START

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July 16, 1990

Meeting Minutes Transmittal/Approval
Unit Managers Meeting: 100-KR-1/KR-4 Operable Units
450 Hills Street, Room 47, Richland, WA
June 13, 1990

From/
Appvl. _____ Date: 18 July 90
J.D. Goodenough, 100-KR-1 Unit Manager, DOE-RL (A6-95)

Appvl. _____ Date: July 18, 1990
K. Michael Thompson, 100-KR-4 Unit Manager, DOE-RL (A6-95)

Appvl.: _____ Date: 18 July 90
~~Douglas R. Sherwood~~ David R. Einan, 100-KR-1/KR-4 Unit Manager, EPA (~~A7-70~~ B5-01)

Appvl. _____ Date 7/18/90
Larry Goldstein, 100-KR-1/KR-4 Unit Manager, WA Department of Ecology

To: Ward Staubitz, USGS
Donna Lacombe, PRC
Russell Fitzpatrick, SWEC (A4-35)
Jack Waite, WHC (B2-35)
Bob Julian, WHC (H4-55)
Tom Wintczak, WHC (B2-15)
Mel Adams, WHC (H4-55)
Rick McCain, WHC (H4-55)
Roy Gephart, PNL (K6-97)
Brian Sprouse, WHC (H4-22)
Diane Clark, DOE-RL (A5-55)
Bill Price, WHC (S0-03)
Don Kane, Battelle EMO (K1-74)
Bill Green, WHC (H4-55)
Chuck Cline, Ecology

cc. Ronald D. Izatt (A6-95)
Director, DOE-RL, ERD
Ronald E. Gerton
Director, DOE-RL, WMD

Roger D. Freeberg (A6-95)
Chief, Rstr. Br., DOE-RL/ERD
Steven H. Wisness (A6-95)
Tri-Party Agreement Proj. Mgr.
Richard D. Wojtasek (B2-15)
Prgm. Mgr. WHC

Jim Patterson, WHC
Doug Sherwood, EPA

ADMINISTRATIVE RECORD (100-KR-1, 100-KR-4) [Care of Susan Wray, WHC (H4-51C)]

Meeting Minutes are attached. Minutes are comprised of the following:

Attachment #1 - Meeting Summary/Summary of Commitments and Agreements;
Attachment #2 - Attendance List and;
Attachment #3 - Viewgraphs used in presentation

Prepared by: Doug Fessett Date: 7/18/90
SWEC Support Services

Concurrence by: _____ Date: 7/18/90
WHC KR-1/KR-4, RI Coordinator

AUG 1990
RECEIVED
EDMC

9011181459

Attachment #1

Meeting Summary and Summary of Commitments and Agreements
100-KR-1/KR-4 Operable Units Managers Meeting
450 Hills Street, Room 47
June 13, 1990

1. Bovay Engineers presented an overview of the work plans, Sections 5.0 - 7.0, and the FSP. Five source units have been identified in the KR-1 unit. Significant areas of other KR units have been looked at as to their relationship to KR-1 and KR-4. These areas include the 105-KE and KW basins and the 118-K-1 burial ground in KR-2. The areas in KR-3 that have been identified include the water treatment french drains and trenches, because mercury was produced due to sulfuric acid productione.

2. The conceptual model of groundwater in the KR-4 operable unit was explained. Based on driller's logs, there appears to be significant amounts of cemented gravel in the vadose zone. The areas of lower permeability may be traced laterally.

3. The groundwater flow in the area appears to be towards the river.

4. There are old wells onsite, but it is uncertain if they are fit for use.

5. There is definite soil contamination areas between the trench and the river, and near the water treatment facilities.

6. The borings that are planned near the trench and crib will be stopped before they hit groundwater if they potential exits for introducing contamination into the groundwater.

7. The investigation is concentrated in the top 200 ft of sediments, because it is expected that the cemented gravels will block the vertical migration of the contaminants.

8. Most of the wells have been planned in locations downgradient of specific sources.

9 0 1 1 8 9 1 4 6 0

Attachment #2

Attendance List
100-KR-1/KR-4 Unit Managers Meeting
June 13, 1990

Name	Organization	KR-1/KR-4 Responsibility	Phone
Dave Einan	EPA	Unit Mgr	509-376-3883
L. Goldstein	WDOE	Unit Mgr	206-438-7018
C.S. Cline	WDOE	Hydrogeologist	206-438-7556
S. Cross	WDOE	Unit Mgr	206-459-6695
J.D. Goodenough	DOE-RL	KR-1 Unit Mgr	509-376-7087
W. Staubitz	USGS	EPA Consultant	206-593-6510
B. Drost	USGS	EPA Consultant	206-593-6510
D. Lacombe	PRC	EPA Consultant	206-624-2692
J. Shuster	PRC	EPA Consultant	206-624-2692
M. Lauterbach	WHC	EE&T Group	509-376-5257
V. Rohay	WHC	Geosciences	509-376-5507
A. Krug	WHC	Unit Mgr	509-376-5634
S. Weiss	WHC		509-376-1683
B. Green	WHC		509-376-3886
R. Julian	WHC		509-376-2539
G. Buhr	ATK		415-598-9390
M. Hagood	WHC		509-376-9664
R. Hoy			509-927-1993
T. Mclaughlin	BOVAY		509-838-4111

Attachment # 3

STATUS REPORT

100-KR-1/100-KR-4

Operable Units

Sections 5.0 - 7.0 & FSP

Work Plan

June 13, 1990

WORK PLAN CONTENTS*

1.0 Introduction

2.0 Background/Setting

3.0 Initial Evaluation

4.0 Approach/Rationale

Att. 1b QAPP
2 HSP
3 PMP
4 DMP
5 CRP

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*discussed April, 1990

WORK PLAN CONTENTS (Continued)

