exposure Factors Handbook. EPA 600/8-89/043. U.S. Environmental Protection Agency. March 1990.

EPA 1991a. 1100-EM-1 Remedial Investigation. Letter from Dave Einan, U.S. Environmental Protection Agency. May 30, 1991.

EPA 1991b. Update on OSWER Soil Lead Cleanup Guidance. Office of Solid Waste and Emergency Response. August 29, 1991. U.S. Environmental Protection Agency.

EPA 1991c. User's Guide for Lead: A PC Software Application of the Uptake/Biokinetic Model Version 0.50, First Draft. Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment, U.S. Environmental Protection Agency. January 1991.

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DOE/RL-92-67

Department of Energy
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OCT 30 1991

91-ERB-202

Mr. Paul T. Day
Hanford Project Manager
U. S. Environmental Protection Agency
712 Swift Boulevard, Suite 5
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Mr. Timothy L. Nord
Hanford Project Manager
State of Washington
Department of Ecology
Mail Stop PV-11
Olympia Washington 99504-8711

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Dear Messrs. Day and Nord:

LAND USE/RISK ASSESSMENT FOR THE 1100-EM-1 OPERABLE UNIT (OU)

The purpose of this letter is to inform you that the DOE Field Office, Richland (RL), will comply with direction as provided by your letters regarding a revised baseline risk assessment for the 1100-EM-1 OU as discussed with you earlier. Specifically, we will perform the required risk assessment that evaluates residential and agricultural scenarios as directed by the letter of January 23, 1991, from Mr. Dave Einan, U.S. Environmental Protection Agency (EPA) to Mr. Bob Stewart, RL and the follow-up clarifications contained in the May 30, 1991, letter from Mr. Einan to Mr. Stewart.

Whether to conduct a baseline risk assessment for the 1100-EM-1 OU using residential and agricultural scenarios has been a long term issue. RL continues to believe that neither residential nor agricultural use is reasonably likely in the areas within the OU. Further we do not believe that the risk assessment is necessary nor appropriate under applicable requirements of the National Contingency Plan or regulatory guidance.

Particularly troublesome aspects of the proposed risk assessment are the assumed exposure pathways for groundwater. Neither RL nor Siemens Nuclear Power Corporation (Siemens) believes that there is any reasonable expectation for either residential or agricultural use of the groundwater which may have been influenced by contamination from the Horn Rapids Landfill and/or Siemens. We continue to believe that the risk assessment contained in the completed Remedial Investigation (RI) Phase 1 Report used appropriate Reasonable Maximum Exposure (RME) assumptions.

Notwithstanding our position, to show good faith in providing the requested information and to get on with the scheduled RI/ Feasibility Study (FS), RL will perform a revised baseline risk assessment as discussed in the first paragraph of this letter. However, our agreement to proceed with this assessment is premised on the understanding that we have reached agreement with EPA and the State of Washington Department of Ecology (Ecology) on two points:

1. That RL's performance of a revised baseline risk assessment, which includes evaluation of residential and agricultural scenarios, shall not be viewed as a concession by RL or be used as any evidence that residential or agricultural use of the property or groundwater is reasonable or foreseeable; and

2. That RL has the right under the Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement) to take to dispute and to obtain dispute resolution of any future regulatory direction to evaluate or investigate remedial alternatives based on assumed residential or agricultural use of the property or groundwater.

Because the EPA has the lead responsibility for the 1100-EM-1 OU, we have discussed these two points with you. We understand that both EPA and Ecology are in agreement with RL. This letter confirms those discussions. If we have misunderstood in any way the agencies' views, please inform us in writing within ten days of the date of this letter.

RL has begun to work on the revised baseline risk assessment. It is expected that the work to perform this assessment can be accomplished in about two months. However, we have not evaluated factors associated with the slightly elevated alpha or beta contamination in the groundwater and this could modify the amount of time required. Work on the assessment for these scenarios will be completed without prejudice to RL's right to express reservations about the accuracy of the assessment and the sufficiency of available data to support a meaningful assessment.

We have discussed with you a proposed procedure to bring any dispute over land use in the 1100-EM-1 OU to early formal Dispute Resolution. We have agreed that RL will provide the revised baseline risk assessment to EPA/Ecology promptly upon its completion. In transmitting the assessment, RL will request regulatory direction regarding the land use scenario(s) on which to base remedial alternatives selection for inclusion in the FS. After you have received the assessment, we request a response to this request as quickly as practicable.

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Messrs. Day and Nord -3- OCT 30 1991
91-ERB-202

It is our understanding that neither EPA nor Ecology has determined that remedial alternatives must be based in whole or in part on the assumption of residential or agricultural use of the land or groundwater. Thus, a dispute over land use assumptions may not develop. However, if EPA directs RL to develop remedial alternatives based on assumed residential or agricultural use or uses of the property or groundwater, then we will immediately invoke the dispute resolution process under the Tri-Party Agreement for a resolution of the appropriate land use assumptions.

Regarding the land use issue as discussed in the May 30, 1991, letter from Mr. Einan to Mr. Stewart, two technical issues related to the baseline risk assessment were carried forward; i.e., calculation of RME and use of the Golder toxicity screening technique. It is our understanding that these issues have been satisfactorily resolved through informal discussions and exchanges of information among the Unit Managers and respective support contractors. If these issues have not been resolved to your satisfaction, please communicate such to Mr. Stewart.

Should you have any questions about this letter, please call Mr. Bob Stewart on (509) 376-6192.

Sincerely,

Steven H. Wisness
Hanford Project Manager

ERD:RKS

cc:
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L. Goldstein, Ecology
W. Greenwald, USACE
M. Harmon, EM-442
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J. Stewart, USACE
G. Welch, Siemens,
(Law Dept. Bellevue, WA)
T. Wintczak, WHC
S. Woodbury, EH-222
T. Veneziano/L. Powers, WHC
Administrative Record, 1100-EM-1,
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Script for Superfund Technical Support Center Questions
on
Tetrachloroethylene, Trichloroethylene and Styrene

Tetrachloroethylene (perchloroethylene, PERC)

The carcinogenicity characterization has a long history. A July 1985 Health Assessment Document for Tetrachloroethylene (Perchloroethylene), EPA # 600/8-82/005F, classified the agent in Weight-of-Evidence Group "C - Possible Human Carcinogen" mentioning that this would be reevaluated because of new information. The 1985 document also provided upper bound inhalation and oral risk estimates. An April 1987 Addendum to the Health Assessment Document, EPA# 600/8-82/005FA, proposed that the Weight-of-Evidence be upgraded to "B2 - Probable Human Carcinogen" and provided a revised inhalation risk estimate. A February 1991 document titled Response to Issues and Data Submissions on the Carcinogenicity of Tetrachloroethylene, EPA# 600/6-91/002A discussed newer data relative to weight-of-evidence classification. The Agency's Science Advisory Board has reviewed these documents finding them to be technically adequate while offering an opinion that the weight-of-evidence is on C-B2 continuum (C=Possible Human Carcinogen, B2=Probable Human Carcinogen). At present time, the Agency has not adopted a final position on the weight-of-evidence classification.

The upper bound risk estimates from the 1985 Health Assessment Document as amended by updated inhalation values from the 1987 Addendum have not as yet been verified by the IRIS-CRAVE Workgroup. The estimates are viewed as useful information in the context of the information available in the 1985-1987 period.

ORAL: 1985 HAD; Unit risk = 1.5E-6 per ug/L

Slope Factor = 5.2E-2 per mg/kg/day

INHALATION: 1987 Addendum; Unit risk = range form 2.9E-7 to 9.5E-7 with a geometric mean of 5.8E-7 per ug/cu.m

Slope factor = 2.0E-3 per mg/kg/day

Those needing to make a choice about carcinogenicity have found the 1985, 1987 and 1991 EPA documents and the 1988 and 1991 Science Advisory Board letters of advice useful background information. When the Agency makes a decision about weight-of-evidence, the CRAVE-IRIS verification will be completed and the information put on IRIS.

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Trichloroethylene (TCE)

The current phase of the carcinogenicity characterization for trichloroethylene started with a July 1985 Health Assessment Document for Trichloroethylene, EPA# 600/8-82/006F which classified trichloroethylene in Weight-of-Evidence Group "B2 - Probable Human Carcinogen". Inhalation and oral upper bound risk estimates were provided. This information was verified on IRIS from 3/87 through 7/89. A June 1987 Addendum to the Health Assessment Document for Trichloroethylene, EPA# 600/8-82/006FA proposed that the Weight-of-Evidence finding of "B2" was further supported by newly available animal bioassay data and offered a minor revision to the inhalation upper bound risk estimate. In 1988 the Agency's Science Advisory Board offered an opinion that the weight-of-evidence was on C-B2 continuum (C=Possible Human Carcinogen, B2=Probable Human Carcinogen). The Agency withdrew the IRIS carcinogenicity file in 7/89 and has not adopted a current position on the weight-of-evidence classification.

The quantitative risk estimates provided in the 1985 Health Assessment Document and 1987 Addendum have been reviewed by the IRIS-Crave Workgroup but are not verified as such pending resolution of the weight-of-evidence classification. The upper bound risk values in these documents are as follows:

ORAL: 1985 HAD; Unit Risk = 3.2E-7 per ug/L
Slope Factor = 1.1E-2 per mg/kg/day

INHALATION: 1987 Addendum; Unit Risk = 1.7E-6 per ug/cu.m.
Slope Factor = 6.0E-3 per mg/kg/day

When the Agency adopts a current position on weight-of-evidence classification, the trichloroethylene file will be reentered on IRIS.

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APPENDIX II

TOXICITY PROFILES

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1.0 TOXICITY PROFILES

The purpose of appendix II is to present toxicological information used in the BISRA and BRSRA. Tables II-1 and II-2 present toxicity values for all contaminants evaluated in chapter 2. This appendix provides toxicity profiles for potential contaminants of concern identified at the 1100-EM-1 Operable Unit and carried through the risk assessment. This information supplements information discussed in chapter 4.0. The categories of information include:

- General background information
- Exposure routes
- Acute toxicity
- Chronic toxicity
- Carcinogenicity
- Toxicity values and supporting information.

Data sources for the information provided in the appendix are from EPA documents and standard reference texts. These sources are:

- EPA Integrated Risk Information System (IRIS)
- EPA Health Effects Assessment Summary Tables (HEAST)
- SRC, Toxicological Profile for Individual Compounds, Agency for Toxic Substances and Disease Registry (ATSDR)
- Casarett and Doull's Toxicology, The Basic Science of Poisons (Amdur et al. 1991)
- Patty's Industrial Hygiene and Toxicology (Clayton and Clayton, 1981)
- Threshold Limit Values and Biological Exposure Indices
- 29 CFR 1910.1000
- Recommendations for Occupational Safety and Health Standards.

9312135

1.1 ANTIMONY

Elemental antimony does not exist naturally in the environment, but is found in small amounts as part of the earth's crust. Antimony has been detected in air, water and soil in varying concentrations. Soil concentrations are usually less than 1 μg/kg. Concentrations up to 2550 μg/kg have been found at antimony-processing sites. Antimony at these sites is strongly attached to the soil.

Exposure to antimony can occur through inhalation of antimony-containing particles, ingestion of antimony-containing soils, and ingestion of foodstuffs containing antimony. It is not known if contamination through dermal contact with antimony-containing soils is a route of exposure.

Table II-1. Summary of Noncarcinogenic Toxicity Information for Contaminants at the 1100-EM-1 Operable Unit. (sheet 1 of 3)

Contaminant	ORAL						INHALATION					
	Oral Rfd (mg/kg-day)	Oral Rfd (basis/source)	Confidence Level	Critical Effect	Uncertainty Factors	Modifying Factors	Inhalation Rfd (mg/kg-d)	Inhalation Rfd (basis/source)	Confidence level	Critical effect	Uncertainty Factor	Modifying Factor
Antimony	4E-4	Water/IRIS	low	longevity, blood gluc.	1,000	1	.	.	.	.	.	.
Arsenic	3E-4	Food/IRIS	medium	hyperpigmentation keratosis	3	1	.	.	.	.	.	.
Barium	7E-2	Water/IRIS	medium	incr. blood press	3	1	1E-4	HEAST	.	.	1,000	.
Beryllium	5E-3	Water/IRIS	.	none observed	100	1	.	.	.	.	.	.
Cadmium	1.0E-03	Food/IRIS	high	significant proteinuria	10	1	.	.	.	.	.	.
Chromium VI	5E-3	Water/IRIS	low	none	500	1	.	.	.	.	.	.
Cobalt	6E-02	EPA Region 10	.	.	.	.	.	.	.	.	.	.
Copper	4E-02	EPA Region 10	.	GI irritation	.	.	.	.	.	.	.	.
Lead	ND	.	.	.	.	.	ND	.	.	.	.	.
Manganese	1E-1	Food/IRIS	medium	CNS effects	1	1	1.1E-04	IRIS	.	CNS and resp. symptom	300	3
Mercury (in organic)	3E-4	HEAST	.	kidney effects	1,000	.	8.5E-05	HEAST	.	.	30	.
Nickel	2E-2	Food/IRIS	medium	decrease body + organ weight	300	1	.	.	.	.	.	.
Selenium	5.3E-3	IRIS	.	hair + nail loss	3	1	.	.	.	.	.	.
Silver	5E-3	I.V./IRIS	low	argyria	3	1	.	.	.	.	.	.
Thallium	7E-5	-/IRIS	.	SGOT and serum LDH level	3,000	.	.	.	.	.	.	.

Table II-1. Summary of Noncarcinogenic Toxicity Information for Contaminants at the 1100-EM-1 Operable Unit. (sheet 2 of 3)

Contaminant	ORAL						INHALATION					
	Oral Rfd (mg/kg-day)	Oral Rfd (basis/source)	Confidence Level	Critical Effect	Uncertainty Factors	Modifying Factors	Inhalation Rfd (mg/kg-d)	Inhalation Rfd (basis/source)	Confidence level	Critical effect	Uncertainty Factor	Modifying Factor
Vanadium	7E-3	Water/HEAST	.	none	100	.	.	.	.	.	.	.
Zinc	2E-1	HEAST	.	anemia	10	.	.	.	.	.	.	.
BEHP	2E-2	IRIS	low	liver weight	1000	1	.	.	.	.	.	.
Beta-HCH (Hexachlorocyclo-hexane)	.	.	.	.	.	.	.	.	.	.	.	.
Chlordane	8E-5	Food/IRIS	low	liver hypertrophy in mice	1,000	1	.	.	.	.	.	.
Chlorobenezene	2E-2	Food/IRIS	medium	liver changes	1,000	1	5E-3	HEAST	.	liver, kidney effects	10,000	.
Cyanide	2E-2	Food/IRIS	medium	weight loss, thyroid effect, myelin deg.	100	5	.	.	.	.	.	.
DDT	5E-4	Food/IRIS	medium	liver lesions	100	1	.	.	.	.	.	.
Endosulfan II	5E-5	Diet/IRIS	medium	kidney toxicity	3,000	1	.	.	.	.	.	.
Endrin	3E-4	Diet/IRIS	low	mild changes liver	100	1	.	.	.	.	.	.
Heptachlor	5E-4	Food/IRIS	low	liver weight	300	1	.	.	.	.	.	.
2-Hexanone	.	.	.	.	.	.	.	.	.	.	.	.
Naphthalene	4.0E-02	Gavage/HEAST	medium	decreased weight	1,000	.	.	.	.	.	.	.
PCBs	.	.	.	.	.	.	.	.	.	.	.	.
Tetrachloroethene	1E-2	Gavage/IRIS HEAST 1991	medium	hepatotoxic in mice, weight gain rat	1,000	1	.	.	.	.	.	.

Table II-1. Summary of Noncarcinogenic Toxicity Information for Contaminants at the 1100-EM-1 Operable Unit. (sheet 3 of 3)

Contaminant	ORAL						INHALATION					
	Oral Rfd (mg/kg-day)	Oral Rfd (basis/source)	Confidence Level	Critical Effect	Uncertainty Factors	Modifying Factors	Inhalation Rfd (mg/kg-d)	Inhalation Rfd (basis/source)	Confidence level	Critical effect	Uncertainty Factor	Modifying Factor
1,1,1-Trichloroethane	9E-2	Oral/HEAST	.	.	1,000	.	3E-01	Oral/HEAST	.	.	1,000	.
Trichloroethane	.	.	.	.	.	.	.	.	.	.	.	.

Sources: Integrated Risk Information System Access: March 1992a
Health Effects Assessment Summary Tables (1992b) unless otherwise indicated
ND Not Determined
. Not Available

Table II-2. Summary of Carcinogenic Toxicity Information for Contaminants at the 1100-EM-1 Operable Unit. (sheet 2 of 3)

Contaminant	Weight of Evidence Classification	Type of Cancer	Oral SF $(mg/kg\text{-}d)^{-1}$	Oral SF (source)	Inhalation SF $(mg/kg\text{-}d)^{-1}$	Inhalation SF (source)
Beta-HCH (Hexachlorocyclo-hexane)	C	-	1.8E+0	IRIS	1.8E+0	IRIS
Chlordane	B2	-	1.3E+0	IRIS	1.3E+0	IRIS
Chlorobenezene	-	-	-	-	-	-
Cyanide	-	-	-	-	-	-
DDT	B2	-	3.4E-1	IRIS	3.4E-1	IRIS
Endosulfan II	-	-	-	-	-	-
Endrin	-	-	-	-	-	-
Heptachlor	B2	-	4.5E+0	IRIS	4.5E+0	IRIS
2-Hexanone	-	-	-	-	-	-
Naphthalene	-	-	-	-	-	-
PCBs	B2	-	7.7E+0[a]	IRIS	7.7E+0[b]	Surrogate
Tetrachloroethene	B2[c,d]	-	5.2E-2	Region-10[c]	2E-03	Region-10[c]
1,1,1-Trichloroethane	-	-	-	-	-	-

Table II-2. Summary of Carcinogenic Toxicity Information for Contaminants at the 1100-EM-1 Operable Unit. (sheet 1 of 3)

Contaminant	Weight of Evidence Classification	Type of Cancer	Oral SF $(mg/kg\text{-}d)^{-1}$	Oral SF (source)	Inhalation SF $(mg/kg\text{-}d)^{-1}$	Inhalation SF (source)
Antimony	-	-	-	-	-	-
Arsenic	A	Skin, Lung	1.75E+0[a]	Surrogate	5.0E+1	IRIS/HEAST
Barium	-	-	-	-	-	-
Beryllium	B2	-	4.3E+00	IRIS	8.4	HEAST
Cadmium	B1	-	ND	-	6.1E+0	IRIS/HEAST
Chromium VI	A	Lung	ND	-	4.1E+01	IRIS/HEAST
Cobalt	-	-	-	-	-	-
Copper	-	-	-	-	-	-
Lead	B2	-	ND	-	ND	-
Manganese	-	-	-	-	-	-
Mercury (in organic)	-	-	-	-	-	-
Nickel	A	Lung	-	-	8.4E-1	IRIS
Selenium	-	-	-	-	-	-
Silver	-	-	-	-	-	-
Thallium	-	-	-	-	-	-
Vanadium	-	-	-	-	-	-
Zinc	-	-	-	-	-	-
BEHP	B2	-	1.4E-02	IRIS	1.4E-02[c]	Surrogate

Table II-2. Summary of Carcinogenic Toxicity Information for Contaminants at the 1100-EM-1 Operable Unit. (sheet 3 of 3)

Contaminant	Weight of Evidence Classification	Type of Cancer	Oral SF $(mg/kg\text{-}d)^{-1}$	Oral SF (source)	Inhalation SF $(mg/kg\text{-}d)^{-1}$	Inhalation SF (source)
Trichloroethene	B2[c,d]		1.1E-02	Region-10[c]	6.0E-03	Region-10[c]

[a]Based on proposed arsenic unit risk of 5E-05 $\mu g/L$ (EPA 1991)
[b]Surrogate; assumed same as oral SF
[c]As recommended by Superfund Technical Support Center, April 1992 (EPA-10, Personal Communication)
[d]Weight of evidence classification under review
ND Not determined
- Not available
Sources: Integrated Risk Information System Access: March 1992a
Health Effects Assessment Summary Tables (1992b unless otherwise indicated)

Antimony has been used in medical treatments for persons infected with parasites. Exposure to antimony for prolonged periods can cause eye, skin, and respiratory irritations. Other reported antimony-related symptoms include heart problems, vomiting, and diarrhea. The carcinogenicity and teratogenicity of antimony are currently unknown. High concentrations have caused animal mortality but it is not known if this would occur in humans. Human health effects (heart problems and stomach ulcers) have been observed following exposure to airborne antimony at a concentration of 2 mg/m^3 for 8 to 24 months. Lung, eye, and skin irritations were present following 9 years of exposure to 9 mg/m^3 of antimony.

Data from acute exposure indicate that the gastrointestinal (GI) tract is a target organ following inhalation of antimony. Respiratory and cardiovascular effects also occur, but at exposure levels lower than those associated with gastrointestinal effects. The GI tract is also targeted following oral exposure to antimony. There is no information on target organs following dermal exposures.

Chronic exposure to antimony indicates that the respiratory tract, heart, eyes, and skin are target organs. There is no evidence of increased cancers due to chronic airborne antimony exposure by humans. Studies have shown that chronic oral exposures result in accumulation of antimony in the liver and GI tract. No dermal cancer studies were located in the literature.

The EPA has set an oral chronic reference dose (RfD) of 4E-04 mg/kg-d (IRIS) for antimony with an uncertainty factor of 1000. The RfD confidence is low due to a lack of adequate oral exposure investigations. The critical effects in humans include altered blood chemistry, reduced longevity and changes in the blood glucose level.

The Occupational Health and Safety Administration (OSHA) has set a limit of 0.5 mg/m^3 of antimony in workroom air during an 8 hour time-weighted average (TWA). The National Institute of Occupational Health and Safety (NIOSH) recommends an identical limit. The American Conference of Governmental Industrial Hygienists (ACGIH) has a Threshold Limit Value (TLV) of 0.5 mg/m^3.

1.2 ARSENIC

Arsenic is a common element found in the earth's crust usually in the form of arsenic bearing minerals. It is difficult to characterize as a single element because its chemistry is very complex. Elemental (metallic) arsenic is a relatively non-toxic steel gray metal which is fairly rare in nature. Trivalent and pentavalent forms are widely distributed in nature as both inorganic and organic compounds. The trivalent form is more toxic than the pentavalent form, and the inorganic is typically more toxic than the organic form which is rapidly eliminated. Soil levels range from 1 to 50 mg/kg, but are usually less than 10 mg/kg. In the soil, compounds revert to arsenates which are held by clay soils and are not readily available for plant uptake. Arsenic compounds have found use as pesticides, herbicides, wood preservatives, pigments, and medicinal agents.

Depending on the chemical species, arsenic can be toxic via all routes of exposure. Acute arsenic poisoning is usually the result of homicidal, suicidal, or accidental ingestion of inorganic arsenical. Arsenic is well absorbed from the gastrointestinal tract. Symptoms include constriction of the throat, stomach pain, vomiting, fever, cardiac disturbances, and watery diarrhea usually within 4 h of exposure. If the amount is sufficiently high (100 to 200 mg), death as a result of severe fluid loss and shock may occur within 24 to 48 h. Toxicity in humans and animals results from the interaction of arsenic with sulfhydryl groups in essential proteins.

Chronic exposures can produce toxic reactions in the skin, mucous membranes, gastrointestinal tract (GI) tract, and central nervous system (CNS). Peripheral vascular disease (gangrene) related to a cumulative effect can occur. Liver injury has also been associated with chronic exposure. Arsenic has a predilection for skin and concentrates in hair and nails. Long term exposure to arsenic compounds can result in hyperpigmentation, hyperkeratosis (thickening, drying, and cracking of the skin and growth of warts), and skin cancer. Skin cancer has been primarily associated with ingestion of drinking water containing high levels of arsenic. Chronic exposure through inhalation of arsenic compounds can produce weakness, loss of appetite, nausea, occasional vomiting and diarrhea, and lung cancer.

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The oral RfD for arsenic provided in HEAST is 3E-04 mg/kg-d and the adverse effects of concern are keratosis and hyperpigmentation. Arsenic is a confirmed human carcinogen (EPA weight-of-evidence-classification Group A) known to produce lung cancer from inhalation and skin cancer from ingestion of drinking water. The inhalation slope factor (SF) listed in IRIS is 5.0E+01 $(mg/kg\text{-}d)^{-1}$ and based on excellent exposure assessment, using air monitoring and some biomonitoring, in large populations of smelter workers. The carcinogenic risk associated with ingestion of inorganic arsenic has been the focus of much debate. A mean unit risk of 0.00005 $(ug/L)^{-1}$ has been recommended by EPA (IRIS, EPA 1992). The unit risk is defined as the risk associated with a lifetime consumption of inorganic arsenic in drinking water. Applying standard exposure assumptions, this unit risk corresponds to an estimated oral slope factor of 1.75 $(mg/kg\text{-}d)^{-1}$. This proposed value, reflecting the most recent opinions regarding the mechanism of action of ingested inorganic arsenic, is used to assess the carcinogenic oral exposure to arsenic. The unit risk is based on human studies showing a definite dose-response relationship between the consumption of drinking water and the development of skin cancer.

Recommended occupational air exposure limits of arsenic are also available. The ACGIH has established a TWA TLV of 0.2 mg/m^3 (as arsenic) for arsenic and soluble compounds, in situations other than the production of arsenic. OSHA has established a TWA permissible exposure limit (PEL) of 0.1 mg/m^3 for inorganic arsenic (29 CFR 1910.1018). The National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit (REL) is 0.002 mg/m^3.

1.3 BARIUM

Barium is a silvery-white metal that occurs in nature in many different forms. It is found naturally in drinking water and food. Barium and barium compounds are commonly used in various industries and in human health care. For example, barium carbonate, barium chloride and barium hydroxide are used to make ceramics, pesticides and additives for oil and fuels. Barium sulfate is used by medical doctors for medical tests and X-ray photography. There is limited quantitative information regarding the extent of barium absorption following inhalation, oral or dermal exposure; however, as with other metals, barium is probably very poorly absorbed from gastrointestinal tract.

Occupational studies of workers exposed to barium dust have shown that workers have developed "baritosis". Affected workers did not show any clinical symptoms except a significantly higher incidence of hypertension (*i.e.*, high blood pressure). The most commonly observed cardiovascular effects in cases of acute ingestion of barium compounds are hypertension and abnormalities in heart rhythm, while respiratory weakness and paralysis is observed in cases of acute ingestion of barium salts by humans. Acute exposure in rats indicates a lethal dose$_{50}$ (LD_{50}) of 132 mg/kg-d for adult rats and 220 mg/kg-d for weanlings.

The EPA has set an RfD of 0.05 mg/kg-d for chronic oral exposures. Confidence in the oral RfD is medium. Increases in blood pressure have been observed as a critical effect in oral exposure studies. An inhalation RfD of 1E-04 mg/kg-d was derived by the EPA based on a short-term reproductive study in rats. This RfD is under review and subject to change as indicated in HEAST. There are no reliable data at present regarding the carcinogenicity of barium.

1.4 BERYLLIUM

Beryllium occurs in nature in rocks, soils and volcanic dust. It does not occur in its elemental form naturally. Beryllium compounds vary in water solubility. A major portion of beryllium will bind to soil and is not likely to migrate deeper into the ground and groundwater.

The primary exposure routes for beryllium are inhalation and ingestion. The dermal route is a minor one. Most ingested beryllium (>99 percent) is excreted. Inhaled beryllium that enters the lungs remain there for an extended period of time (months to years). Beryllium contact with open wounds can cause rashes or ulcers. Acute airborne exposure to beryllium can result in lung damage similar to pneumonia. Hypersensitivity to beryllium can also result from exposures. Chronic exposure at levels permitted under OSHA may result in lung damage to some workers.

The EPA has set an oral RfD of 5E-03 mg/kg-d (IRIS) with an accompanying uncertainty factor of 100. The confidence is low due to limited toxicity data by the oral route. There are no toxic effects reported for the reference dose. Beryllium is a B2 (probable) human carcinogen. The human epidemiology studies are considered inadequate. The oral slope factor (SF) for beryllium is 4.3E+00 $(mg/kg\text{-}d)^{-1}$ (IRIS) based on water

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ingestion, and the inhalation SF is 8.4E+00 $(mg/kg-d)^{-1}$ (IRIS). Both slope factors were derived from experimental animal exposures to beryllium sulfate and other beryllium compounds. Lung and bone cancer are the most common cancers associated with beryllium exposure.

Airborne 8 hour TWA workplace exposures have been set as follows: OSHA, 0.002 mg/m^3; NIOSH, Ca (carcinogen)-lowest feasible concentration is 0.00005 mg/m^3; ACGIH, 0.002 mg/m^3.

1.5 BIS (2-ETHYLHEXYL)PHTHALATE

Bis (2-ethylhexyl)phthalate (BEHP) is a chemical used to make plastics more flexible. This compound is a constituent of numerous products including rainwear, flooring, shower curtains, and medical tubing. This substance and other phthalate-ester plasticizers have been found to be general contaminants in virtually all soil and water ecosystems. Insoluble phthalate esters complex with fulvic acid components of humic substances in soil. Fulvic acid functions as a solubilizer for the phthalates and thus serves to mediate the mobilization and transport of phthalates in soil and water. The widespread occurrence of phthalates such as BEHP has produced concern regarding their toxicity.

BEHP is well absorbed orally and there is evidence of some absorption through the dermal and inhalation routes of exposure. Acute toxicity is low by all routes of exposure. No effects have been observed from a single 5,000 mg oral dose in humans while 10,000 mgs produced only some gastrointestinal distress.

Animal studies indicate the liver and testes are target organs for adverse effects from chronic exposure to BEHP. This compound has also been reported to affect male and female reproductive capacity and oral ingestion has produced birth defects in laboratory animals. The chronic oral RfD is 2E-02 (mg/kg-d). A 1953 study is cited by IRIS in which the observed critical effect was an increase in relative liver weight. Confidence in the RfD is low to medium. Although sufficient numbers of animals were tested and multiple endpoints measured, only two dosages were utilized for less than lifetime exposures to determine RfD. Corroborating chronic animal bioassays, however, do support this RfD.

BEHP is considered to be a probable human carcinogen (EPA B2 classification) based on a 1982 National Toxicology Program (NTP) oral study in animals. A statistically significant, dose-dependent increase in liver tumors was observed in male and female mice and female rates receiving BEHP in food. The oral SF listed in IRIS is 1.4E-02 $(mg/kg-d)^{-1}$. A potential source of variation in the NTP study that could effect the slope factor in the use of an intake based on standard food consumption rates rather than administration of a known dose. Evidence for carcinogenicity of BEHP in exposed human populations is inadequate.

The ACGIH recommended TLV-TWA for BEHP is 5 mg/m^3 and a TLV short-term exposure limit (STEL) of 10 mg/m^3. The NIOSH REL is reduction of the exposure to the lowest feasible concentration because of the cancer-causing potential of BEHP. The OSHA PEL for BEHP is 5 mg/m^3.

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1.6 CHLORDANE

Chlordane is man-made chemical used prior to 1983 as an agricultural pesticide and until 1988 for termite control. It is a multicomponent mixture with alpha- and gamma-chlordane as the primary components. Exposure to chlordane is possible via all routes including inhalation, ingestion, and dermal absorption. Chlordane is extremely persistent in the environment and can be toxic to wildlife.

In humans, acute toxicity from inhaling high concentrations of chlordane vapors is manifested as headache, irritation, confusion, and gastrointestinal complaints. Similar adverse effects have occurred after dermal contact and heavily contaminated soil for several hours. Suicidal or accidental ingestion of large quantities of chlordane have produced liver damage, seizures, and death. The acute lethal dose in man is not known, but has been estimated to be 25 to 50 mg/kg by ingestion.

Chronic toxic effects have not been identified in workers who produced or used chlordane. The critical effects in a 1983 chronic feeding study in rats was regional liver hypertrophy in female rats. Based on this study, the EPA oral RfD reported in IRIS is 6E-05 (mg/kg-d). Confidence in this RfD, however, is low. The database lacks adequate reproductive studies, testing in multiple mammalian species, and inadequate assessment of sensitive endpoints. Chlordane is known to biaccumulate in body fat with chronic exposure.

The EPA classifies chlordane as a B2 probable human carcinogen. Results of a 1977 National Cancer Institute (NCI) study indicate a significant dose-response increase in liver tumors in mice. These data are supported by additional animal studies. However, evidence from human studies to document the carcinogenicity of chlordane is insufficient. An oral SF for chlordane of 1.3E+00 $(mg/kg\text{-}d)^{-1}$ is reported in IRIS. The inhalation SF published in IRIS is 1.3E+00 $(mg/kg\text{-}d)^{-1}$.

