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Department of Energy

Richland Operations Office
P.O. Box 550
Richland, Washington 99352

DEC 26 1991

91-ERB-227

Mr. Paul T. Day
Hanford Project Manager
U.S. Environmental Protection Agency
712 Swift Boulevard, Suite 5
Richland, Washington 99352

Mr. Timothy L. Nord
Hanford Project Manager
State of Washington
Department of Ecology
Mail Stop PV-11
Olympia, Washington 98504-8711

Dear Messrs. Day and Nord:

TRANSMITTAL OF 200 AGGREGATE AREA MANAGEMENT STUDY (AAMS) SAMPLING AND ANALYSIS PLAN ADDENDUMS

Reference: Letter, from S. H. Wisness to P. T. Day and T. L. Nord, "Transmittal of 200 Aggregate Area Study Sampling and Analysis Plan for Information Only," dated November 20, 1991. 17570

Please find attached Appendix B, Phase II Contaminant Plume Maps, Well Networks, and Analytical Requirements, and Appendix C, Well Selection for Radionuclide Logging System Surveys in the S-Plant Area.

These appendices should be added to the respective Groundwater Field Activity and Borehole Geophysics Field Activity Sampling and Analysis Plans submitted previously, as referenced. These plans serve as internal Westinghouse Hanford Company planning documents for outlining and implementing portions of the 200 AAMS field program.

As agreed to during the September 1991 and October 1991 Unit Manager meetings, sampling and analysis plan materials are to be transmitted by the U.S. Department of Energy, Richland Field Office to the State of Washington Department of Ecology and the U.S. Environmental Protection Agency for information.

If you have any questions, please contact Mr. A. C. Harris on (509) 376-4339.

Sincerely,

Jon Yerxa, for

Steven H. Wisness
Hanford Project Manager

ERD:ACH

Attachment

cc w/o att:
T. B. Veneziano, WHC
R. D. Wojtasek, WHC

JAN 1992
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APPENDIX B

PHASE II CONTAMINANT PLUME MAPS, WELL NETWORKS, AND ANALYTICAL REQUIREMENTS

Phase II groundwater sampling and analysis will be conducted during the first three quarters of CY 1992. The primary objective of the sampling and analysis activities is to provide information to refine contaminant plume geometries in support of the 200 Aggregate Area Management Study Program. Each quarterly sampling is described in subappendices to this appendix.

APPENDIX B

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Appendix B.2 - Phase II Groundwater Sampling and Analysis, April-June, 1991 . . . . (To Be Provided)

Appendix B.3 - Phase II Groundwater Sampling and Analysis, July-September, 1991 . . (To Be Provided)

APPENDIX B.1
PHASE II GROUNDWATER SAMPLING AND ANALYSIS
JANUARY-MARCH, 1991

INTRODUCTION

This subappendix describes the rationale and supporting information for selection of wells and constituents for the first quarter (January-March, 1991) of Phase II sampling and analysis. Existing information regarding contaminant plume geometries is summarized and a sampling program is defined. Non-network wells are identified for remediation.

EXISTING PLUME INFORMATION

Groundwater contaminant plume mapping in the 200 areas has been conducted on selected constituents since the 1940s. In support of the current 200 AAM study program, the most recent information regarding plume distributions in the area has been reviewed. Six studies have been identified which contain contaminant plume maps and/or information on contaminant detections in the 200 Area (Evans et al, 1990; Jaquish and Bryce, 1990; Serkowski and Jordan, 1989; DOE 1991a; DOE 1991b; and WHC 1991).

There was an interruption of laboratory services during the period from June, 1990 until May, 1991 during which time no sampling for hazardous chemistry constituents was conducted. Samples for radioactive constituents were collected from select wells and archived for later analysis. Those samples are currently being analyzed in conjunction with normally scheduled samples. Therefore, the most recent published information, with the exception of one report, is based on groundwater samples collected in 1989 and/or the first half of 1990. The one report that contains more recent information is the *Expedited Response Action Proposal (EE/CA & EA) for 200 West Area Carbon Tetrachloride Plume* (DOE 1991a). This study was directed towards understanding the distribution of only one constituent.