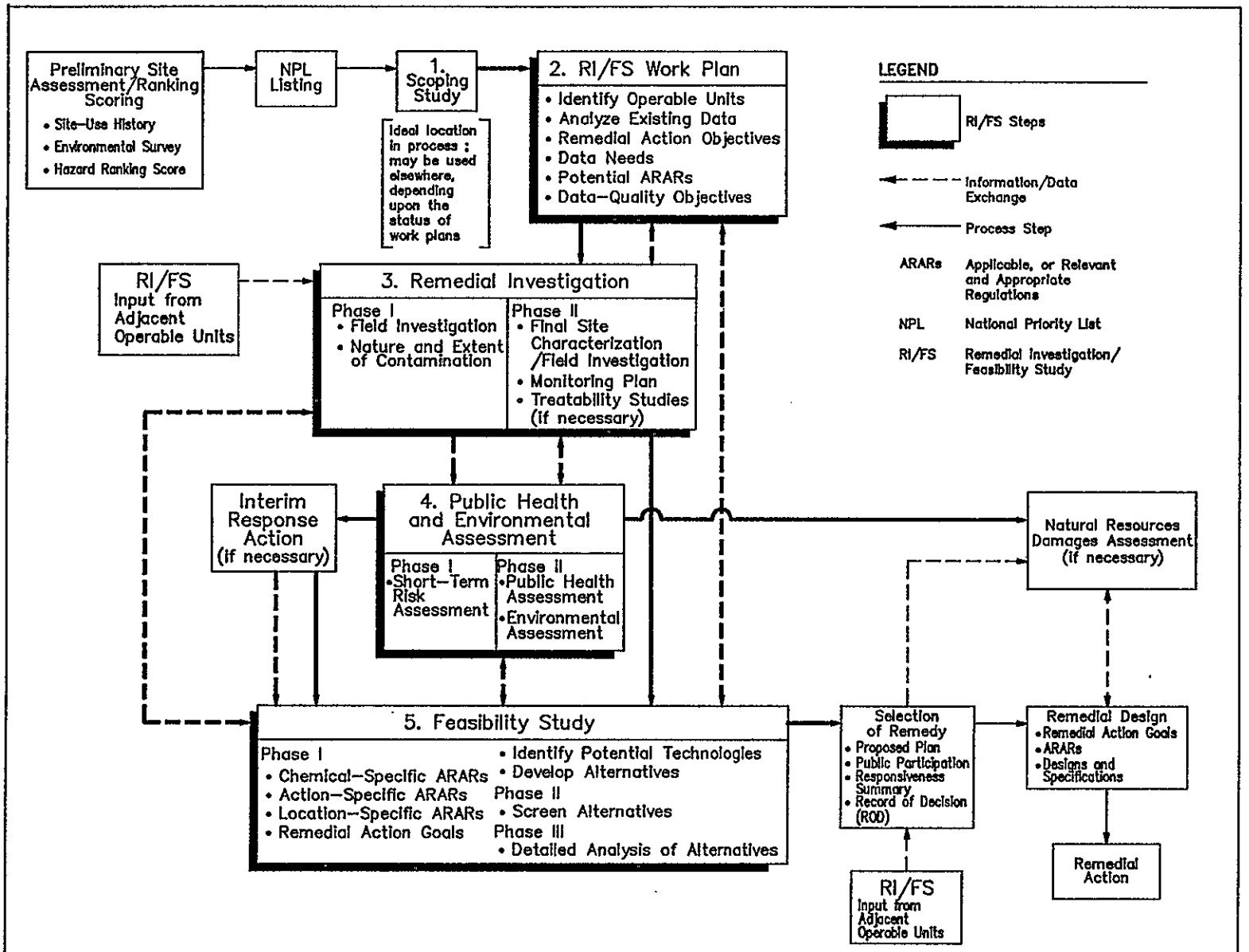
5.0 RI/FS Tasks

6.0 Project Schedule

7.0 Project Management

8.0 References

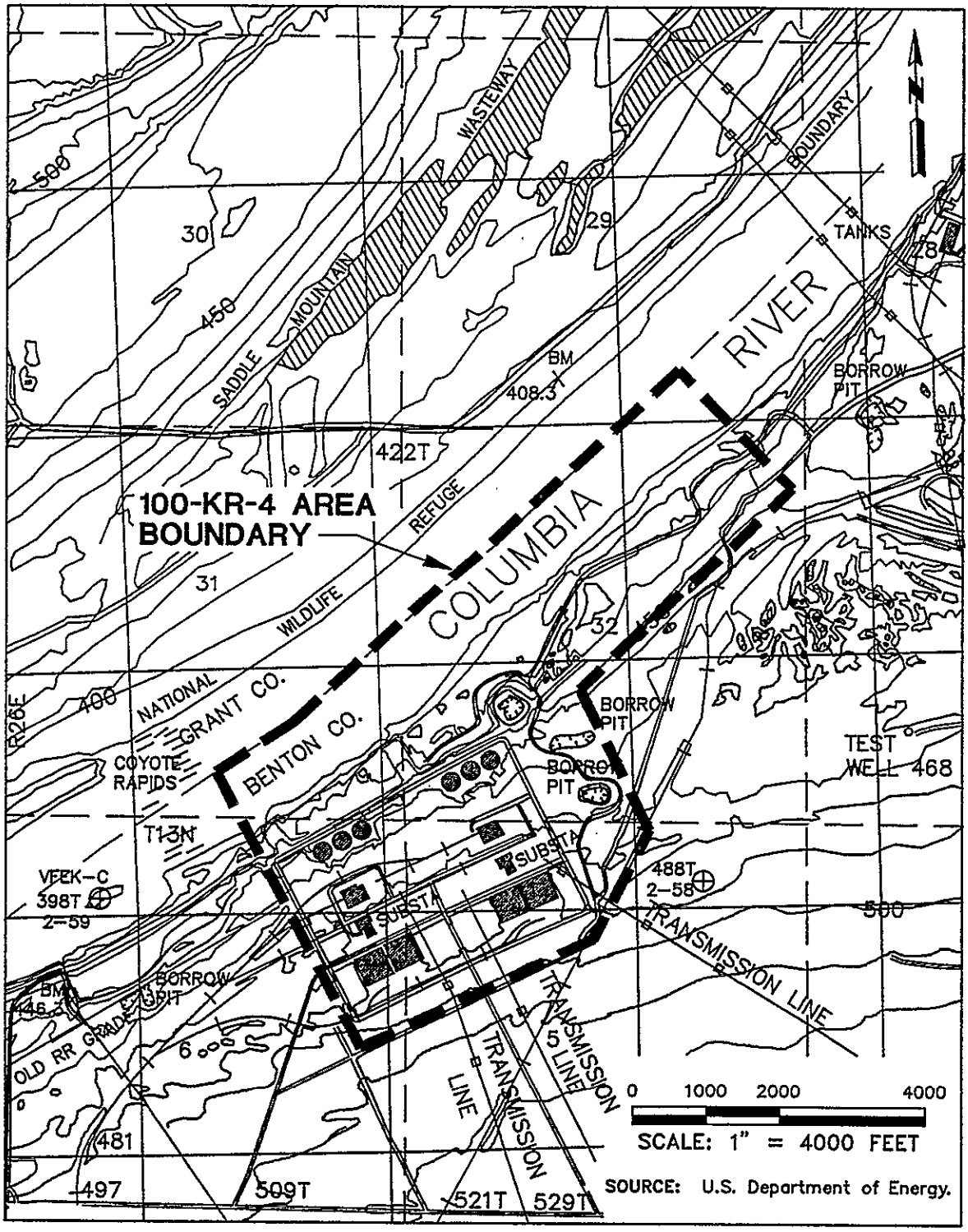
Att. 1a Field Sampling Plan



The RI/FS Process at Hanford

WORK PLAN INTEGRATION

	100-KR-1	100-KR-4
Source	X	X
Geology	X	X
Surface Water		X
Vadose	X	
Groundwater		X
Air	X	
Ecology	X (terrestrial)	X (riparian)
Cultural	X	X



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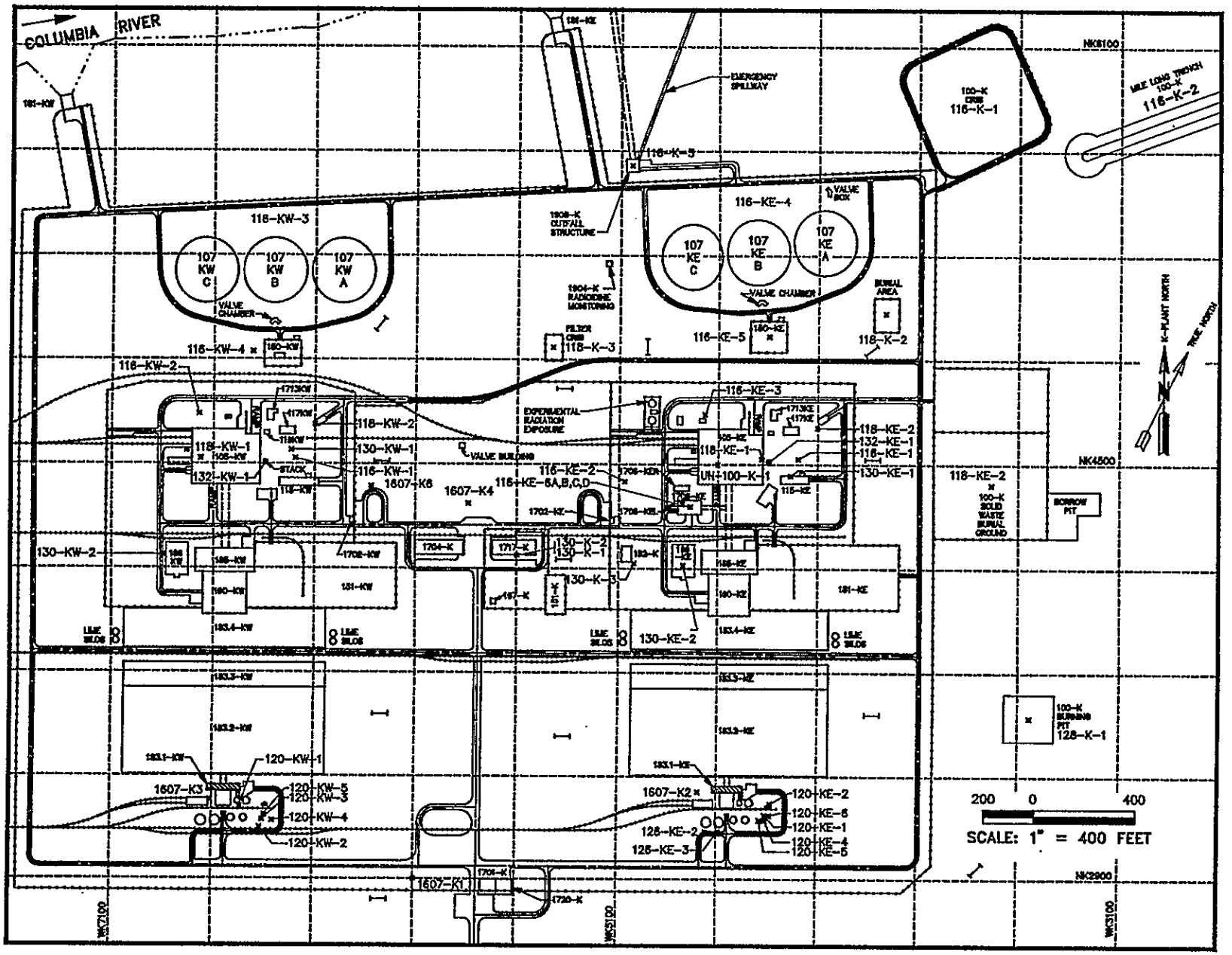


Waste Site Locations in the
100-KR-4 Operable Unit

100-KR-1 SOURCE UNITS

116-K-1	Percolation Crib
116-K-2	Percolation Trench
116-K-3	Outfall Structure
116-KE-4	107-K Retention Basins
116-KW-3	107-K Retention Basins
Effluent Pipelines /Valves	

SIGNIFICANT 100-KR-2 SOURCE UNITS

105-KE 105-KW	Fuel Storage Basins
118-K-1	Burial Ground
116-KE1 116-KW1	Gas Recirculation Condensate Cribs
116-KE2	1706 KER R&D Crib Filter Crib Burial Ground