The OSHA established TWA-PEL for chlordane is 0.5 mg/m^3 with a recommendation to protect skin in order to limit dermal absorption of chlordane. This occupational exposure limit is the same as that recommended by NIOSH and the ACGIH.

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1.7 CHROMIUM

Elemental chromium does not exist naturally in the environment, but is found primarily as a part of chromite ore. In compounds, this element exists in one of three valence states, +2, +3, or +6. The trivalent form is an essential human micronutrient involved in carbohydrate metabolism. Adverse effects have not been associated with the trivalent form. The hexavalent form is important industrially (typically in the form of chromates) and has been associated with serious toxicities.

Hexavalent chromium is mobile in soil, but under aerobic and acidic soil conditions, it is reduced to trivalent chromium which readily precipitates with carbonates, hydroxides, and sulfides in the soil. Hexavalent chromium is toxic to plants; however, plants actually

tolerate relatively high levels of chromium in the soil and do not bioaccumulate significant amounts.

Human toxicity has been associated with hexavalent chromium by all routes of exposure. Hexavalent chromium is irritating and short-term high exposures can result in adverse effects at the site of contact, whether it is the skin, GI tract, or respiratory tract. Such contact can result in coughing, wheezing, irritation and perforation of the nasal mucosa, and pulmonary edema. Kidney and liver damage have also been associated with acute exposures. Hexavalent chromium is a potent sensitizer causing allergic reactions in the lungs, nasal passages, and skin. Long term exposure to airborne hexavalent chromium higher than natural background levels is known to produce lung and respiratory tract cancer in humans.

The EPA has determined the oral RfD for hexavalent chromium as 5E-03 mg/kg-d (IRIS) based on a drinking water study in rats. The confidence in this RfD is low and no critical effects were observed because of poor study design.

Hexavalent chromium is classified by EPA as a known human carcinogen (weight-of-evidence classification is Group A) by inhalation exposure. A number of studies, cited in IRIS, demonstrate dose-response relationships between hexavalent chromium exposure, and lung tumor production. The inhalation SF is 4.1 E+01 $(mg/kg\text{-}d)^{-1}$. No evidence exists to indicate that chromium is carcinogenic by the oral route.

Occupational air exposure limits for chromium are based on the toxicities associated with different forms. For carcinogenic forms of hexavalent chromium, the NIOSH TWA recommendation is 0.001 mg/m^3. The OSHA Permissible Exposure Level (PEL) for chromium metal is 1 mg/m^3, and the Immediately Dangerous to Life or Health (IDLH) level is 500 mg/m^3.

9312117

1.8 COPPER

Copper is a naturally occurring metal in rock, soil, water, sediment, and air. It also occurs in plants and animals. Copper compounds are not easily removed from the environment. Copper is an essential element for all known living organisms and is important for iron utilization in humans.

Exposure to copper can occur through the inhalation, ingestion, and dermal routes. Copper in concentrations over 1 mg/L has been found in household water supplies that utilize copper pipes. Dietary intakes of naturally occurring copper-containing foods amount to about 1 mg/day.

Acute copper exposure by ingestion can cause vomiting and diarrhea. The copper is excreted after several days. It is unknown how much exposure by inhalation and dermal routes occurs. Chronic exposure to high concentrations of copper can cause eye, nasal and oral irritations, headaches, dizziness and diarrhea. Liver and kidney damage can occur following high intakes of copper. Copper exposure is not known to cause cancer.

Workers exposed to airborne copper experienced respiratory irritation, hepatomegaly (enlargement of the liver), and ocular mucosal irritation. Metal fume fever has been associated with exposure to copper fumes. Gastrointestinal effects include anorexia, nausea, and occasional diarrhea.

An interim oral RfD of 4.0E-02 mg/kg-d has been recommended for copper by the EPA. Gastrointestinal irritation is the critical effect associated with copper exposure. Copper is not classified as a carcinogen.

The OSHA, NIOSH, and ACGIH occupational exposure limit is 1 mg/m^3 as copper dust.

1.9 DDT

DDT is a synthetic chemical produced for control of pests on crops and control of insects that act a vectors for diseases such as malaria and typhus. The abbreviation stands for 1,1,1-trichloro-2,2-bis-(p-chlorophenyl)ethane. It was one of the most widely used pesticides in the world. Technical DDT is primarily composed of three forms (p,p'-DDT, o,p'-DDT and o,o'-DDT), which are white, crystalline, tasteless and almost odorless solids. In addition, 1,1-dichloro-2,2-bis(p-chlorophenyl)ethylene (DDE) and 1,1-dichloro-2,2-bis (p-chlorophenyl)ethane (DDD) are found as contaminants and degradation products in technical DDT. DDT and its metabolites are persistent in the environment, bioaccumulate through the food chain and have been detected in human adipose tissues. The presence of DDT in the environment is generally as a result of past use of the insecticide and subsequent movement from sites of application to land, water and air.

The central nervous system is a major target organ in humans and animals; the liver is also a major target organ in animals. Occupational exposure by inhalation, skin absorption and dermal contact with liquid forms of DDT have shown some CNS effects such as cold moist skin, hypersensitivity to contact, tremor, and convulsions. The acute oral exposure in mice indicates lethal $dose_{50}$ (LD_{50}) that range from 237 to 325 mg/kg and in rats the LD_{50} range from 113 to 800 mg/kg. Doses as high as 285 mg/kg have been ingested accidentally by humans with no fatal results.

Chronic exposure of experimental animals to DDT is associated with tremors and general hyperirritability. In one human study, DDT exposure for 12 to 18 months at 0.61 mg/kg have induced hepatic, hematological and cardiovascular responses. The EPA has set an oral RfD of 0.0005 mg/kg and slope factors of 0.34 $(mg/kg\text{-}day)^{-1}$ for both oral and inhalation exposures (HEAST). DDT is classified as probable human carcinogen by EPA weight-of-evidence classification (Group B2) based on positive cancer findings in animal studies.

The OSHA occupational exposure limit TWA is 1 mg/m^3 with indication for potential dermal absorption. NIOSH regards DDT as a potential carcinogen and recommended the exposure limit of 0.5 mg/m^3. ACGIH recommended TWA for DDT of 1 mg/m^3.

1.10 HEPTACHLOR

Heptachlor is a synthetic chemical produced as a component of the pesticide chlordane (approximately 10 percent by weight). Heptachlor is metabolized to heptachlor epoxide by humans, animals and bacteria in the environment. The EPA has banned the use of heptachlor as an insecticide for crops, for homes and buildings; however, it is still approved to kill fire ants in power transformers.

Human exposure to heptachlor or heptachlor epoxide commonly occurs by ingestion of contaminated water or food, and may occur by inhalation and skin absorption. The target organ affected by heptachlor and heptachlor epoxide are the central nervous system and the liver (seen as changes in the enzymes and cells).

In humans, signs of neurotoxicity (irritability, salivation, lethargy, dizziness, labored respiration, muscle tremors, and convulsions) are seen following exposure to technical grade chlordane which contains between 6 to 30 percent heptachlor. However, these effects can not be attributed solely to heptachlor. Heptachlor and heptachlor epoxide have long half-lives and because they are lipophilic, they bioaccumulate in the adipose (fat) tissues. Measurable levels of heptachlor and heptachlor epoxide have been detected in breast milk and serum without evidence of adverse health effects. Acute exposure in rodents and rabbits indicate lethal dose$_{50}$ (LD_{50}) that range from 40 to 162 mg/kg for heptachlor and 39 to 144 mg/kg for heptachlor epoxide.

The EPA has set an oral RfD of 0.0005 mg/kg and a slope factor of 4.5 (mg/kg - day)$^{-1}$ for both oral and inhalation exposures (IRIS). Heptachlor is classified as probable human carcinogen by EPA weight-of-evidence classification (Group B2) based on positive cancer findings in animal studies.

Both OSHA and the NIOSH recommended occupational exposure on TWA basis of 0.5 mg/m^3. Only NIOSH regarded heptachlor as potential human carcinogen. The dermal absorption is likely and should be prevented as necessary. The ACGIH TWA for heptachlor is also 0.5 mg/m^3.

1.11 Beta-HEXACHLOROCYCLOHEXANE

Beta-Hexachlorocyclohexane (HCH) is a synthetic chemical that exists in eight isomers. All HCH isomers are solids at room temperature. Gamma-HCH, commonly called lindane, has been used a an insecticide on fruit vegetable and other crops, and to treat head and body lice in humans. The general population can be exposed to lindane, alpha-, beta-, and delta-HCH in the air surrounding heptachlor manufacturing plants or agricultural fields where the pesticide is used, and through ingestion of contaminated food and water. Production of lindane in the U.S. was prohibited by 1976, and none of the isomers are currently produced in the U.S. It is currently imported from France, Germany, Japan and China. The primary health effects associated with exposure to HCH are hematological, hepatic, renal, immunological, neurological, reproductive and cancer.

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Most available information in the literature is for the health effects of lindane or gamma-HCH. Typically, humans are not exposed to the individual isomers of HCH but to gamma-HCH or to technical-grade HCH which contains several HCH isomers. In rats hematological effects, specifically reduced numbers of red and white blood cells, were observed in rats fed beta-HCH in diet for 13 weeks.

The EPA has set a SF of $(1.8 \text{ mg/kg-d})^{-1}$ for inhalation exposure (IRIS). It is classified as possible human carcinogen (Group C) since there is a limited evidence of carcinogenicity in animals, and no published human data is available.

Both OSHA and the NIOSH recommended exposure limits TWA of 0.025 mg/m^3 for gamma-hexachlorocyclohexane. The ACGIH determines exposure limit TWA of 0.5 mg/m^3. Skin precautions are also recommended to prevent dermal absorption.

1.12 LEAD

Lead is a naturally occurring bluish-gray metal found in small amounts in the earth's crust. It is widely distributed in the environment, and can be transported long distances. Anthropogenic sources of lead come from gasoline additives, various metal products, ammunition, paint, and storage batteries. The biggest single source of lead in air is from automobile exhaust. Oral exposure occur from ingestion of contaminated food and beverages, in addition to incidental soil ingestion.

Acute exposure data for inorganic lead inhalation are not available. The reported lethal concentration$_{50}$ (LC_{50}) in rats for inhalation of tetramethyl and tetraethyl lead are 8,870 and 850 mg/m^3, respectively.

Children and pregnant women are the most sensitive populations to chronic effects from lead exposure. In children lead exposure is associated with frequent ingestion of dirt (pica) and inhalation of household dust from crawling and playing on floors. The effects of such exposure are reported as a decrease in IQ, neurobehavior impairment and hearing problems. Excessive exposures can result in serious neurological effects including changes in brain function (encephalopathy) which may progress to coma. The mortality rate for untreated lead encephalopathy in children was approximately 65 percent prior to the introduction of chelation therapy.

Transplacental transfer of lead from mother to fetus in humans has been demonstrated in several studies. This transfer can result in nervous system damage or changes. Lead also interferes with heme biosynthesis by altering the activity of three aminolevulinic acid (ALAD) enzymes. The result is a reduction of hemoglobin concentration in blood (anemia).

Although EPA has classified lead as a B2 carcinogen (probable human carcinogen based on adequate animal studies) there are no Agency-verified toxicological values that can be used to perform a risk assessment and to develop protective soil cleanup levels for lead. Studies relating soil lead to blood lead levels are difficult to compare. However, EPA has

recommended soil criteria for lead, as an interim guideline (EPA, 1989b) of 500 to 1,000 ppm total lead to be protective of sensitive populations.

1.13 NICKEL

Nickel is a naturally occurring metal found in the earth's crust. Nickel can also be found in wind-blown soil. Many nickel compounds are water-soluble, causing the water to have a green color. Nickel is released into the environment during metal working processes, and incineration and power production. Nickel will settle into the soil where it has an affinity for iron- or manganese-containing particles. Under acidic conditions, nickel may migrate into groundwater. Nickel does not appear to bioaccumulate in fish or plants. Food naturally contains nickel, and adult dietary intake of nickel is estimated to be in the range of 300 - 600 μg/day.

Exposure routes for nickel include inhalation, ingestion and dermal contact. Inhaled particles can enter the bloodstream, if small, or remain in the lungs if large. Ingested nickel will enter the body through the stomach and intestines. Small amounts of nickel can enter the bloodstream through dermal contact. The kidneys are the primary target organ. Nickel is excreted through feces and to a lesser extent through urine. Excretion is nearly completed in 4 to 5 days.

Exposure to nickel has been shown to cause lung and nasal sinus cancers. The heart, blood, and kidneys have also been shown to be effected by exposure to nickel. Dermal exposures can result in skin rashes and asthma. Allergic contact dermatitis from exposure to nickel is common in persons in the general population. Nickel's reproductive effects are unknown.

The EPA has established an oral RfD of 2E-02 mg/kg-d (IRIS) based on food consumption. Decreased body and organ weights have been reported as the critical effects of nickel exposure. An inhalation RfD has not been determined. There is inadequate evidence for carcinogenicity by the oral route to support the establishment of an oral SF.

Airborne occupational exposure limits are: OSHA, 0.1 mg/m^3 for soluble compounds and 1 mg/m^3 for insoluble compounds; NIOSH, 0.015 mg/m^3, based on a determination that nickel refinery dust is a carcinogen; ACGIH, 1 mg/m^3 for both soluble and insoluble compounds. The ACGIH is currently reviewing its limits.

1.14 NITRATE

As a class, nitrate compounds are a variety of chemicals used as explosives, medications, dyes, food additives, and as numerous other industrial products. Nitrate occurs naturally, and the majority of dietary intake is from vegetables. The dietary contribution from drinking water is usually quite small. The nitrate form of nitrogen is very water soluble and is highly mobile in water and soil contributing to concern over the presence of these compounds in the environment.

Exposure can result primarily from ingestion of contaminated water, but may also be associated with ingestion of soils and dermal contact with contaminated media. Toxicity is related to the specific nitrate compound. However, as a class, acute exposure to nitrates can produce headache, decrease blood pressure, abdominal pain, dilation of blood vessels, and methemoglobinemia, an impaired ability of the blood system to transport oxygen. Chronic exposure may result in weakness, general depression, headache, and mental impairment.

Human toxicity to nitrates in water is due to the conversion of nitrate to nitrite which results in the oxidation of hemoglobin to methemoglobin. Animals are a poor model for methemoglobin formation because many species lack nitrate-reducing bacteria. Infants, however, are particularly susceptible to nitrates due to their high gut content of nitrate-reducing bacteria, their lower enzymatic capacity to convert methemoglobin back to hemoglobin, and the presence of hemoglobin F, which is more susceptible to oxidation.

The chronic RfD for nitrate as nitrogen is 1.6E+00 mg/kg-d based on human infant studies of exposure to nitrate in drinking water. The observed adverse effect was methemoglobinemia. No uncertainty factors have been applied to this intake because of the RfD was determined from epidemiological studies in the most sensitive human population. Thus, confidence in the RfD is high. Nitrate has not been evaluated for carcinogenic potential.

1.15 POLYCHLORINATED BIPHENYLS

Polychlorinated biphenyls (PCB's) are very stable materials that contain 12 to 68 percent chlorine and are extremely persistent in the environment. Because of their low flammability and stability, PCB's have been used as insulating materials in electrical transformers and capacitors, as plasticizers in waxes, in paper manufacturing, and for a variety of other industrial purposes. The diversity of their use patterns, the large quantities used, and their stability has led to widespread occurrence of these compounds in soil and water. PCB's have been banned from use in the U.S. since 1978, but are still found in older electrical equipment and as contaminants in the environment. All PCB's are mixtures of chlorinated congeners, but the exact nature of these mixtures is unknown. Arochlor 1260 and Arochlor 1254 are commonly recognized PCB products. The last two digits in the number indicate the percentage of chlorine in the compound (*i.e.*, 60 and 54 percent, respectively).

Exposure to PCB's can occur from inhaling PCB-contaminated particulates, dermal absorption, or ingestion of contaminated food, soil, or water. Toxicity by all routes of exposure is similar. However, because of high public awareness of PCB's, in large part due to their extensive publicity, concern about exposure may far outweigh documented human toxicity.

Skin irritation can occur with acute and chronic exposure. A severe and disabling form of acne called chloracne is the primary dermal effect. Chronic toxicity studies in animals have suggested that PCB's can cause respiratory tract impairment, neurotoxicity, liver damage, birth defects, and cancer. PCB congeners vary in their potency for producing

biological effects, but little is known about which congeners may be responsible for the effects and to what extent the effects occur in humans.

PCB's as a group (not as specific congeners or total chlorine mixtures) are considered probable human carcinogens because of data in animals indicating increased liver cancer in exposed animals. However, the commercial preparations used may not be representative of actual mixtures of congeners found in the environment. There is inadequate but suggestive evidence that PCB's may also cause liver cancer in humans by all routes of exposure.

The EPA oral SF listed in IRIS is 7.7 $(mg/kg\text{-}d)^{-1}$. This slope factor is based on a study in rats showing a sequential progression of liver lesions to liver cancer during the natural life of the rat. The EPA carcinogenicity classification for PCB's is B2 (probable human carcinogen).

Occupational exposure limits for polychlorinated biphenyls are based on the chlorine content of the compound. Both OSHA and the ACGIH recommend a TWA of 0.5 mg/M^3 for 54 percent PCB's. The NIOSH recommendation for an occupational exposure limit is 0.001 mg/M^3. This level is the minimum reliably detectable concentration using the recommended sampling and analytical methods. Skin precautions are also recommended to prevent dermal absorption.

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1.16 TETRACHLOROETHENE

Tetrachloroethene, also known as perchloroethylene and tetrachloroethylene, is a nonflammable liquid solvent used for dry cleaning fabrics and for metal degreasing operations. When tetrachloroethene evaporates, it produces an ether-like odor. However, it is relatively resistant to hydrolysis and biodegradation and thus persists in the environment. Tetrachloroethene is moderately to highly mobile in soil and susceptible to significant leaching.

The primary route of exposure to tetrachloroethene is through inhalation of vapors. Ingestion may occur from contaminated water. Dermal absorption is limited because tetrachloroethene does not penetrate intact skin to any great extent. The principal target organs are the CNS, liver, and kidney. Acute exposure to tetrachloroethene in confined, poorly ventilated areas, can produce dizziness, headache, confusion, nausea, and difficultly in walking. These effects are rapidly reversed when the individual is moved to clean air. The effect of long-term, low level exposure is not as well understood. Studies in animals suggest liver and kidney damage, birth defects, leukemia, and liver cancer may occur.

The oral RfD provided in IRIS for tetrachloroethene is 1E-02 (mg/kg-d). The critical adverse effects found in animal studies used to determine the RfD were liver damage in mice and weight gain in rats. No inhalation RfD is currently available. Confidence in this RfD is only medium; a good overall database of information is available, but insufficient reproductive studies have been conducted.

The carcinogenicity of tetrachloroethene is under review as is the classification of B2 (probable human carcinogen) or C (possible human carcinogen). Currently, epidemiological studies suggest an association between tetrachloroethene and an increased cancer risk but the human studies provide no good quantitative exposure information and involve exposure to other chemicals. Thus, the association is inconclusive. All SF's have been withdrawn form IRIS. The Superfund Technical Support Center recommends an oral SF of 5.2E-02 $(mg/kg-d)^{-1}$ and an inhalation SF of 2.0E-3 $(mg/kg-d)^{-1}$.

1.17 THALLIUM

Thallium is a bluish-white metal that is widely distributed in trace amounts in the earth crust. It is present in air, water and soil. It can be found in pure form or mixed alloys with other metals. Thallium can also be found combined with other substances such as bromine, chlorine, fluorine and iodine to form salts. Thallous is the most common form of thallium in the environment. Manufacturing industries of electronic devices, switches, and closures are significant users of this metal. Thallium compounds have limited use in the manufacture of special glasses and for medical procedures that evaluate heart disease. Thallium was used as a rat poison until 1972 when it was banned in the U.S. because of its potential to cause adverse health effects in exposed human populations.

Human exposure to thallium may occur by inhalation, ingestion or dermal absorption. The general population is exposed most frequently by ingestion of contaminated foods. Thallium compounds such as thallium oxide and thallium sulfate can be lethal at relatively low doses; however, typical human exposure levels are significantly below such doses. Thallium compounds affect the respiratory, cardiovascular, GI, and CNS systems. They are also toxic to the liver, kidneys, and the male reproductive system. Temporary hair loss has also been associated with ingestion of thallium in human.

The EPA has set an oral RfD of 0.00007 mg/kg-d for chronic oral exposure. No published inhalation RfD is available. There are no reliable data at present regarding the carcinogenicity of thallium.

The OSHA, NIOSH and ACGIH each recommend an occupational exposure limit TWA of 0.1 mg/M^3. There is a potential for dermal absorption and should be prevented when necessary.

1.18 1,1,1-TRICHLOROETHANE

1,1,1-trichloroethane (TCA), also known as methyl chloroform, is a halogenated hydrocarbon used primarily as a solvent because of a favorable combination of chemical, physical, flammability, and toxicologic properties. Although TCA is probably the least toxic chlorinated solvent, careless use, high volatility, and poor disposal practices have contributed to the potential human and environmental exposure.

Acute exposure to TCA can produce CNS depression. Inhalation of 1,600 mg/M^3 by humans produces no untoward response while inhalation of 5,400 to 10,800 mg/M^3 for 60 min can produce eye and nasal irritation and minor CNS impairment. The inhalation of 100,000 mg/M^3 for 60 min can produce anesthesia, cardiac sensitization to epinephrine, and possible death. Chronic, industrial exposure to TCA over 6 years did not demonstrate liver toxicity or cardiac toxicity in humans. Some studies have suggested that animals exposed to TCA may develop fatty livers and liver necrosis. However, no adverse effects were detected in a 6-month inhalation study in guinea pigs on which the IRIS oral RfD is based. An older supporting study noted only slight growth retardation in chronically exposed animals. The oral RfD is 9.0E-02 (mg/kg-d). Confidence in the RfD is medium to low because the number of animals at each dose level was limited, lengths of exposure were variable, and few toxic endpoints were examined. No inhalation RfD is published in IRIS, but HEAST lists an inhalation RfD for TCA of 3.0E-01 (mg/kg-d). The adverse effect noted for the inhalation RfD is hepatotoxicity.

Animal studies have not demonstrated carcinogenicity nor are there any human data reported to indicate that 1,1,1-trichloroethane is a human carcinogen.

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1.19 TRICHLOROETHENE

Trichloroethene (also known as trichloroethylene) is a colorless liquid with an odor similar to ether or chloroform. This chemical is a man-made solvent used for degreasing metal parts, extracting caffeine from coffee, and in numerous consumer products such as typewriter correction fluid, paint removers, and spot removers.

Trichloroethene moves readily through soil and groundwater. Ingestion of contaminated water and inhalation of volatilized trichloroethene are the chief source of exposure. Absorption is not significant from skin contact with this solvent.

Acute oral toxicity in humans is low. Death has occurred from an ingested dose of 170 mg/kg. Acute effects from inhalation of trichloroethene are associated with the central nervous system (dizziness, headache, sleepiness) and occur at a threshold of 436 to 592 mg/M^3. Extremely high, acute exposures may produce cardiac rhythm disturbances. In animals, chronic exposure to trichloroethene by inhalation and ingestion has produced liver and kidney damage and may affect reproductivity toxicity.

Neither IRIS nor HEAST currently provide an RfD for trichloroethene and determination of an RfD is pending. Trichloroethene may induce lung cancer in animals when inhaled and may produce liver cancer in animals from oral administration. The EPA weight-of-evidence classification of B2 (probable human carcinogen) is under review. The oral and inhalation SF's for trichloroethene have also been withdrawn from IRIS pending further review of carcinogenicity studies. The Superfund Technical Support Center recommends an oral SF of 1.1E-2 (mg/kg-d)$^{-1}$ and an inhalation SF of 6.0E-3 (mg/kg-d)$^{-1}$.

1.20 VANADIUM

Vanadium is a metal found in compounds that are widely distributed at low concentrations in the earth's crust. Elemental vanadium does not occur in nature, but is associated with over 50 different mineral ores and in fossil fuels. Vanadium replaces other metals such as iron, titanium and aluminum in crystal structures. Natural releases of vanadium to soil result from the weathering of rock-bearing vanadium minerals, precipitation/deposition of vanadium from the atmosphere or water, and plant and animal wastes. Anthropogenic sources of vanadium are: fossil fuel combustion, mining, slag heaps, sewage sludge, and certain fertilizers.

The only significant effect of vanadium exposure in human is mild to moderate respiratory distress, and mucosal irritation from exposure to vanadium dust. Workers exposed to vanadium through inhalation may develop coughs, chest pain, sore throat or eye irritation that can last for several days, following the exposure. These effects are not specific to pure vanadium but are equally associated with other vanadium chemical forms, following inhalation exposure.

The EPA has set an oral RfD of 0.007 mg/kg-d for chronic exposure via drinking water ingestion. An assessment of carcinogenic potential in humans can not be made at present because of the inadequacy of human and animal data.

The OSHA, NIOSH and ACGIH recommend the same occupational exposure limit TWA of 0.05 mg/m^3 as respirable dust and fume. NIOSH recommends a ceiling exposure level (REL) for 15 minutes.

1.21 ZINC

Zinc is a common element in the earth's crust. It is detected in rock, soil, groundwater, surface water, and air. Zinc may be released by natural or anthropogenic activities. Major anthropogenic sources are metallurgic wastes from smelter and refining operations, mining drainage, electroplating, smelting, plastics, agricultural practices, and industrial and municipal waste effluents.

Zinc is an essential nutrient and is found in all foods. The average American daily intake is 12 to 15 mg, mostly from food. Zinc is important for the maintenance of healthy skin and hair, good healing, and resisting infections. Zinc does not accumulate with continued exposure, but the body regulates absorption and storage depending on body needs. It is often concentrated in the tissues of organisms even in the absence of abnormally high background concentrations.

Overexposure to zinc by oral ingestion can produce severe gastric and digestive problems. Inhalation of zinc dust or fumes from smelting or welding induced a syndrome called metal fume fever, characterized by difficulty in breathing and flu-like symptoms. The degree of adverse effects appears to be influenced by the associated compounds in zinc salt or oxides. The EPA has set an oral RfD of 0.2 mg/kg-d. The critical effect of zinc

exposure is anemia. No published inhalation RfD is available. Currently zinc is not classified as a human carcinogen.

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APPENDIX III

RISK ASSESSMENT CALCULATIONS

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This appendix presents the equations used to generate the Intake and Risk Assessment Tables created for the residential scenario risk assessment, but are similar to those used for the industrial scenario. All example calculations are based on the maximum contaminant concentration from the Phase I RI data, although the same calculations can be used with the 95 percent UCL concentrations.

1.0 CALCULATION OF CONTAMINANT INTAKES FOR THE SOIL INGESTION, INHALATION, AND DERMAL PATHWAYS

Standard EPA equations for calculation of intakes, as provided in RAGS (EPA, 1989a) and EPA (1991a) are used as the basis for all intake calculations. The basic equation for calculating intakes, normalized with respect to body weight, via soil ingestion or inhalation is:

$$\text{Intake} = \frac{C \times IR \times EF \times ED \times CF}{BW \times AT} \quad (1)$$

where:

Intake	=	chronic daily intake of the contaminant (mg/kg-d)
C	=	concentration of contaminant in the medium (*e.g.*, mg/kg or mg/m^3)
IR	=	intake rate (*e.g.*, mg/d or m^3/d)
EF	=	exposure frequency (d/yr)
ED	=	exposure duration (yr)
BW	=	body weight (kg)
AT	=	averaging time (d/yr x yr)
CF	=	conversion factor (as appropriate)

All exposure parameters (*i.e.*, body weight, averaging time, contact rate, exposure frequency, and exposure duration) are those presented for the residential scenario, as presented in EPA Region-10 guidance (EPA-10, 1991). A summary of the residential exposure factors is provided in table III-1.

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Table III-1. Summary of Residential Scenario Exposure Factors.

Exposure Factor	Reasonable Maximum Exposure[a]
Intake Rate	
Ingestion	
Adult - Soil	100 mg/d
Child - Soil	200 mg/d
Adult - Groundwater	2 L/d
Inhalation	
Adult - Soil	20 m^3/d
Adult - Groundwater (volatiles)	15 m^3/d
Fish Ingestion[c]	54 g/d
Garden Produce[b]	
Root (e.g., carrots)	0.88 g/d
Leafy (e.g., lettuce)	1.1 g/d
Garden fruit (e.g., tomato)	2.2 g/d
Potato	9.1 g/d
Exposure Frequency	350 d/yr 2.6 h/d, 7 d/yr (swimming)
Exposure Duration	
Soil Ingestion and Dermal	
Adult	24 yr
Child	6 yr
All other pathways	30 yr
Body Weight	
Adult	70 kg
Child	15 kg
Averaging Time	
Carcinogens	70 yr x 365 d/yr
Non-carcinogens	30 yr x 365 d/yr
Skin Surface Area	
Adult - Soil	5000 cm^2 (summer); 1900 cm^2 (winter)
Child - Soil	3900 cm^2
Adult - Swimming	20,000 cm^2
Soil to Skin Adherence Factor	1 mg/cm^2/d
Contaminant-Specific Absorption Factor	
Inorganics[d]	0.001
BEHP[e]	0.0055
All other organics[d]	0.06
Permeability Coefficient - Trichloroethene[d]	4E-01 cm/hr
Groundwater Volatilization Factor[a]	0.5 L/m^3

[a]Factors based on EPA-10 (1991) unless otherwise specified
[b]EPA (1986a)
[c]EPA (1991a)
[d]EPA (1992c)
[e]Calculated factor; see Section 3.3.2

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Dermal Exposure

The intake equation provided above is modified to provide the absorbed dose equation for dermal exposures to contaminated soil. Exposure factors, as provided in EPA-10 (EPA-10, 1991) are indicated.

$$\text{Dermally Absorbed Dose} = \frac{(CS \times CF \times ABS \times AF)\left[\left(\frac{SA \times EF \times ED}{BW}\right)_{\text{child}} + \left(\frac{SA \times EF \times ED}{BW}\right)_{\text{adult}}\right]}{AT} \quad (2)$$

where :

Dermally absorbed dose = (mg/kg-d)

CS	=	maximum concentration of contaminant in soil (mg/kg)
SA	=	skin surface area available for contact (child: 3,900 cm^2, Adult: 5,000 cm^2-summer, 1,900 cm^2-winter)
AF	=	soil-to-skin adherence factor (1 mg/cm^2/day)
ABS	=	contaminant-specific absorption factor (unitless)
EF	=	event frequency (child: 1 event/day, 350 d/yr; adult: 1 event/day 350 d/yr with 90 d as summer and 260 d as winter)
ED	=	exposure duration (6 yr) child (24 yr) adult
CF	=	conversion factor (1E-06 kg/mg)
BW	=	body weight (15 kg) child (70 kg) adult
AT	=	averaging time (noncarcinogenic effects: 365 d/yr x 30 yr; carcinogenic effects: 365 d/yr x 70 yr)

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1.1 INTAKE CALCULATIONS

The following subsections present intake calculations for the soil ingestion, fugitive dust inhalation and dermal exposure pathways.

1.1.1 Soil Ingestion

Non-Carcinogenic

$$\text{Intake mg/kg-d} = \frac{(\text{C mg/kg})(1\text{E-06 kg/mg})\left[\left(\frac{(200\ \text{mg/d})(350\ \text{d/yr} \times 6\ \text{yr})}{15\ \text{kg}}\right)\text{child} + \left(\frac{(100\ \text{mg/d})(350\ \text{d/yr} \times 24\ \text{yrs})}{70\ \text{kg}}\right)\text{adult}\right]}{(365\ \text{d/yr} \times 30\ \text{yr})}$$

$$= \text{C mg/kg} \times 3.7\text{E-06 d}^{-1} \quad (3)$$

Carcinogenic

$$\text{Intake mg/kg-d} = \frac{(\text{C mg/kg})(1\text{E-06 kg/mg})\left[\left(\frac{(200\ \text{mg/d})(350\ \text{d/yr} \times 6\ \text{yr})}{15\ \text{kg}}\right)\text{child} + \left(\frac{(100\ \text{mg/d})(350\ \text{d/yr} \times 24\ \text{yrs})}{70\ \text{kg}}\right)\text{adult}\right]}{(365\ \text{d/yr} \times 70\ \text{yr})}$$

$$= \text{C mg/kg} \times 1.6\text{E-06 d}^{-1} \quad (4)$$

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1.1.2 Inhalation

Intakes for the inhalation of fugitive dust are calculated for a residential receptor at each subunit and are based on fugitive dust emissions from that subunit only. Contaminant specific concentrations within fugitive, dust are calculated by multiplying the subunit specific dust concentration in table 3-1, with the maximum contaminant concentration in soil table 2-1.