CONTAMINANT PLUME MAPPING

The information from the most recent published studies has been integrated with the contaminant detection determinations made in Task 2 (Contaminant Determination) in the 200 AAMS Groundwater Field Activity Sampling and Analysis Plan (11/8/92) to develop plume distribution maps. Task 2 evaluation included all contaminant detections in the 200 Area regardless of whether a regulatory standard was exceeded. The contaminants that exceeded a standard were then compiled and the results are presented in Table B.1-1. Contaminant distribution maps were developed for the constituents identified in Table B.1-1. Maps were developed from average concentration values from the period 1/1/88 to the present. This approach was chosen so as to provide a gross indication of the extent of contamination of each constituent as well as to provide sufficient data for contouring.

Table B.1-1. 200 AAMS Constituents that exceed a regulatory standard.

CONSTITUENT	STANDARD EXCEEDED	MOST STRINGENT LIMIT
ARSENIC	WWQS	.05 PPB
CHROMIUM	WWQS, DWS	50 PPB
FLUORIDE	WWQS, DWS	4000 PPB
IRON	WWQS, DWS	300 PPB
MANGANESE	WWQS, DWS	50 PPB
CARBON TETRACHLORIDE	WWQS, DWS	0.3 PPB
CHLOROFORM	WWQS, DWS	7 PPB
TRICHLOROETHYLENE	WWQS, DWS	3 PPB *
HYDRAZINE	WWQS	0.03 PPB *
STYRENE	DWS	5 PPB
NITRATE	WWQS, DWS	45 PPM
SULFATE	WWQS, DWS	250 PPM
BIS(2-ETHYLHEXYL)PHTHALATE	WWQS	6 PPB *
COLIFORM	DWS	1 PPB
ALPHA	WWQS, DWS	15 PCI/L
BETA	WWQS, DWS	50 PCI/L
CESIUM-137	1/25 DCG, DWS	120 PCI/L
COBALT-60	DWS, 1/25 DCG	100 PCI/L
IODINE-129	DWS, 1/25 DCG	1 PCI/L
PLUTONIUM-239/240	1/25 DCG, DWS	1 PCI/L
RADIUM	WWQS, DWS	3 PCI/L
STRONTIUM-90	DWS, WWQS, 1/25 DCG	8 PCI/L
TECHNETIUM-99	DWS, 1/25 DCG	900 PCI/L
TRITIUM	DWS, WWQS, 1/25 DCG	20,000 PCI/L
URANIUM	DWS	40 PCI/L

* INDICATES THAT THE DETECTION LIMIT FOR THIS CONSTITUENT IS HIGHER THAN THE MOST STRINGENT REGULATORY LIMIT.

WWQS - Washington Water Quality Standard (WAC 173-200)
DWS - Drinking Water Standard
DCG - Derived Concentration Guide

The maps can be categorized into four groupings based on areal extent of contamination (widespread, intermediate, localized, and indeterminate). A summary of these categorizations (by contaminant) is contained Table B.1-2. Contaminant plume maps for all contaminants listed in Table B.1-2 are presented at the end of this subappendix.

WELL NETWORK SELECTION

Contaminant plume maps were composited in order to select the monitoring well network for the first quarter of 1992 (Table B.1-3). Wells that are to be remediated are identified in the column entitled "Remediation Required". Tritium was not considered at this time due to the fact that there is a copious amount of data and because of the limited number of wells which may be allocated for sampling. For different reasons, the "indeterminate" plume constituents were deleted from consideration at this time. These constituents are being evaluated as possibly being either spurious detects or attributable to a well-specific condition (e.g. well construction contamination).

Of the remaining plumes, the majority can be seen to be present in the groundwater beneath or immediately adjacent to the 200 West area. The majority of the wells selected for sampling for this first quarter of Phase II reflect this distribution.

Wells will be sampled for a "long list" of constituents. The analytical requirements are presented in Table B.1-4. The constituents lists of wells that are to be sampled by other Hanford Site monitoring programs during this first quarter have been reviewed and the duplicate analyses have been deleted from the 200 AAMS list of analyses.

Table B.1-2. Contaminant plume distribution.