SIGNIFICANT 100-KR-3 SOURCE UNITS

120-KE-1

120-KE-2 } KE Water Treatment F.D. and Trench

120-KE-3

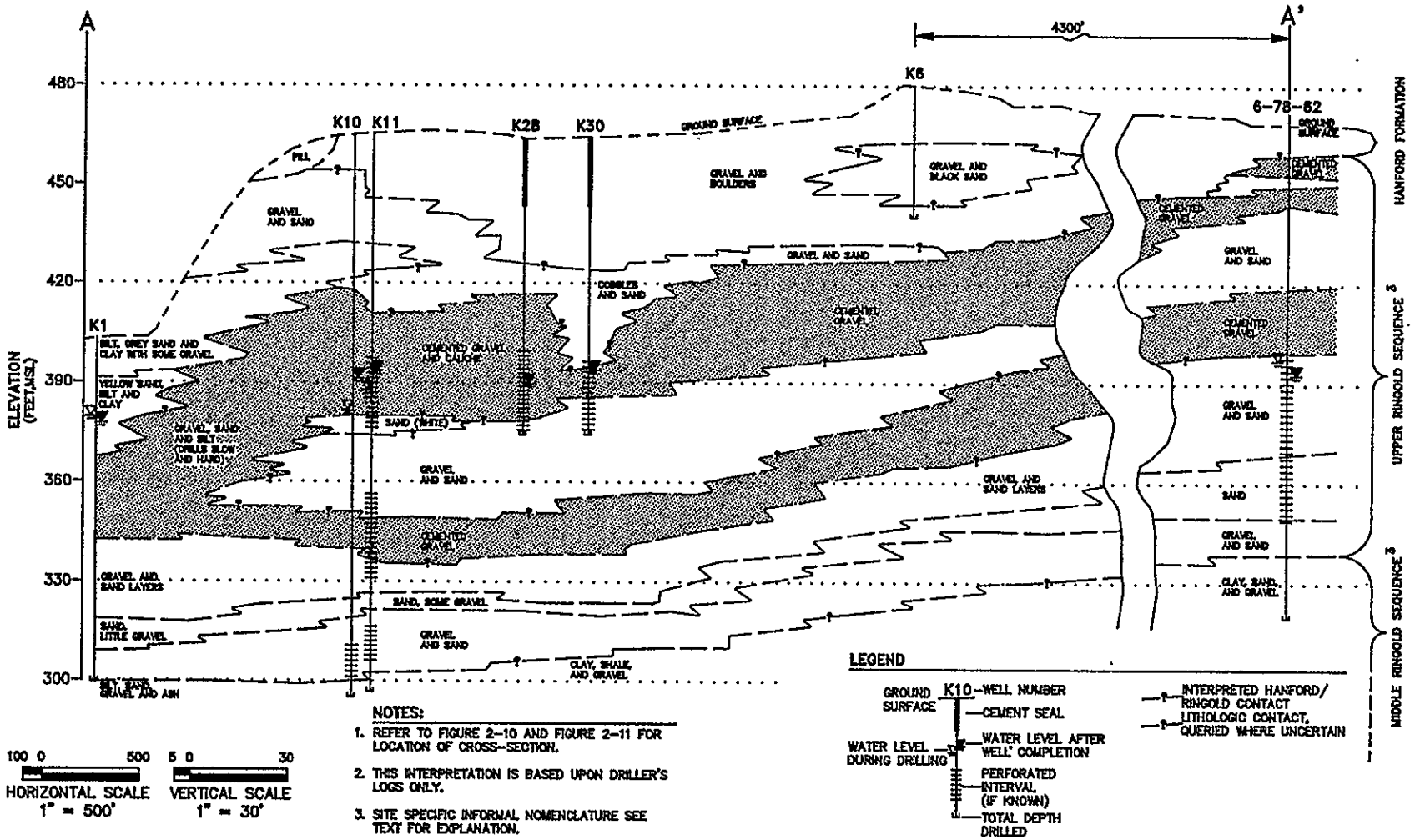
120-KW-1

} KW Water Treatment F.D.'s

120-KW-2

CONCEPTUAL 100-K AREA HYDROSTRATIGRAPHY

Hydrostratigraphy	Stratigraphy	Approximate Depth (ft. below surface)	Lithologic Description
UNSATURATED			
Vadose zone	Fill/alluvium	0-5	Reworked gravel with sand
	Hanford formation	5-45	Cobbles, boulders, gravel, and sand
	Upper Ringold Sequence	45-70	Cemented gravel and sand
Water Table			
SATURATED			
Lower Permeability Layer A (uppermost water-bearing unit)	Upper Ringold Sequence	70-85	Cemented gravel and sand, unconsolidated silt and clay
Producing Layer A	Upper Ringold Sequence	85-115	Gravel and sand
Lower Permeability Layer B	Upper Ringold Sequence	115-125	Cemented gravel and sand
Producing Layer B	Upper Ringold Sequence	125-165	Gravel and sand
Confining Layer C	Middle Ringold Sequence	165-185(?)	Light colored clay/shale/ash
Confined Aquifer C	Middle Ringold Sequence	185(?)-400	Siltstone, claystone and sandstone
Confining Layer D	Middle Ringold Sequence	400-505	Green to black siltstone/claystone
Confined Aquifer D	Lower Ringold Sequence	505-525	Sandstone and conglomerate
Basalt Confining Layer	Elephant Mountain Member	525-645	Basalt
Basalt Interbed Aquifer	Rattlesnake Ridge Interbed (Ellensburg Formation)	645-685	Welded tuff, siltstone, sandstone and conglomerate



NOTES:

1. REFER TO FIGURE 2-10 AND FIGURE 2-11 FOR LOCATION OF CROSS-SECTION.
2. THIS INTERPRETATION IS BASED UPON DRILLER'S LOGS ONLY.
3. SITE SPECIFIC INFORMAL NOMENCLATURE SEE TEXT FOR EXPLANATION.

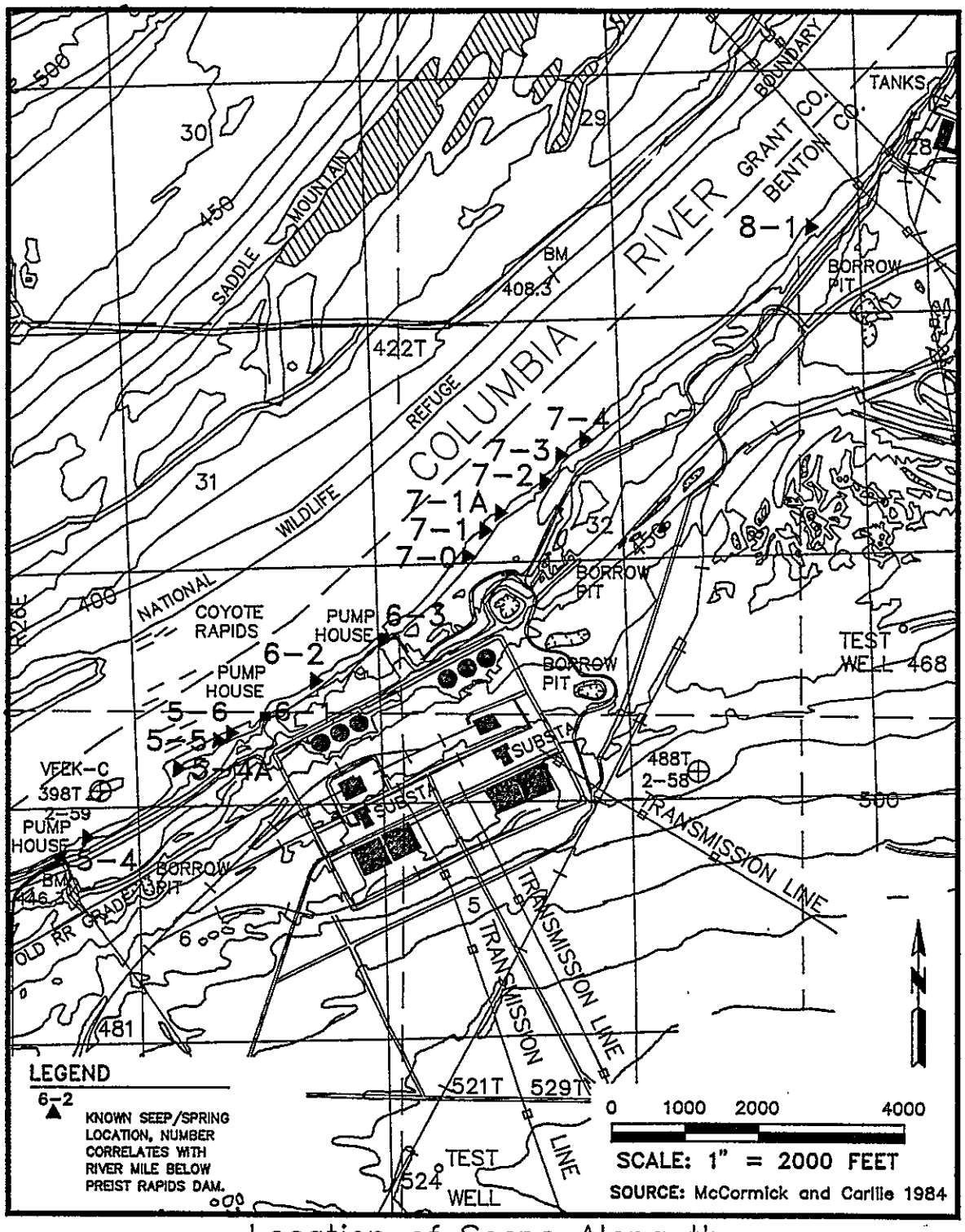
LEGEND

- GROUND SURFACE
- K10 — WELL NUMBER
- CEMENT SEAL
- WATER LEVEL DURING DRILLING
- WATER LEVEL AFTER WELL COMPLETION
- PERFORATED INTERVAL (IF KNOWN)
- TOTAL DEPTH DRILLED
- INTERPRETED HANFORD/RINGOLD CONTACT
- LITHOLOGIC CONTACT, QUERIED WHERE UNCERTAIN

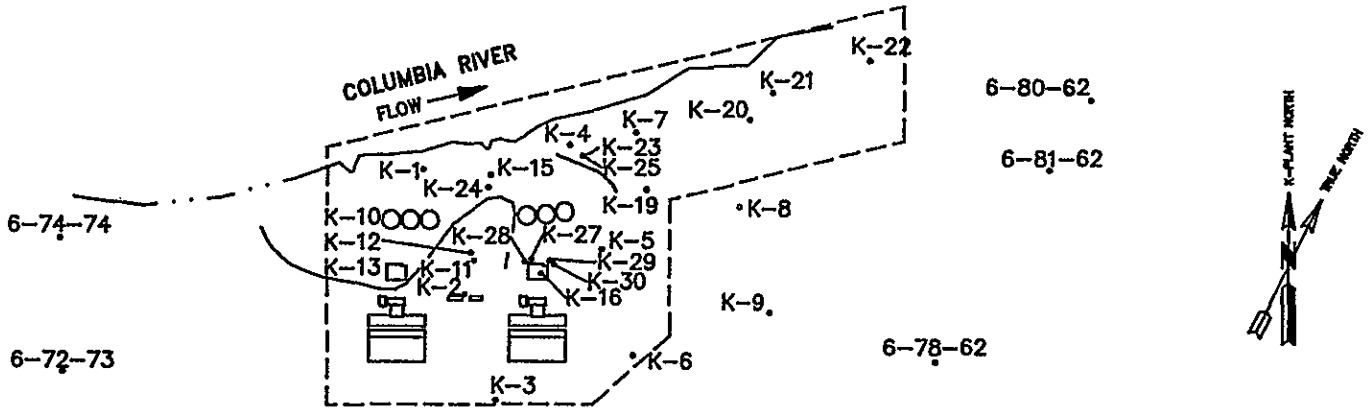
100 0 500
HORIZONTAL SCALE
1" = 500'

5 0 30
VERTICAL SCALE
1" = 30'