Non-Carcinogenic

$$\text{Intake mg/kg-d} = \frac{(\text{C mg/m}^3)(20\ \text{m}^3\text{/d})(350\ \text{d/yr})(30\ \text{yr})}{(70\ \text{kg})(30\ \text{yr} \times 365\ \text{d/yr})} = \text{C mg/m}^3 \times 0.27\ \text{m}^3\text{/kg-d} \quad (5)$$

Carcinogenic

$$\text{Intake mg/kg-d} = \frac{(\text{C mg/m}^3)(20\ \text{m}^3/\text{d})(350\ \text{d/yr})(30\ \text{yr})}{(70\ \text{kg})(70\ \text{yr} \times 365\ \text{d/yr})} = \text{C mg/m}^3 \times 0.12\ \text{m}^3/\text{kg-d} \quad (6)$$

1.1.3 Dermal Absorption

Non-Carcinogenic

$$\text{Dermally Absorbed Dose mg/kg-d} =$$

$$\frac{(\text{CS mg/kg})(1\text{E}-06\ \text{kg/mg})(\text{ABS})(1\ \text{mg/cm}^2\text{-d})\left[\left[\frac{(3900\ \text{cm}^2)(350\ \text{d/yr})(6\ \text{yr})}{15\ \text{kg}}\right]_{\text{child}} + \left[\frac{(5000\ \text{cm}^2)(90\ \text{d/yr})(24\ \text{yr})}{70\ \text{kg}} + \frac{(1900\ \text{cm}^2)(260\ \text{d/yr})(24\ \text{yr})}{70\ \text{kg}}\right]_{\text{adult}}\right]}{(365\ \text{d/yr} \times 30\ \text{yr})}$$

$$= \text{CS mg/kg} \times \text{ABS} \times 7.9\text{E}-05\ \text{d}^{-1} \quad (7)$$

See table D-1 for ABS values (contaminant-specific absorption factors) and sources.

Carcinogenic

$$\text{Dermally Absorbed Dose mg/kg-d} =$$

$$\frac{(\text{CS mg/kg})(1\text{E}-06\ \text{kg/mg})(\text{ABS})(1\ \text{mg/cm}^2\text{-d})\left[\left[\frac{(3900\ \text{cm}^2)(350\ \text{d/yr})(6\ \text{yr})}{15\ \text{kg}}\right]_{\text{child}} + \left[\frac{(5000\ \text{cm}^2)(90\ \text{d/yr})(24\ \text{yr})}{70\ \text{kg}} + \frac{1900\ \text{cm}^2)(260\ \text{d/yr})(24\ \text{yr})}{70\ \text{kg}}\right]_{\text{adult}}\right]}{(365\ \text{d/yr} \times 70\ \text{yr})}$$

$$= \text{CS mg/kg} \times \text{ABS} \times 3.4\text{E}-05\ \text{d}^{-1} \quad (8)$$

See table III-1 for ABS values (contaminant-specific absorption factors) and sources.

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1.2 EXAMPLE CALCULATIONS

All example intake calculations are made using the maximum contaminant concentrations for arsenic at the HRL. Calculations are not performed for the non-carcinogenic inhalation pathway because none of the COPC have an inhalation RfD.

1.2.1 Soil Ingestion

Non-Carcinogenic

$$6.6 \text{ mg/kg} \times 3.7\text{E-}06 \text{ d}^{-1} = 2.4\text{E-}05 \text{ mg/kg-d}$$

Carcinogenic

$$6.6 \text{ mg/kg} \times 1.6\text{E-}06\text{d}^{-1} = 1.0\text{E-}05 \text{ mg/kg-d}$$

1.2.2 Inhalation

The concentration of arsenic in air, contributed to the residential receptor via the inhalation of fugitive dust from the HRL is:

$$C \text{ (mg/m}^3\text{)} = U \text{ (mg/kg)} \times D \text{ (}\mu\text{g/m}^3\text{)} \times CF \text{ (kg/}\mu\text{g)} \quad (9)$$

where:

C = Contaminant concentration of arsenic in air.
U = maximum contaminant concentration in soil for arsenic at the HRL (table 2-1).
D = Dust concentration at residential receptor for the HRL (table 3-1).
CF = Conversion Factor = 1E-09 kg/μg.

$$C = 6.6 \text{ mg/kg} \times 9.93 \text{ }\mu\text{g/m}^3 \times 1\text{E-}09 \text{ kg/}\mu\text{g} = 6.6\text{E-}08 \text{ (mg/m}^3\text{)} \quad (10)$$

Therefore,

Carcinogenic

Intake = 6.6E-8 mg/m^3 x 0.12 m^3/kg-d x .30* = 2.4E-09 (mg/kg-d)

*Assumes approximately 30 percent of the inhaled dose of arsenic is absorbed

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Non-Carcinogenic

Not applicable.

1.2.3 Dermal Absorption

Non-Carcinogenic

$$6.6 \text{ mg/kg} \times .001 \times 7.9\text{E-}05 \text{ d}^{-1} = 5.2\text{E-}07 \text{ mg/kg-d}$$

Carcinogenic

$$6.6 \text{ mg/kg} \times .001 \times 3.4\text{E-}05 \text{ d}^{-1} = 2.2\text{E-}07 \text{ mg/kg-d}$$

2.0 CALCULATION OF CONTAMINANT INTAKES FOR THE GARDEN PATHWAY

Calculation of contaminant intakes was performed for 4 categories of vegetables:

1) Leafy (lettuce)
2) Root (carrot)
3) Garden vegetable (tomato)
4) Potato

2.1 PLANT CONCENTRATIONS

Before intakes can be calculated a contaminant concentration within each plant must be determined via the following equation:

$$CP = SC \times UF$$

where:

CP	=	concentration in plant mg/kg
SC	=	maximum soil concentration mg/kg
UF	=	uptake factor (unitless)

Table III-2 presents the uptake factors specific to each vegetable category.

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Table III-2. Summary of Plant Uptake Factors[a,b].

Contaminant	Leafy	Root	Garden Fruits	Potatoes
Arsenic	0.04	0.02	0.002	0.0006
BEHP[c]	0.38	0.36	0.02	0.02
Beryllium[d]	0.43	0.26	0.041	0.06
Chlordane	0.02[e]	2.02[f]	0.21[e]	0.3[e]
Chromium	0.2[g]	0.26[d]	0.041[d]	0.06[d]
PCBs	0.38	0.36	0.02	0.02
Tetrachloroethene	NA	NA	NA	NA
1,1,1-Tetrachloroethane	NA	NA	NA	NA
Trichloroethene	NA	NA	NA	NA

[a]All uptake factors expressed as [μg/g tissue DW (μg/g soil)$^{-1}$]
[b]Source: EPA 1986a unless otherwise indicated
[c]PCB uptake factors used as surrogates for BEHP
[d]95% UCL of mean for uptake factors of As, Cd, Pb, Hg, Ni, Se, Zn (EPA 1986a)
[e]Heptachlor uptake factors used as surrogates for chlordane
[f]95% UCL of mean for uptake of chlordane by sugar beets
[g] Kabata - Pendias and Pendias 1984

NA Indicates not applicable

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2.1.1 Calculation of Contaminant Concentration in the Four Vegetable Categories

All example calculations use the soil concentration of arsenic at HRL.

Leafy (Lettuce)

$$CP\ mg/kg = 6.6\ mg/kg \times 0.04 = 0.26\ mg/kg$$

Root (Carrots)

$$CP\ mg/kg = 6.6\ mg/kg \times 0.02 = 0.13\ mg/kg$$

Garden Vegetable (tomato)

$$CP\ mg/kg = 6.6\ mg/kg \times 0.002 = 0.013\ mg/kg$$

Potato

$$CP\ mg/kg = 6.6\ mg/kg \times 0.0006 = 0.004\ mg/kg$$

2.2 INTAKE CALCULATIONS

The following section presents intake calculations for the four vegetable groups (leafy, root, garden vegetable, and potato).

The basic intake equation is:

$$\text{Intake mg/kg-d} = \frac{CP \times IR \times EF \times ED \times CF}{BW \times AT} \quad (11)$$

where:

CP	=	concentration in plant mg/kg
EF	=	exposure frequency (350 d/yr)
ED	=	exposure duration (30 yr)
CF	=	conversion factor (1E-03) kg/g
BW	=	body weight (70 kg)
AT	=	averaging time: carcinogens (365 d/yr x 70 yrs) non-carcinogens (365 d/yr x 30 yrs)
IR	=	intake rate for specific vegetable (g/d)

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Vegetable Group	Intake Rate (g/d)
Leafy (lettuce)	1.1
Root (carrot)	0.88
Garden vegetable (tomato)	2.2
Potato	9.1

Non-Carcinogenic

$$\text{Intake mg/kg-d} = \frac{\text{(CP mg/kg)(IR g/d)(350 d/yr)(30 yr)(1E-03 kg/g)}}{\text{(70 kg)(365 d/yr x 30 yr)}} \quad (12)$$

$$\text{Intake mg/kg-d} = \text{CP mg/kg x IR g/d x 1.4E-05 g}^{-1}$$

Carcinogenic

$$\text{Intake mg/kg-d} = \frac{\text{(CP mg/kg)(IR g/d)(350 d/yr)(30 yr)(1E-03 kg/g)}}{\text{(70 kg)(365 d/yr x 70 yr)}} \quad (13)$$

$$\text{Intake mg/kg-d} = \text{CP mg/kg x IR g/d x 5.9E-06 g}^{-1}$$

2.3 EXAMPLE CALCULATIONS

Example calculations for the noncarcinogenic intakes are made using concentrations for arsenic at the HRL. As discussed in section 4.2, arsenic in plants is predominatly in organic forms that are not carcinogenic. Therefore, beryllium is used to calculate the example carcinogenic intake.

Non-Carcinogenic (leafy) - arsenic

$$\text{Intake} = 0.26 \text{ mg/kg x } 1.1 \text{ g/d x } 1.4\text{E-}05 \text{ g}^{-1} = 4\text{E-}06 \text{ mg/kg-d}$$

Carcinogenic (leafy) - beryllium

$$\text{Intake} = 0.56 \text{ mg/kg x } 1.1 \text{ g/d x } 5.9\text{E-}06\text{g}^{-1} = 3.6\text{E-}06 \text{ mg/kg-d}$$

The additional three vegetable categories are calculated in the same manner with the group specific intake rate (see section 3.2) and plant contaminant concentrations (table 3-3) as the two variables.

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3.0 CALCULATION OF CONTAMINANT INTAKES FOR THE GROUNDWATER PATHWAYS

As in sections D2.0 and D3.0, Standard EPA Equations for calculation of contaminant intakes, as provided in RAGS (EPA, 1989a) and EPA (1991a) are used as the basis for groundwater contaminant intake calculations.

The basic equation for calculating intakes via groundwater ingestion or volatile inhalation is:

$$\text{Intake} = \frac{C \times IR \times EF \times ED}{BW \times AT} \quad (14)$$

where:

Intake	=	estimated contaminant intake (mg/kg-d)
C	=	estimated water concentration (mg/L)
IR	=	contact rate (2 L/d)
EF	=	exposure frequency (350 d/yr)
ED	=	exposure duration (30 yr)
BW	=	body weight (70 kg)
AT	=	averaging time: carcinogens (365 d/yr x 70 yrs) non-carcinogens (365 d/yr x 30 yrs)

For volatile inhalation the equation is modified to include a volatilization factor (K):

Therefore,

$$\text{Intake} = \frac{CW \times IR \times EF \times ED}{BW \times AT} \quad (15)$$

where:

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Intake	=	estimated contaminant intake (mg/kg-d)
CW	=	estimated water concentration (mg/L) x K volatilization factor (0.5 L/m^3)
IR	=	contact rate (15 L/d)
EF	=	exposure frequency (350 d/yr)
ED	=	exposure duration (30 yr)
BW	=	body weight (70 kg)
AT	=	averaging time: carcinogens (365 d/yr x 70 yrs) non-carcinogens (365 d/yr x 30 yrs)

3.1 Intake Calculations

The following Subsections present intake calculations for the groundwater ingestion and volatile inhalation pathways.

3.1.1 Groundwater Ingestion

Non-Carcinogenic

$$\text{Intake mg/kg-d} = \frac{(\text{C mg/L})(2\ \text{L/d})(350\ \text{d/yr})(30\ \text{yr})}{(70\ \text{kg})(365\ \text{d/yr})(30\ \text{yr})} \quad (16)$$

$$= \text{C mg/L} \times 0.027\ \text{L/kg-d}$$

Carcinogenic

$$\text{Intake mg/kg-d} = \frac{(\text{C mg/L})(2\ \text{L/d})(350\ \text{d/yr})(30\ \text{yr})}{(70\ \text{kg})(365\ \text{d/yr} \times 70\ \text{yr})} \quad (17)$$

$$= \text{C mg/L} \times 0.012\ \text{L/kg-d}$$

3.1.2 Inhalation of Volatiles

Non-Carcinogenic

Not applicable.

Carcinogenic

$$\text{Intake mg/kg-d} = \frac{(\text{C mg/L})(15\ \text{m}^3/\text{d})(350\ \text{d/yr})(30\ \text{yr})(0.54\ \text{m}^3)}{(70\ \text{kg})(365\ \text{d/yr} \times 70\ \text{yr})} \quad (18)$$

$$= \text{C mg/L} \times 4.4\text{E-}02\ \text{L/kg-d}$$

3.2 EXAMPLE CALCULATIONS

Example calculations are performed using the maximum contaminant concentrations for nitrate and trichloroethene as appropriate.

3.2.1 Groundwater Ingestion

Non-Carcinogenic - Nitrate

$$61\ \text{mg/L} \times 0.027\ \text{L/kg-d} = 1.7\ \text{mg/kg-d} \quad (19)$$

Carcinogenic - Trichloroethene

$$0.11\ \text{mg/L} \times 0.012\ \text{L/kg-d} = 1.3\text{E-}03\ \text{mg/kg-d} \quad (20)$$

3.2.2 Inhalation of Volatiles

Non-Carcinogenic

Not applicable.

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Carcinogenic - Trichloroethene

$$0.11\ mg/L \times 4.4E-02\ L/kg-d = 4.8E-03\ mg/kg-d \quad (21)$$

4.0 CALCULATION OF HUMAN HEALTH ASSESSMENT

Hazard Quotient

The basic equation for determining the HQ for all pathways is:

$$HQ = I/RfD$$

where:

HQ	=	hazard quotient (unitless)
I	=	intake (mg/kg-d)
RfD	=	contaminant-specific chronic reference dose (mg/kg-d)

Incremental Cancer Risk

The basic equation for determining the ICR for all pathways is:

$$ICR = I \times SF$$

where:

ICR	=	lifetime incremental cancer risk (unitless)
I	=	intake (mg/kg-d)
SF	=	contaminant-specific slope factor $(mg/kg-d)^{-1}$

Note: All ICR calculations are made to one significant figure only.

4.1 EXAMPLE CALCULATIONS

All example calculations are made using values for arsenic at the HRL with the exception of the HQ for the Inhalation Pathway. No HQ's have been calculated for this pathway since there are no published inhalation RfD's available for any of the COPC.

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4.1.1 Soil Pathway

4.1.1.1 Soil Ingestion

Hazard Quotient

$$HQ = \frac{2.4E-05\ mg/kg-d}{3.0E-04\ mg/kg-d} = 0.08 \quad (22)$$

Incremental Cancer Risk

$$ICR = (1.0E-05\ mg/kg-d \times 1.7\ (mg/kg-d)^{-1} = 2E-05 \quad (23)$$

4.1.1.2 Inhalation of Fugitive Dust

Hazard Quotient - Not Applicable

Incremental Cancer Risk

$$ICR = 2.4E\text{-}09\ mg/kg\text{-}d \times 50\ (mg/kg\text{-}d)^{-1} = 1E\text{-}07^{*}$$

*The slope factor for arsenic is based on 30 percent absorption of the inhaled arsenic. Therefore, intakes have been adjusted accordingly for arsenic, to determine the ICR.

4.1.1.3 Dermal Exposure

Hazard Quotient

$$HQ = \frac{5.2E-07\ mg/kg-d}{3.0E-04\ mg/kg-d} = 0.002 \quad (24)$$

Incremental Cancer Risk

$$ICR = 2.2E\text{-}07\ mg/kg\text{-}d \times 1.7\ (mg/kg\text{-}d)^{-1} = 4E\text{-}07$$

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4.1.2 Garden Pathway

The values used to calculate HQ and ICR for the garden pathway are the total contaminant intake, *i.e.*, the sum of all the intakes for arsenic for the four vegetable groups combined. As discussed in section 4.2, arsenic in plants is predominantly in organic forms that are not carcinogenic. Therefore, beryllium is used for the example ICR calculation.

Hazard Quotient - arsenic

$$HQ = \frac{6.4E-06\ mg/kg-d}{3.0E-04\ mg/kg-d} = 0.02 \quad (25)$$

Incremental Cancer Risk - beryllium

$$ICR = 1E\text{-}05\ mg/kg\text{-}d \times 4.3\ (mg/kg\text{-}d)^{-1} = 4E\text{-}05$$

4.1.3 Groundwater Pathway

4.1.3.1 Groundwater Ingestion

Hazard Quotient - nitrate

$$HQ = \frac{1.7\ mg/kg-d}{1.6\ mg/kg-d} = 1 \quad (26)$$

Incremental Cancer Risk - trichloroethene

$$ICR = 1.3E-03\ mg/kg-d \times 1.1E-02\ (mg/kg-d)^{-1} = 1E-05 \quad (27)$$

4.1.3.2 Inhalation of Volatiles

Hazard Quotient

Not applicable.

Incremental Cancer Risk - trichloroethene

$$ICR = 4.8E-03\ mg/kg-d \times 6.0E-03\ (mg/kg-d)^{-1} = 3E-05 \quad (28)$$

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APPENDIX IV

STATISTICAL INFORMATION FOR BISRA AND BRSRA

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This appendix presents the methodologies and results for the calculation of the 95 percent upper confidence limit (UCL) of the mean contaminant concentration. Soil contaminants are discussed in section 1.0 and groundwater contaminants are discussed in section 2.0. A discussion of upper tolerance limit calculations is provided in section 3.0.

1.0 CALCULATION OF 95 PERCENT UCL'S FOR SOIL CONTAMINANTS

To calculate the 95 percent UCL, data were used that approximately represented the distribution of specific contaminants for each site. Data that were rejected by validation were not included in calculations. All data from the Phase I and Phase II RI's were considered but not all data were used in the calculations. Selected data at the Horn Rapids Landfill (HRL) and the UN-1100-6 subunit were selected to provide analyses of "hot spots" for soil and the contaminant plume in the groundwater in the vicinity of the HRL, as discussed below. This provides a conservative bias to the 95 percent UCL for certain contaminants. For a contaminant of concern, specific to a subunit, one-half the sample quantitation limit (SQL) (DOE-RL 1992) was used in the calculations when a contaminant of concern was not detected in a sample. These are reported at one-half the SQL (*i.e.*, noted with a U qualifier) in all tables in this section. Anywhere PCB's were detected, the measured concentrations or one-half the SQL, were summed for all the Arochlors detected at that subunit.

Phase I soil data used in the calculations were taken from DOE-RL (1990) and Phase II soil data is presented in appendix D.

95 percent UCL was calculated as follows (Hines and Montgomery, 1980):

95% UCL	=	Sample average + $t_{\alpha, df}$ (sample standard deviation/square root (n))
n	=	sample size
t	=	Student's t statistic for α, df (*i.e.*; degrees of freedom)

where:

α	=	0.05
df	=	n-1

The 95 percent UCL's for soil contaminants are summarized in table V-1. The data used for calculating the UCL's is provided in tables V-2, V-3, and V-4 for the UN-1100-6 subunit, the Ephemeral Pool, and HRL, respectively.

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Table IV-1. Summary of Statistical Calculation Information for Soils.

Location	Contaminant	Sample Mean Concentration mg/kg	Sample Standard Deviation mg/kg	Sample Number	95% UCL mg/kg
Ephemeral Pool	Chlordane	1.4	0.89	9	1.9
Ephemeral Pool	Total PCBs	6.5	14	9	15
UN-1100-6	BEHP	13,000	6,400	6	18,000
UN-1100-6	Chlordane	1.1	0.56	6	1.6
Horn Rapids Landfill	Arsenic	1.3	0.7	100	1.4
Horn Rapids Landfill	Beryllium	0.5	0.3	100	0.5
Horn Rapids Landfill	Chromium	44	170	55	83
Horn Rapids Landfill	Total PCBs	28	26	22	38

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Table IV-2. Summary of Phase 1 BEHP and Chlordane Surface Soil Sampling at UN-1100-6.

Sample No.	BEHP ug/kg	Q	Chlordane ug/kg	Q
S6150	25000000		1860	J
S6151	6700000		590	J
S6152	8900000		1780	J
S6153	11000000		820	J
S6154	13000000		960	J
S6155	14000000		670	J

BEHP - Bis(2-ethylhexyl)phthalate
* Chlordane is sum of alpha and gamma chlorane
Q - data qualifier

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Table IV-3. Summary of Phase 1 and Phase 2 Soil Sampling Data at the Ephemeral Pool.

SDG	Boring Loc.	Sample No.	Sample Depth (ft)	Total PCB's ug/kg	Q	Chlordane ug/kg	Q
PHASE I DATA							
S6150A	UNK	S6164A	0-0.5	4700		480	
	UNK	S6165A	0-0.5	300	J	1810	
PHASE II DATA							
B00G51	E1	B00G76	S	170	U	2800	
	E2	B00G51	S	42000		950	
	E3	B00G52	S	11000	J	700	
	E4	B00G53	S	165	U	540	
	E4	B00G54	S	170	U	730	
	E5	B00G77	S	175	U	2560	
	E6	B00G56	S	190	U	1710	

PCB's - polychlorinated biphenyls
* Chlordane is sum of alpha and gamma chlorane
Q - data qualifier

Table IV-4. Summary of Phase I and Phase II Soil Sampling at the Horn Rapids Landfill (sheet 1 of 8).

SDG	Boring Loc.	Sample No.	Sample Depth	Arsenic mg/kg	Q	Beryllium mg/kg	Q	Chromium mg/kg	Q	Total PCBs ug/kg	Q
PHASE I DATA								NA		NA	
AH168S/ A1307S		AH168S	0-0.5	0.65	J	0.46		NA		NA	
		AH169S	0-0.5	1.5	J	0.09	U	NA		NA	
		AH171S	0-0.5	2.1	J	0.42		NA		NA	
		AH172S	0-0.5	1.9		0.79		NA		NA	
		AH173S	0-0.5	0.67	J	0.105	U	NA		NA	
		AH174S	0-0.5	1.1	J	0.08	U	NA		NA	
		AH175S	0-0.5	1.6		0.08	U	NA		NA	
		AH176S	0-0.5	1.1		0.085	U	NA		NA	
		AH177S	0-0.5	1.7		0.22		NA		NA	
		AH178S	0-0.5	0.96	J	0.2		NA		NA	
		AH179S	0-0.5	1	J	0.085	U	NA		NA	
AH180S/ A1312S		AH180S	0-0.5	0.62		0.085	U	NA		NA	
		AH181S	0-0.5	2.3		0.83		NA		NA	
		AH184S	0-0.5	0.87		0.13		NA		NA	
		AH185S	0-0.5	3.6		0.67		NA		NA	
AH186S		AH186S	0-0.5	1.1		0.09	U	NA		NA	
AH186S		AH187S	0-0.5	1.3		0.085	U	NA		NA	
		AH188S	0-0.5	1.1		0.09	U	NA		NA	

Table IV-4. Summary of Phase I and Phase II Soil Sampling at the Horn Rapids Landfill (sheet 2 of 8).

SDG	Boring Loc.	Sample No.	Sample Depth	Arsenic mg/kg	Q	Beryllium mg/kg	Q	Chromium mg/kg	Q	Total PCBs ug/kg	Q
		AH189S	0-0.5	1.8		0.095	U	NA		NA	
		AH190S	0-0.5	2.1		0.18	U	NA		NA	
		AH191S	0-0.5	1.4		0.08	U	NA		NA	
		AH192S	0-0.5	1.5		0.08	U	NA		NA	
		AH193S	0-0.5	1.2		0.09	U	NA		NA	
		AH194S	0-0.5	1.1		0.095	U	NA		NA	
		AH195S	0-0.5	1.8		0.095	U	NA		NA	
		AH196S	0-0.5	1.8		0.085	U	NA		NA	
		AH197S	0-0.5	1.7		0.085	U	NA		NA	
		AH198S	0-0.5	2.2		0.09	U	NA		NA	
		AH199S	0-0.5	1.3		0.085	U	NA		NA	
		AH200S	0-0.5	1.5		0.08	U	NA		NA	
		AH201S	0-0.5	0.92		0.07	U	NA		NA	
		AH202S	0-0.5	1.9		0.08	U	NA		NA	
		AH203S	0-0.5	0.71		0.07	U	NA		5000	J
		AH204S	0-0.5	1.9		0.08	U	NA		NA	
		AH205S	0-0.5	1.8		0.09	U	NA		NA	

Table IV-4. Summary of Phase I and Phase II Soil Sampling at the Horn Rapids Landfill (sheet 3 of 8).

SDG	Boring Loc.	Sample No.	Sample Depth	Arsenic mg/kg	Q	Beryllium mg/kg	Q	Chromium mg/kg	Q	Total PCBs ug/kg	Q
AH206S		AH206S	0-0.5	1.9		0.62		NA		NA	
		AH207S	0-0.5	1.2	J	1.1		NA		NA	
		AH208S	0-0.5	1.6	J	1		NA		NA	
		AH209S	0-0.5	1.2	J	0.94		NA		NA	
		AH211S	0-0.5	1.9	J	0.85		NA		NA	
		AH212S	0-0.5	1.8	J	0.98		NA		NA	
		AH213S	0-0.5	1.4	J	1		NA		NA	
		AH214S	0-0.5	2.1	J	0.52		NA		NA	
		AH215S	0-0.5	NR		NR		NA		NA	
A1615S	HRL-2	A1802S	0-2.5	1.2		0.42		9		NA	
		A1804S	5.1-7.9	1.3	J	0.52		6.6	J	NA	
		A1805S	5.1-7.9	1.1	J	0.55		6	J	NA	
		A1807S	13.9-16.2	0.67	J	0.57		5.1	J	NA	
		A1810S	13.9-16.2	0.67	J	0.55		7.3	J	NA	
A1901S	HRL-3	A2002S	0-2.5	2.2		0.59		13.2		NA	
		A2004S	4.6-7.5	1.3		0.56		7.6	J	NA	
		A2005S	4.6-7.5	1.8		0.69		6.6	J	NA	
		A2007S	10.8-13	1.4	J	0.62		4.6		NA	
A1901S	HRL-3	A2009S	14.5-17	1.4		0.78		7	J	NA	

Table IV-4. Summary of Phase I and Phase II Soil Sampling at the Horn Rapids Landfill (sheet 4 of 8).

SDG	Boring Loc.	Sample No.	Sample Depth	Arsenic mg/kg	Q	Beryllium mg/kg	Q	Chromium mg/kg	Q	Total PCBs ug/kg	Q
A1912S	HRL-4	A2202S	0-2.8	0.82	J	0.85		4.1		65000	J
		A2204S	5.4-8	1.5		0.97		7.4		NA	
		A2205S	5.4-8	1.1		0.87		6.2		NA	
		A2207S	10.5-13.6	1		1.1		10		NA	
		A2209S	14.6-16.9	1.7		1.1		1250		NA	
A1501W	HRL-5	A1502S	0-2.1	1.1	J	0.58		5.7	J	NA	
		A1503S	3.8-6	0.56	J	0.54		4.1	J	NA	
		A1504S	0.4-8.6	0.71	J	0.71		5.2	J	NA	
		A1506S	9.4-11.6	0.79	J	0.8		6.1	J	NA	
		A1507S	9.4-11.6	0.79	J	0.66		6.2	J	NA	
		A1509S	13.1-15.5	0.76	J	0.73		81.5	J	NA	
	HRL-6	A1601S	2.4-4.8	0.67	J	0.38		7.9	J	NA	
		A1602S	4.8-7.1	0.81	J	0.58		7.8	J	NA	
		A1604S	7.1-9.4	0.72	J	0.48		4.8	J	NA	
		A1606S	9.4-11.6	0.91	J	0.33		5.8	J	NA	
		A1607S	11.6-13.9	0.57	J	0.59		13.7	J	NA	
		A1608S	11.6-13.9	0.72	J	0.52		8	J	NA	
A2214S	HRL-7	A2301S	0-2.5	1.3	J	0.69		8.8		NA	
		A2303S	4.8-7.2	0.94	J	0.28		7.6		NA	

Table IV-4. Summary of Phase I and Phase II Soil Sampling at the Horn Rapids Landfill (sheet 5 of 8).

SDG	Boring Loc.	Sample No.	Sample Depth	Arsenic mg/kg	Q	Beryllium mg/kg	Q	Chromium mg/kg	Q	Total PCBs ug/kg	Q
A2214S	HRL-7	A2304S	4.8-7.2	0.82	J	0.54		9.7		NA	
		A2306S	8.9-11.2	4.2	J	0.76		6.5		NA	
		A2310S	12.7-15.1	0.97	J	0.61		9.1		NA	
A1401W	HRL-8	A1402S	0-2.5	1		0.95		16.2		NA	
		A1404S	5.9-7.4	0.73		0.73		11.4		NA	
		A1406S	8.7-10.9	0.2		1		284		NA	
		A1408S	10.9-12.8	0.45		0.89		72		NA	
		A1409S	15-17.3	1.1		1		119		NA	
A1615S	HRL-9	A1701S	0-2.5	0.76	J	0.44		5	J	NA	
		A1704S	3.7-4.6	0.46	J	0.51		24.9	J	NA	
		A1706S	6.8-9.1	0.58	J	0.62		14	J	NA	
		A1707S	6.8-9.1	0.37	J	0.48		13.2	J	NA	
		A1709S	10.9-13.1	0.48	J	0.42		4.7	J	NA	
A1901S	HRL-10	A1901S	0-2.3	1.9		0.37		10.8	J	NA	
		A1902S	2.3-4	1.7		0.61		17.6	J	NA	
		A1905S	6.9-9.1	1.5		0.69		9.9	J	NA	
		A1906S	6.9-9.1	1.8		0.6		9.6	J	NA	

Table IV-4. Summary of Phase I and Phase II Soil Sampling at the Horn Rapids Landfill (sheet 6 of 8).

SDG	Boring Loc.	Sample No.	Sample Depth	Arsenic mg/kg	Q	Beryllium mg/kg	Q	Chromium mg/kg	Q	Total PCBs ug/kg	Q
PHASE II DATA											
WHC 23	TP-11	B00Z59	4	4.1		0.115	U	85.7		NA	
WHC 28	TP-3B	B00ZT3	7-7.5	R		R		4.9	J	NA	
	TP-3B	B00ZT4	7-7.5	R		R		4.3	J	NA	
	TP-3A	B00ZT7	5	R		R		3.7	J	NA	
	TP-3A	B00ZT8	10	R		R		9.9	J	NA	
	TP-4/5	B00ZV1	5	R		R		3.2	J	NA	
	TP-4/5	B00ZV2	12	R		R		133	J	NA	
WHC 29	TP-8	B00ZV3	5	0.74	B	0.55	B	19.8		NA	
WHC 27	TP-7	B00ZT2	5	2.9	J	0.115	U	9.8		NA	
WHC 23	TP-1	B00ZT0	5	NA		NA		NA		NA	
	TP-1	B00ZT1	9	NA		NA		NA		NA	
WHC 30	B5-2	B00ZX5	1	NA		NA		NA		NA	
WHC 31	B5-3	B00ZX7	S	NA		NA		NA		NA	
	B5-3	B00ZY0	1'	NA		NA		NA		NA	
WHC 30	B4-1	B00ZW6	S	NA		NA		NA		NA	
	B4-1	B00ZW7	1	NA		NA		NA		NA	
WHC 31	B5-3	B00ZX9	S	NA		NA		NA		NA	
WHC 6	B5-3	B00GB0	0-1	1.2	J	0.55	B	NA		NA	
WHC 6	B5-3	B00GB1	1-2	1.2	J	0.48	B	NA		NA	

Table IV-4. Summary of Phase I and Phase II Soil Sampling at the Horn Rapids Landfill (sheet 7 of 8).