CONSTITUENT	PLUME DISTRIBUTION	AREAS OF CONTAMINATION		
		200 WEST	200 EAST	600 AREA
ARSENIC	LOCALIZED	X	X	
CHROMIUM	INTERMEDIATE	X	X	
FLUORIDE	INTERMEDIATE	X		
IRON	INDETERMINATE			
MANGANESE	INDETERMINATE			
ALUMINUM	INDETERMINATE			
CARBON TETRACHLORIDE[1]	INTERMEDIATE	X		
CHLOROFORM	INTERMEDIATE	X		
TRICHLOROETHYLENE	INTERMEDIATE	X		
HYDRAZINE	INDETERMINATE			
STYRENE	INDETERMINATE			
NITRATE	WIDESPREAD	X	X	X
SULFATE	INDETERMINATE			
BIS(2-ETHYLHEXYL) PHTHALATE	INDETERMINATE			
COLIFORM	INDETERMINATE			
ALPHA	INTERMEDIATE	X	X	X
BETA[2]	INTERMEDIATE	X	X	X
CESIUM-137	LOCALIZED		X	
COBALT-60[2]	INTERMEDIATE			X
IODINE-129	INTERMEDIATE	X	X	X
PLUTONIUM-239/240	LOCALIZED	X	X	
RADIUM	INDETERMINATE			
STRONTIUM-90	LOCALIZED		X	X
TECHNETIUM-99[2]	INTERMEDIATE	X	X	X
TRITIUM	WIDESPREAD	X	X	X
URANIUM	LOCALIZED	X		

[1]The contour map presented for this constituent is from DOE/RL-91-32.
[2]One of the contour maps presented for this constituent was prepared for the 200-BP-1 RI/FS.

Table B.1-3. First Quarter, Phase II well network with annotation of wells requiring remediation.

#	WELL	PLUME LOCATION	REMEDIATION REQUIRED	#	WELL	PLUME LOCATION	REMEDIATION REQUIRED
1	2-E16-1	200 EAST	YES	22	2-E33-27	200 EAST	YES
2	2-E17-12	200 EAST	NO	23	6-36-46R	200 EAST	YES
3	2-E23-1	200 EAST	NO	24	6-37-43	200 EAST	NO
4	2-E23-2	200 EAST	NO	25	6-42-42A	200 EAST	YES
5	2-E24-3	200 EAST	NO	26	6-52-46A	200 EAST	NO
6	2-E24-4	200 EAST	NO	27	6-53-48A	200 EAST	NO
7	2-E24-5	200 EAST	YES	28	6-53-50	200 EAST	NO
8	2-E24-7	200 EAST	NO	29	6-54-45B	200 EAST	YES
9	2-E25-17	200 EAST	NO	30	6-54-48	200 EAST	NO
10	2-E26-2	200 EAST	NO	31	6-54-49	200 EAST	NO
11	2-E26-6	200 EAST	NO	32	6-55-60A	200 EAST	YES
12	2-E26-7	200 EAST	YES	33	6-56-43	200 EAST	NO
13	2-E26-8	200 EAST	NO	34	6-56-53	200 EAST	NO
14	2-E28-1	200 EAST	NO	35	6-59-55	200 EAST	YES
15	2-E28-2	200 EAST	YES	36	6-59-58	200 EAST	NO
16	2-E28-5	200 EAST	NO	1	2-W10-1	200 WEST	NO
17	2-E28-6	200 EAST	YES	2	2-W10-4	200 WEST	NO
18	2-E28-9	200 EAST	NO	3	2-W10-5	200 WEST	NO
19	2-E28-12	200 EAST	NO	4	2-W11-3	200 WEST	NO
20	2-E29-1	200 EAST	YES	5	2-W11-6	200 WEST	YES
21	2-E33-10	200 EAST	NO	6	2-W11-7	200 WEST	NO