Geological Cross Section A-A
100-K Area



Location of Seeps Along the
Columbia River Shoreline Near 100-K Area



6-70-68

6-73-61

6-66-64

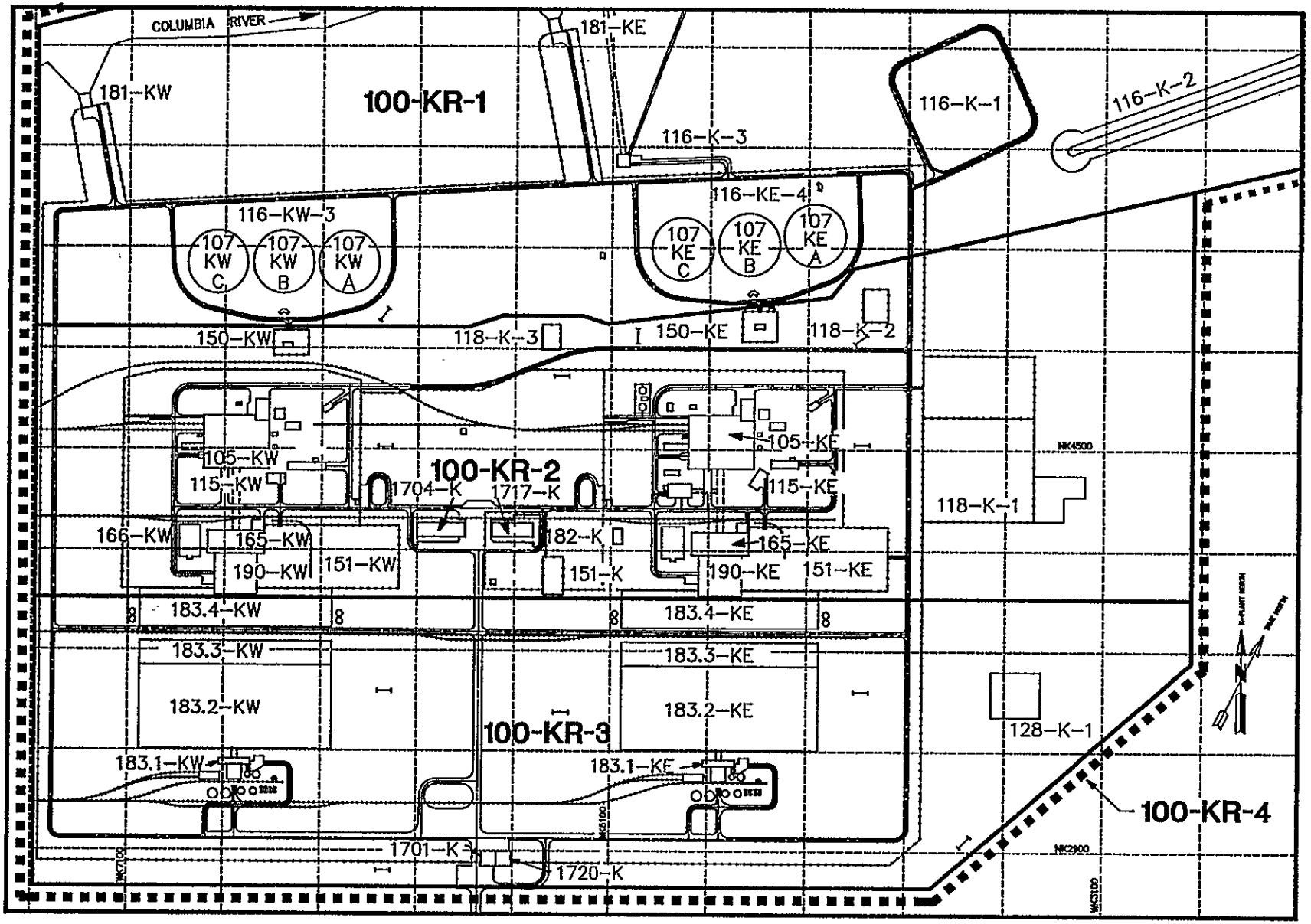
LEGEND

6-73-61 WELL, LOCATION, AND DESIGNATION

2000 1000 0 2000

SCALE: 1" = 2000 FEET

100-K Area Wells

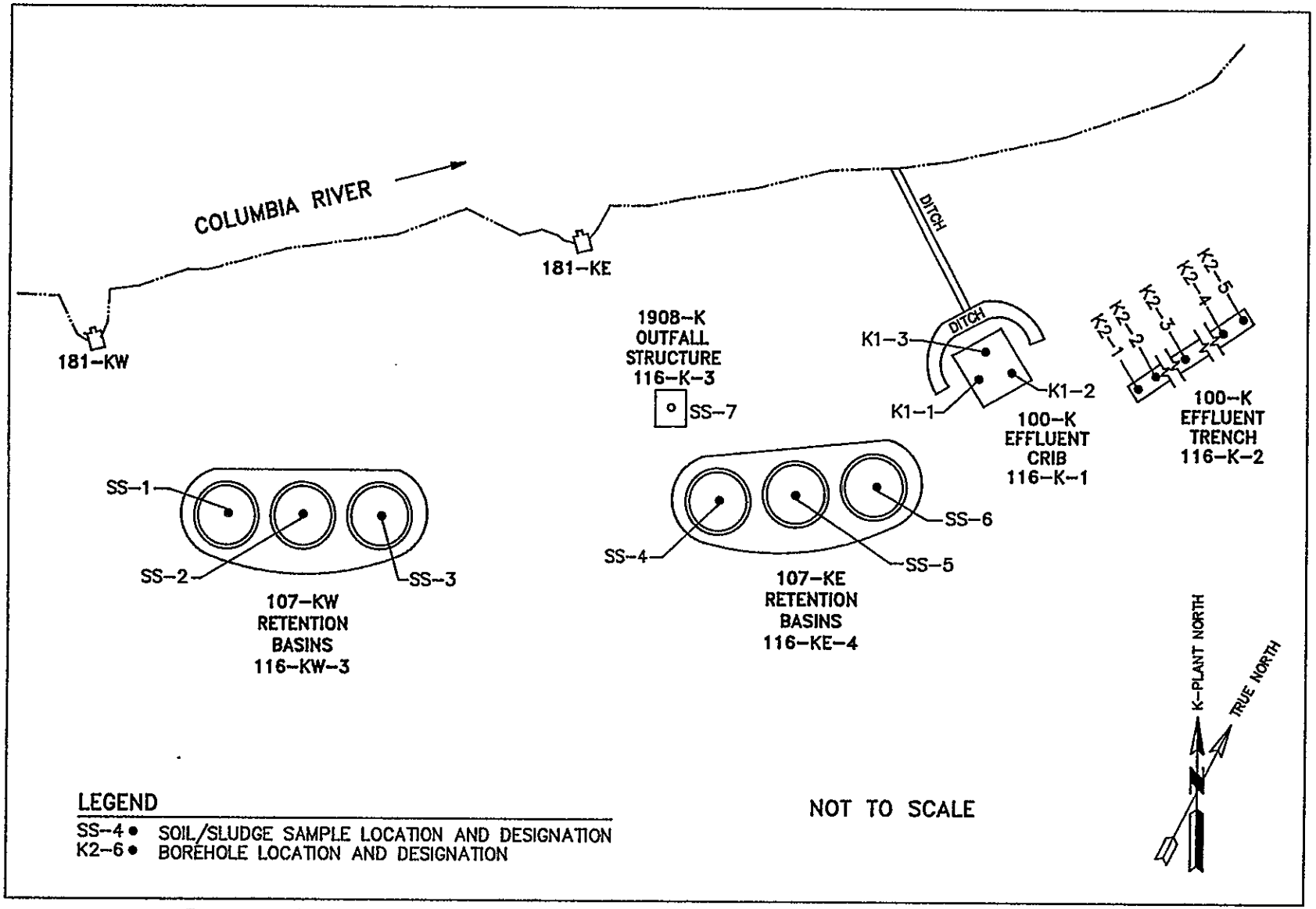

COLUMBIA RIVER
181-KW
100-KR-1
181-KE
116-K-3
116-K-1
116-K-2
116-KW-3
107 KW C
107 KW B
107 KW A
116-KE-4
107 KE C
107 KE B
107 KE A
150-KW
118-K-3
150-KE
118-K-2
105-KW
115-KW
100-KR-2
1704-K
1717-K
105-KE
115-KE
118-K-1
166-KW
165-KW
190-KW
151-KW
182-K
151-K
165-KE
190-KE
151-KE
183.4-KW
183.4-KE
183.3-KW
183.3-KE
183.2-KW
183.2-KE
100-KR-3
128-K-1
183.1-KW
183.1-KE
100-KR-4
1701-K
1720-K

Well	Constituent	#	Max	Min	Units
K22	3H	2	1380	1060	PCi/L
	CR	-	-	-	-
	CCL4	-	-	-	-
	I129	-	-	-	-
	NO3	-	-	-	-
	U	2	1.76	0.94	ppb
K21	3H	3	3862	700	PCi/L
	CR	-	-	-	-
	CCL4	-	-	-	-
	I129	-	-	-	-
	NO3	-	-	-	-
	U	3	0.77	0.66	PCi/L
K20	3H	2	1380	1060	PCi/L
	CR	-	-	-	-
	CCL4	-	-	-	-
	I129	-	-	-	-
	NO3	-	-	-	-
	U	2	1.76	0.94	PCi/L
78-62	3H	-	-	-	-
	CR	2	106	88	ppb
	CCL4	2	<5	<5	ppb
	I129	-	-	-	-
	NO3	3	8480	8330	ppb
	U	-	-	-	-
K27	3H	2	2740	1850	PCi/L
	CR	-	-	-	-
	CCL4	-	-	-	-
	I129	-	-	-	-
	NO3	-	-	-	-
	U	2	3.55	3.37	PCi/L
K29	3H	2	17000	10800	PCi/L
	CR	-	-	-	-
	CCL4	-	-	-	-
	I129	-	-	-	-
	NO3	-	-	-	-
	U	2	1.78	1.76	PCi/L
K30	3H	-	1220000	1180000	PCi/L
	CR	-	-	-	-
	CCL4	-	-	-	-
	I129	-	-	-	-
	NO3	-	-	-	-
	U	2	2.0	1.89	PCi/L