SDG	Boring Loc.	Sample No.	Sample Depth	Arsenic mg/kg	Q	Beryllium mg/kg	Q	Chromium mg/kg	Q	Total PCBs ug/kg	Q
	B5-2	B00GB2	0-1	0.86	J	0.42	B	NA		NA	
	B5-2	B00GB3	1-2	0.76	J	0.42	B	NA		NA	
	B4-1	B00GB4	0-1	1.8	J	1	B	NA		NA	
	B4-1	B00GB5	0-1	1.8	J	1.1	B	NA		NA	
	B4-1	B00GB7	1-2	1.2	J	0.77	B	NA		NA	
	PCB-1	B00G92	0-1	NA		NA		NA		49000	J
	PCB-1	B00G93	1-2	NA		NA		NA		41000	J
	PCB-2	B00G94	0-1	NA		NA		NA		80000	J
	PCB-2	B00G95	1-2	NA		NA		NA		100,000	J
	PCB-3	B00G96	0-1	NA		NA		NA		6100	J
	PCB-3	B00G97	1-2	NA		NA		NA		15000	J
	PCB-4	B00G98	0-1	NA		NA		NA		21000	J
	PCB-4	B00G99	1-2	NA		NA		NA		1500	J
WHC 30	PCB-2A	B00ZV4	1	NA		NA		NA		8500	B
	PCB-2A	B00ZV5	1.5	NA		NA		NA		12000	B
	PCB-3A	B00ZV6	S	NA		NA		NA		3500	B
	PCB-3A	B00ZV7	1	NA		NA		NA		23000	B
	PCB-3A	B00ZV8	20"	NA		NA		NA		9700	B
	PCB-4A	B00ZV9	S	NA		NA		NA		16000	B
WHC 30	PCB-2A	B00ZX6	1.5	NA		NA		NA		2300	B

Table IV-4. Summary of Phase I and Phase II Soil Sampling at the Horn Rapids Landfill (sheet 8 of 8).

SDG	Boring Loc.	Sample No.	Sample Depth	Arsenic mg/kg	Q	Beryllium mg/kg	Q	Chromium mg/kg	Q	Total PCBs ug/kg	Q
	PCB-4A	B00ZW1	S	NA		NA		NA		36000	B
	PCB-4A	B00ZW2	1	NA		NA		NA		39000	B
	PCB-1A	B00ZW3	S	NA		NA		NA		20000	B
	PCB-1A	B00ZW4	1	NA		NA		NA		29000	B
	PCB-1A	B00ZW5	1.5	NA		NA		NA		43000	B

PCB's - polychlorinated biphenyls
Q - data qualifier

Table IV-5. Summary of Statistical Calculation Information for Groundwater at Horn Rapids Landfill.

Contaminant, units	Sample Mean	Sample Standard Deviation	95% UCL of Mean Conc.	Sample Number
TCE, mg/L	71	13	75	39
NO3-N, mg/L	43	8	45	58
Alpha, pCi/L	4.3	3	5	49
Beta, pCi/L	60	21	65	53

TCE - Trichloroethene
UCL - Upper confidence limit

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Table IV-6. Summary of Groundwater Sampling Data (Non-Radioactive) at Horn Rapids Landfill. (sheet 1 of 2)

Well	Round	Trichloroethene (mg/L)	Nitrate as nitrogen (mg/L)
MW-10	1	--	38.4
	2	--	36.9
	3	--	42.1
	4	--	38.3
	5	--	39
	6	--	38
	7	--	47
	7.5	--	38
	8	--	42
	9	--	43
MW-11	1	--	40.6
	2	--	40.5
	3	--	47.8
	4	--	46.5
	5	--	40
	6	--	46
	7	--	39
	7.5	--	48
	8	--	NA
	9	--	49
MW-12	1	92	49
	2	110	49
	3	80	56.7
	4	74	50.8
	5	79	50
	6	78	49
	7	69	51
	7.5	67	52
	8	69	NA
	9	58	52
MW-13	1	90	47
	2	91	44.9
	3	81	60.6
	4	69	46.7
	5	68	45
	6	70	46
	7	69	45
	7.5	66	43
	8	63	NA

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Table IV-6. Summary of Groundwater Sampling Data (Non-Radioactive) at Horn Rapids Landfill. (sheet 2 of 2)

Well	Round	Trichloroethene (mg/L)	Nitrate as nitrogen (mg/L)
MW-14	1	40	48.5
	2	73	50.9
	3	60	61
	4	66	49.9
	5	82	47
	6	75	47
	7	75	47
	7.5	76	48
	8	67	NA
	9	58	51
MW-15	1	84	32.3
	2	80	32.2
	3	82	44.3
	4	59	31
	5	60	30
	6	62	33
	7	70	30
	7.5	66	36
	8	64	NA
	9	34	24
MW-20	6	--	NA
	7	--	31
	7.5	--	31
	8	--	28
	9	--	35

-- Data not used in statistical calculations
NA Not available

Table IV-7. Summary of Groundwater Sampling Data (Radioactive) at Horn Rapids Landfill. (sheet 1 of 2)

Well	Round	Alpha (pCi/L)	Beta (pCi/L)
MW-10	1	11.9	30.2
	2	<2.2	85.2
	3	<0	95.4
	4	6.6	88.9
	5	<2	63
	6	<3	62
	7	<1	18
	7.5	2.9	43
	8	<2	48
	9	NA	NA
MW-11	1	12.2	35.2
	2	<2.4	86.5
	3	6.6	74.7
	4	4.2	81
	5	<2	60
	6	<3	61
	7	<2	20
	7.5	<2	49
	8	9.6	60
	9	NA	NA
MW-12	1	7.6	34.6
	2	4.8	87.6
	3	NA	91
	4	6.5	77.6
	5	<2	61
	6	5.5	66
	7	NA	NA
	7.5	3.6	53
	8	<2	58
	9	NA	NA
MW-13	1	9.1	28.8
	2	4.1	71
	3	6.5	81.2
	4	5.8	85.8
	5	6.4	61
	6	<5	48
	7	NA	NA
	7.5	3.5	48
	8	2.9	51

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Table IV-7. Summary of Groundwater Sampling Data (Radioactive) at Horn Rapids Landfill. (sheet 2 of 2)

Well	Round	Alpha (pCi/L)	Beta (pCi/L)
MW-14	1	6.3	25.1
	2	4.9	89.4
	3	9.6	90.8
	4	9.2	89
	5	<3	70
	6	8.4	61
	7	NA	NA
	7.5	<2	46
	8	5.3	56
	9	NA	NA
MW-15	1	9.3	23.2
	2	<1.6	51.4
	3	3.7	63.6
	4	5	57.6
	5	<2	46
	6	<5	50
	7	NA	NA
	7.5	2.2	41
	8	3.5	43
	9	NA	NA
MW-20	6	--	NA
	7	--	71
	7.5	--	53
	8	--	87
	9	--	NA

-- Data not used in statistical calculations
NA Not available

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Table IV-8. TAL Parameter UTLs for Background Soils (mg/kg). (Sheet 1 of 2)

Parameter	Operable Unit Specific Background									
	0-2 ft deep					>2 ft deep[1]				
	$\bar{X}$	s	n	d	UTL	$\bar{X}$	s	n	d	UTL
aluminum	6703	943	8	8	8,710	4,270	698	11	11	6,236
antimony			8	0	3.70*			11	0	3.1*
arsenic	1.51	0.78	8	8	3.99	1.0	0.67	11	10	2.92**
barium	73.5	14.6	8	8	120	90.8	51.5	11	11	236
beryllium	0.32	0.13	8	7	0.74**	0.11	0.06	11	2	0.27**
cadmium	0.24	0.15	8	2	0.70**			11	0	0.36*
calcium	3073	845.2	8	8	5,130	5,443	848	11	11	7,830
chromium	9.19	1.18	8	8	12.9	13.5	12.01	11	11	47.3
cobalt	10.0	2.42	8	8	17.7	12.8	1.44	11	11	16.8
copper	11.1	2.50	8	8	19.1	16.09	1.22	11	11	19.5
iron	19,225	3,728	8	8	31,110	22,445	2,480	11	11	29,400
lead	5.04	2.38	8	8	12.6	2.8	0.85	11	11	5.0
magnesium	3,984	797	8	8	6,524	3,873	286	11	11	4,680
manganese	323	72.0	8	8	552	290	23.1	11	11	355
mercury			8	0	0.10*			11	0	0.1*
nickel	8.82	3.16	8	7	19.0**	10.8	35.4	11	11	28.0
potassium	1,318	186	8	8	1,910	843	115	11	11	986
selenium			8	0	0.39*			11	0	0.41*
silver	0.85	0.50	8	6	2.44**			21	0	0.54*

Table IV-8. TAL Parameter UTLs for Background Soils (mg/kg). (Sheet 2 of 2)

Parameter	Operable Unit Specific Background									
	0-2 ft deep					>2 ft deep[1]				
	$\bar{X}$	s	n	d	UTL	$\bar{X}$	s	n	d	UTL
sodium	103	43.5	8	3	242**	306	40.4	11	11	419
thallium			8	0	0.39*			11	0	0.41*
vanadium	44.4	12.4	8	8	83.9	70.4	15.6	11	11	115
zinc	38.9	7.30	8	8	62.2	41.1	3.33	11	11	50.4
cyanide			8	0	0.52*			11	0	0.51*

$\bar{X}$ - Mean.
s - standard deviation.
n - number of samples.
d - number of detects.
UTL - upper 95 percentile tolerance limit.
*Parameter was never detected in the respective background samples; therefore, the highest reported respective background SQL is substituted as a surrogate UTL.
**Some non-detects present, 1/2 SQL used as surrogate value for corresponding sample.
[1]Does not include saturated soils.

Table IV-9. TCL Parameter UTL's for Background Soils (μg/kg). (Sheet 1 of 7)

Parameter	Operable Unit Specific Background									
	>2 ft deep[1]					>2 ft deep[1]				
	$\bar{X}$	s	n	d	UTL	$\bar{X}$	s	n	d	UTL
Volatiles										
chloromethane			9	0	11			11	0	11
bromomethane			9	0	11			11	0	11
vinyl chloride			9	0	11			11	0	11
chloroethane			9	0	5			11	0	11
methylene chloride			9	0	5			11	0	5
acetone			9	0	43			11	0	22
carbon disulfide			9	0	5			11	0	5
1,1-dichloroethene			9	0	5			11	0	5
1,1-dichloroethane			9	0	5			11	0	5
1,2-dichloroethene			9	0	5			11	0	5
chloroform			9	0	5			11	0	5
1,2-dichloroethane			9	0	11			11	0	5
2-butanone			9	0	5			11	0	11
1,1,1-trichloroethane			9	0	5			11	0	5
carbon tetrachloride			9	0	11			11	0	5
vinyl acetate			9	0	5			11	0	11
bromodichloromethane			9	0	5			11	0	5
1,2-dichloropropane			9	0	5			11	0	5
cis-1,3-dichloropropene			9	0	5			11	0	5
trichloroethene			9	0	5			11	0	5

Table IV-9. TCL Parameter UTL's for Background Soils (μg/kg). (Sheet 2 of 7)

Parameter	Operable Unit Specific Background									
	>2 ft deep[1]					>2 ft deep[1]				
	$\bar{X}$	s	n	d	UTL	$\bar{X}$	s	n	d	UTL
dibromochloromethane			9	0	5			11	0	5
1,1,2-trichloroethane			9	0	5			11	0	5
benzene			9	0	5			11	0	5
trans-1,3-dichloropropene			9	0	5			11	0	5
bromoform			9	0	5			11	0	5
4-methyl-2-pentanone			9	0	11			11	0	11
2-hexanone			9	0	11			11	0	11
tetrachloroethene			9	0	5			11	0	5
1,1,2,2-tetrachloroethane			9	0	5			11	0	5
toluene			9	0	5			11	0	5
chlorobenzene			9	0	5			11	0	5
ethylbenzene			9	0	5			11	0	5
styrene			9	0	5			11	0	5
xylene(total)			9	0	5			11	0	5
Semivolatiles										
phenol			9	1	38,100			11	0	350
bis(2-chloroethyl)ether			9	0	690			11	0	350
2-chlorophenol			9	0	690			11	0	350
1,3-dichlorobenzene			9	0	690			11	0	350
1,4-dichlorobenzene			9	0	690			11	0	350
benzyl alcohol			9	0	690			11	0	350

Table IV-9. TCL Parameter UTL's for Background Soils (μg/kg). (Sheet 3 of 7)

Parameter	Operable Unit Specific Background									
	>2 ft deep[1]					>2 ft deep[1]				
	$\bar{X}$	s	n	d	UTL	$\bar{X}$	s	n	d	UTL
1,2-dichlorobenzene			9	0	690			11	0	350
2-methylphenol			9	0	690			11	0	350
bis(2-chloroisopropyl)ether			9	0	690			11	0	350
4-methylphenol			9	0	690			11	0	350
N-nitroso-di-n-propylamine			9	0	690			11	0	350
hexachloroethane			9	0	690			11	0	350
nitrobenzene			9	0	690			11	0	350
isophorone			9	0	690			11	0	350
2-nitrophenol			9	0	690			11	0	350
2,4-dimethylphenol			9	0	690			11	0	350
benzoic acid			9	0	2,792			11	0	1,700
bis(2-chloroethoxy)methane			9	0	690			11	0	350
2,4-dichlorophenol			9	0	690			11	0	350
1,2,4-trichlorobenzene			9	0	690			11	0	350
naphthalene			9	0	690			11	0	350
4-chloroaniline			9	0	690			11	0	350
hexachlorobutadiene			9	0	690			11	0	350
4-chloro-3-methylphenol			9	0	690			11	0	350
2-methylnaphthalene			9	0	690			11	0	350
hexachlorocyclopentadiene			9	0	690			11	0	350
2,4,6-trichlorophenol			9	0	690			11	0	350

Table IV-9. TCL Parameter UTL's for Background Soils (μg/kg). (Sheet 4 of 7)

Parameter	Operable Unit Specific Background									
	>2 ft deep[1]					>2 ft deep[1]				
	$\bar{X}$	s	n	d	UTL	$\bar{X}$	s	n	d	UTL
2,4,5-trichlorophenol			9	0	3,300			11	0	1,700
2-chloronaphthalene			9	0	690			11	0	350
2-nitroaniline			9	0	3,300			11	0	1,700
dimethylphthalate			9	0	690			11	0	350
acenaphthylene			9	0	690			11	0	350
2,6-dinitrotoluene			9	0	690			11	0	350
3-nitroaniline			9	0	3,300			11	0	1,700
acenaphthene			9	0	690			11	0	350
2,4-dinitrophenol			9	0	3,300			11	0	1,700
4-nitrophenol			9	0	3,300			11	0	1,700
dibenzofuran			9	0	690			11	0	350
2,4-dinitrotoluene			9	0	690			11	0	350
diethylphthalate			9	0	690			11	0	350
4-chlorophenyl-phenylether			9	0	690			11	0	350
fluorene			9	0	690			11	0	350
4-nitroaniline			9	0	3,300			11	0	1,700
4,6-dinitro-2-methylphenol			9	0	3,300			11	0	1,700
N-nitrosodiphenylamine (1)			9	0	690			11	0	350
4-bromophenyl-phenylether			9	0	690			11	0	350
hexachlorobenzene			9	0	690			11	0	350

Table IV-9. TCL Parameter UTL's for Background Soils (μg/kg). (Sheet 5 of 7)

Parameter	Operable Unit Specific Background									
	>2 ft deep[1]					>2 ft deep[1]				
	$\bar{X}$	s	n	d	UTL	$\bar{X}$	s	n	d	UTL
pentachlorophenol			9	0	3,300			11	0	1,700
phenanthrene			9	0	690			11	0	350
anthracene			9	0	690			11	0	350
di-n-butylphthalate			9	0	690			11	0	350
fluoranthene			9	0	690			11	0	350
pyrene			9	0	690			11	0	350
butylbenzylphthalate			9	0	690			11	0	350
3,3'-dichlorobenzidine			9	0	690			11	0	710
benzo(a)anthracene			9	0	690			11	0	350
chrysene			9	0	690			11	0	350
bis(2)-ethylhexyl)phthalate			9	0	690			11	0	350
di-n-octylphthalate			9	0	690			11	0	350
benzo(b)fluoranthene			9	0	690			11	0	350
benzo(k)fluoranthene			9	0	690			11	0	350
benzo(a)pyrene			9	0	690			11	0	350
indeno(1,2,3-cd)pyrene			9	0	690			11	0	350
dibenz(a,h)anthracene			9	0	690			11	0	350
benzo(g,h,i)perylene			9	0	690			11	0	350
Pesticides										
alpha-BHC			9	0	17			11	0	17
beta-BHC			9	0	17			11	0	17

Table IV-9. TCL Parameter UTL's for Background Soils (μg/kg). (Sheet 6 of 7)

Parameter	Operable Unit Specific Background									
	>2 ft deep[1]					>2 ft deep[1]				
	$\bar{X}$	s	n	d	UTL	$\bar{X}$	s	n	d	UTL
delta-BHC			9	1	14			11	0	17
gamma-BHC (indane)			9	0	17			11	0	17
heptachlor			9	0	17			11	0	17
aldrin			9	0	17			11	0	17
heptachlor epoxide			9	0	17			11	0	17
endosulfan I			9	0	17			11	0	17
dieldrin			9	0	33			11	0	34
4,4'-DDE			9	0	33			11	0	34
endrin			9	0	33			11	0	34
endosulfan II			9	0	33			11	0	34
4,4'-DDD			9	0	33			11	0	34
Aniline			9	0	33			11	0	34
endosulfan sulfate			9	0	33			11	0	34
4,4'-DDT			9	0	33			11	0	34
methoxychlor			9	0	170			11	0	170
endrin ketone			9	0	33			11	0	34
alpha-chlordane			9	0	170			11	0	170
gamma-chlordane			9	1	160			11	0	170
toxaphene			9	0	330			11	0	340
aroclor-1016			9	0	170			11	0	170
aroclor-1221			9	0	170			11	0	170

Table IV-9. TCL Parameter UTL's for Background Soils (μg/kg). (Sheet 7 of 7)

Parameter	Operable Unit Specific Background									
	>2 ft deep[1]					>2 ft deep[1]				
	$\bar{X}$	s	n	d	UTL	$\bar{X}$	s	n	d	UTL
aroclor-1232			9	0	170			11	0	170
aroclor-1242			9	0	170			11	0	170
aroclor-1248			9	0	170			11	0	170
aroclor-1254			9	0	330			11	0	340
aroclor-1260			9	0	330			11	0	340

X = Mean
s = standard deviation
n = number of samples
d = number of detects
UTL = upper 95 percentile tolerance limit
[1]Does not include saturated soils.
NA = Not analyzed for.

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Table 3-1. Maximum Concentrations for Detected Compounds, Compared to UTLs for Surface Soils (0 to 2 feet) from Phase I and II Data. (Sheet 1 of 3)

Parameter	Surface Soil UTL	Max Value 1100-1	Max Value 1100-2	Max Value 1100-3	Max Value 1100-4	Max Value 1100-6	Max Value HRL	Max Value EP
INORGANIC COMPOUNDS (mg/kg)								
Aluminum	9708.78	7130	8300	**9770**	7320	8880	**15800**[b]	5810
Antimony	3.70	ND	ND	ND	ND	ND	**15.6**[b]	ND
Arsenic	3.89	3.2	2.3	3.4	2.6	2.7	3.6	2.6
Barium	120.10	80.8	91.5	106	80.9	99.2	**1320**	72.3
Beryllium	0.74	ND	0.51	0.44	0.25	0.4	**1.3**	0.26
Cadmium	0.70	ND	ND	ND	ND	ND	**2**	ND
Calcium	5128.25	**8690**	**6480**	**6810**	**9710**	4180	**86700**	3030
Chromium	12.94	10.6	**16.8**	14	11.3	10.9	**17.1**	7.7
Cobalt	17.74	13.2	13.9	14.1	11.4	12.2	15.9[b]	10.3
Copper	19.11	**37.9**	**24.4**	**22.8**	14.4	16.2	**58.8**	15.2
Iron	31110.42	21100	26800	25500	23300	23500	29800	18900
Lead	12.64	**266**	**94.6**	**26.4**	5	**22.1**	**482**	54.2
Magnesium	6523.58	6430	5210	6170	4650	4840	**25000**	4250
Manganese	552.27	484	385	438	330	383	423	354
Mercury	0.10	**0.22**	ND	ND	ND	ND	**1.3**	ND
Nickel	19.00	**20.9**	15	14.9	9.8	12.9	**174**	12.5
Potassium	1909.71	850	**2060**	1730	1210	**1950**	**2230**	1140
Selenium	0.39	ND	ND	ND	ND	ND	**0.97**[b]	ND
Silver	2.44	ND	ND	ND	ND	ND	**4.5**	ND
Sodium	241.52	**479**	**374**	**495**	**413**	143	**5140**[b]	216
Thallium	0.39	ND	**0.48**	**.40**	ND	ND	**.42**	ND
Vanadium	83.93	32.5	73.4	70.2	61.8	60.8	**87.3**	44.4
Zinc	62.20	**92**	56.6	59	45.9	**111**	**408**	**67.5**
Cyanide	0.52	ND	ND	ND	ND	ND	**0.56**	ND
VOLATILE ORGANIC COMPOUNDS (µg/kg)								
1,1,1-trichloroethane	5	ND	2	ND	ND	**35**	ND	ND
1,1-dichloroethene	5	ND	**5**	ND	ND	ND	ND	ND
2-butanone	11	ND	**10**[c]	**17**[c]	ND	**68**[c]	**35**[c,b]	ND
2-hexanone	11	ND	ND	ND	ND	**53**	ND	ND
Acetone	43	ND	**19**[c]	**92**[c]	**6**[c]	**190**[c]	ND	ND
Chlorobenzene	5	ND	**6**	ND	ND	ND	ND	ND
Methylene chloride	5	ND	**42**[c]	**120**[c]	ND	**20**[c]	**43**[c]	**4**[c]
Tetrachloroethene	5	ND	**35**	ND	ND	ND	**5**	ND
Toluene	5	ND	**11**[c]	**6**[c]	ND	**8**[c]	**16**[c]	ND
Trichloroethene	5	ND	**6**	ND	ND	ND	ND	ND
Xylene	5	ND	**6**	ND	ND	ND	ND	ND

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Table 3-1. Maximum Concentrations for Detected Compounds, Compared to UTLs for Surface Soils (0 to 2 feet) from Phase I and II Data. (Sheet 2 of 3)

Parameter	Surface Soil UTL	Max Value 1100-1	Max Value 1100-2	Max Value 1100-3	Max Value 1100-4	Max Value 1100-8	Max Value HRL	Max Value EP
SEMI-VOLATILE ORGANIC COMPOUNDS (µg/kg)								
1,2,4-trichlorobenzene	690	ND	120	ND	ND	83	ND	ND
1,3-dichlorobenzene	690	ND	120	ND	ND	ND	ND	ND
1,4-dichlorobenzene	690	ND	120	ND	ND	86	ND	ND
2-chlorophenol	690	ND	230	ND	ND	170	ND	ND
2-methylnaphthalene	690	ND	ND	ND	ND	ND	**7100**	ND
2,6-dinitrotoluene	690	ND	ND	ND	ND	ND	210[b]	ND
4-chloro-3-methylphenol	690	ND	190	ND	ND	95	ND	ND
4-nitrophenol	3300	ND	ND	ND	ND	ND	**3800**	ND
Acenaphthene	690	ND	110	ND	ND	77	ND	ND
Anthracene	690	ND	ND	ND	ND	ND	70[b]	ND
Benzoic acid	2790	ND	ND	ND	ND	ND	220[a]	ND
Benzo(a)anthracene	690	ND	ND	120	ND	ND	180	ND
Benzo(a)pyrene	690	ND	110	150	ND	ND	200	ND
Benzo(b)fluoranthene	690	150	79	180	ND	ND	250	ND
Benzo(g,h,i)perylene	690	ND	330	230	ND	ND	150	ND
Benzo(k)fluoranthene	690	ND	120	160	ND	ND	190	ND
Bis(2-ethylhexyl)phthalate	690	390[a]	280[a]	940[a]	ND	**2.5E+07**	ND	ND
Butylbenzylphthalate	690	ND	ND	ND	ND	ND	99[a]	ND
Chrysene	690	100	ND	170	ND	ND	240	ND
Dibenzofuran	690	ND	ND	ND	ND	ND	130	ND
Dibenz(a,h)anthracene	690	ND	300	110	ND	ND	ND	ND
Di-n-butyl phthalate	690	ND	ND	ND	ND	ND	65[b]	ND
Di-n-octyl phthalate	690	ND	67[a]	ND	ND	**46000**	ND	ND
Fluoranthene	690	110	ND	220	ND	ND	180	ND
Indeno(1,2,3-cd)pyrene	690	ND	300	230	ND	ND	170	ND
Naphthalene	690	ND	ND	ND	ND	ND	1100	ND
N-nitroso-di-n-propylamine	690	ND	110	ND	ND	78	ND	ND
Pentachlorophenol	3300	ND	ND	99	ND	ND	980[b]	ND
Phenanthrene	690	ND	ND	130	ND	ND	380[b]	ND
Phenol	39100	ND	94	ND	ND	ND	ND	ND
Pyrene	690	97	120	250	ND	94	220	ND

Table 3-1. Maximum Concentrations for Detected Compounds, Compared to UTLs for Surface Soils (0 to 2 feet) from Phase I and II Data. (Sheet 3 of 3)

Parameter	Surface Soil UTL	Max Value 1100-1	Max Value 1100-2	Max Value 1100-3	Max Value 1100-4	Max Value 1100-6	Max Value HRL	Max Value EP
PESTICIDES/PCBs (µg/kg)								
4,4"-DDE	33	6.8	**42**	ND	ND	**170**	**1200**	ND
4,4'-DDD	33	ND	3.6	ND	ND	ND	**260**	ND
4,4'-DDT	33	ND	**57**	ND	ND	ND	**520**[b]	ND
Aldrin	17	ND	9.6[a]	1.1[a]	ND	9.6[a]	11[b]	ND
Alpha-chlordane	170	6.5	ND	ND	ND	**1000**	**770**[b]	**1100**[b]
Total PCBs	1510	290	300	150	ND	ND	**100550**	**42000**
Aroclor 1248	170	ND	ND	ND	ND	ND	**100000**[b]	ND
Aroclor 1260	330	290	300	150	ND	ND	260	**42000**[b]
Aroclor-1254	330	ND	ND	ND	ND	ND	280	ND
Beta-BHC	17	ND	ND	ND	ND	ND	**84**[b]	ND
Delta-BHC	14	ND	ND	ND	ND	13	ND	ND
Dieldrin	33	ND	1.3	ND	ND	2.3	**1200**[b]	ND
Endosulfan II	33	ND	ND	ND	ND	ND	**110**[b]	160
Endosulfan sulfate	33	ND	ND	ND	ND	ND	19	ND
Endrin	33	ND	ND	ND	ND	ND	**280**[b]	**39**
Endrin ketone	33	ND	2	ND	ND	1.3	**140**[b]	ND
Gamma-BHC(Lindane)	17	ND	ND	ND	ND	0.77	1.8	ND
Gamma-chlordane	158	6.2	ND	ND	ND	**860**	82	**1700**[b]
Heptachlor	17	ND	1.2	ND	ND	**85**	ND	28
Methoxychlor	170	ND	ND	ND	ND	ND	140[b]	ND

ND - Contaminant not detected
UTL - Upper tolerance limit
[a]Concentration less than detection limit after blank-adjustment
[b]Phase II data

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Table IV-11. Maximum Concentrations for Detected Compounds Compared to UTL's for Subsurface Soils (> 2 feet) from Phase I and Phase II Data. (Sheet 1 of 2)

Parameter	Subsurface Soil UTL	Max Value 1100-1	Max Value 1100-2	Max Value 1100-3	Max Value 1100-4	Max Value 1100-6	Max Value HRL	Max Value EP
INORGANICS (mg/kg)								
Aluminum	6236	5860	7470	7480	6680	NS	17800[b]	NS
Antimony	3.1	ND	3	ND	ND	NS	15.8[b]	NS
Arsenic	2.82	3.2	1.8	1.8	5.8	NS	6.6	NS
Barium	236	85.9	98.8	85.9	98.7	NS	511[b]	NS
Beryllium	0.27	ND	ND	ND	0.93	NS	1.1[b]	NS
Cadmium	0.36	ND	ND	ND	ND	NS	2.4[b]	NS
Calcium	7830	6240	13000	9080	10600	NS	44800[b]	NS
Chromium	47.3	14.6	10.3	13.6	13.2	NS	1,250	NS
Cobalt	16.8	11.8	15.3	17.8	16.5	NS	42.5	NS
Copper	19.5	25	23.6	31.7	19.8	NS	1280[b]	NS
Cyanide	0.51	ND	ND	ND	ND	NS	0.56	NS
Iron	29400	25800	27100	31700	28700	NS	35200	NS
Lead	5	191	45.9	4.7	5.7	NS	854[b]	NS
Magnesium	4680	3860	4620	5290	4630	NS	7640[b]	NS
Manganese	355	249	366	381	329	NS	501[b]	NS
Mercury	0.1	0.39	ND	ND	ND	NS	0.44	NS
Nickel	26	9.5	13.8	11.3	10.7	NS	557	NS
Potassium	966	4880	1200	878	1030	NS	3820[b]	NS
Selenium	0.41	ND	ND	ND	ND	NS	0.38	NS
Silver	0.54	ND	ND	ND	2	NS	7.7	NS
Sodium	419	868	458	999	726	NS	2360[b]	NS
Thallium	0.41	ND	ND	ND	0.48	NS	0.46	NS
Vanadium	115	118	80.2	103	82.4	NS	101	NS
Zinc	50.4	100	54.9	68	63.8	NS	3,160[b]	NS
VOLATILE ORGANIC COMPOUNDS (µg/kg)								
2-butanone	11	8[a]	8[a]	11[a]	ND	NS	23[a]	NS
Acetone	22	26[a]	28[a]	29[a]	9[a]	NS	200	NS
Benzene	5	ND	ND	ND	ND	NS	0.3[b]	NS
Ethylbenzene	5	ND	2	ND	ND	NS	ND	NS
Methylene Chloride	5	ND	61[a]	16[a]	ND	NS	5[a]	NS
Tetrachloroethene	5	ND	18[b]	ND	ND	NS	4[b]	NS
Toluene	5	ND	3[a]	ND	ND	NS	ND	NS
SEMI-VOLATILE ORGANIC COMPOUNDS (µg/kg)								
1,2,4-trichlorobenzene	350	ND	ND	ND	ND	NS	230[b]	NS
1,4-dichlorobenzene	350	ND	ND	ND	ND	NS	170	NS
2-chlorophenol	350	ND	ND	ND	ND	NS	240[b]	NS
2,4-dinitrotoluene	350	ND	ND	ND	ND	NS	92	NS
4-chloro-3-methyphenol	350	ND	ND	ND	ND	NS	280	NS
4-nitrophenol	1700	ND	ND	ND	ND	NS	310	NS
Acenaphthene	350	ND	ND	ND	ND	NS	320[b]	NS
Benzoic Acid	1700	ND	ND	ND	ND	NS	160[a,b]	NS
Benzo(b)fluoranthene	350	74	ND	ND	ND	NS	ND	NS
Bis(2-ethylhexyl) phthalate	350	ND	3600[a]	950[a]	ND	NS	1,000[a]	NS
Di-n-butylphthalate	350	ND	37	ND	ND	NS	ND	NS
Di-n-octylphthalate	350	ND	ND	ND	ND	NS	270[a,b]	NS
Fluoranthene	350	110	ND	ND	ND	NS	ND	NS
N-nitro-di-n-propylamine	350	ND	ND	ND	ND	NS	170	NS
Pentachlorophenol	1700	ND	ND	ND	ND	NS	280	NS
Phenol	350	ND	ND	ND	ND	NS	330[b]	NS
Pyrene	350	84	290	ND	ND	NS	270[b]	NS

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Table IV-11. Maximum Concentrations for Detected Compounds Compared to UTL's for Subsurface Soils (> 2 feet) from Phase I and Phase II Data. (Sheet 2 of 2)

Parameter	Subsurface Soil UTL	Max Value 1100-1	Max Value 1100-2	Max Value 1100-3	Max Value 1100-4	Max Value 1100-6	Max Value HRL	Max Value EP
PESTICIDES (µg/kg)								
Aldrin	17	ND	18[a]	ND	ND	NS	5.5[a,b]	NS
Alpha-chlordane	170	1.3	ND	ND	ND	NS	13[b]	NS
4,4'-DDE	34	ND	**39**	ND	ND	NS	14	NS
4,4'-DDT	34	ND	**121**	ND	ND	NS	ND	NS
Beta BHC	17	ND	ND	ND	ND	NS	1.2[b]	NS
Dieldrin	34	ND	ND	ND	ND	NS	**90**[b]	NS
Endrin	34	ND	ND	ND	ND	NS	**120**[b]	NS
Endrin ketone	34	ND	22	ND	ND	NS	ND	NS
Heptachlor	17	ND	ND	0.58	ND	NS	ND	NS
Total PCB's	1530	ND	180	ND	ND	NS	**2640**	NS
Aroclor 1248	170	ND	ND	ND	ND	NS	**640**	NS
Aroclor 1254	340	ND	ND	ND	ND	NS	**2,000**[b]	NS
Aroclor 1260	340	ND	160	ND	ND	NS	ND	NS

Notes:
ND: contaminant not detected
UTL: upper tolerance limit
NS: no subsurface samples collected for analysis
[a]Concentration less than detection limit after blank - adjustment
[b]Phase 2 data

DATA REPORTING QUALIFIERS

The following is a summary of data reporting qualifiers and abbreviations used in the tables for this appendix.