#	WELL	PLUME LOCATION	REMEDIATION REQUIRED	#	WELL	PLUME LOCATION	REMEDIATION REQUIRED
7	2-W11-10	200 WEST	YES	28	2-W19-22	200 WEST	YES
8	2-W11-14	200 WEST	NO	29	2-W22-9	200 WEST	NO
9	2-W11-18	200 WEST	NO	30	2-W22-12	200 WEST	NO
10	2-W12-1	200 WEST	NO	31	2-W23-9	200 WEST	NO
11	2-W14-6	200 WEST	NO	32	2-W6-1	200 WEST	NO
12	2-W14-7	200 WEST	YES	33	6-31-65	200 WEST	YES
13	2-W14-8	200 WEST	YES	34	6-32-62	200 WEST	NO
14	2-W14-10	200 WEST	NO	35	6-35-66	200 WEST	NO
15	2-W15-2	200 WEST	NO	36	6-35-70	200 WEST	NO
16	2-W15-4	200 WEST	NO	37	6-36-61A	200 WEST	NO
17	2-W15-7	200 WEST	NO	38	6-38-65	200 WEST	NO
18	2-W18-3	200 WEST	NO	39	6-39-79	200 WEST	NO
19	2-W18-7	200 WEST	NO	40	6-40-62	200 WEST	NO
20	2-W18-15	200 WEST	NO	41	6-40-80	200 WEST	YES
21	2-W18-22	200 WEST	NO	42	6-44-64	200 WEST	NO
22	2-W19-2	200 WEST	NO	43	6-45-78	200 WEST	YES
23	2-W19-3	200 WEST	NO	44	6-46-79	200 WEST	YES
24	2-W19-4	200 WEST	YES				
25	2-W19-5	200 WEST	NO				
26	2-W19-8	200 WEST	YES				
27	2-W19-12	200 WEST	NO				

Table B.1-4. Analytical Parameters (Sheet 1 of 4)

Volatiles	CAS[a] number
Chloromethane	74-87-3
Bromomethane	74-83-9
Vinyl chloride	75-01-4
Chloroethane	75-00-3
Methylene chloride	75-09-2
Acetone	67-64-1
Carbon disulfide	75-15-0
1,1-Dichloroethene	75-35-4
1,1-Dichloroethane	75-34-3
1,2-Dichloroethene (total)	540-59-0
Chloroform	67-66-3
1,2-Dichloroethane	107-06-2
2-Butanone	78-93-3
1,1,1-Trichloroethane	71-55-6
Carbon tetrachloride	56-23-5
Vinyl acetate	108-05-4
Bromodichloromethane	75-27-4
1,2-Dichloropropane	78-87-5
1,3-Dichloro-1-propene (Z)	10061-01-5
Trichloroethene	79-01-6
Dibromochloromethane	124-48-1
1,1,2-Trichloroethane	79-00-5
Benzene	71-43-2
trans-1,3-Dichloropropene	542-75-6
Bromoform	75-25-2
4-Methyl-2-pentanone	108-10-1
2-Hexanone	591-78-6
Tetrachloroethene	127-18-4
Toluene	108-88-3
1,1,2,2-Tetrachloroethane	79-34-5
Chlorobenzene	108-90-7
Ethyl benzene	100-41-4
Styrene	100-42-5
Xylenes (total)	1330-20-7

Table B.1-4. Analytical Parameters (Sheet 2 of 4)

Semivolatiles	CAS[a] number
Phenol	108-95-2
bis(2-Chlorethyl) ether	111-44-4
2-Chlorophenol	95-57-8
1,3-Dichlorobenzene	541-73-1
1,4-Dichlorobenzene	106-46-7
Benzyl alcohol	100-51-6
1,2-Dichlorobenzene	95-50-1
2-Methylphenol	95-48-7
bis(2-Chloroisopropyl) ether	39635-32-9
4-Methylphenol	106-44-5
N-Nitroso-di-n-dipropylamine	621-64-7
Hexachloroethane	67-72-1
Nitrobenzene	98-95-3
Isophorone	78-59-1
2-Nitrophenol	88-75-5
2,4-Dimethylphenol	105-67-9
Benzoic acid	65-85-0
bis(2-Chloroethoxy) methane	111-91-1
2,4-Dichlorophenol	120-83-2
1,2,4-Trichlorobenzene	120-82-1
Naphthalene	91-20-3
4-Chloroaniline	106-47-8
Hexachlorobutadiene	87-68-3
4-Chloro-3-methylphenol (para-chloro-meta-cresol)	59-50-7
2-Methylnaphthalene	91-57-6
Hexachlorocyclopentadiene	77-47-4
2,4,6-Trichlorophenol	88-06-2
2,4,5-Trichlorophenol	95-95-4
2-Chloronaphthalene	91-58-7
2-Nitroaniline	88-74-4
Dimethylphthalate	131-11-3
Acenaphthylene	208-96-8
2,6-Dinitrotoluene	606-20-2
3-Nitroaniline	99-09-2
Acenaphthene	83-32-9
2,4-Dinitrophenol	51-28-5
4-Nitrophenol	100-02-7
Dibenzofuran	132-64-9
2,4-Dinitrotoluene	121-14-2
Diethylphthalate	84-66-2
4-Chlorophenyl-phenyl-ether	7005-72-3
Fluorene	86-73-7
4-Nitroaniline	100-01-6
4,6-Dinitro-2-methylphenol	534-42-1