Well	Constituent	#	Max	Min	Units
K19	3H	6	4640	2840	PCi/L
	CR	-	-	-	-
	CCL4	-	-	-	-
	I129	-	-	-	-
	NO3	-	-	-	-
	U	6	1.17	0.63	PCi/L
K11	3H	2	5.37	4.71	PCi/L
	CR	-	-	-	-
	CCL4	-	-	-	-
	I129	-	-	-	-
	NO3	-	-	-	-
	U	2	5.24	4.73	PCi/L
K28	3H	2	3290	3050	PCi/L
	CR	-	-	-	-
	CCL4	-	-	-	-
	I129	-	-	-	-
	NO3	-	-	-	-
	U	2	3.77	3.44	PCi/L
72-73	3H	2	1850	1670	PCi/L
	CR	2	<10	<10	ppb
	CCL4	2	<5	<5	ppb
	I129	1	-0.009	-	PCi/L
	NO3	4	4140	4030	ppb
	U	-	-	-	-
70-68	3H	4	1850	1380	PCi/L
	CR	3	<10	<10	ppb
	CCL4	2	<5	<5	ppb
	I129	-	-	-	-
	NO3	7	3820	3710	ppb
	U	4	1.26	0.63	PCi/L
73-61	3H	4	183	-247	PCi/L
	CR	3	17	12	ppb
	CCL4	2	<5	<5	ppb
	I129	1	0.03	-	PCi/L
	NO3	7	9740	8300	ppb
	U	4	1.61	1.23	PCi/L
66-64	3H	4	6850	5870	PCi/L
	CR	-	-	-	-
	CCL4	-	-	-	-
	I129	1	0.08	-	PCi/L
	NO3	4	18100	15100	
	U	4	1.93	1.17	PCi/L

PROPOSED SOURCE SAMPLING AREAS

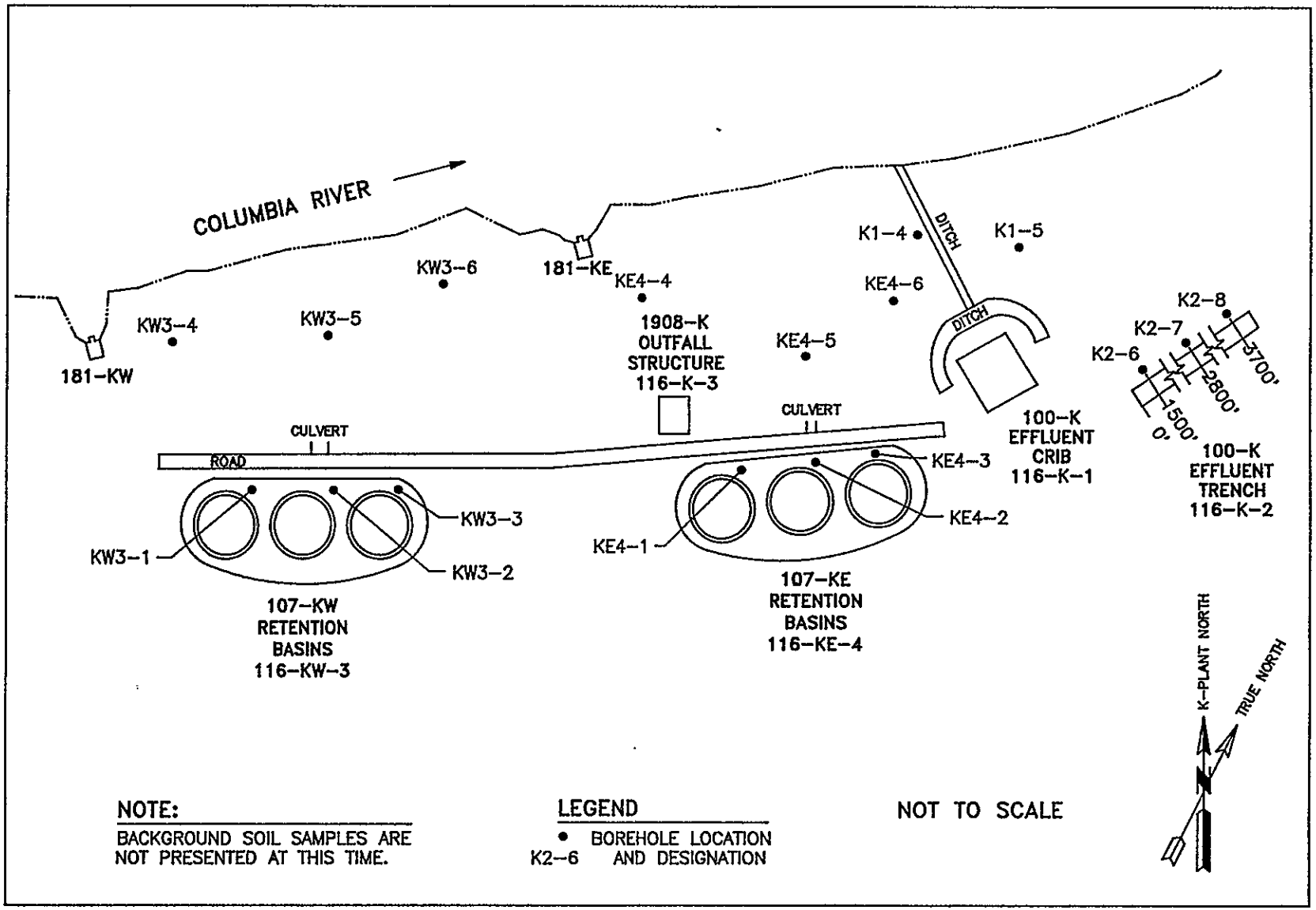
- Waste Units 116-KE-4 & 116-KW-3 (Retention Basins)
- Waste Unit 116-K-1 (Effluent Crib)
- Waste Unit 116-K-2 (Effluent Trench)
- Waste Unit 116-K-3 (Outfall Structure)
- Effluent Discharge Pipeline & Valves



Proposed Sampling Locations for 100-KR-1 Source Investigations

PROPOSED VADOSE SAMPLING AREAS

- o Area of Retention Basin (116-KE-4 & 116-KW-3) Leaks
- o Area of Effluent Crib (116-K-1) Failure
- o Area of Effluent Trench (116-K-2) Overflow



Proposed Sampling Locations for Soil Investigation

SOIL PHYSICAL PARAMETERS

Parameter	ASTM Standard/ Analytical Method
Moisture content (above water table in fine-grained sediments)	D-2216
Grain size distribution, including percent clay	D-422
Soil classification (USCS)	D-2487
Permeability	D-2434
Caton exchange capacity	EPA Method 9080 (SW 846)

Legend:

ASTM = American Society for Testing Materials
USCS = Unified Soil Classification System

PROPOSED GROUNDWATER WELL NETWORK

Total of 43 Wells

20 Existing wells (unevaluated for fitness)
23 Proposed wells

- A Horizon (32 total)

  19 Existing wells
  13 Proposed wells

- B Horizon (7 total)

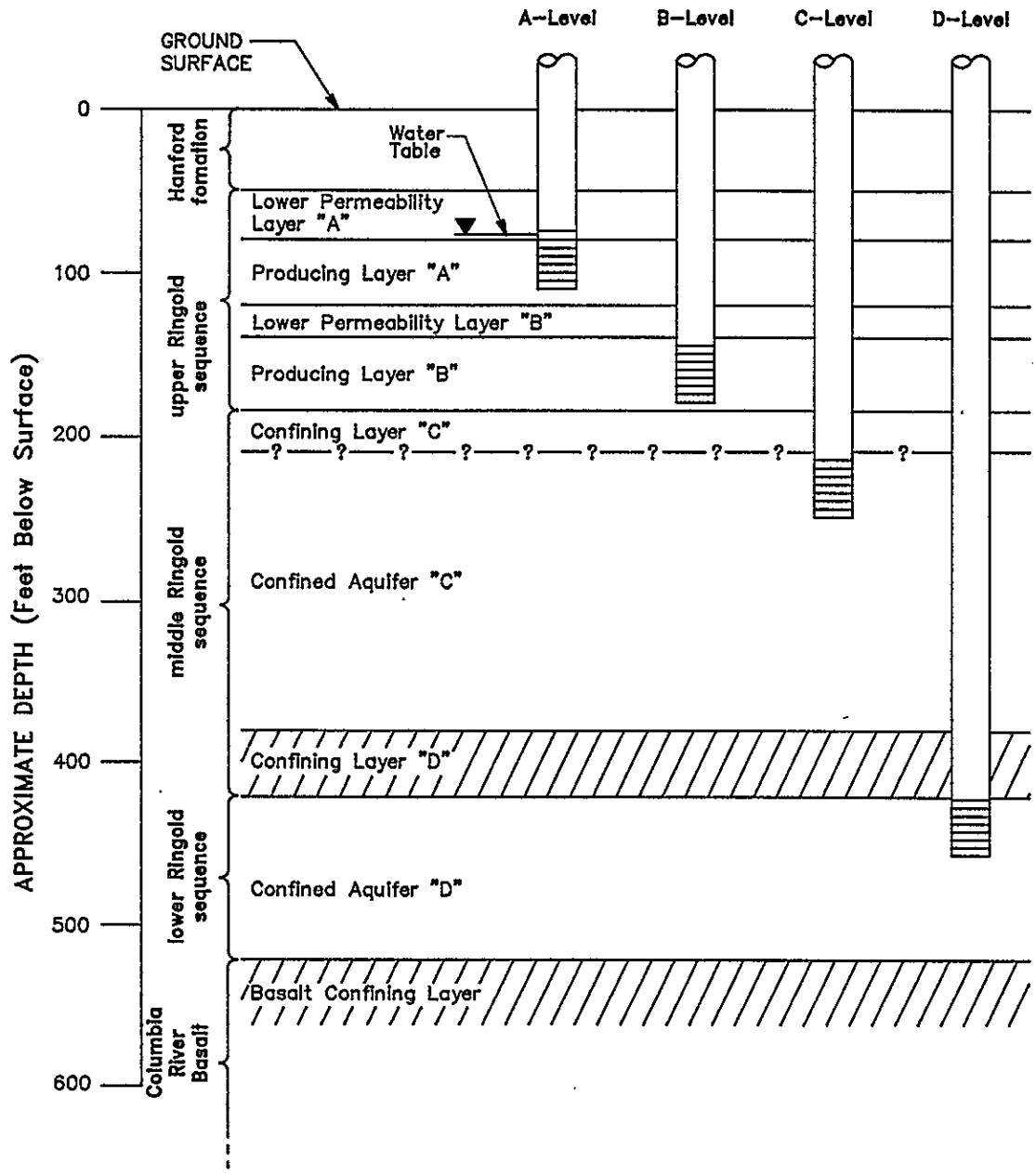
  1 Existing well
  6 Proposed wells

- C Horizon (3 total)