B - Organic Samples: Indicates compound was found in the associated blank as well as in the sample.

Inorganic Samples: Indicates value is greater than the instrument detection limit and below the contract required detection limit.

J - Indicates an estimated value.

U - Indicates compound was analyzed for but not detected at the given detection limit. Values associated with a U qualifier are one-half the SQL.

R - Data has been rejected during the validation process.

ABBREVIATIONS

-- Data result not used (see groundwater discussion Section 2, Appendix E)

UCL - Upper confidence limit of 95 used in the statistical calculations.

SDG - Sample delivery group.

UNK - Location is unknown.

NA - Analysis not performed, not available, or not used in the risk assessment.

NR - Not requested for analysis.

*Chlordane - The concentrations reported for alpha and gamma chlordane were summed.

SQL - Sample quantitation limit.

S - Surface sample.

WHC - Westinghouse Hanford Company.

< - Indicated the radioactivity is less than the given count.

Q - Data qualifier indicating acceptability for use in risk assessment; (a blank indicates no associated qualifier).

1.1 UN-1100-6 SUBUNIT (DISCOLORED SOIL SITE)

Bis(2-ethylhexyl)phthalate (BEHP) and Chlordane

Alpha and gamma chlordane were summed for statistical calculations. Data for BEHP and chlordane were treated in the same way since their distributions on the site are similar. BEHP and chlordane were detected in samples A6150S to A6155S and were greater than any other detections. Because these samples are all in close proximity to each other, only data from these samples were used for statistical calculations. Data used in the calculations are provided in table E-2. The use of these data provides a conservatively biased estimate of the 95 percent UCL because low values or nondefects are not used.

1.2 EPHEMERAL POOL

Chlordane and PCB's

All data for these contaminants, collected from this site, were used in the calculations. The data are summarized in table E-3.

1.3 HRL

Arsenic and Beryllium

These contaminants are evenly distributed on the site. All data were included that were taken from the surface to a depth of 15 feet.

Chromium

In borehole HRL-4, chromium was found to be at a significantly higher concentration than any of the other samples on the site. In order to estimate the concentrations over the 15-foot soil column, data taken from all boreholes and trenches down to 15 feet were used in calculations. Data from auger holes and surface samples not associated with boreholes were not used to calculate the 95 percent UCL. These data provide a conservatively biased estimate of the 95 percent UCL for evaluation of chromium.

PCB's

Elevated levels of PCB were mostly found in close proximity to HRL-4, therefore the 95 percent UCL calculations used data from samples taken from this vicinity. Data used were from AH203, Borehole HRL-4 (0-2.8 feet), PCB-1 to PCB-4 and PCB-1A to PCB-4A.

The data for the HRL used to calculate the 95 percent UCL are presented in table E-4.

2.0 CALCULATION OF 95 PERCENT UCL FOR GROUNDWATER CONTAMINANTS

The 95 percent UCL's for contaminants in the groundwater in the vicinity of the HRL were calculated as described above. Two nonradioactive contaminants are evaluated. These contaminants are trichloroethene and nitrate. In addition, gross alpha and gross beta are evaluated because they have been detected at elevated concentrations in some sampling rounds as discussed in Section 5. For radioactive contaminants, actual net counts were used in the tables.

2.1 NONRADIOACTIVE CONTAMINANTS

Trichloroethene (TCE)

Data from MW-12 to MW-15 were used for statistics, because concentrations of TCE are consistently detected over MCL (5 mg/L) at these wells. The use of these data provide a conservatively biased 95 percent UCL of groundwater quality within the contaminant plume.

Nitrate (as Nitrogen)

Statistics are performed on data from MW-10 to MW-15 and MW-20 because nitrate was detected above MCL (10 mg/L) at these wells. Other data for nitrate were not used to calculate the 95 percent UCL. As indicated above, this provides a conservatively biased estimate of the groundwater quality within the contaminant plume.

The 95 percent UCL's are summarized in table E-5. The data used to calculate the 95 percent UCL's are presented in table E-6.

2.2 RADIOACTIVE CONTAMINANTS

Gross alpha and gross beta contamination have also been detected in the groundwater in the vicinity of HRL. As discussed in Chapter 5 of the risk assessment, most of the beta activity appears to be associated with Technetium-99. The 95 percent UCL's for gross alpha and gross beta activity are summarized in table E-5. Data from wells located within the contaminant plume were used to estimate conservatively biased 95 percent UCL's. In general, gross alpha activity exceeded 5 pCi/L or gross beta activity exceeded 50 pCi/L at the wells used for the calculation of the 95 percent UCL's. These activity levels are not MCL's, but are concentration limits with which the assumption of compliance with radionuclide MCL's may be assumed without further analysis.

The data used to calculate the 95 percent UCL's are presented in table E-7. The wells used to calculate the 95 percent UCL's for gross alpha are MW-10 to MW-15. The wells used to calculate the 95 percent UCL's for gross beta are MW-10 to MW-15 and MW-20.

3.0 UPPER TOLERANCE LIMIT

The tolerance interval is a statistical interval that contains at least a specified proportion, p, of the population with a specified degree of confidence, $100(1-\alpha)$ percent (Hahn and Meeker, 1991). Thus, the tolerance interval provides an estimate of the limits which define a proportion of the population, in contrast to the confidence interval which provides an estimate of a population parameter (*e.g.*, mean or variance). As the sample size, n, approaches infinity, the width of the tolerance interval approaches a finite range determined by the tolerance limits. In contrast, the width of a confidence interval approaches zero as n increases (Hines and Montgomery, 1980).

The UTL is an upper bound on the tolerance interval and, therefore, provides an estimate of the maximum expected value for the specified proportion of the population. This UTL is calculated using the equation:

$$UTL = X + Ks$$

where UTL is the upper tolerance limit, X is the sample mean, K is the tolerance factor, and s is the sample standard deviation. Values for K are found in appropriate tables in Hahn and Meeker, 1991, and are based on specified values for the population proportion (p), confidence ($1-\alpha$), and the number of samples (n) used to calculate the mean and standard deviation.

For this risk assessment, the UTL was calculated for surface soils (1 to 2 feet) and subsurface soils (> 2 feet) to provide a representation of analyte concentrations that could be expected in samples that have been unaffected by activities associated with the 1100-EM-1 Operable Unit (background). Comparison of analyte concentrations in samples collected from within the operable unit with the appropriate analyte UTL determined which analytes are greater than background and must be considered contaminants.

The UTL's were calculated to contain 95 percent of the population (p) with a 95 percent degree of confidence (α=0.05). Tables IV-8 and IV-9 contain the sample mean (X), sample standard deviation (s), number of background samples analyzed (n), the number of background samples in which the analyte is detected (d), and the UTL for the target analyte list (TAL) and target compound list (TCL) analytes, respectively. Background sample data used to generate the statistical values are contained in appendix I of the 1100-EM-1 Phase I RI (DOE-RL, 1990). The samples used to calculate UTL's for surface soils are: AH217S, AH218S, AH222S, AH224S, AH225S, A0201S, A0101, A0301S. The samples used to calculate UTL's for subsurface soils are A0203S, A0204S, A0206S, A0208S, A0209S, A0210S, A0302, A0306, A0104, A0105, A0109S. For those analytes not detected in any sample, the highest sample quantitation limit (SQL) was used as the UTL. If an analyte was detected in at least one sample, the mean and standard deviation were calculated; one-half of the SQL is used as a surrogate sample value for those samples where the analyte was reported as nondetectable in this case. This is consistent with DOE-RL, 1992.

Tables IV-10 and IV-11 provide a comparison between the UTL and the maximum concentration for contaminants detected in surface and subsurface soil samples, respectively,

from the various subunits. These tables incorporate data that was collected during the Phase I and Phase II Operable Unit RI.

4.0 REFERENCES

DOE/RL, 1990.

DOE/RL, 1992.

Hahn and Meeker, 1991

Hines, W.W., and D.C. Montgomery, 1980, *Probability and Statistics in Engineering and Management Science*, 2nd ed., John Wiley & Sons, Inc., New York, New York.

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APPENDIX V

UPTAKE/BIOKINETIC MODEL FOR LEAD

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1100-3 UBK Results for Default Parameters Assuming a Soil Lead Concentration of 26.4 (mg/kg)

ABSORPTION METHODOLOGY: Non-Linear Active-Passive

AIR CONCENTRATION: 0.200 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: Multiple Source Analysis

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	26.4	27.4
1-2	26.4	27.4
2-3	26.4	27.4
3-4	26.4	27.4
4-5	26.4	27.4
5-6	26.4	27.4
6-7	26.4	27.4

Additional Dust Sources: None DEFAULT
Soil contribution conversion factor: 0.28
Air contribution conversion factor: 100.0

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 7.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	1.81	4.19	0.81
1-2:	1.48	4.84	0.81
2-3:	1.49	5.37	0.81
3-4:	1.53	5.29	0.81
4-5:	1.57	5.22	0.81
5-6:	1.60	5.53	0.81
6-7:	1.66	5.92	0.81

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.94	0.40	0.00	0.04
1-2:	2.96	1.00	0.00	0.07
2-3:	3.40	1.04	0.00	0.12
3-4:	3.29	1.06	0.00	0.13
4-5:	3.18	1.10	0.00	0.13
5-6:	3.38	1.16	0.00	0.19
6-7:	3.74	1.18	0.00	0.19

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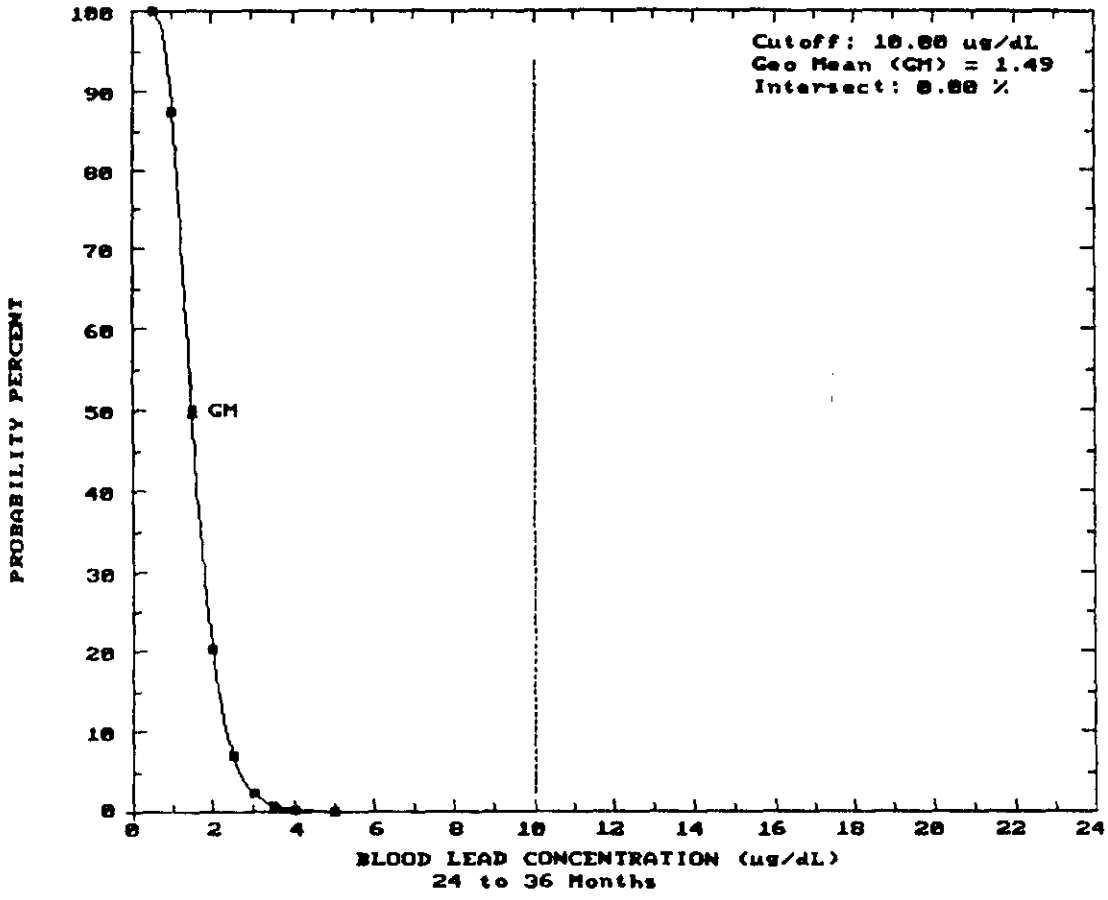

1100-3 UBK Results for Default Parameters Assuming a Soil Lead Concentration of 26.4 (mg/kg)

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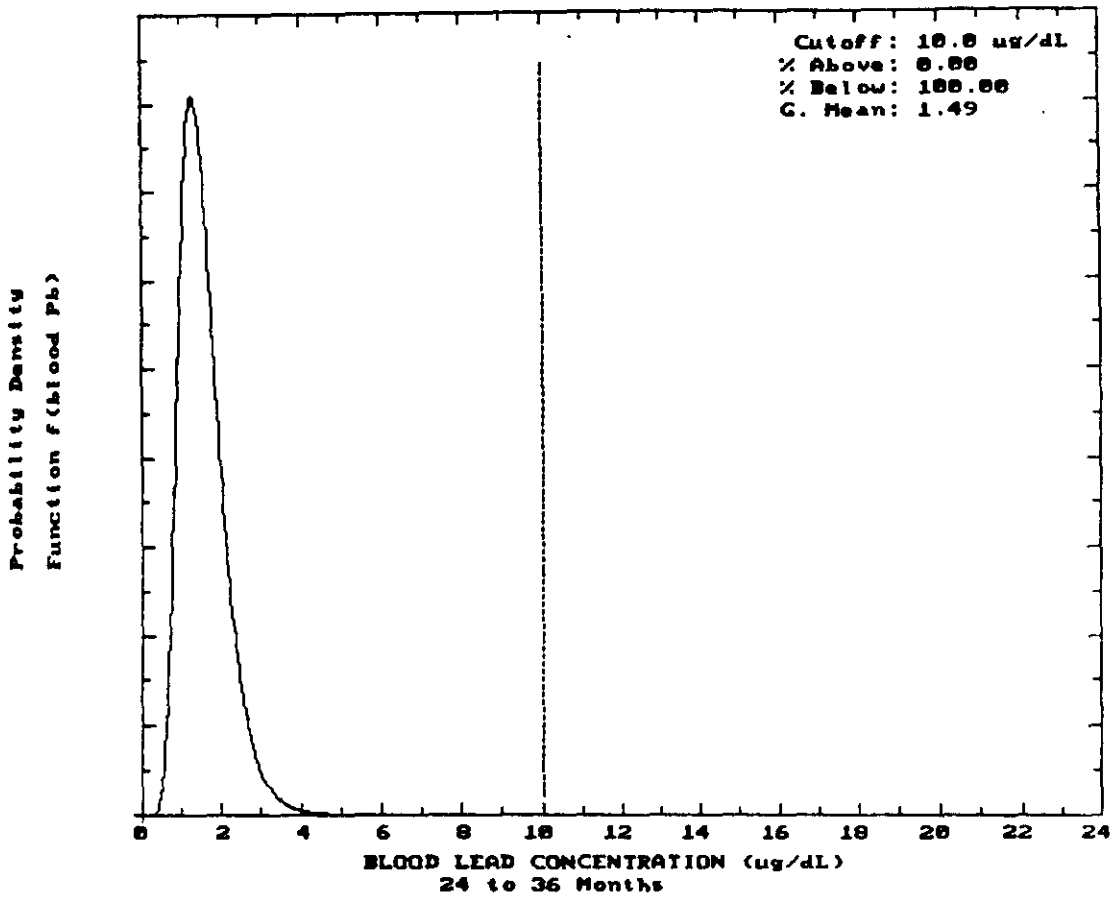

1100-3 UBK Results for Default Parameters Assuming a Soil Lead Concentration of 26.4 (mg/kg)

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1100-3: UBK Results for Default Parameters with Ingestion of Homegrown Vegetables for a 2-Year Old

ABSORPTION METHODOLOGY: Non-Linear Active-Passive

AIR CONCENTRATION: 0.200 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: daily Pb consumption by year as follows:

0-1:	5.88	ug Pb/day
1-2:	5.92	ug Pb/day
2-3:	7.16	ug Pb/day
3-4:	6.57	ug Pb/day
4-5:	6.36	ug Pb/day
5-6:	6.75	ug Pb/day
6-7:	7.48	ug Pb/day

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: Multiple Source Analysis

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	26.4	27.4
1-2	26.4	27.4
2-3	26.4	27.4
3-4	26.4	27.4
4-5	26.4	27.4
5-6	26.4	27.4
6-7	26.4	27.4

Additional Dust Sources: None DEFAULT
Soil contribution conversion factor: 0.28
Air contribution conversion factor: 100.0

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 7.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	1.81	4.19	0.81
1-2:	1.48	4.84	0.81
2-3:	1.52	5.55	0.81
3-4:	1.55	5.29	0.81
4-5:	1.58	5.22	0.81
5-6:	1.60	5.53	0.81
6-7:	1.66	5.92	0.81

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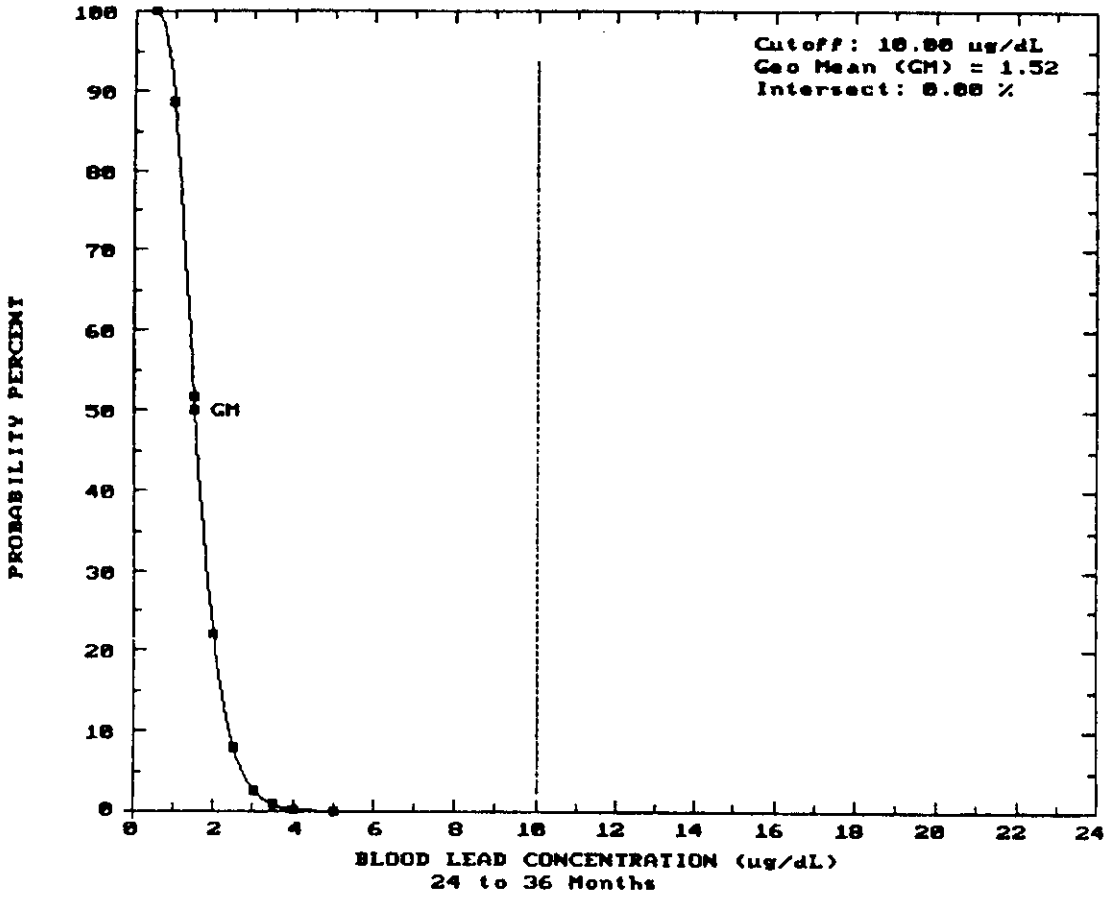
1100-3: UBK Results for Default Parameters with Ingestion of Homegrown Vegetables for a 2-Year Old

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
).5-1:	2.94	0.40	0.00	0.04
1-2:	2.96	1.00	0.00	0.07
2-3:	3.58	1.04	0.00	0.12
3-4:	3.29	1.06	0.00	0.13
4-5:	3.18	1.10	0.00	0.13
5-6:	3.38	1.16	0.00	0.19
6-7:	3.74	1.18	0.00	0.19



1100-3: UBK Results for Default Parameters with Ingestion of Homegrown Vegetables for a 2-Year Old

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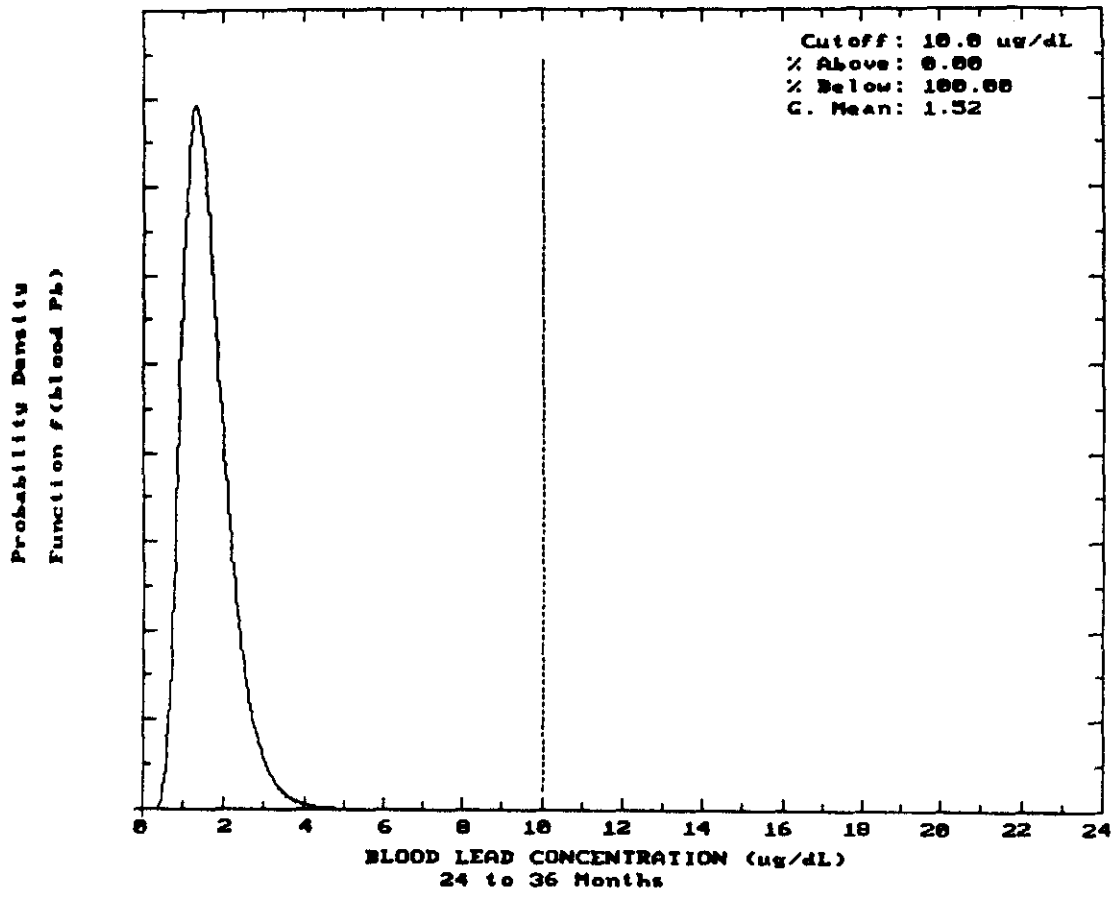

1100-3: UBK Results for Default Parameters with Ingestion of Homegrown Vegetables for a 2-Year Old

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HORN RAPIDS LANDFILL: UBK Results for Default Parameters
Assuming a Soil Lead Concentration of 854 (mg/kg)

ABSORPTION METHODOLOGY: Non-Linear Active-Passive

AIR CONCENTRATION: 0.200 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: DEFAULT

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: Multiple Source Analysis

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	854.0	259.1
1-2	854.0	259.1
2-3	854.0	259.1
3-4	854.0	259.1
4-5	854.0	259.1
5-6	854.0	259.1
6-7	854.0	259.1

Additional Dust Sources: None DEFAULT
Soil contribution conversion factor: 0.28
Air contribution conversion factor: 100.0

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 7.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	6.13	19.19	15.80
1-2:	5.90	19.83	15.80
2-3:	5.80	20.36	15.80
3-4:	5.88	20.28	15.80
4-5:	6.06	20.22	15.80
5-6:	6.07	20.53	15.80
6-7:	6.07	20.91	15.80

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.94	0.40	0.00	0.04
1-2:	2.96	1.00	0.00	0.07
2-3:	3.40	1.04	0.00	0.12
3-4:	3.29	1.06	0.00	0.13
4-5:	3.18	1.10	0.00	0.13
5-6:	3.38	1.16	0.00	0.19
6-7:	3.74	1.18	0.00	0.19

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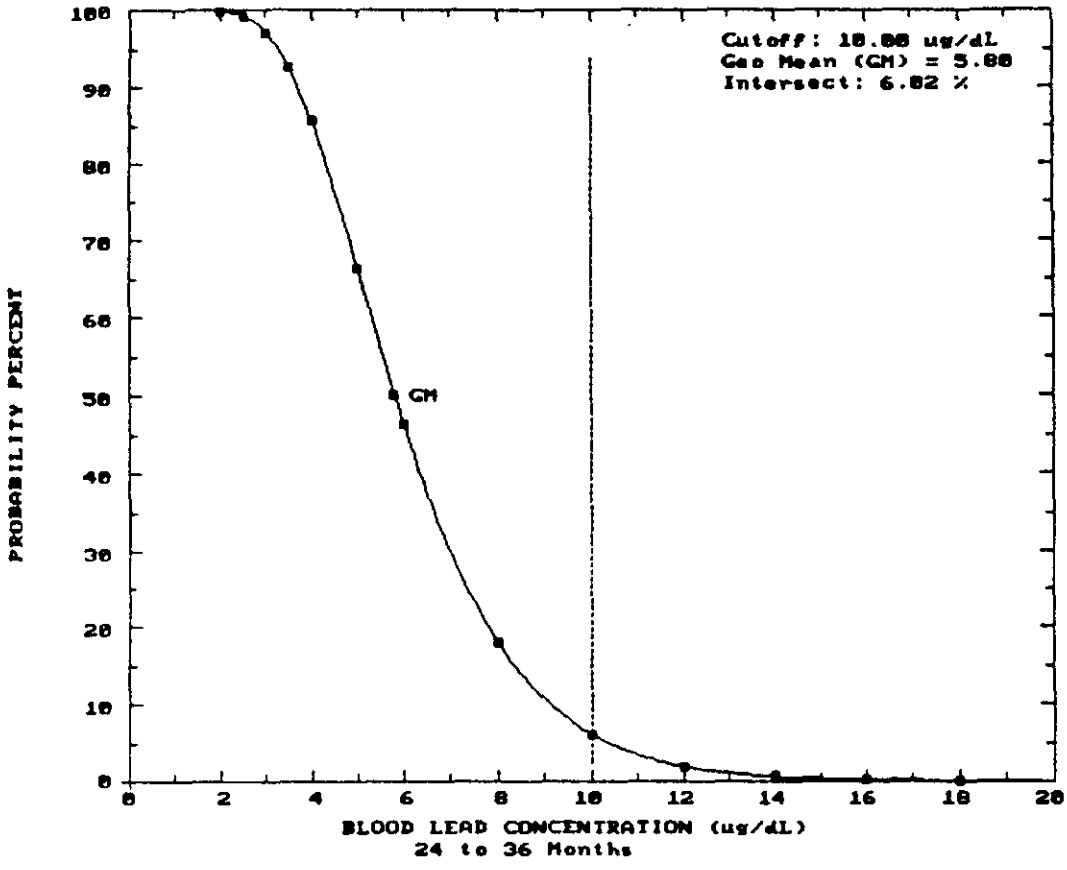

HORN RAPIDS LANDFILL: UBK Results for Default Parameters
Assuming a Soil Lead Concentration of 854 (mg/kg)

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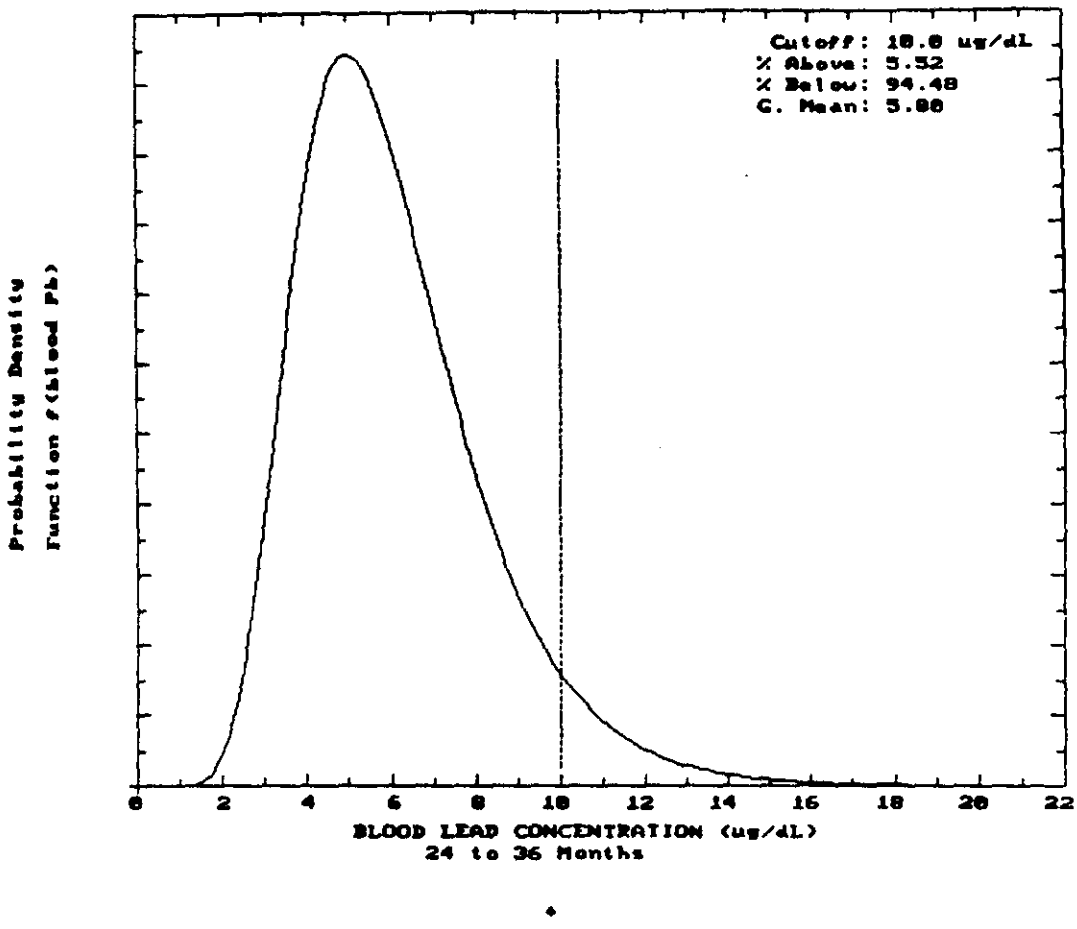