Table B.1-4. Analytical Parameters (Sheet 3 of 4)

Semivolatiles (contd)	CAS[a] number
N-nitrosodiphenylamine	86-30-6
4-Bromophenyl-phenylether	101-55-3
Hexachlorobenzene	118-74-1
Pentachlorophenol	87-86-5
Phenanthrene	85-01-8
Anthracene	120-12-7
Di-n-butylphthalate	84-74-2
Fluoranthene	206-44-0
Pyrene	129-00-0
Butylbenzylphthalate	85-68-7
3,3'-Dichlorobenzidine	91-94-1
Benzo(a)anthracene	56-55-3
Chrysene	218-01-9
bis(2-Ethylhexyl)phthalate	117-81-7
Di-n-octylphthalate	117-84-0
Benzo(b)fluoranthene	205-99-2
Pesticides/polychlorinated biphenyls	**CAS[a] number**
Benzo(k)fluoranthene	207-08-9
Benzo(a)pyrene	50-32-8
Indeno (1,2,3-cd)pyrene	193-39-5
Dibenz(a,h)anthracene	53-70-3
Benzo(g,h,i)perylene	191-24-2
Alpha-BHC	319-84-6
Beta-BHC	319-85-7
Delta-BHC	319-86-8
Gamma-BHC (Lindane)	58-89-9
Heptachlor	76-44-8
Aldrin	309-00-2
Heptachlor epoxide	1024-57-3
Endosulfan I	959-98-8
Dieldrin	60-57-1
4,4'-DDE	72-55-9
Endrin	72-20-8
Endosulfan II	33213-65-9
4,4'-DDD	72-54-8
Endosulfan sulfate	1031-07-8
4,4'-DDT	50-29-3
Methoxychlor	72-43-5
Endrin ketone	53494-70-5
Alpha-Chlordane	5103-71-9
Gamma-Chlordane	5103-74-2
Toxaphene	8001-35-2

Table B.1-4. Analytical Parameters (Sheet 4 of 4)