  3 Proposed wells

- D Horizon (1 total)

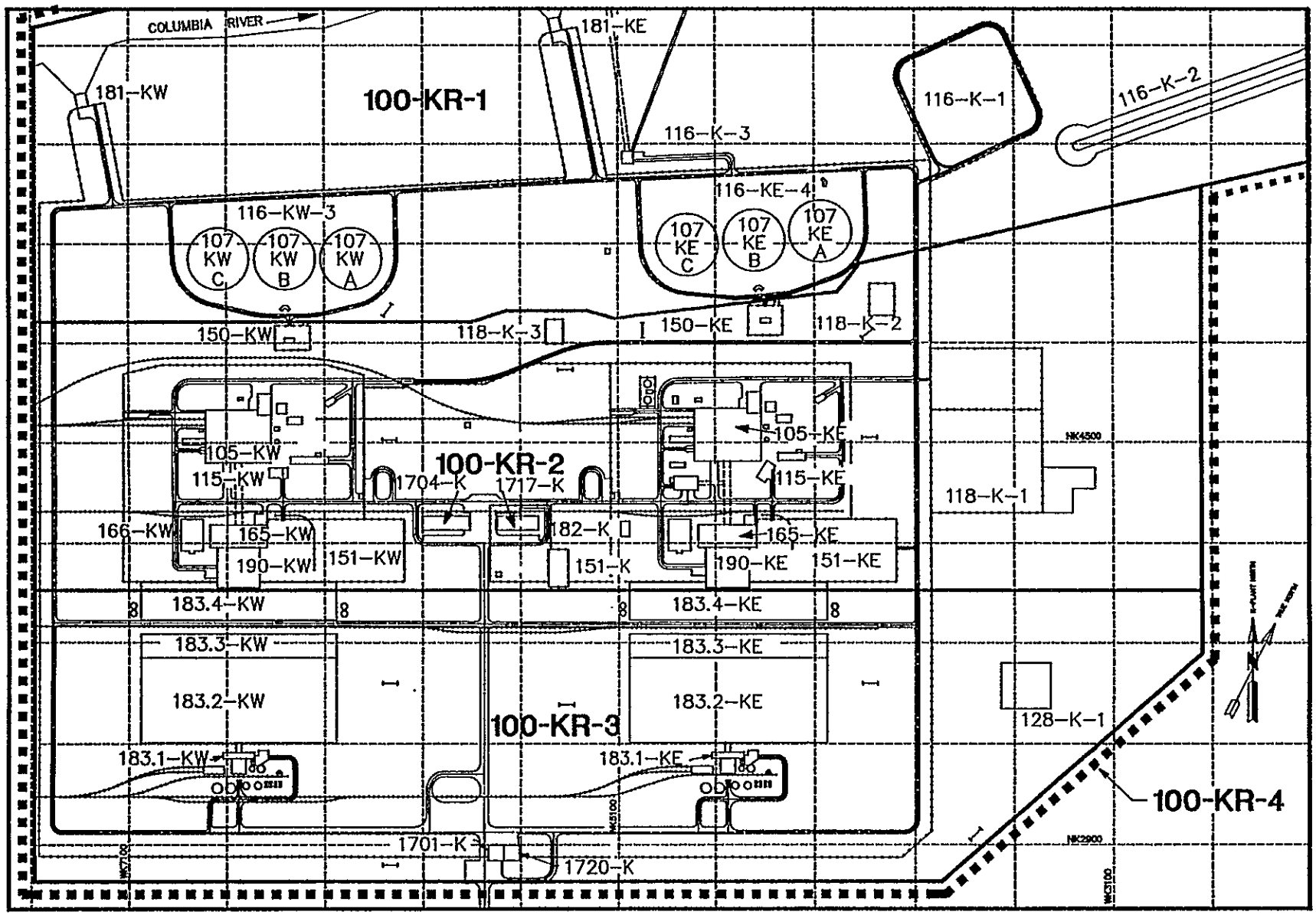
  1 Proposed well



Hydrostratigraphic Zones Targeted for Monitoring Well Completions at 100-K Area

SOURCE WELLS

- Waste Units 116-KE-4 & 116-KW-3 (Retention Basins)
- Waste Unit 116-K-1 (Effluent Crib)
- Waste Unit 116-K-2 (Effluent Trench)
- Waste Units 120-KW-1, -2, -3, -4, -5 (Sulfuric Acid, Mercury, Sodium Dichromate)
- Waste Units 120-KE-1, -2, -3, -4, -5, -6 (Sulfuric Acid, Mercury, Sodium Dichromate)
- Waste Unit 105-KW and associated facilities
- Waste Unit 105-KE and associated facilities
- Waste Unit 118-K-1 Solid Waste Bruial Ground


COLUMBIA RIVER
100-KR-1
181-KW
181-KE
116-K-1
116-K-2
116-K-3
116-KE-4
116-KW-3
107 KW C
107 KW B
107 KW A
107 KE C
107 KE B
107 KE A
150-KW
118-K-3
150-KE
118-K-2
105-KW
115-KW
100-KR-2
1704-K
1717-K
105-KE
115-KE
118-K-1
166-KW
165-KW
190-KW
151-KW
182-K
151-K
165-KE
190-KE
151-KE
183.4-KW
183.4-KE
183.3-KW
183.3-KE
183.2-KW
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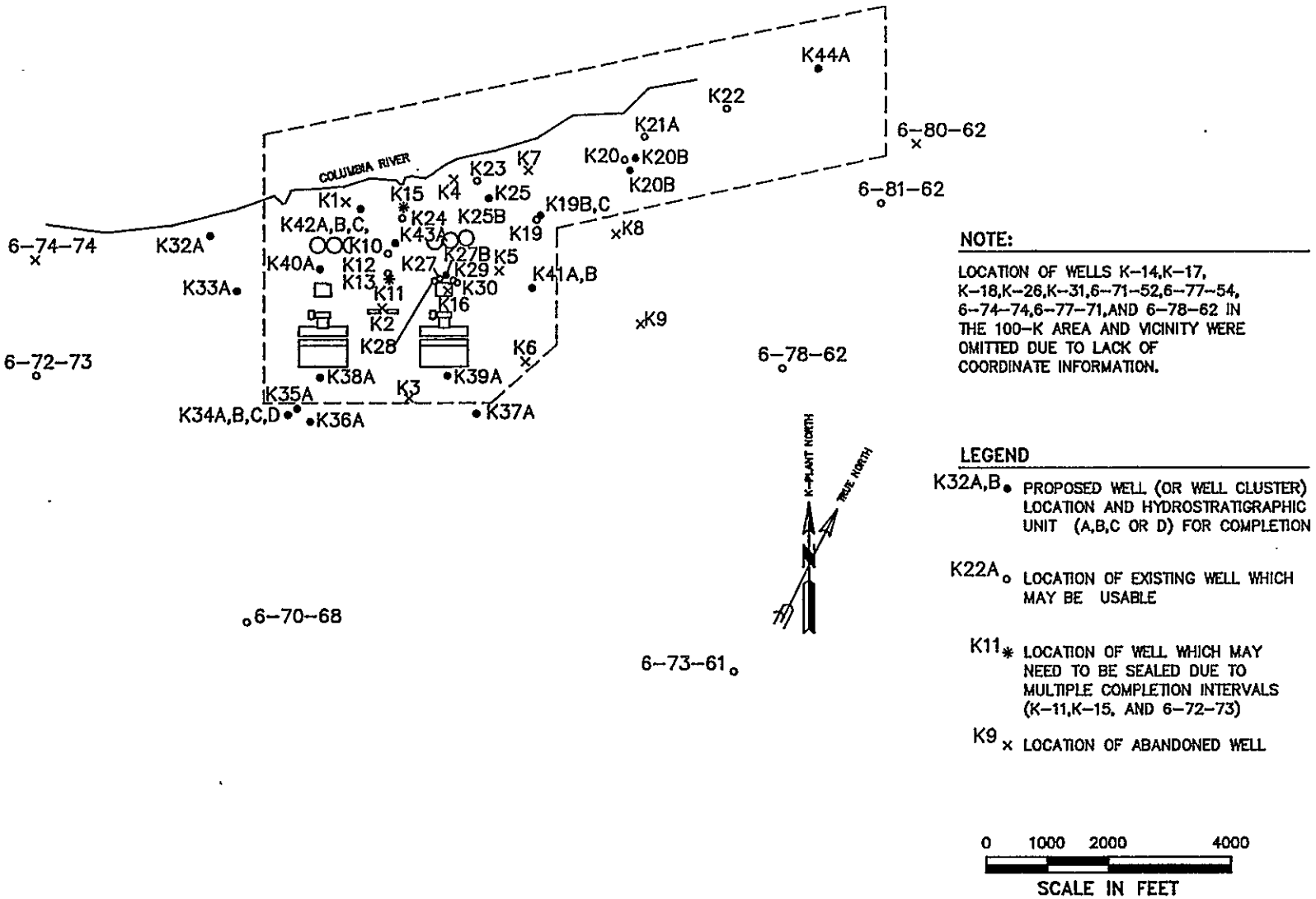
183.1-KE
100-KR-4
1701-K
1720-K