HORN RAPIDS LANDFILL: UBK Results for Default Parameters Assuming a Soil Lead Concentration of 854 (mg/kg)

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HORN RAPIDS LANDFILL: UBK Results for Default Parameters with Ingestion of Homegrown Vegetables for a 2-Year Old

ABSORPTION METHODOLOGY: Non-Linear Active-Passive

AIR CONCENTRATION: 0.200 ug Pb/m3 DEFAULT
Indoor AIR Pb Conc: 30.0 percent of outdoor.
Other AIR Parameters:

Age	Time Outdoors (hr)	Vent. Rate (m3/day)	Lung Abs. (%)
0-1	1.0	2.0	32.0
1-2	2.0	3.0	32.0
2-3	3.0	5.0	32.0
3-4	4.0	5.0	32.0
4-5	4.0	5.0	32.0
5-6	4.0	7.0	32.0
6-7	4.0	7.0	32.0

DIET: daily Pb consumption by year as follows:
0-1: 5.88 ug Pb/day
1-2: 5.92 ug Pb/day
2-3: 21.39 ug Pb/day
3-4: 6.57 ug Pb/day
4-5: 6.36 ug Pb/day
5-6: 6.75 ug Pb/day
6-7: 7.48 ug Pb/day

DRINKING WATER Conc: 4.00 ug Pb/L DEFAULT
WATER Consumption: DEFAULT

SOIL & DUST:
Soil: constant conc.
Dust: Multiple Source Analysis

Age	Soil (ug Pb/g)	House Dust (ug Pb/g)
0-1	854.0	259.1
1-2	854.0	259.1
2-3	854.0	259.1
3-4	854.0	259.1
4-5	854.0	259.1
5-6	854.0	259.1
6-7	854.0	259.1

Additional Dust Sources: None DEFAULT
Soil contribution conversion factor: 0.28
Air contribution conversion factor: 100.0

PAINT Intake: 0.00 ug Pb/day DEFAULT

MATERNAL CONTRIBUTION: Infant Model
Maternal Blood Conc: 7.50 ug Pb/dL

CALCULATED BLOOD Pb and Pb UPTAKES:

YEAR	Blood Level (ug/dL)	Total Uptake (ug/day)	Soil+Dust Uptake (ug/day)
0.5-1:	6.13	19.19	15.80
1-2:	5.90	19.83	15.80
2-3:	7.01	27.66	15.80
3-4:	6.66	20.28	15.80
4-5:	6.25	20.22	15.80
5-6:	6.14	20.53	15.80
6-7:	6.09	20.91	15.80

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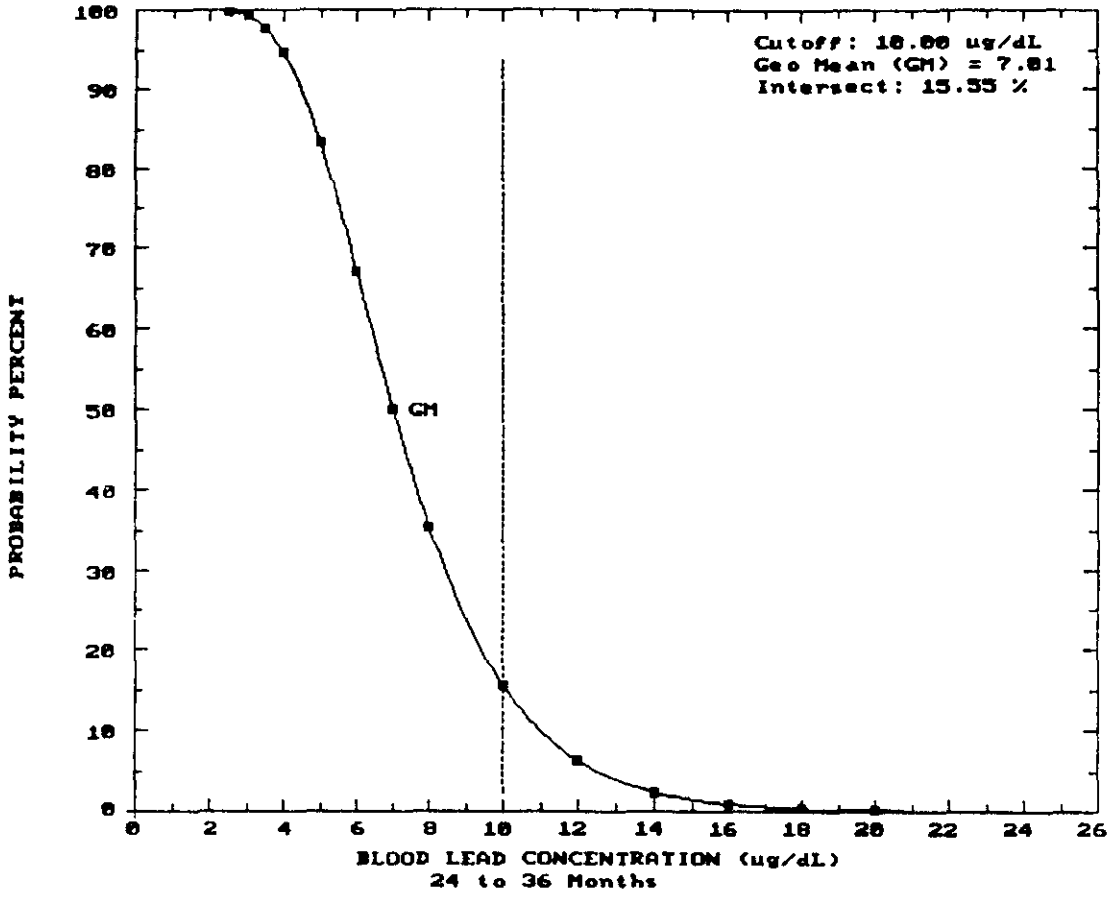
HORN RAPIDS LANDFILL: UBK Results for Default Parameters with Ingestion of Homegrown Vegetables for a 2-Year Old

YEAR	Diet Uptake (ug/day)	Water Uptake (ug/day)	Paint Uptake (ug/day)	Air Uptake (ug/day)
0.5-1:	2.94	0.40	0.00	0.04
1-2:	2.96	1.00	0.00	0.07
2-3:	10.69	1.04	0.00	0.12
3-4:	3.29	1.06	0.00	0.13
4-5:	3.18	1.10	0.00	0.13
5-6:	3.38	1.16	0.00	0.19
6-7:	3.74	1.18	0.00	0.19



HORN RAPIDS LANDFILL: UBK Results for Default Parameters
with Ingestion of Homegrown Vegetables for a 2-Year Old

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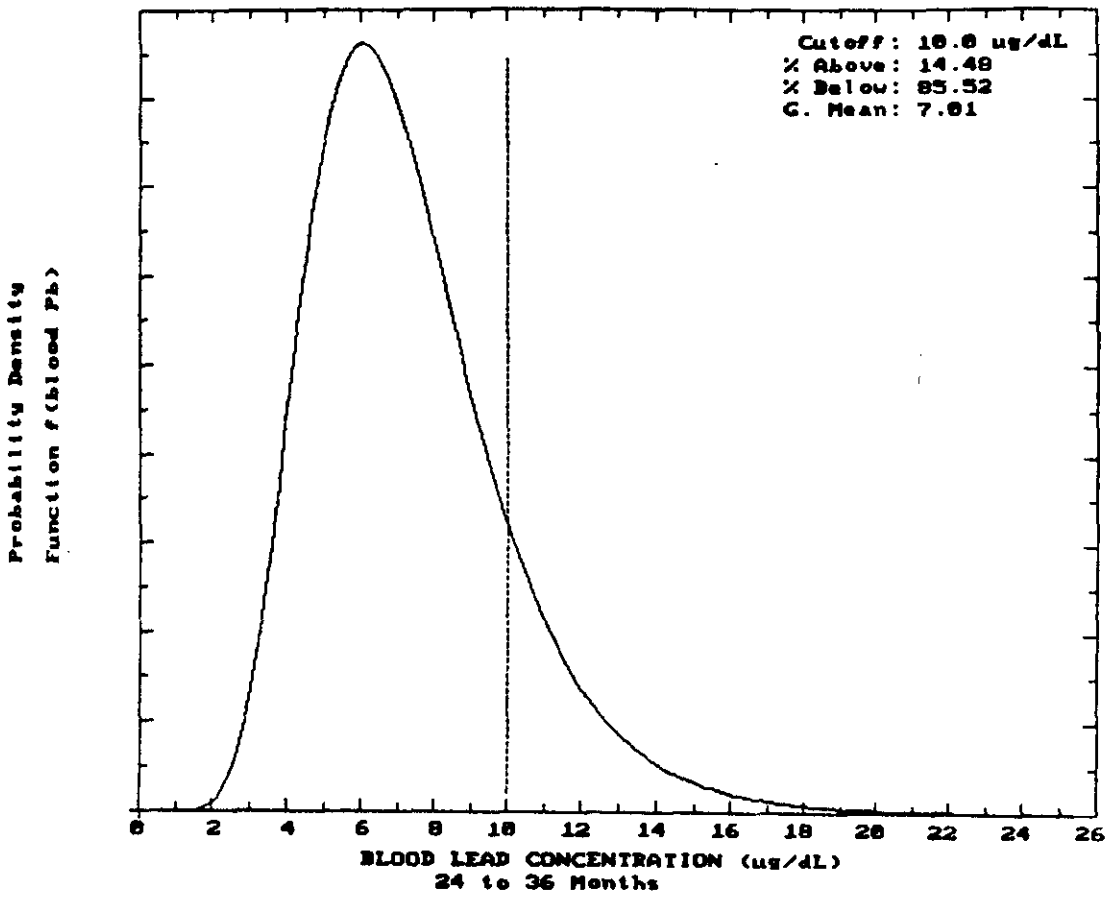

HORN RAPIDS LANDFILL: UBK Results for Default Parameters with Ingestion of Homegrown Vegetables for a 2-Year Old

APPENDIX L

ECOLOGICAL RISK ASSESSMENT FOR THE 1100-EM-1 OPERABLE UNIT

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1.0 PURPOSE AND SCOPE OF THE BASELINE ENVIRONMENTAL RISK ASSESSMENT

The objective of the environmental assessment is to provide an evaluation of the site specific ecological risks. An environmental assessment was provided in the Phase I RI report (DOE/RL 90-18) for the 1100-EM-1 operable unit. Presentation of an ecological risk assessment for the Phase II RI/FS is a voluntary effort that includes Phase II RI data in a manner that follows guidelines outlined in the Hanford site baseline risk assessment methodology (HSBRAM) (DOE/RL 91-45).

This assessment includes a problem definition, analysis, and risk characterization. The problem definition identifies stressor characteristics (*i.e.*, contaminants of potential concern), ecosystems potentially at risk, and ecological effects. These discussions lead to the selection of assessment and measurement endpoints. Assessment endpoints are those "specific properties of each habitat of interest used to evaluate the state, or change in the state, of the ecological system" (DOE/RL 91-45). Measurement endpoints are "those used to approximate, represent, or lead to an assessment endpoint" (DOE/RL 91-45). An analysis was performed by characterizing exposure and ecological effects. Risk characterization was performed by integrating exposure and toxicity, discussing uncertainty, and interpreting ecological risk.

It should be noted that, with the lack of better data, this assessment is a qualitative examination of the baseline ecological conditions. Conclusions are based on many estimations and assumptions that provide large uncertainties in the calculated results.

2.0 PROBLEM DEFINITION

The following paragraphs describe the stressor characteristics, ecosystems potentially at risk, ecological effects, and selection of endpoints. Previously conducted studies of the Hanford site ecology and data collected during the phase I and II Remedial Investigation (RI) for 1100-EM-1 were used in this assessment.

2.1 ECOSYSTEMS POTENTIALLY AT RISK

Potentially sensitive habitats chosen for the 1100-EM-1 site are habitats known to be frequented by designated or proposed, endangered or threatened species. In determining ecosystems potentially at risk at 1100-EM-1, only terrestrial organisms are considered. Aquatic species are not addressed, since it has been demonstrated, with groundwater modeling, that contaminants in the groundwater will not reach the river above drinking water standards. The following sections present the species expected to be found at the site, and the state or federal designation (*e.g.*, threatened or endangered) for these species.

2.1.1 Terrestrial Flora

The dominant plant species at the 1100 site are sagebrush-bitterbrush and cheatgrass. In addition, the following plants may exist at the operable unit (Franklin and Dyrness 1988, DOE, 1987):

- Medium shrubs--
  - Tall Green Rabbitbrush (*Chrysothamnus viscidiflorus*)
- Low shrubs--
  - Longleaf Phlox (*Phlox longifolia*)
  - Threadleaf Fleabane (*Erigeron filifolius*)
- Perennial grasses--
  - Cusick Bluegrass (*Poa cusickii*)
  - Needle and Thread (*Stipa comata*)
- Perennial forbs--
  - Spalding's Milkvetch (*Astragalus spaldingii*)
  - False Agoseris (*Microseris troximoides*)
  - Green-banded Miraposa Lily (*Calachortus macrocarpus*)
- Annuals--
  - Indianwheat (*Plantago patagonica*)
  - Nuttall's Fescue (*Festuca microstachys*)
  - Cheatgrass Brome (*Bromus tectorum*)
  - Pinnate Tansymustard (*Descurainia pinnata*)
  - Vernal Draba (*Draba verna*)
  - Thompson's Sandwort (*Arenaria franklinii va. thompsonii*), designated a monitored species (DNR, 1990)

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2.1.2 Terrestrial Fauna

Table L-1 is a list of mammals, birds, reptiles, amphibians, and insects that may inhabit the 1100 site. Of the birds listed, the peregrine falcon and ferruginous hawk are endangered and threatened, respectively. The swainson's hawk, golden eagle, and prairie falcon are candidate species and the long-billed curlew is a monitored species. No endangered or threatened species of mammals, reptiles, amphibians, or insects are expected to inhabit the 1100 site. However, the grasshopper mouse and sagebrush vole are monitored and the pocket gopher and striped whipsnake are candidate species.

2.2 STRESSOR CHARACTERISTICS

Chemical contamination is the only stressor addressed for this site. Contaminants of potential concern (COPC), determined in the Baseline Industrial Scenario Risk Assessment (BISRA) for 1100-EM-1, were used in the analysis and risk characterization as recommended by HSBRAM (DOE/RL, 1992). Table L-2 includes the contaminants of potential concern from the sub-units of the 1100-EM-1 operable unit. The maximum concentration of a COPC

for the entire operable unit was used in this risk assessment. All maximum contaminant values reported in the table were found at HRL except bis (2-ethylhexyl) phthalate (BEHP), Chlordane and Heptachlor, which were found at UN-1100-6. The COPC were reported for the other subunits in the BISRA, but at levels lower than for HRL and UN-1100-6.

2.3 ECOLOGICAL EFFECTS

No toxicological studies were performed on species inhabiting 1100-EM-1 during the Phase I or Phase II RI's. The toxicological effects on species exposed to the COPC are assumed to be those addressed in the derivation of parameters such as the No Observed Adverse Effect Level (NOAEL). These parameters are used in the analysis and characterization sections.

Phase I field observations of the ecology of 1100-EM-1 (DOE/RL 91-45) showed that there was no evidence of adverse impacts from the COPC to the flora and fauna inhabiting any of the subunits, except for UN-1100-6. Except for a clump of grass, there is no vegetation growing in the depression of the UN-1100-6 subunit. The only evidence of ecological damage at the operable unit is this apparent lack of vegetative growth at this subunit.

2.4 SELECTION OF ASSESSMENT AND MEASUREMENT ENDPOINTS

As noted above, assessment endpoints are the properties of habitats of potential concern used to assess the state of an ecosystem. These endpoints "must be of ecological importance and of direct management relevance..." (DOE/RL 91-45). Terrestrial organisms have been designated as having habitats of potential concern for this site and the ferruginous hawk and peregrine falcon are threatened and endangered, respectively. From these considerations, adverse effects on these raptors have been chosen as assessment endpoints in this risk assessment. Without better data, it is impossible to be more specific about the assessment endpoints (*i.e.*, to specify, for example, abundance, mortality, or ecosystem productive capability).

A measurement endpoint is defined "to approximate, represent, or lead to an assessment endpoint" (DOE/RL 91-45). For this risk assessment, adverse effects on the swainson's hawk and long-billed curlew are used as measurement endpoint. These birds were chosen since they can be considered analog species, they are designated as candidate and monitored species (hawk and curlew, respectively), and data used for the exposure assessments were readily available.

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Table L-1. TERRESTRIAL FAUNA INHABITING 1100-EM-1

Organism Name		Frequency	State Designation	Source[3]
Common Name	Scientific Name	F/O/I/U[1]	E/T/S/C/M[2]	
MAMMALS:				
Mule deer	*Odocoileus hemionus*	F		1,2
Badgers	*Taxidea taxus*	F		1,2
Coyotes	*Canis latrans*	F		1,2
Blacktail jackrabbbits	*Lepus califonicus*	F		1,2
Townsend ground squirrels	*Spermophilus townsendii*	F		1,2
Great Basin Pocket mice	*Perognathus parvus*	F		1,2
Pocket gophers	*Thomomys talpoides*	F	C	1,2,3
Deer mice	*Peromyscus maniculatus*	F		1,2
Western Harvest mouse	*Reithrodontomys megalotis*	O		1,2
Grasshopper		O		1,2
Mice	*Onychomys leucogaster*	O	M	1,2,3
Skunks	*Mephitis mephitis*	I		1,2
Raccoons	*procyon lotor*	I		1,2
Weasels	*Mustella spp.*	I		1,2
Porcupines	*Erethizon dorsatum*	I		1,2
Bobcats	*Lynx rufus*	I		1,2
Sagebrush vole		I	M	2
Vagrant shrew		O		2
Muskrat		I		2
BIRDS:				
Starlings	*Sturnus vulgaris*	F		1,2
Horned larks	*Eremophila alpestris*	F		1,2
Western meadowlarks	*Sturnella neglecta*	F		1,2
Western Kingbirds	*Tyranus virticalis*	F		1
Black-billed magpies	*Pica pica*	F		1
Ravens	*Corvus corax*	F		1,2
sage sparrows		O		2
Ring-necked pheasants	*Phasianus colchicus*	O		1,2
Mourning dove	*Zenaida macrora*	F		1,2
Sage sparrows	*Amphispiza belli*	F	C	1,2

Table L-1. TERRESTRIAL FAUNA INHABITING 1100-EM-1 (continued)

Organism Name		Frequency	State Designation	Source[3]
Common Name	Scientific Name	F/O/I/U[1]	E/T/S/C/M[2]	
Raptors:				
American kestrel	*Falco sparvarius*	F		1,2
Red-tailed hawk	*Buteo jamaicensis*	F		1,2
Swainson's hawks	*Buteo sainsoni*	F	C	1,2,3
Golden eagles	*Aquila chrysaetos*	O	C	1,2,3
Peregrine falcon	*Falco peregrinus*	I/U	E	1,2,3
Long-billed curlews	*Numenius americanus*	F	M	2,3
Ferruginous hawk	*Buteo regalis*	I	T	1,2,3
Prairie falcons	*Falco mexicanus*	O	C	1,2,3
REPTILES AND AMPHIBIANS:				
Gopher snakes	*Pituophis melanoleucus*	F		2
Sideblotched lizards	*Uta stannsburiana*	F		2
Sagebrush lizards	*Sceloporus graciosus*	I		1
Yellow-bellied racer	*Coluber constrictor*	I		1
Pacific rattlesnake	*Crotalus viridis*	I/rocks		2
Striped whipsnake	*Masticophis taeniatus*	I	C	1,2,3
INSECTS:				
Darkling beetles		F		2
Grasshopers	*Ornithoptera*	F		2
Harvester ants		F		1
Bees		O		1
Butterflies		O		1
Scarab beetles		O		1

Table L-1. TERRESTRIAL FAUNA INHABITING 1100-EM-1 (continued)

Definitions of abbreviations and terms:

[1]F-Frequent visitor to site.
[1]O-Occasional visitor to site.
[1]I-Infrequent visitor to site.
[1]U-Unlikely that species visits site.

[2]E-Endangered species.
[2]T-Threatened species.
[2]S-Sensitive species.
[2]C-Candidate species
[2]M-Monitor species

Endangered Species: Wildlife species native to the state of Washington that are seriously threatened with extinction throughout all or a significant portion of their range within the state. Endangered species are legally designated in WAC 232-12-014.

Threatened Species: Wildlife species native to the state of Washington that are likely to become an endangered species within the foreseeable future throughout a significant portion of their range within the state without cooperative management or removal of threats. Threatened species are legally designated in WAC 232-12-0111.

Sensitive Species: Wildlife species native to the state of Washington that are vulnerable or declining and are likely to become endangered or threatened in a significant portion of their range within the state without cooperative management or removal of threats. Sensitive species are legally designated in WAC 232-12-0111.

Candidate species: Wildlife species native to the state of Washington that the Department of Wildlife will review for possible listing as endangered, threatened, or sensitive. Candidate species are designated in Wildlife Policy 4802.

Monitor species: Wildlife species native to the state of Washington that are of special interest because: 1) they were at one time classified as endangered, threatened, or sensitive; 2) they require habitat that had limited availability during some portion of their life cycle; 3) they are indicators of environmental quality; 4) further field investigations are required to determine their population status; 5) there are unresolved taxonomic problems which may bear upon their status classification; 6) they may be competing with and impacting other species of concern; or 7) they have significant popular appeal. Monitor species are designated in Wildlife Policy 4803.

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SOURCES[3]:

[1] DOE/RL-92-05, *B Plant Source Aggregate Area Management Study Report*, Department of Energy, Richland Operation Office, Richland, Washington.

[2] DOE/RL-1987, *Disposal of Hanford Defense High-Level, Transuranic and Tank Wastes, EIS-0113 (Vol. 1 of 5)*, Department of Energy, Richland Operation Office, Richland, Washington.

[3] Washington Department of Wildlife, *Species of Conern List*, Nongame Program, Wildlife Management Division, Washinton Department of Wildlife, 600 Capital Way, Olympia 98501-1091.

3.0 ANALYSIS

The following analysis involved performing an exposure and toxicity assessment. In paragraph 3.1, the exposure to the COPC for the long-billed curlew and swainson's hawk is addressed. Paragraph 3.2 reports toxicological parameters (*e.g.*, NOAEL) for the COPC, choosing parameters taken from the most appropriate studies (*i.e.*, preferably birds).

3.1 EXPOSURE ASSESSMENT

The following is a discussion of, and calculations for the exposure assessment at 1100-EM-1. This involved first identifying the exposure pathways and, secondly, calculating intake rates for the receptor population (swainson's hawk and long-billed curlew).

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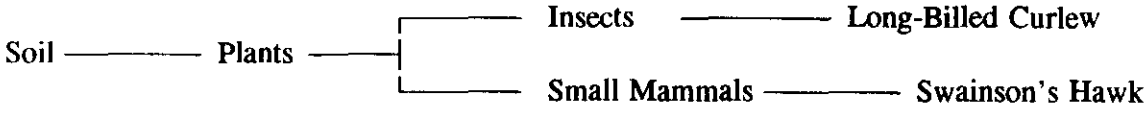
3.1.1 Exposure Pathways

The primary diet of long-billed curlews and ferruginous hawks has been estimated to be insects and small mammals, respectively (Terres,1980). These birds may actually be exposed to contaminants via several other pathways. These include dust inhalation, dermal contact, and soil ingestion by the birds and their prey. For the purpose of this risk assessment and for simplicity, it was assumed that the exposure to contaminants via prey ingestion is the major route of exposure. As a result of this assumption, intake rates may underestimate exposure. However, whenever possible, conservative assumptions are made for other parameters. A simplified contaminant biological transport pathway can be represented as:



3.1.2 Uptake Rate Calculations for Receptor Population

The maximum contaminant concentration detected to 2 feet was considered the concentration in the soil over the entire subunit where the contaminant was found. This method is conservative and reflects the availability of contaminants to plant roots. Contaminant concentration in plants was determined and used to calculate contaminant concentration in insects and mammals. These values were then used in the uptake rate calculations for the long-billed curlew and ferruginous hawk.

Table L-2 lists maximum contaminant concentrations and plant and small mammal uptake factors used in uptake calculations. When available, unitless, dry weight uptake factors were used for small mammals. In the absence of this data, uptake factors were used that required an alternate calculation method as described below. The results of the uptake calculations are reported in table L-3. The methods used and assumptions made in determining uptake rates are described below.

The following are abbreviations used for plant, insect, and small mammal uptake calculations:

C_s = Contaminant concentration in soil (maximum concentration), mg/kg
UF_p = Plant uptake factor as dry weight (dw), unitless
C_p = Contaminant concentration in plants, mg/kg dw
UF_i = Insect uptake factor as dry weight, unitless
C_i = Contaminant concentration in insects, mg/kg dw
UF_m = Uptake factor for small mammals, unitless or d/kg as indicated
IR_m = Ingestion rate of vegetation for small mammals, kg/d
C_m = Contaminant concentration in small mammals, mg/kg dw

Plant and small mammal uptake factors were not readily available for thallium, beta-HCH and BEHP. The UF_p and UF_m for thallium was conservatively estimated to be that of mercury. UF_p and UF_m for PCB was used as a surrogate for BEHP and beta-HCH. Since PCB has a higher bioconcentration factor for fish than BEHP and beta-HCH (USAF,1989) this is also a conservative estimate.

Plants

Plant uptake was calculated as:

$$C_p = C_s \times UF_p$$

Insects

It was assumed that insects only eat plants therefore the insect uptake was calculated as:

$$C_i = C_p \times UF_i$$

Insect uptake factors were not available for the contaminants of potential concern, however, one study suggests an uptake factor of one for Dioxin (Paustenbach, 1989), which is used for the uptake calculations. Insect uptakes are therefore the same as plant uptakes.

Table L-2. Values used in Uptake Calculations

Contaminant	Maximum Concentration, mg/kg	Plant Uptake Factor, unitless	Small Mammal Uptake Factor, unitless
Antimony	15.6	0.01[b]	0.002[c]
Arsenic	3.6	0.04[a]	0.002[c]
Barium	1320	0.001[b]	0.001[c]
Beryllium	1.3	0.43[a]	0.001[c]
Chromium	17.1	0.2[a]	0.0092[c]
Copper	58.6	0.3[a]	0.15[a]
Lead	482	0.008[a]	0.0004[c]
Nickel	174	0.09[a]	0.002[c]
Thallium	0.42	0.5[b]	0.02[a]
Vanadium	87.3	0.04[b]	0.0092[c]
Zinc	408	0.80[a]	1.1[a]
BEHP	24000	0.38[a]	5.5[a]
Beta-HCH	0.094	0.38[a]	15.6[a]
Chlordane	1.86	0.05[a]	5.5[a]
DDT	2.0	0.11[a]	5.7[a]
Heptachlor	0.065	0.02[a]	14.2[a]
PCB's	100	0.38[a]	5.5[a]

[a] Values from EPA 1986 mg/g tissue DW (mg/g soil DW)-1
[b] Values from Kabatus-Pendias and Pendias, mg/g tissue DW (mg/g soil DW)-1
[c] Values from Clement Assoc., 1988, d/kg

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Table L-3. Results of Uptake Calculations

Contaminant	Plant Uptake mg/kg	Insect Uptake mg/kg	Small Mammal Uptake mg/kg	Swainson's Hawk Uptake Rate mg/kg-d	Long-Billed Curlew Uptake Rate mg/kg-d
Antimony	0.16	0.16	1.2E-6	1.6E-8	1.1E-3
Arsenic	0.14	0.14	1.1E-6	1.4E-8	0.00079
Barium	1.32	1.32	5.2E-6	6.2E-8	0.0072
Beryllium	0.56	0.56	2.2E-6	2.8E-8	0.0031
Chromium	3.42	3.42	1.2E-4	1.5E-6	0.019
Copper	17.6	17.6	2.5	0.032	0.096
Lead	3.85	3.85	6.0E-6	7.4E-8	0.021
Nickel	15.7	15.7	1.2E-4	1.6E-6	0.086
Thallium	0.21	0.21	4.2E-3	5.2E-5	0.0011
Vanadium	3.5	3.5	1.3E-4	1.5E-6	0.019
Zinc	326	326	360	4.4	1.8
BEHP	9100	9100	50000	0.12	1.0
Beta-HCH	0.035	0.035	0.56	0.0069	2.0E-4
Chlordane	0.093	0.093	0.51	1.3E-6	1.0E-5
DDT	0.22	0.22	1.3	0.015	0.0012
Heptachlor	0.0013	0.0013	0.018	4.4E-8	1.4E-7
PCB's	38	38	210	2.5	0.2

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Small Mammals

Small mammals are assumed to reside entirely within the operable unit boundaries and consume only plants. Small mammal uptake was calculated as:

$$C_m = C_p \text{ X } UF_m$$

This equation was used where the unitless, dry weight uptake factors were available. If these values were unavailable, the following equation was used:

$$C_m = C_p \text{ X } UF_m \text{ X } IR_m$$

For this calculation, UF_m has units of d/kg and IRm was estimated from a mouse study to be 0.0039 kg/d (Clements Assoc., 1988).

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Swainson's Hawk and Long-Billed Curlew

The average annual uptake rates for the swainson's hawk and long-billed curlew were calculated using the following equation (EPA, 1989):

$$\text{Uptake rate (mg/kg/d)} = \frac{(CB)(IR)(FI)(EF)(ED)}{(BW)(AT)}$$

Where:
- CB = concentration of contaminant in the food source, C_i or C_m (mg/kg)
- IR = ingestion rate (kg/d)
- FI = fraction ingested from the contaminant site
- EF = exposure frequency (d/yr)
- ED = exposure duration (yr)
- BW = body weight (kg)
- AT = averaging time (d)

For both birds, the FI is conservatively assumed to be 100 percent for the contaminants from HRL. Since the contaminants of potential concern at 1100-UN-6 cover a relatively small area, the FI for these contaminants was estimated to be the area of 1100-UN-6 divided by the bird's foraging range. The maximum territory size expected for a long-billed curlew at Hanford is 8 hectares (ha) (Allen, 1980). The average male swainson's hawk territory is 910 ha (9.1E + 6 m^3) (Fitzner, 1980). Since the area of UN-1100-6 is approximately 0.16 ha (1,600 m^3) the FI for the contaminants at this subunit for the long-billed curlew and swainson's hawk were calculated as 2 and 0.02 percent, respectively. The exposure duration and averaging time are both estimated to be the lifetime of the organisms. Given that the average weights of the swainson's hawk and long-billed curlew are approximately 0.5 and 1.0 kg, respectively (Terres, 1980), and assuming that birds weighing over 0.1 kg consume 20 percent of their body weight per day (Paustenbach, 1989), the respective IR's for the swainson's hawk and long-billed curlew are 100,000 and 200,000 mg

wet weight per day. Conservatively assuming that 80 percent of the birds' diet is water (Driver, 1990) the IR was calculated as 4 percent of body weight per day. IR for the swainson's hawk is, therefore, 0.020 kg/d and the IR for the long-billed curlew is 0.040 kg/d. Respectively, swainson's hawks and long-billed curlews spend approximately 5 months per year (Fitzner, 1980) and 2 months per year (Allen, 1980) in the area. The EF's are therefore 150 days per year for the swainson's hawk and 60 days per year for the long-billed curlew.

The following is an example calculation for the uptake rate of copper for the swainson's hawk:

C_s = 58.6 mg/kg
$C_p = UF_p \times C_s$ = 0.3 X 58.6 mg/kg = 17.6 mg/kg
$C_m = CB = UF_m \times C_p$ = 0.15 X 17.6 mg/kg = 2.6 mg/kg

Uptake Rate =

$$\frac{(2.6\ \text{mg/kg})(0.015\ \text{kg/d})(1)(150\ \text{d/yr})(*\text{yr})}{(0.5\ \text{kg})(*\text{d} \times 365)} = 0.032\ \text{mg/kg/d}$$

*Since the exposure duration and averaging time were taken as the same, only the units and conversion factor of 365 are given in this equation for these parameters.

3.2 TOXICITY ASSESSMENT

Intake rates for measurement endpoints were compared to toxicological values in table L-4. Values for birds were used whenever possible. When these were not available, values for small mammals were reported. The most conservative parameters were used where available (*e.g.*, NOAEL as opposed to LOAEL). For copper and PCB's, the most conservative dose value (TDLo) was reported. Limited information for beta-hexachlorocyclohexane (beta-HCH), was available and, therefore, the NOAEL for gamma-HCH, an isomer of HCH, was used instead.