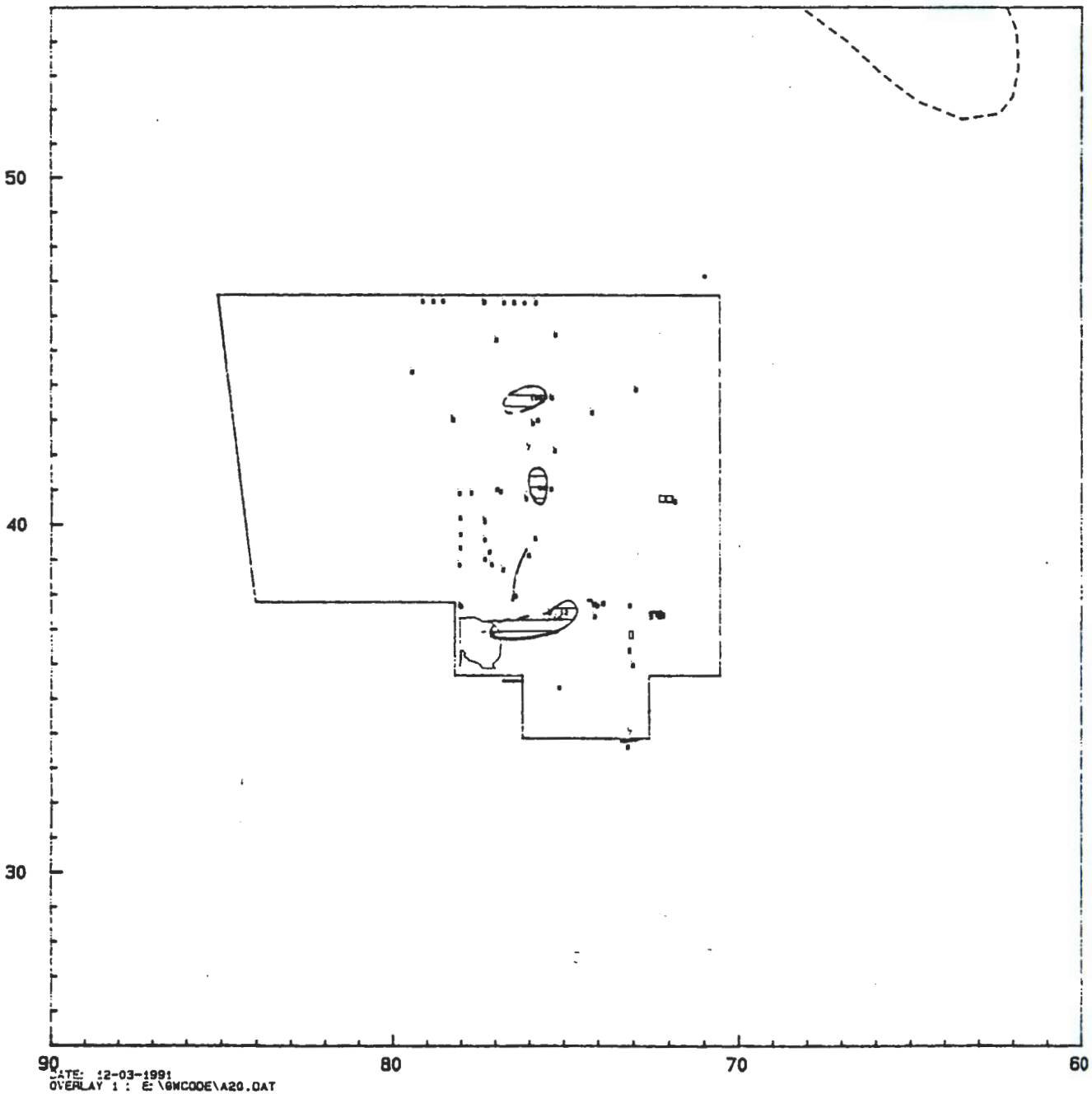
Pesticides/polychlorinated biphenyls (contd)	CAS[a] number
Aroclor-1016	12674-11-2
Aroclor-1221	11104-28-2
Aroclor-1232	11141-16-5
Aroclor-1242	53469-21-9
Aroclor-1248	12672-29-6
Aroclor-1254	11097-69-1
Aroclor-1260	11096-82-5

Analyte[b]	Radionuclides[c]	Inorganic anions[c]
Aluminum	Gamma scan	Bicarbonate
Antimony	Gross alpha	Carbonate
Arsenic	Gross beta	Chloride
Barium	Iodine-129	Fluoride
Beryllium	Plutonium	Nitrate (as NO_3^-)
Cadmium	Strontium-90	Phosphate
Calcium	Technetium-99	Sulfate
Chromium	Tritium	
Cobalt	Uranium (including specific isotopes)	
Copper		
Cyanide		
Iron		
Lead		
Magnesium		
Manganese		
Mercury		
Nickel		
Potassium		
Selenium		
Silver		
Sodium		
Thallium		
Vanadium		
Zinc		

Other[c]
Alkalinity/acidity
Ammonia-N
Biological oxygen demand
Chemical oxygen demand
Dissolved oxygen
Hardness
Total organic carbon
Total organic halogen
Total dissolved solids
Total suspended solids

[a]From American Chemical Society system for compounds.
[b]Analyses will be for dissolved metals only.
[c]These parameters are not on the Contract Laboratory Program target compound list, but are included for completeness.

CONTAMINANT PLUME MAPS



200 AAMS
Arsenic Plume Map
200-West Area
December 1991

. 7 Monitoring well symbol and analytical value.