Existing and Proposed Monitoring Well Locations

PROPOSED NUMBER OF SAMPLE (1) LOCATIONS

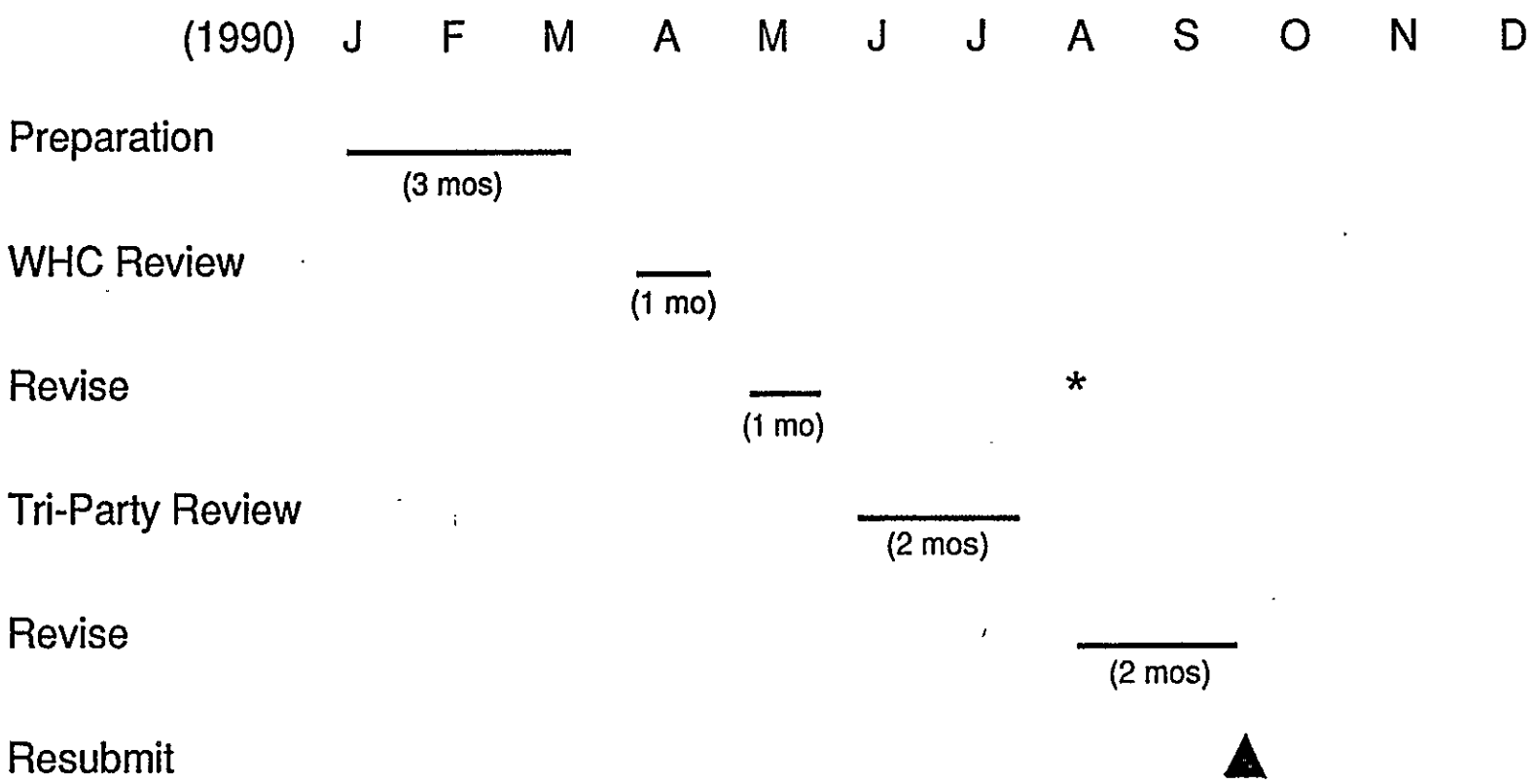
WP Task	100-KR-1	100-KR-4
Source	15	----
Geology	(2)	----
Surface Water	----	(3)
Vadose	17	----
Ground Water	----	43
Air	(2)	----
Ecology	(4)	(4)

(1) for laboratory analysis
(2) no separate sample locations - will be part of other tasks
(3) TBD, focus will be on 13 near-field springs identified by McCormack & Carlile, 1984
(4) no samples - to be determined by onsite survey

ACCELERATED SCHEDULE IMPLEMENTATION

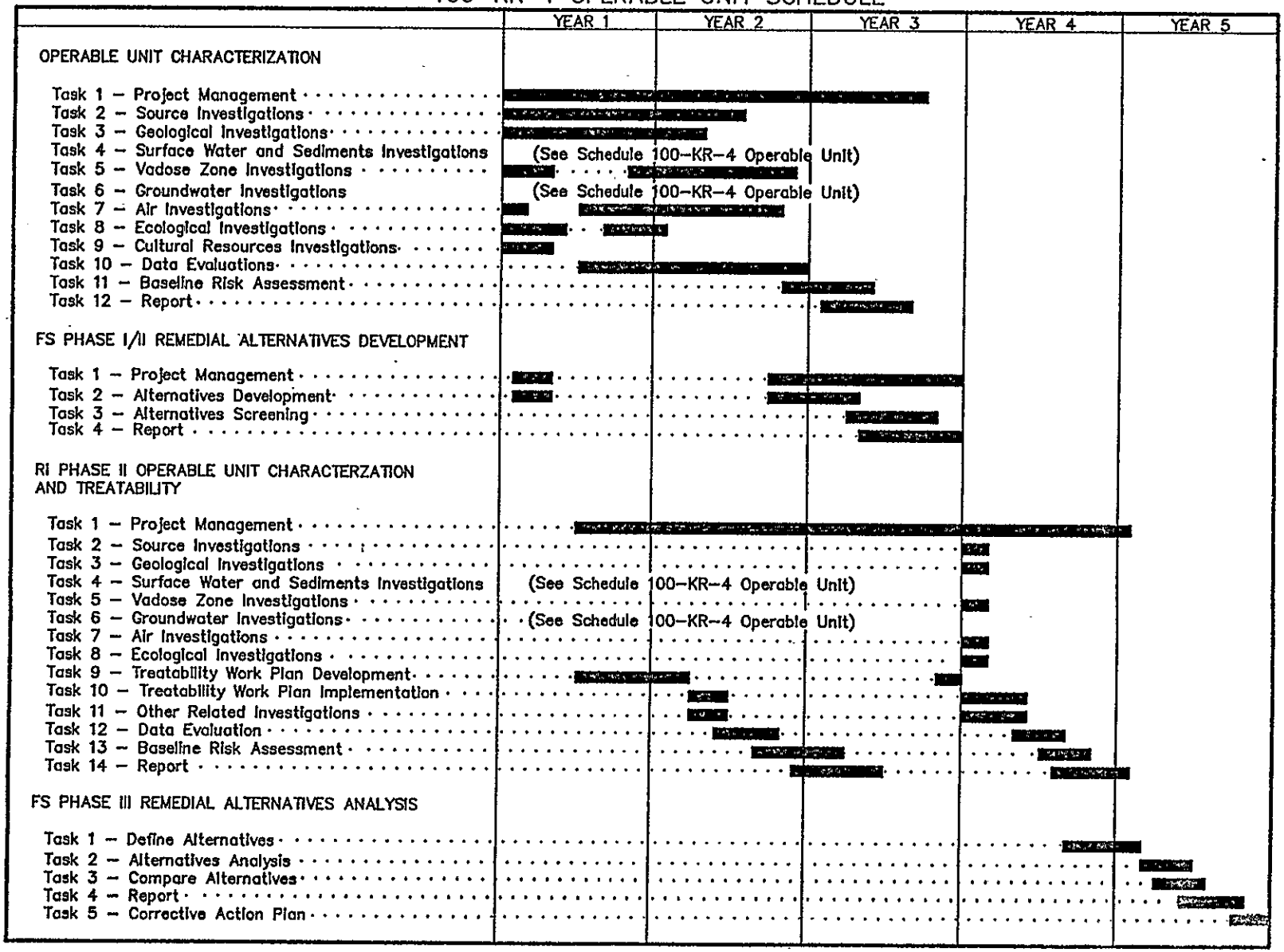
- o Standardized RI/FS Tasks/WBS
- o Take full advantage of other OU investigations
- o New Strategy
  - Scoping studies
  - Input from adjacent OUs
  - Interim response actions