4.0 RISK CHARACTERIZATION

The following sections qualitatively discuss risk characterization. Given the uncertainty in information available, it was not practical to perform risk calculations for this evaluation. Ecological risk was estimated by comparing exposure to the contaminant toxicity. Additionally, the uncertainties in calculations and the ecological implications of contamination were discussed.

Table L-4. Toxicological Values

Contaminant	Toxicity	Toxicity Parameter	Organism	Comments
Antimony	0.35 mg/kg bw/d	LOAEL	Rat	Chronic Oral
Arsenic	0.014 mg/kg/d	LOAEL	Human	Chronic Oral
Barium	0.21 mg/kg/d	NOAEL	Human	Chronic drinking
Beryllium	0.54 mg/kg bw/d	NOAEL	Rat	Chronic Oral
Chromium	2.4 mg/kg bw/d	NOAEL	Rat	1 year drinking
Copper	152 mg/kg	TDLo	Rat	Chronic Oral
Lead	4.3 mg/kg/d	LOAEL	Hawk	Subchronic Oral
Nickel	5 mg/kg/d	NOAEL	Rat	Chronic Oral
Thallium	0.7 mg/kg/d	LOAEL	Rat	Chronic Oral
Vanadium	0.89 mg/kg/d	NOAEL	Rat	Chronic Oral
Zinc	96 mg/kg/d	NOAEL	Mouse	Drinking water
BEHP	19 mg/kg bw/d	LOAEL	Guinea Pig	Chronic Oral
Beta-HCH	0.33 mg/kg/d	NOAEL	Rat	Subchronic Oral
Chlordane	0.055 mg/kg/day	NOEL	Rat	30 mo Oral
DDT	0.49 mg/kg/d	NOAEL	Hawk	Lifetime dosing
Heptachlor	0.15 mg/kg/day	NOEL	Rat	2-year Oral
PCB's	325 mg/kg	TDLo	Mammals	Subchronic Oral

LOAEL = Lowest Observed Adverse Effect Level
NOAEL = No Observed Adverse Effect Level
TDLo = Toxic Dose Low
NOEL = No Observed Effect Level

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4.1 COMPARISON OF TOXICITY TO EXPOSURE

None of the uptake rates in table L-2 exceed the toxicologic values in table L-3. For the swainson's hawk uptake rates for zinc, BEHP, beta-HCH, DDT, and PCB were between 10 and 80 times lower than the corresponding toxicological value. Uptake rates for Copper, thallium and Chlordane were between 2,000 and 20,000 times lower, and the remaining uptake rates were more than 300,000 times below toxicological values. For the long-billed curlew, arsenic, barium, nickel, vanadium, zinc and BEHP had uptake rates 20 to 100 times less than toxicological values. The other contaminants were more than 100 times less than toxicological values.

4.2 UNCERTAINTY ANALYSIS

There are many sources of uncertainty in the exposure assessment and risk characterization for the ecological evaluation of 1100-EM-1. All information regarding the presence and behavior of species at the site, the exposure to contaminants, and toxicity of contaminants is estimated and extrapolated from information available from previous studies. Limited ecological data were taken from the site, therefore, the most conservative and simple models were used to determine the ecological impact. Thus, the exposure assessment represents the worst case scenario and the comparison of toxicity to exposure is highly conservative.

Since limited field observations were made, a search was performed to identify all terrestrial organisms expected to inhabit the Hanford site. Of these, organisms that seemed likely to exist at 1100-EM-1 were reported in table L-1. This list excluded organisms, such as amphibians, not likely to be found at 1100-EM-1. It is probable that many of the organisms listed in table L-1 do not actually inhabit the site, but they were addressed in order to ensure that important species were identified.

Stressor characteristics chosen for the site are also a source of uncertainty. COPC from the BISRA were used. This is expected to be a highly conservative assumption, since these contaminants were chosen by performing conservative risk-based screening that used exposure parameters for humans. The slope factors and reference doses used in these calculations are derived from animal studies (*e.g.*, NOAEL) that are usually modified by orders of magnitude. Offsite sources of stressors are not addressed for this assessment. Since organisms do not necessarily inhabit 1100 alone, they would be exposed to offsite contamination. It was not in the scope of this assessment to address these exposures. It is possible, however, that the contamination outside 1100 would probably be much more significant offsite than that identified at 1100-EM-1. In addition, this assessment did not address possible synergistic or indirect effects.

When selecting assessment endpoints, it is preferable to chose specific cases (such as reduced population size), however, with the lack of data regarding the effects of contaminants at the site on organisms known to inhabit the site, this was not possible. Therefore, adverse effects that generate the toxicological parameters (NOAEL, *etc.*) on

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important species (*i.e.*, the ferruginous hawk and peregrine falcon) were considered assessment endpoints. It would be preferable to use effects on these species as measurement endpoints, but data for the analog species was more readily available.

The simplified exposure routes introduce uncertainty that may underestimate exposure. Only ingestion of contaminated food is addressed, where other sources of contamination, such as soil ingestion, would contribute to exposure. The use of uptake factors for plants, insects, and small mammals are also a source of uncertainty. These include the following examples: extrapolation of UF's for leafy vegetables to plants that insects and small mammals consume; extrapolating UF's for species such as cattle to UF's for small mammals; and using UF's for the uptake of dioxin by insects for all insect UF's. Wherever possible, the most appropriate values were used. For example, when available, UF's reported for rats were used as UF's for small mammals. All parameters for the exposure calculations were taken from previously conducted studies, or conservatively estimated values were used. For example, it was assumed that the hawk and curlew consumed 100 percent of their contaminated diet from the HRL. Additionally, the exposure duration and averaging time were conservatively estimated to be the lifetime of the organisms.

Toxicological parameters reported in table L-2 are a source of uncertainty. Only two values were derived from studies on hawks. Values for small mammals were chosen if values for birds were not available. There is probably little confidence in this extrapolation, however, the most conservative data available are presented. For example, NOAEL is used over LOAEL, and TDLo is used over LD50.

The conclusion that impacts to the ecology of the site would not be distinguishable from background is probably sound. Even though there are significant uncertainties in this assessment, there has been little evidence of ecological damage at the site, and most of the approximations made here are highly conservative.

4.3 ECOLOGICAL IMPLICATIONS

Using highly conservative assumptions and models, no uptake rates for the long-billed curlew or the swainson's hawk exceeded toxicity values, therefore, it is unlikely that contaminants of potential concern at 1100-EM-1 would have an impact on these birds that is distinguishable from background conditions. In addition, the annual reoccurrence of both migratory species suggests that they have a historically stable population. However, this evaluation is simplistic and far from conclusive.

Contaminants with uptake rates that were closest to toxicity values were zinc for the swainson's hawk and BEHP for the long-billed curlew, which were approximately 10 and 20 times less than toxicity values, respectively. If any adverse impacts on these organisms were to be suspected, zinc (HRL) or BEHP (UN-1100-6) toxicity would be most likely. However, as previously noted, the many assumptions used in this assessment are highly conservative.

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APPENDIX M

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

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1.0 ARAR OVERVIEW

In accordance with section 121 (d) of CERCLA and the Tri-Party Agreement, applicable or relevant and appropriate requirements under other laws (ARAR's) are used to establish final cleanup or operating standards that must be met by the remedial alternative(s) selected. In general, cleanup levels are set by reasonably applying standards from Federal, state, or public health laws. In the process of attaining these standards, remedial actions must also comply with ARAR's.

Applicable requirements are those cleanup standards, standards of control, or other substantive environmental protection requirements, criteria, or limitations promulgated by law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance found at a CERCLA site. Only those standards identified by a state in a timely manner and that are more stringent than Federal requirements are applicable. "Applicability" implies that the remedial action or the circumstances at the site satisfy all of the jurisdictional prerequisites of a requirement (EPA, 1987).

Relevant and appropriate requirements are those standards that address problems or situations sufficiently similar to those encountered at a CERCLA site; their use is well suited to the site in question. To determine relevance a comparison must be made between the action, location, or chemicals covered by the requirement and those encountered or anticipated at the specific site. To be determined appropriate, further comparison is made to establish if the requirement is well suited to the nature of the substances, the characteristics of the site, the circumstances of the release, or the proposed remedial action. Only those requirements that are both relevant and appropriate must be complied with (EPA, 1987).

Other materials such as nonpromulgated advisories or guidance issued by various agencies that are not legally binding and do not have status as ARARs, are to be considered. These materials are to be used on an "as appropriate" basis, however, they do not carry the same weight as ARARs and cannot be considered as required cleanup standards.

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2.0 TYPES OF ARAR'S

There are three types of ARAR's applicable to CERCLA response actions. A description of each follows:

Ambient or chemical specific requirements which specify health or risked based exposure limits or ranges for contaminants in various media. An example would be the Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCL's) or non-zero Maximum Contaminant Level Goals (MCLG's). Also, these could restrict the level of discharge of certain contaminants during remedial activities (*i.e.*, air emission standards). As is the case with all ARAR's, if a chemical has more than one applicable ARAR, the more stringent ARAR must be complied with.

Location specific ARAR's limit activities based on the sites siting or environmental characteristics. The Endangered Species Act is an example.

Action specific ARAR's regulate the activities related to the management, treatment, and disposal of hazardous substances at the site. The Resource Conservation and Recovery Act (RCRA) regulations would be an example of these.

Only substantive requirements such as effluent discharge standards must be complied with for on-site remedial actions and not administrative requirements such as permitting and administrative review. This allows the remedial action to proceed in an expeditious manner without potential delays, which may be encountered during a permitting or review process.

In certain instances compliance with an ARAR may be waived by the regulatory agencies. As specified in the current guidance, waivers may be granted only under the following situations:

- Cases in which compliance with an ARAR will result in a greater risk to human health and the environment than an alternative option.

- Cases in which compliance with an ARAR is technically impracticable from an engineering standpoint.

- Cases in which alternative treatment methods to those specified as ARAR's have been shown to result in equivalent standards of performance.

- With respect to a State standard, requirement, criteria, or limitation, the State has not consistently applied procedures to establish a standard, requirement or criteria or demonstrated the intention to consistently apply the standard, requirement, criteria, or limitation in similar circumstances for other remedial actions.

The TPA specifies that the lead regulatory agency (EPA) will prepare the final list and prepare the rationale for the selection of ARAR's as part of the Record of Decision. Until that time, the ARAR's included here shall only be considered as "potential" ARAR's. These ARAR's were first developed and presented in the Phase I and II FS (DOE/RL-90-32). They were based on the contaminants of concern in soils and groundwater, the site specific environmental concerns, and the proposed remedial actions identified in the Phase I and II FS. The ARAR's presented in this document consist of those ARAR's updated to incorporate comments from EPA and Ecology. New ARAR's have been added and others reevaluated to specifically address the contaminants of concern identified by the Phase II RI and the Baseline Industrial Site Risk Assessment (appendix K), and to address the specific remedial actions identified in the main body of this report. The resulting list is the potential ARAR's that are specific to the cleanup of the 1100-EM-1 Operable Unit. The rationale for the inclusion of these ARAR's in this report follows. A summary table is provided at the end of this discussion.

3.0 AMBIENT OR CHEMICAL SPECIFIC ARAR's

The ambient and chemical specific ARAR's identified in the following sections are based on the contaminants of concern, with respect to the risks to human health, identified for each operable subunit in appendix K. There are no contaminants of concern which pose unacceptable risks to other ecological receptors (appendix M). The contaminants of concern are:

Operable Subunit	Contaminant
UN-1100-6 (Discolored Soil Site)	BEHP
Ephemeral Pool	PCBs
HRL	PCB's
Groundwater	TCE Nitrate

Appendix K also identifies chromium as a contaminant of concern at the HRL due to risks associated with the fugitive dust pathway. However, a reevaluation of the chromium sampling results for near surface soils (from 0 to 2 feet) has shown that these risk are on the order of 10^{-7}; chromium has been dropped as a contaminant of concern. This is discussed further in section 4 of the main body of this report.

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3.1 DRINKING WATER STANDARDS (40 CFR 141 and 143, WAC 246-290-310)

Drinking water standards must be attained for any present or potential sources of drinking water. The contaminants of concern identified in the groundwater risk assessment (appendix L) are TCE and nitrates. The primary MCL's for these contaminants are 5 μg/l for TCE and 10 mg/l for nitrates as nitrogen. MCLGs for TCE and nitrate as nitrogen are 0 μg/l and 10 mg/l respectively. Therefore, the MCL's are considered "relevant and appropriate" requirements.

In addition to these primary standards, secondary standards have been set to control the contaminants in drinking water that effect its aesthetic qualities. These standards are not enforceable, but are intended as guidelines, and they relate to the public acceptance of the drinking water. These standards are "to be considered," however, groundwater analyses to date have indicated that groundwater quality currently meets these secondary standards. Anticipated remedial actions will not degrade the current quality of the groundwater.

3.2 PROTECTION OF SURFACE WATERS (33 U.S.C. 1251, 40 CFR 116 and 117, WAC 173-201 and Quality Criteria for Water)

The ambient water quality of the Columbia River and the groundwater aquifer must be preserved to ensure the health and welfare of all aquatic plant and animal life, and to maintain the aesthetic and recreational value of the Columbia's shoreline and beaches. The Federal Water Pollution Control Act (Clean Water Act (CWA), 33 U.S.C. 1251) requires the EPA to publish and periodically update ambient water quality criteria. These values are published in the "Gold Book" (EPA 1986) and are intended to provide scientific data and guidance on the environmental effects of specific contaminants. These criteria are not regulatory cleanup levels; rather, they are used to derive regulatory requirements based on water quality impacts. However, Ecology has adopted this criteria (WAC 173-201) and for Class A waters (the Columbia) concentrations of contaminants shall be below those published in the "Gold Book." Releases of hazardous substances to groundwaters shall not directly or indirectly cause violations of surface water quality. The fresh water acute criteria for TCE is 45,000 μg/l, and the chronic criteria is 21,900 μg/l as published in the "Gold Book." No criteria exists for nitrate.

Hazardous substances are designated under the CWA (40 CFR 116) and the discharge of these contaminants to surface or groundwaters shall not exceed the reportable quantity (RQ) specified (40 CFR 117). For the 1100-EM-1 Operable Unit, the potential contaminants of concern designated as hazardous and the reportable discharge quantity of each are PCB's with a RQ of one pound, and TCE with an RQ of 100 pounds. These requirements are "applicable."

3.3 ACTION AND CLEANUP LEVELS (40 CFR 300.43, OSWER 9355.4-01, and WAC 173-340-745 MTCA)

The NCP provides general guidance for the establishment of acceptable exposure levels for the protection of human health and the environment. Cleanup requirements shall be based on applicable or relevant and appropriate requirements if available. In the absence of these, cleanup standards shall be based on the potential risks to receptors. For systemic toxicants, cleanup levels are set below the concentration that would adversely impact the human population over a lifetime, incorporating an adequate margin of safety. For carcinogens, cleanup levels are set below the concentration that represents an upper bound lifetime cancer risk of between 10^{-4} to 10^{-6}. The 10^{-6} risk level shall be used as the point of departure for determining remediation goals when ARAR's are not available or sufficiently protective. For ground and surface waters, contaminant cleanup should be at or below MCL's if the water is a source or potential source of drinking water. For soil, remediation would be consistent with plausible future land use. These rules are "applicable" to the remediation of contaminants at this site.

PCB's action levels are provided in OSWER Directives 9355.4-01. The action level for industrial sites should be in the range of 10 to 25 parts per million. The actual level chosen is dependent on the site specific exposure assumptions. This directive is guidance and is "to be considered."

Ecology's MTCA contains promulgated cleanup regulations that are "applicable" to the contaminants of concern at the site. Cleanup levels prescribed are based on the designated land use. Three basic methods are provided for the establishment of cleanup levels. They are:

- Method A--Method A tables have been established providing cleanup standards for several hazardous contaminants in various media. Cleanup levels shall attain these concentrations for listed contaminants, or meet established state and Federal requirements for those not listed. Use of Method A is allowed for cleanup of sites that have relatively few hazardous substances.

- Method B--Cleanup levels are established for all media of concern using applicable state and Federal laws or by using the risk equations specified in WAC 173-340-720 through 173-340-750. For individual carcinogens, the upper bound of the incremental cancer risk is set at one in one million; for noncarcinogens, cleanup levels are established at levels which are not anticipated to have adverse acute or chronic effects on human health or the environment. For sites with multiple contaminants, the total excess lifetime cancer risk for a site shall not exceed one in a hundred thousand and the hazard index for substances with similar noncarcinogenic toxic effects shall not exceed one.

- Method C--When cleanup to Method A or B standards is impossible to achieve or may cause greater environmental harm, or when the site is determined to be an industrial site meeting the criteria of WAC 173-340-745, the use of Method C is allowed. The upper bound of the estimated cancer risk is one in one hundred thousand for individual carcinogens under Method C cleanup levels. For individual noncarcinogens, cleanup levels are set at concentrations that are anticipated to have no acute or chronic toxic effects on human health or the environment. Cleanup levels shall not exceed applicable state or Federal requirements. As in Method B, the total excess lifetime cancer risk for all contaminants at the site shall not exceed one in one hundred thousand and the hazard index for substances with similar noncarcinogenic toxic effects shall not exceed one.

Under WAC 173-340-360 all cleanup actions shall comply with the above cleanup standards, shall comply with applicable state and Federal laws (other ARAR's), shall provide for compliance monitoring, and shall be protective of human health and the environment (meet the overall goals for site risk). Consideration is also given to additional factors in selecting cleanup actions (WAC 173-340-360 and 173-340-700(2)(a)). Application of these factors may in some instances result in the selection of MTCA cleanup actions that do not achieve the otherwise applicable cleanup standards. For example, although permanent solutions are to be selected to the maximum extent practicable, if achieving cleanup standards is not technically possible or if the incremental cost of the cleanup action is substantial and disproportionate to the incremental degree of protection it would achieve over a lower preference cleanup action, then permanent solutions achieving cleanup standards may not be

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required. In that event, alternatives such as containment or institutional controls may be considered.

The current land use and long range-planning for the 1100-EM-1 (appendix J) is for an industrial type use. In addition, the current zoning and long-range planning by the City of Richland for property adjacent to the 1100-EM-1 is industrial and commercial in nature. WAC 173-340-745 sets forth criteria which can be used to determine if the site land use is industrial. These criteria and a discussion of how each is met by the 1100-EM-1 Operable Unit follows:

I) **The site is zoned or has been otherwise officially designated for industrial use.** The 1100-EM-1 Operable Unit lies within the eastern half of the 1100 Area, which is designated for heavy industrial use in the Benton County Comprehensive Land Use Plan. The western half of the 1100 Area falls within the city limits of Richland. The city of Richland zoning map shows this area as being zoned for heavy industrial use. *The Hanford Site Development Plan* (DOE/RL-92-20) designates the northern portion of the 1100 Area for research and development activities and the southern portion for operation support activities (both activities are consistent with industrial types of land use).

II) **The site is currently used for industrial purposes or has a history of use for industrial purposes.** Industrial facilities consist of central warehousing, vehicle maintenance, and transportation distribution in support of the Hanford Site operations. The contaminated sites of the 1100-EM-1 Operable Unit are associated with these activities.

III) **Adjacent properties are currently used or designated for use for industrial purposes.** Properties adjacent to the 1100-EM-1 Operable Unit are administered by the city of Richland and are currently used or reserved for medium or heavy industrial use. Areas to the east, adjacent to the Columbia River, are designated for heavy industrial use. To the north, the operable unit is bounded by other lands within the Hanford Site that are also designated for heavy industrial use.

IV) **The site is expected to be used for industrial purposes for the foreseeable future due to site zoning, statutory or regulatory restrictions, comprehensive plans, adjacent land use, and other relevant factors.** As stated in the Phase I RI, in conversations with county, city, and Hanford Site planning officials, they indicated that the current land use status of this area will remain unchanged as long as the Hanford Site exists. These conversations are summarized in the issue paper *Future Land Use Assumptions for the 1100-EM-1 Operable Unit* (Golder,1990). If control of the site is relinquished by the Government, land use in the vicinity of the Operable Unit would remain unchanged due to the presence of established commercial and industrial facilities that could be readily utilized by the private sector.

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Additionally, several recently published planning documents confirm that the proposed future land use in and adjacent to the 1100 Area will be industrial. The *Hanford Site Development Plan* (DOE/RL-92-20) shows that the 1100 Area will be used for operational support to include warehousing, vehicle maintenance, and office operations. The *Hanford 300 Area Development Plan* (DOE/RL-91-09) shows that the area north of Horn Rapids Road and east of Stevens Drive, which is downgradient of HRL, will be used for industrial uses. This area will be the site of office facilities and the proposed Environmental Molecular Science Laboratory. Heavier industrial operations will occupy the northern 300 Area. Also, the 600 Area, which includes areas north of HRL, is designated for use by research and development facilities, which can be associated with light to medium industrial use.

V) **The clean up action provides for institutional controls implemented in accordance with WAC 173-340-440.** Both Ecology and DOE have institutional controls in place that protect against human exposure from the contaminated groundwater. Within the Hanford Works Boundary, access and development are closely controlled by DOE. Ecology controls exposure to the groundwater by means of water well permits.

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Based on the five criteria above, the 1100-EM-1 Operable Unit is an industrial site. WAC 173-340-745(1)(c) states that "the department expects that only sites located within a limited number of large industrial areas will qualify for industrial soil cleanup levels." The operable unit is within the larger area known as the Tri-Cities Science and Technology Park, which is zoned for industrial use. All areas adjacent to the park are also currently zoned for industrial use. This land use is anticipated to continue as industrial with a high degree of certainty through the period of time required for the remediation of the groundwater or attenuation to MCL's, thereby allowing this operable unit to completely fulfill the industrial definition requirement.

Method C standards for soil cleanup of industrial sites are first considered. Additional requirements are that all practicable methods of remediation are used and that institutional controls be implemented in accordance with WAC 173-340-440. Practicability of technologies available for the remediation of the operable subunits are briefly summarized below. Detailed discussions of the practicability of processes and remedial alternatives are included in sections 6 through 8 of the main report.

- UN-1100-6 (Discolored Soil Site)--Soils at the Discolored Soil Site are easily accessed and can readily be excavated and treated without substantial risk to remediation workers. Treatment process options are available which can achieve BEHP destruction efficiencies of as high as 99.9999 percent. Cleanup to requirements more stringent than Method C is practicable and the Method B criteria is proposed as the ARAR for this operable subunit with the possibility of attaining clean closure.

- Ephemeral Pool--Technology process options to destroy or remove PCB's from contaminated soils are available with efficiencies as high as 99.9999

percent. Remedial work at the site should not pose a substantial risk to remediation workers and the contaminated soils can be easily accessed and processed. Cleanup to levels more stringent than Method C is practicable. Because the only subunit contaminant of concern is PCB's, the Method A criteria is proposed as the ARAR. Attaining clean closure is also a possibility at this site.

- HRL--As stated above technology is available for the efficient removal or destruction of PCB's. Remediation of the PCB's hot spot in the HRL will pose considerable risk to remediation workers and may pose increased risk to the environment. The migration of asbestos containing fugitive dust is the primary concern to on site workers. To prevent dust migration the site must be thoroughly wetted. The saturation of the soil horizon in this area may provide a potential migration pathway for vadose zone contaminants to the groundwater. Any active remedial measures taken at the HRL that would require excavation of soils will pose these risks. Cleanup to levels more stringent than Method C criteria is practicable but the associated risks to human health and the environment are also greater. Method C is proposed as the ARAR for the HRL.

Soil cleanup levels for the contaminants of concern are shown in table M-1. MTCA states that where there is a potential for migration of contaminants from soil to groundwater, these values must be at least as stringent as 100 times the groundwater cleanup level. Preliminary modeling of the vadose zone for the Phase II RI has shown that there is minimal recharge of the aquifer directly below the contaminated soil sites from precipitation. Therefore, there is adequate evidence to rule out this contaminant migration pathway and to base cleanup levels solely on the appropriate method for soil cleanup.

For groundwaters, cleanup levels must be set at safe drinking water levels unless it is shown that there is no current or potential use of the groundwater as a drinking water source. While it is very difficult to predict the long-term future use of the aquifer, it is not very likely that the groundwater will be used as a drinking water source in the near future (next 25 years) due to the site's current land use. To disqualify the groundwater as a drinking water source several MTCA criteria must be met. These criteria and a discussion of each as it pertains to the 1100-EM-1 Operable Unit are:

I) **The groundwater does not serve as a current source of drinking water.** The groundwater hydraulically downgradient, and within .5 miles upgradient of the HRL plume, does not currently serve as a drinking water source. Existing industrial facilities in the 1100 and 300 Areas obtain domestic water from the city of Richland water supply system. Existing domestic wells in the vicinity of these areas are used either for irrigation or for domestic heat pumps.

II) **The groundwater is not a potential source of drinking water.** Areas downgradient of the HRL plume are within the Hanford Site boundary and are strictly controlled by the DOE. Directly upgradient, the land falls within the city limits of Richland and is designated as in industrial area. Both the DOE and the city of

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Richland have institutional controls in place that would restrict the installation of wells for the consumption of water. Additionally, these groundwaters are hard and not suited to industrial or domestic use. Because the city's distribution system serves this area, all water for domestic consumption is anticipated to be supplied by the city.

III) **The department determines that it is unlikely that hazardous substances will be transported from the contaminated groundwater to groundwater that is a current or potential future source of drinking water at concentrations that exceed groundwater quality criteria.** The only wells that are used as a drinking water source are those operated by the city of Richland at their well field. The well field is approximately 2.0 miles southeast of the HRL plume and hydraulically at the same gradient. The city uses the well field to filter Columbia River water, which is softer than the groundwater. The city uses a recharge/withdrawal ratio of approximately 2 or 3 to 1. This maintains a hydraulic gradient sloping away from the well field. This has been confirmed by monitoring the groundwater elevations throughout the Phase II RI investigation. It is inconceivable that the contaminants from the HRL plume could be transported to this area.

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Groundwater cleanup to Method C standards is considered for this site. Under this method groundwater must be returned to its most beneficial use. While the short term use of this groundwater is nonexistent, the most beneficial use in the long term would be as a drinking water source. Cleanup concentrations shall be based on the most stringent requirement of applicable state or Federal law. Standards derived from the Method C equations are 39.8 μg/l for TCE and 56 mg/l for nitrate as nitrogen. These values are substantially higher than established SDWA MCL's and the MCL's will be used as the ARAR's for groundwater cleanup and are shown in table M-1.

Table M-1. Summary Of Cleanup Standards

Operable Subunit	Media	Contaminant	ARAR	Cleanup Standard
UN-1100-6	Soil	BEHP	MTCA B	71 mg/kg
Ephemeral Pool	Soil	PCB's	MTCA A	1 mg/kg
HRL	Soil	PCB's	MTCA C	17 mg/kg
HRL	Groundwater	TCE	SDWA MCL	5 μg/l
HRL	Groundwater	Nitrate	SDWA MCL	10 mg/l as N

For onsite groundwater remedies, WAC 173-340-720(6)(c) allows conditional points of compliance which shall be as close as practicable to the source of the hazardous substances, not to exceed the property boundary. At sites where the affected groundwater flows into nearby surface water, if certain treatment and water quality criteria are met, the cleanup level may be based on the protection of surface water. At such sites, the conditional

point of compliance may be where the groundwater flows into the surface water. Conditional points of compliance may be considered when applying MTCA cleanup standards.

3.4 DANGEROUS WASTE REGULATIONS (WAC 173-303)

Dangerous Wastes (DW) and Extremely Hazardous Wastes (EHW) are defined by WAC 173-303-081. A waste is hazardous if it is designated as such or if it exhibits the hazardous characteristics of reactivity, ignitability, corrosivity, or EP toxicity. These regulations also consider the toxicity, persistence and carcinogenicity of the waste. Contaminated soils on site which exhibit DW or EHW characteristics must be transported, treated, and disposed of in accordance with these "applicable" regulations.

Toxicity is determined by applying the formula given in WAC 173-303-101 and by utilizing the toxicity designations of WAC 173-303-9903 to develop an equivalent concentration. For the contaminants of concern in soils, only BEHP - toxic category not determined, is listed. For the discolored soil site BEHP at a concentration of 25,046 ppm gives an equivalent concentration of 0.0025 percent based on a toxic category D for BEHP. Based on this equivalent concentration, the contaminated soil would not be designated as either DW or EHW for toxicity.

The soil contaminants of concern have no persistent characteristics, but do have carcinogenic characteristics in that they contain BEHP and PCB's. Wastes with concentrations of carcinogenic contaminants in excess of 1 percent are classified as EHW. A DW designation is given to wastes containing carcinogenic contaminants in excess of 0.01 percent. For the discolored soil site BEHP is present in soil at a concentration of 2.5 percent, which gives a EHW designation. For the Ephemeral Pool and the Horn Rapids Landfill, maximum PCB's concentrations are 0.004 percent [42,225 parts per billion (ppb)] and 0.01 percent (100,000 ppb), respectively. Therefore, soils at these sites are not classified as either EHW or DW.

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3.5 AIR QUALITY (40 CFR 50, 40 CFR 58, 40 CFR 61, WAC 173-400, WAC 173-403, WAC 173-434, WAC 173-470, WAC 173-474, WAC 173-475, and WAC 173-480)

The EPA, state of Washington, and Tri-City Air Pollution Control Authority have set air pollution standards for the Hanford Reservation. Through the use of best available technologies (BAT), these standards are technically feasible and reasonably attainable. General standards for maximum emissions are outlined in WAC 173-400 and 40 CFR 50. Air emissions generated from handling of soils and treatment actions are subject to these and other applicable regional air quality standards in order to control or prevent the emission of air contaminants. These standards are considered "applicable." Specific guidance are listed and referenced below.

(1) Sulfur Dioxide

1-hour average (not more than once/year)	0.4 ppm
1-hour twice per week	0.25 ppm
24-hour average	0.10 ppm
Annual average	0.02 ppm

Reference: WAC 173-474

(2) Nitrogen Dioxide

Annual arithmetic mean	100 $\mu g/m^3$

Reference: WAC 173-475

(3) Suspended Particulates

The annual mean concentration shall not exceed 60 $\mu g/m^3$. If the annual mean background concentration exceeds 20 $\mu g/m^3$ due to rural fugitive dust, the standard becomes 40 $\mu g/m^3$ plus the background concentration. Maximum 24-hour concentrations of 150 $\mu g/m^3$ of air are not to be exceeded more than once a year. If the background concentration exceeds 30 $\mu g/m^3$ due to rural fugitive dust, the standard becomes 120 $\mu g/m^3$ plus the background concentration.

Reference: WAC 173-470

(4) Carbon Monoxide

Average concentrations over 8 hours shall not exceed 10 mg/m^3 more than once a year. Further, a concentration of 40 mg/m^3 averaged over a 1-hour period shall not be exceeded more than once a year.

Reference: WAC 173-475

(5) Ozone

Maximum hourly concentrations shall not exceed 0.12 ppm (235 $\mu g/m^3$) hourly concentration on more than 1.0 days per calendar year.

Reference: WAC 173-475

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(6) Radionuclides

The maximum accumulated dose due to air emissions shall not exceed 25 mrems/yr to the whole body or 75 mrems/yr to a critical organ of any member of the public.

Reference: WAC 173-480

"Relevant and appropriate" procedures for the implementation of these regulations are set forth in WAC 173-403. After construction of the facility, air quality shall be monitored and reported in accordance with "applicable" requirements of 40 CFR 58. Monitoring stations will be required to ensure that air quality is preserved. Monitoring will be required for all contaminants listed above.

Specific regulations pertaining to solid waste incineration facilities are contained in WAC 173-434. These define the emission standards for the design and operation of such facilities and are considered to be "relevant and appropriate."

Fugitive dust from HRL may contain asbestos and, therefore, is a threat to air quality. Standards for inactive waste disposal sites containing asbestos are provided in 40 CFR 61 and are "relevant and appropriate." Asbestos containing waste shall be covered with non-asbestos containing material and compacted. These sites shall be fenced and signed to deter public access.

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4.0 LOCATION SPECIFIC ARAR's

4.1 THREATENED AND ENDANGERED SPECIES (50 CFR 17, WAC 232-12-011, and WAC 232-12-014)

The Hanford Reservation is known to be a nesting site for the swainson's hawk and the long-billed curlew, two bird species that are designated as sensitive by the Washington Department of Wildlife. Additionally, the Columbia River is in the migratory flyway of several species that are state or Federally listed including the bald eagle, American white pelican, falcon, Aleutian Canada goose, ferruginous hawk, and sandhill crane. These regulations are "to be considered" before remedial action is undertaken to ensure that the habitat of these species is preserved.

4.2 PRESERVATION OF CULTURAL AND HISTORIC ARTIFACTS (16 U.S.C. 469, 16 U.S.C. 461, 16 U.S.C. 470, Executive Order 11593)

Requirements are in place to recover and preserve artifacts, preserve historic sites, buildings or objects of national significance, and prohibit impacts to cultural resources that may be disturbed, harmed, lost, or destroyed during remedial actions. These "applicable" requirements must be considered prior to undertaking remedial actions.

4.3 FLOODPLAINS, WETLANDS AND SHORELINES (10 CFR 1022 and RCW 90.58)

Any remedial action with the potential to adversely impact natural wetlands, or which may cause adverse effects associated with indirect or direct development of floodplains or shorelines is restricted under these "applicable" requirements. Every effort must be made to avoid these potential impacts.

5.0 ACTION SPECIFIC ARAR's

5.1 WATER QUALITY (40 CFR 122, 40 CFR 131, 40 CFR 141.13, WAC 173-216)

Remedial actions requiring point source discharges to surface waters shall meet "applicable" state and federal standards for water quality. The National Pollution Discharge Elimination System (NPDES) Program (40 CFR 122) requires that a permit be acquired for facilities discharging to surface waters. Discharges shall meet the water quality standards of the body of water based on its use or uses. Water quality data and information on discharges will be reviewed by the state to identify toxic pollutants that may adversely affect the water quality and its designated use (40 CFR 131). Because the Hanford Site is a Federal facility, the NPDES permit will be administered by the EPA.

Point source discharges from remedial actions may effect the turbidity standards of the Columbia River. For cities using the Columbia River as a source of drinking water, the MCL for turbidity at the entry point is 1 turbidity unit (TU) as determined by a monthly average. If turbidity does not interfere with disinfection or the maintenance of disinfecting agents, or interfere with the microbiological determination, up to 5 TU's may be allowed. Effluent water quality must meet these "relevant and appropriate" turbidity standards.

The state regulates the discharge of waste materials from industrial and commercial operations not covered by the NPDES Program into ground and surface waters of the state (WAC 173-216). These "applicable" regulations are intended to set pretreatment requirements to comply with the CWA.

5.2 GROUNDWATER QUALITY (WAC 173-154, WAC 173-160, WAC 173-162 and WAC 173-218)

The groundwater aquifer underlying the 1100-EM-1 Operable Unit supplies wells for domestic, municipal, and industrial use. Municipal wells at the Richland Well Field , located east of the 1100 Area, draw water from the unconfined aquifer, which is recharged with water from the Columbia River, to supply the municipality with a total output capacity of 15,000 to 23,000 m^3/day (4.0 to 6.1 MGD)(DOE-RL 1990). The well field is currently used to supplement the city water supply during times of peak seasonal demand. WAC 173-154 establishes policies and procedures in regard to the protection of the occurrence and availability of groundwater within the upper aquifers or upper aquifer zones of a multiple

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aquifer system. These regulations protect the aquifers from depletion, excessive water level declines or reductions in water quality, and are considered to be "relevant and appropriate."

Requirements for the operation of well drilling equipment and the construction of groundwater monitoring wells are set forth in WAC 173-160 and WAC 173-162. Wells shall be constructed in accordance with these regulations to prevent the degradation of the aquifer from current and future activities. When establishing a well in known or potential areas of contamination, procedures shall be in place to decontaminate the drilling equipment prior to and after drilling the well. Completed wells shall be protected and shall be tamper proof. Construction of the well shall be under the supervision of a Washington state licensed well driller. These requirements are considered "relevant and appropriate."

If the remedial alternative selected requires the reinjection of treated effluent into the aquifer, the effluent shall meet cleanup standards in order to preserve the aquifer for existing and future beneficial uses. Requirements for reinjection wells are provided in WAC 173-218 and are "applicable."

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5.3 HAZARDOUS WASTE GENERATION (40 CFR 262)

Remedial actions having hazardous waste as a secondary waste stream shall meet the "applicable" standards for hazardous waste generators outlined in 40 CFR 262. The secondary waste stream must first be identified as hazardous or not. If the waste is hazardous, an EPA identification number must be obtained in order to store, treat, or dispose of the waste. Shipping records shall be kept for 3 years after the waste is transported offsite.

5.4 HAZARDOUS WASTE TRANSPORTATION (49 CFR Subchapter C, 40 CFR 263, and WAC 446-50)

Transportation of hazardous waste is regulated by the Federal government through 49 CFR, subchapter C, and by the state through WAC 446-50. These regulations prohibit the transportation of hazardous materials in commerce unless the material is properly classed, described, packaged, labeled, and in a suitable condition for handling and shipment. The EPA has adopted these requirements as part of RCRA (40 CFR 263) to protect human health and the environment. These transportation requirements are "applicable" if wastes are to be transported offsite.

5.5 GENERAL STORAGE AND TREATMENT OF HAZARDOUS WASTE (40 CFR 264, 42 U.S.C. 6901, and WAC 173-303)

A hazardous waste must be a analyzed and identified before an owner or operator of a storage, treatment, or disposal facility can handle it. If wastes are to be stored or disposed of as part of a remedial alternative these regulations would be "applicable." Owners of hazardous waste storage and treatment facilities must comply with RCRA (42 U.S.C. 6901) and 40 CFR 264 when handling these hazardous wastes. Ecology's dangerous waste

regulations (WAC 173-303) also apply to storers or treaters of hazardous waste. Dangerous or extremely hazardous waste (as previously identified) to be disposed of through incineration, land treatment, or in a landfill are covered by this "applicable" regulation.

5.6 TREATMENT OF WASTEWATER (WAC 173-240 and Richland City Ordinance 35-84)

Plans and specifications for groundwater treatment systems constructed as part of a remedial action that will discharge to surface or ground waters, or to a POTW, will be subject to the substantive requirements of state regulations (WAC 173-240) and shall comply with the submittal requirements of the TPA. These requirements are "relevant and appropriate." Additionally, if the wastewater from any remedial process is sent to the Richland sewage treatment plant for final disposal, it must meet the pretreatment standards set forth by City Ordinance 35 through 84. These standards should be considered "applicable" for treatment options requiring discharge to the POTW.

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5.7 LAND TREATMENT (40 CFR 264.271)

If land treatment is selected as an alternative technology it must be demonstrated that the application of wastes containing the hazardous constituents can be treated. The treatment method must ensure that these constituents can be degraded, transformed, or immobilized within the treatment zone. The maximum depth of the treatment zone allowable is no more than 5 feet, and the zone must be at least 3 feet above the seasonal high water table in order to satisfy this "applicable" requirement.

5.8 LANDFILLING (40 CFR 264, 40 CFR 268 and WAC 173-304)

Remedial actions requiring the excavation of hazardous waste with ultimate disposal in an off site chemical waste landfill are subject to the "applicable" requirements of 40 CFR 264 and 268 under RCRA. Land disposal restrictions are in place for certain RCRA listed wastes. Contaminated soil and debris containing these listed wastes are subject to treatment standards prior to their disposal, although RCRA rules provide an opportunity for variances from the treatment standards (40 CFR 268.8 and OSWER Directive 9347.3-06FS). Of the contaminants of concern, a pretreatment standard of 28 mg/kg for BEHP must be attained prior to landfilling. Landfilling requirements for PCB's will be discussed later. Additionally, groundwater monitoring will be required under the "applicable" provisions of 40 CFR 264.90-109, which addresses the release of contaminants from solid waste management units.

"Applicable" requirements for the design, maintenance, and closure of solid waste handling facilities such as landfills are contained in WAC 173-304. If landfills are constructed on site for ultimate disposal of the contaminated soil and debris, these regulations would apply. Additionally, groundwater monitoring will be required under the "applicable"

provisions of 40 CFR 264.90-109, which address the release of contaminants from solid waste management units.

5.9 CLOSURE AND POST-CLOSURE (40 CFR 264.111, 40 CFR, 40 CFR 264.228, 40 CFR 264.258, 40 CFR 264.310, and WAC 173-304)

RCRA closure requirements for land disposal facilities will be triggered if the hazardous waste is consolidated and moved to an off site land disposal facility, or if the waste is excavated and removed from the operable unit, treated on site, and then redeposited. These closure requirements are set forth in 40 CFR 264.111 and 264.228 and are "applicable" to remediation alternatives requiring land disposal. Caps must be designed to provide long-term minimization of the infiltration of rainfall. Also, they must function with the minimum of maintenance, promote drainage, minimize abrasion or erosion of the cover, accommodate settling and subsidence, and have a permeability of less than 10^{-7} cm/sec.

Because of the arid climate of the Hanford Reservation, an alternate cap consisting of a geomembrane of at least 50 mil thickness is allowed under the "applicable" regulations of WAC 173-304. The geomembrane must be covered by a minimum of 6-inches of topsoil and seeded to dryland grass or other shallow rooted vegetation.

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5.10 REQUIREMENTS FOR PCB'S (40 CFR 761)

"Applicable" requirements for the storage, treatment, and disposal of PCB's under the Toxic Substances Control Act are provided in 40 CFR 761. In general, concentrations of PCB's greater than 50 ppm present an unreasonable risk to human health and the environment for controlled access sites, while concentrations exceeding 25 ppm present unreasonable risk at uncontrolled access sites. Disposal of PCB's with concentrations from 50-500 ppm is allowed in chemical waste landfills or by incineration. For concentrations greater than 500 ppm, incineration is the only disposal alternative. Chemical waste landfills must meet specific requirements for soils, geomembranes, hydrologic conditions, flood protection, topography and monitoring systems as outlined in 40 CFR 761.75. Incinerators must meet the combustion and monitoring requirements of 40 CFR 761.70.

Regulations that cover the cleanup of PCB's spilled or leaked to the environment are "to be considered" and are found in 40 CFR 761.120. Items covered include the disposal of debris and materials used in the cleanup and the statistical sampling required to determine the completeness of the cleanup.

5.11 INCINERATION OF SOILS (40 CFR 264, Subpart O)

Incinerators used for the treatment of contaminated soil and debris are subject to the "applicable" requirements of 40 CFR 264, Subpart O. Contaminated waste feeds must be analyzed for characteristic RCRA wastes. Contaminated ash and residue must be properly disposed of. Destruction removal efficiencies for principal organic hazardous constituents

and for PCB's and dioxins shall be 99.99 percent and 99.9999 percent respectively. Emissions of hydrogen chloride (HCl) gases shall not exceed 1.0 kg/hr or 1 percent of the HCl in the stack gases prior to entering any pollution control device. Provisions for monitoring combustion temperature, waste feed rate, combustion gas, and carbon dioxide formation shall be in place. Particulate emissions are not to exceed 0.08 grains/dry standard cubic foot. For the incineration of PCB contaminated soils, incineration requirements shall comply with requirements in 40 CFR 761.

5.12 OPERATION OF FACILITIES (WAC 173-300)

WAC 173-300 sets forth requirements that are "applicable" to operators of landfills and incinerators. In general, operators must meet certain standards before they are certified to operate these facilities.

5.13 NONROUTINE RELEASES (40 CFR 302)

Any nonroutine release of hazardous substances in the process of a remedial investigation or action, shall be reported. Nonroutine releases are not to exceed CERCLA/SARA/Ecology release limits and could be derived from a spill or discharge via liquid effluent stream. Permits are based on DOE and EPA requirements that set Environmental Control Limits. These regulations are "relevant and appropriate" to activities that will take place at the site.

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Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.

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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
1.0 Chemical Specific				
1.1 Drinking Water Standards				
1.1.1 Safe Drinking Water Act (SDWA) 42 U.S.C. 300 (f) 40 CFR part 141		x		Drinking water standards must be attained for any potential or future sources of drinking water. These sources must be protected against groundwater contamination from the 1100-EM-1 Operable Unit. Established maximum contaminant levels (MCL's) for the contaminants of concern are: TCE 5 µg/l nitrate (as N) 10 mg/l
1.1.2 40 CFR 143.3 Secondary Maximum Contaminant Levels for Drinking Water			x	National secondary drinking water standards are intended to control contaminants in drinking water that primarily effect the aesthetic qualities relating to the public acceptance of drinking water. The regulations are not federally enforceable, but are intended as guidelines for the state. Groundwater at the site currently meets these standards and remedial actions are not expected to degrade the quality of the groundwater.

Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.

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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
1.2 Protection of Surface Waters				
1.2.1 Clean Water Act (CWA) 33 U.S.C. 1251, and WAC 173-201		x		The ambient water quality of the Columbia River must be preserved for the protection of aquatic life. The Columbia is classified as a Class A water. The State has adopted the EPA's Federal Water Quality Criteria and concentrations of contaminants in Class A waters shall be below the following to prevent acute and chronic toxicity to freshwater organisms: Chemical — Acute Criteria — Chronic Criteria Nitrate (as N)[1] — -- — -- TCE — 45,000 µg/l — 21,900 µg/l [1] Nitrate-Nitrogen concentrations below 90 mg/l are reported to have no adverse impact on warm water fish.
1.2.2 40 CFR 116 and 40 CFR 117 Designation of Hazardous Substances	x			The following contaminants of concern are listed as hazardous substances: trichloroethylene (TCE), and polychlorinated biphenyls (PCB's). Discharge of these contaminants to surface or ground waters shall not exceed reportable quantities of 100 lbs for TCE, and 1 lb for PCB's.
1.3 Action and Cleanup Levels				
1.3.1 40 CFR 300.43 National Contingency Plan	x			Direction is given for basing cleanup levels on ARARs, or on potential risk in the absence of ARARs.
1.3 2 EPA Directive 9355.4 - FS 1990 A Guide on Remedial Actions at Superfund Sites With PCB Contamination			x	Recommended soil action levels for PCB's at an industrial site are from 10 to 25 mg/kg. The appropriate action level within the range will depend on site-specific factors affecting the exposure assumptions.

Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.
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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
1.3.3 WAC 173-340-745 Model Toxic Control Act (MTCA) Cleanup Regulations		x		Ecology's Model Toxic Control Act (MTCA) contains promulgated cleanup regulations for the contaminants of concern at the site. Three methods to determine cleanup are provided. Use of a specific method considers the specific contaminant, the presence of other contaminants, land use, the practicability of cleanup, and the risk to human health and the environment. These methods provide cleanup levels that reduce cancer risks to less than 1 in 100,000 for carcinogens, and will have no chronic or acute effects on human health or the environment. Contaminant migration to surface or groundwaters is not viable pathway and has not been considered when determining these levels. Groundwater cleanup will be to SDWA MCLs at a designated point of compliance. Cleanup levels for the contaminants of concern in their respective medias are: Media / Subunit / Contaminant / Cleanup Level / Method Soil / UN-1100-6 / BEHP / 71 mg/kg / MTCA B Ephemeral Pool / PCBs / 1 mg/kg / MTCA A HRL / PCBs / 17 mg/kg / MTCA C Ground Water / HRL / TCE / 5 µg/l / MCL Nitrates / 10 mg/l / MCL

Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.

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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
1.4 Dangerous Waste Regulations				
1.4.1 WAC 173-303 Dangerous Waste Regulations	x			Hazardous wastes may be characterized as Dangerous Waste (DW) or Extremely Hazardous Waste (EHW). Additional characteristics based on persistence, carcinogenicity, mutagenicity, teratogenicity, the concentration of certain compounds, and toxicity is required. Contaminated soils on site which exhibit DW or EHW characteristics must be transported, treated, and disposed of in accordance with these regulations. For the discolored soil site, soils contaminated with BEHP are classified as EHW based on carcinogenicity. For the HRL, assuming a worst case in which all carcinogenic contaminants of concern are present, soils are given a DW designation.
1.5 Air Quality				
1.5.1 40 CFR 50 National Primary and Secondary Air Quality Standards WAC 173-400 General Regulations for Air Pollution Sources WAC 173-403 Implementation of Regulations for Air Contaminant Sources WAC 173-470 Ambient Air Quality Standards for Particulate Matter WAC 173-474 Ambient Air Quality Standards for Sulfur Oxide	x			EPA, State of Washington, and Tri-County Air Pollution Control Authority have set air pollution WAC standards at Hanford. These standards are technically feasible and reasonably attainable. Air emissions generated from handling of soils and treatment actions are subject to the applicable regional air quality standards in order to control or prevent the emission of air contaminants. (1) <u>Sulfur dioxide</u> 1-hr average: 0.4 ppm (not more than once a year) 1-hr twice per week 0.25 ppm 24-hr average: 0.1 ppm Annual average: 0.02 ppm Reference: WAC 173-474

Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.
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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
1.5.1 (Continued) WAC 173-475 Ambient Air Quality Standards for Carbon Monoxide, Ozone and Nitrogen Dioxide WAC 173-480 Ambient Air Quality Standards and Emission Limits for Radionuclides WAC 173-490 Emission Standards and Controls for Sources Emitting Volatile Organic Compounds (VOC) Regional Air Quality Standards				(2) Nitrogen dioxide Annual arithmetic mean 100 $\mu g/m^3$ Reference: WAC 173-475 (3) Suspended Particulates Annual mean concentration shall not exceed 60 $\mu g/m^3$. If the annual mean background concentration exceeds 20 $\mu g/m^3$ due to rural fugitive dust, the standard becomes 40 $\mu g/m^3$ plus the background concentration. Maximum 24-hr concentrations of 150 $\mu g/m^3$ of air are not to be exceeded more than once a year. If the background concentration exceeds 30 $\mu g/m^3$ due to rural fugitive dust, the standard becomes 120 $\mu g/m^3$ plus the background concentration. Reference: WAC 173-470 (4) Carbon monoxide Average concentrations over 8 hours shall not exceed 10 mg/m^3 more than once a year. Further, a concentration of 40 mg/m^3 averaged over a 1-hour period shall not be exceeded more than once a year. Reference: WAC 173-475

Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.
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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
1.5.1 (Continued)				(5) Ozone 0.12 ppm (235 $\mu g/m^3$) where the expected number of days with maximum hourly average concentrations above 0.12 ppm is equal to or less than 1. Reference: WAC 173-475 (6) Radionuclides Maximum accumulated dose due to air emissions shall not exceed 25 mrem/yr to the whole body or 75 mrem/yr to a critical organ of any member of the public.
1.5.2 40 CFR 58 Ambient Air Quality Surveillance	x			Surveillance of ambient air quality includes requirements for monitoring and reporting of data. An owner or operator of a proposed emission source that could affect air quality is required to operate a sampling station for purposes of prevention of significant deterioration. Monitoring is required for sulfur dioxide, nitrogen dioxide, carbon monoxide, ozone, and particulate matter.
1.5.3 40 CFR 60 New Source Performance Standards (NSPS)		x		Emission standards for municipal incinerators are set for the following: (1) Sulphur dioxide and hydrogen chloride shall not exceed 50 ppm, corrected to 7% oxygen for an hourly average. (2) Total carbon monoxide, ozone, and nitrogen dioxide from combustion shall not exceed 100 ppm at stack exit, after volumes are corrected to 7% oxygen. (3) Particulate matter 0.23 gr/m^3 at standard condition (0.1 grain/dscf) or 0.46 gr/m^3 at standard condition (0.2 gr/dscf).

Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.

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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
1.5.4 40 CFR 61 National Emission Standards for Hazardous Air Pollutants		x		Fugitive dust containing asbestos may pose a threat to air quality. Asbestos containing waste shall be covered with a non-asbestos containing material and compacted. These sites shall be fenced and signed to deter public access.
1.5.5 WAC 173-400 General Regulations for Air Pollution	x			This chapter implements RCW 70.94 of the Washington Clean Air Act and establishes standards that are technically feasible and reasonably attainable for air pollution sources.
1.5.6 WAC 173-403 Supplementation of Regulations for Air Contaminant Sources		x		This section states the policy of the Department of Ecology under the authority of RCW Chapter 43.21.A to provide control of air pollution, where needed, and to establish procedures for the implementation of air quality rules and regulations.
1.5.7 WAC 173-434 Solid Waste Incinerator Facilities		x		Emission standards for design and operation of solid waste incineration facilities are defined by this regulation.
2.0 Location Specific				
2.1 Threatened and Endangered Species				
2.1.1 WAC 232-12-011 Wildlife classified as protected wildlife			x	The Swainson's hawk and long-billed curlew are proposed by the Department of Wildlife as sensitive, but are not formally protected as an endangered or threatened species. They are federally-designated candidate species.
2.1.2 Endangered Species Act 50 CFR 17 WAC 232-12-014 Wildlife classified as endangered species			x	The bald eagle, American white pelican, falcon, Aleutian Canada goose, ferruginous hawk, and sandhill crane are federal- and/or state- listed species. They are common migrants along the Columbia River and modifications of their habitat should be avoided.
2.2 Preservation of Cultural and Historic Artifacts				
2.2.1 16 U.S.C. 469 Archaeological and Historic Preservation Act	x			In areas where activity may cause irreparable harm, loss, or destruction of significant artifacts, action must be taken to recover and preserve the artifacts.

Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.

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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
2.2.2 16 U.S.C. 461 Historic Sites, Buildings, and Antiquities Act	x			Historic sites, buildings, or objects of national significance must be preserved from undesirable impacts.
2.2.3 16 U.S.C. 470 et seq National Historic Preservation Act	x			Impacts to cultural resources are prohibited. In cases where impacts are unavoidable, appropriate mitigation shall occur.
2.2.4 Executive Order 11593 Protection and Enhancement of the Cultural Environment			x	Federal agencies are directed to preserve, restore, and maintain cultural resources.
2.3 Floodplains, Wetlands, and Shorelines				
2.3.1 10 CFR 1022 Floodplains/Wetlands Environmental Review			x	An evaluation of the potential adverse impacts of development within a floodplain or the destruction of wetlands must be made for remedial actions which may effect these areas.
2.3.2 RCW 90.58 Shoreline Management Act	x			Establishes requirements which restrict activities associated with development in floodplains, wetlands, or historical areas.
3.0 Action Specific				
3.1 Water Quality				
3.1.1 40 CFR 122 Discharge of Treated Effluent	x			Applicable federal and state standards for water quality must be complied with if use of best available technology requires point-source discharge to surface waters of the United States. An application for new discharge must be made 180 days before discharge actually begins. Because Hanford is a federal facility, the NPDES Program will be administered by the EPA.
3.1.2 40 CFR 131 Water Quality Standards	x			Water quality standards designate the use or uses to be made of the water, and enforcement criteria. Water quality data and information on discharges will be reviewed by the state to identify toxic pollutants that may adversely affect water quality and its designated use.

Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.

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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
3.1.3 40 CFR 141.13 Maximum Contaminant Levels for Turbidity		x		Treatment systems may discharge water into the Columbia River and affect turbidity standards. The MCL for turbidity in a water system used for drinking water, measured at the entry point, is 1 turbidity unit (TU) as determined by a monthly average. Up to five TU's may be allowed if higher turbidity does not: (1) interfere with disinfection; (2) prevent maintenance of the disinfectant agents; (3) interfere with microbiological determinations.
3.1.4 WAC 173-216-010 State Waste Discharge Permit Program	x			Implements RCW 90.48 water pollution control and RCW 90.52 Pollution Disclosure Act for the state permit program, applicable to the discharge of waste materials from industrial and commercial operations not covered under the NPDES Program into ground and surface waters of the state.
3.2 Groundwater Quality				
3.2.1 WAC 173-154-020 Protection of Upper Aquifer Zones		x		Policies and procedures are outlined for the protection of groundwater within the upper aquifers or upper aquifer zones where there are multiple aquifer systems. In the 1100-EM-1 Operable Unit, groundwater volumes are discharged to water supply wells used for domestic, municipal, and industrial purposes. Municipal wells at the Richland Well Field, located east of the 1100 Area, draw water from the unconfined aquifer for municipal supply with a total output capacity of 15,000 to 23,000 m^3/day (4.0 to 6.1 million gallons/day) (DOE-RL 1990). The well field is currently used to supplement the city water supply during times of peak seasonal demand.
3.2.2 WAC 173-160 and 162 Ground Water Protection		x		Requirements are established for monitoring of groundwater to prevent degradation from current and future activities, and monitoring of clean-up activity. Groundwater monitoring wells shall be constructed in accordance with WAC 173-160 and WAC 173-162. Groundwater monitoring wells shall be operated in accordance with WAC 173-162 and 173-160 for resource protection wells.

Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.

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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
3.2.3 WAC 173-218 Underground Injection Control Program	x			Groundwater may be used as a source of drinking water. Effluent from the treatment system should meet cleanup standards before being reinjected into the aquifer.
3.3 Hazardous Waste Generation				
3.3.1 40 CFR 262 Standards for Generators of Hazardous Waste	x			A generator who generates, treats, stores, or disposes of hazardous waste on-site must comply with the following sections: Section 262.11 Determine whether or not waste is hazardous; Section 262.12 Obtain an EPA identification number for the accumulation of hazardous waste; and Section 262.40 Record keeping. (c) and (d)
3.4 Hazardous Waste Transportation				
3.4.1 CFR, subchapter C Transportation of Hazardous Materials WAC 446-50 Transport of Hazardous Material	x x			No person may transport a hazardous material in commerce unless the material is properly classed, described, packaged, labeled and in condition for handling and shipment in accordance with 49 CFR subchapter C; Hazardous Materials Regulations: Part 171, General information Part 172, Hazardous materials tables and hazardous materials communications regulations Part 173, General requirements for shipments and packages Part 174, Carriage by rail Part 175, Carriage by vessel Part 177, Carriage by highway
3.4.2 40 CFR 263 Standards Applicable to Transporters of Hazardous Waste	x			EPA has adopted certain regulations from the Department of Transportation governing the transport of hazardous material. These regulations concern labeling, marking, placarding,record keeping, containers and reporting discharges. These regulations are adopted to protect human health and the environment.

Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.

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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
3.5 General Storage and Treatment of Hazardous Waste				
3.5.1 40 CFR 264 Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities 42 U.S.C. 6901 Resource Conservation and Recovery Act	x			Hazardous waste must be analyzed before an owner or operator can treat, store, or dispose of it. Hazardous waste storage must be in compliance with RCRA under 40 CFR part 264, subpart I (Storage Containers), subpart J (Storage Tanks), subpart K (Surface Impoundments), and subpart L (Waste Piles).
3.5.2 WAC 173-303 Dangerous Waste Regulation	x			This regulation implements chapter 70.105 of the Revised Code of Washington (RCW) and regulates those solid wastes that are dangerous or extremely hazardous to the public health and environment. Dangerous or Extremely Hazardous waste to be disposed of through incineration, land treatment, or in a landfill is governed by these regulations.
3.6 Treatment of Wastewater				
3.6.1 WAC 173-240 Submission of Plans and Reports for Construction of Wastewater Facilities		x		Plans, reports, and specifications for wastewater treatment systems which discharge to POTW, surface or ground waters shall be submitted to Ecology for review under these regulations.
3.6.2 Richland City Ordinance 35-84 Publicly-Owned Treatment Works			x	Discharge of any liquid effluent to Richland's publicly owned treatment works must be in accordance with City Ordinance 35-84. Specific limits are set for chromium (1.41 mg/l) and nickel (0.31 mg/l). The contaminant of concern that is specifically banned is dieldrin. Limits on discharge are given to prevent damage to maintenance and operation of the facility.
3.7 Land Treatment				

Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.

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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
3.7.1 40 CFR 264.271 Land Treatment	x			Prior to land treatment, the waste must be treated to best demonstrated available technology (BDAT) levels or meet no migration standard. Treatment must ensure that hazardous constituents are degraded, transformed or immobilized within the treatment zone. The maximum depth of the treatment zone is no more than 5 feet from the soil surface and 3 feet above the seasonal high water table.
3.8 Landfilling				
3.8.1 40 CFR 264.300-317 Landfills	x			Contaminated soil that is excavated and placed in a landfill is subject to land disposal restrictions if the soil contains RCRA hazardous waste.
3.8.2 40 CFR 268.44 Land Disposal Restrictions	x			BEHP will be subject to land disposal treatment standards if excavated material is moved to a new location and placed into a landfill, and if residue from a treatment option is to be land disposed. The contaminated material consists of soil and debris that contain these RCRA hazardous wastes. Pretreatment standards of 28 mg/kg BEHP must be met prior to land disposal. A variance to this treatment standard may be petitioned for under RCRA.
3.8.3 WAC 173-304 Minimum Functional Standards for Solid Waste Handling	x			This chapter implements RCW 70.95 regulations pertaining to solid waste handling facilities such as municipal landfills. Contains provisions for facility design, maintenance, and closure.
3.8.4 40 CFR 264.90-109 Releases from Solid Waste Management Units		x		Groundwater monitoring will be required if a new landfill is constructed to treat, store, or dispose of contaminated soils as part of a remedial action.

Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.

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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
3.9 Closure and Post-Closure				
3.9.1 40 CFR 264.111-120, 264.228 (D), 264.258 and 264.310 Closure and Post-Closure Care	x			Land disposal closure requirements under RCRA will apply if: (1) the waste at the contaminated site is consolidated and moved to another outside location for disposal; or (2) the waste is picked up from the unit and treated within the area of contamination, then redeposited into the unit. Closure of surface impoundment, waste pile, or landfill will require a cap or final cover designed to provide long-term minimization of the migration of liquids through the closure structure, function with minimum maintenance, promote drainage and minimize erosion or abrasion of the final cover, accommodate settling and subsidence, and have a permeability less than or equal to the permeability of a bottom-liner system or natural subsoils present. Specific restrictions are listed in subparts 264.228(a) surface impoundments, 264.258(b) waste piles and 310(a) landfills.
3.9.2 WAC 173-304 Minimum Functional Standards for Solid Waste Handling	x			This section provides for an alternate cap because of the arid climate of the Hanford Reservation. The cap shall consist of a geomembrane liner of at least 50-mil thickness covered by 6-inches of topsoil and seeded to dryland grass.
3.10 Requirements for PCB's				
3.10.1 40 CFR 761.30 PCB's Storage and Disposal 40 CFR 761.60 Alternative Technology to Incineration 40 CFR 761.70 Chemical Waste Landfill	x			Restrictions on the disposal of PCB's are established pursuant to section 6(e)(1) of Toxic Control Act. PCB concentration over 50 ppm presents an unreasonable risk of injury to health at controlled access sites and 25 ppm at uncontrolled access sites. PCB's at concentrations greater than 50 but less than 500 ppm must be disposed of in an incinerator or chemical waste landfill. Incinerators must comply with 40 CFR 761.70, and chemical waste landfills must comply with 761.75. PCB wastes containing greater than 500 ppm must be incinerated in accordance with the technical requirements in 40 CFR 761.70

Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.

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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
3.10.2 40 CFR 761.75 Chemical Waste Landfills	x			A chemical landfill used for the disposal of PCB's must meet specific requirements for soils, synthetic membrane liners, hydrologic conditions, flood protection, topography, and monitoring systems.
3.10.3 40 CFR 761.120 Requirement for PCB Spill Cleanup			x	Regulations provide for the proper corrective actions for cleanup of all spilled or leaked PCB's.
3.11 Incineration of Soils				
3.11.1 40 CFR 264 Subpart O Incineration of Soils	x			Soils treated through incineration are subject to specific requirements: (1) analyze waste feed for RCRA hazardous waste; (2) dispose of all hazardous waste and residue; (3) achieve a destruction removal efficiency of 99.99% for each principal organic hazardous constituent and 99.9999% for PCB's and dioxins; (4) reduce hydrogen chloride (HCL) emissions to 1.0 kg/hr or 1% of the HCl in stack gases before entering any pollution control devise; (5) monitor combustion temperature, waste-feed rate, combustion gas and carbon dioxide; (6) keep particulate matter to no more than 0.08 grains/dry standard cubic foot; and (7) follow special performance standards for PCB's in 40 CFR 761.70.
3.12 Operation of Facilities				
3.12.1 WAC 173-300 Certification of Operators of Solid Waste Incinerator and Landfill Facilities		x		This regulation sets forth certification requirements for operators of landfills and incinerators

Table M-2. Listing of Potential Federal and State Applicable or Relevant and Appropriate Requirements (ARAR's) for the 1100-EM-1 Operable Unit.

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ARAR	Applicable	Relevant and Appropriate	To Be Considered	Rationale
3.13 Non-Routine Releases				
3.13.1 40 CFR 302 EPA Designation, Reportable Quantities Notification Requirements for Hazardous Substances Under CERCLA		x		Environmental Control Limits (ECL's) requirements are based on permit limits as derived from DOE and EPA requirements. Any non-routine release of hazardous material must be reported. A release could be from a spill or discharge via liquid effluent stream. Non-routine releases are not to exceed CERCLA/SARA/Ecology release limits.