REVIEW SCHEDULE



*Original TPA submittal date

100–KR–1 OPERABLE UNIT SCHEDULE



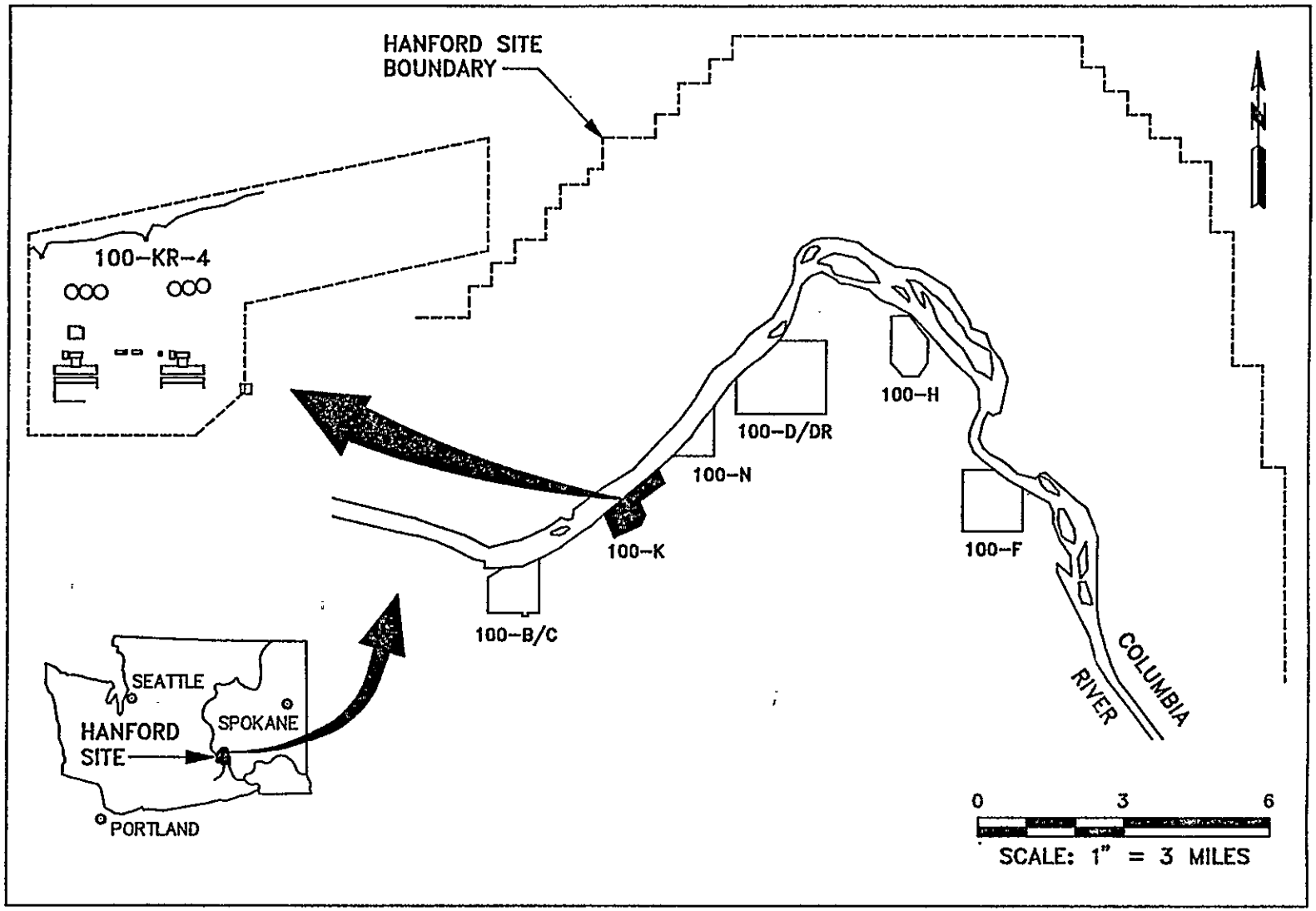
SCHEDULE ASSUMPTIONS

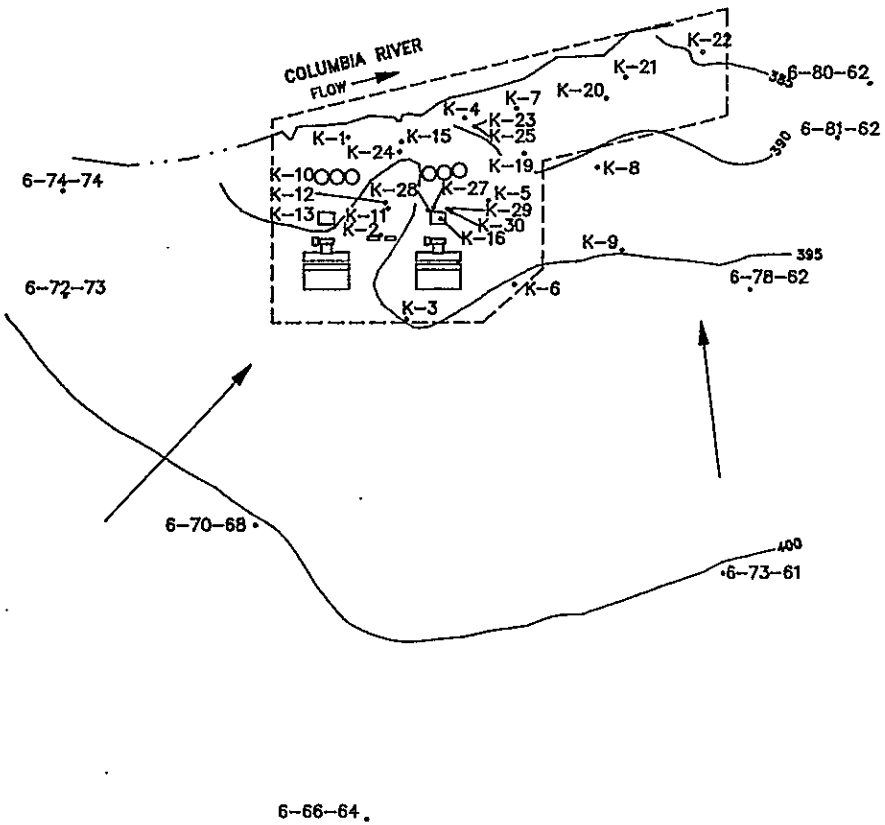
100-KR-1

- o 1 RIG/2 weeks per 80' boring (1 wk = 40')
- o 30 - 45 day lab turnaround +
  30 - 60 days for data validation

100-KR-4

- o 4 cable tool rigs
- o 10' per day


HANFORD SITE
BOUNDARY
100-KR-4
100-H
100-D/DR
100-N
100-K
100-F
100-B/C
COLUMBIA
RIVER
SEATTLE
SPOKANE
HANFORD
SITE
PORTLAND
0
3
6
SCALE: 1" = 3 MILES



Water Table Contour Map of the
Unconfined Aquifer in 1989
100-K Area

NOTE:

Not all Wells Were Sampled on the Same Date. Map Contours Were Created From Available Data. Dates Closest to 6/19/67 Were Selected to Allow Interpolation Between Bore Holes. Wells Selected Were Constructed in Different Geologic Horizons Which May Contribute to Local Variation in Hydrologic Head. Some Wells Were Screened in Multiple Horizons Also Contributing to Variation With Actual Conditions.

WELL	DATE	ELEV
K-10	--	--
K-11	06/08/89	395.21
K-13	03/25/87	390.48
K-19	02/16/89	389.22
K-20	02/16/89	388.75
K-21	--	--
K-22	02/16/89	384.55
K-27	02/14/89	392.76
K-28	02/14/89	393.53
K-29	02/14/89	392.36
K-30	02/14/89	393.84
66-64	06/09/89	401.28
70-68	06/09/89	400.24
72-73	06/09/89	398.53
73-61	06/14/89	400.11
78-62	01/19/89	396.03

LEGEND

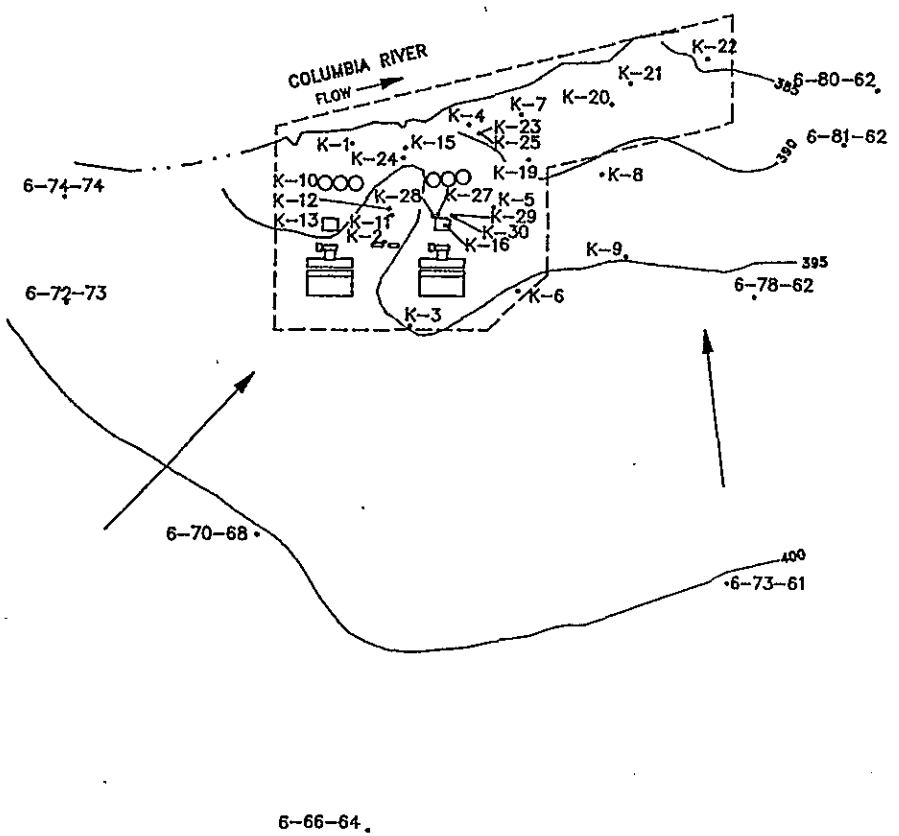
6-73-61 — WELL, LOCATION, AND DESIGNATION

385 — WATER TABLE ELEVATION CONTOUR

GENERAL FLOW DIRECTION

2000 1000 0 2000

SCALE: 1" = 2000 FEET



Water Table Contour Map of the
Unconfined Aquifer in 1989
100-K Area

NOTE:

Not all Wells Were Sampled on the Same Date. Map Contours Were Created From Available Data. Dates Closest to 6/19/67 Were Selected to Allow Interpolation Between Bore Holes, Wells Selected Were Constructed in Different Geologic Horizons Which May Contribute to Local Variation in Hydrologic Head. Some Wells Were Screened in Multiple Horizons Also Contributing to Variation With Actual Conditions.

WELL	DATE	ELEV
K-10	--	--
K-11	06/08/89	395.21
K-13	03/25/87	390.48
K-19	02/16/89	389.22
K-20	02/16/89	388.75
K-21	--	--
K-22	02/16/89	384.55
K-27	02/14/89	392.76
K-28	02/14/89	393.53
K-29	02/14/89	392.36
K-30	02/14/89	393.84
66-64	06/09/89	401.28
70-68	06/09/89	400.24
72-73	06/09/89	398.53
73-61	06/14/89	400.11
78-62	01/19/89	396.03

LEGEND

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385 WATER TABLE ELEVATION CONTOUR

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HISTORY OF WELL INSTALLATION IN THE 100-K AREA

Time Frame	Well #	Purpose
1943	K15	Unknown (rediscovered in 1953)
1952	K1 to K14, K24	
1953	K16, K17, K25	Presumably installed to evaluate overall conditions of 100-K Area
1954	K18	
1955	K19 to K22	
1979	K27 to K30	Four wells to determine impact from 105-KE fuel storage basin
1986	K31	Supplement 1979 wells
1966-1981	"6" Series Wells	Installed to evaluate overall condition of 100 Areas