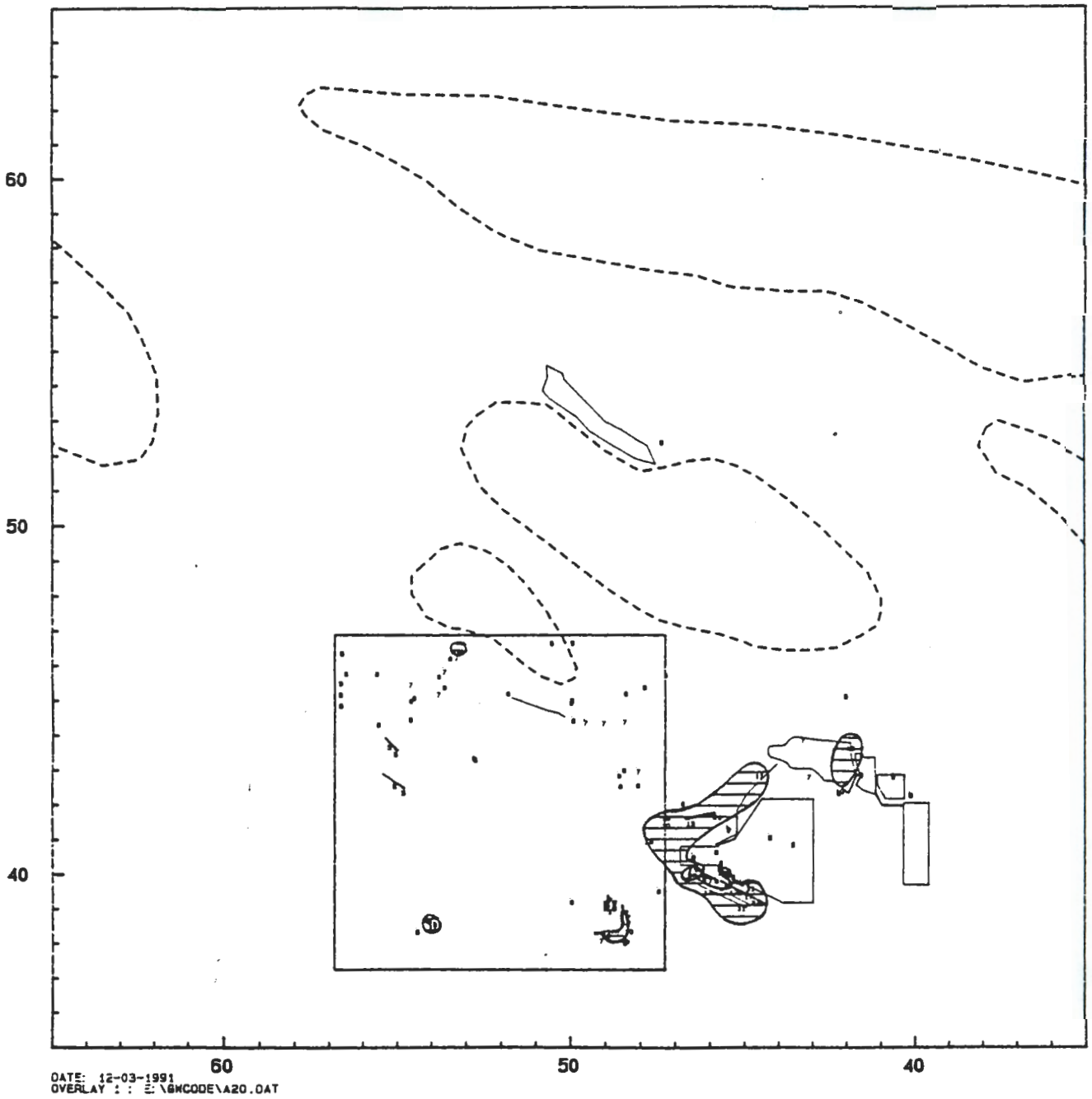
Areas where the basalt surface is generally above the water table.

Facility/area boundary.

10 - 49 ppb

>=50 ppb

Detection limit — 5 ppb
Wa. Water Quality Standard — 0.5 ppb
Drinking Water Standard — 50 ppb
Maximum Concentration Limit — 50 ppb



200 AAMS
Arsenic Plume Map
200-East Area
December 1991

Monitoring well symbol and analytical value.

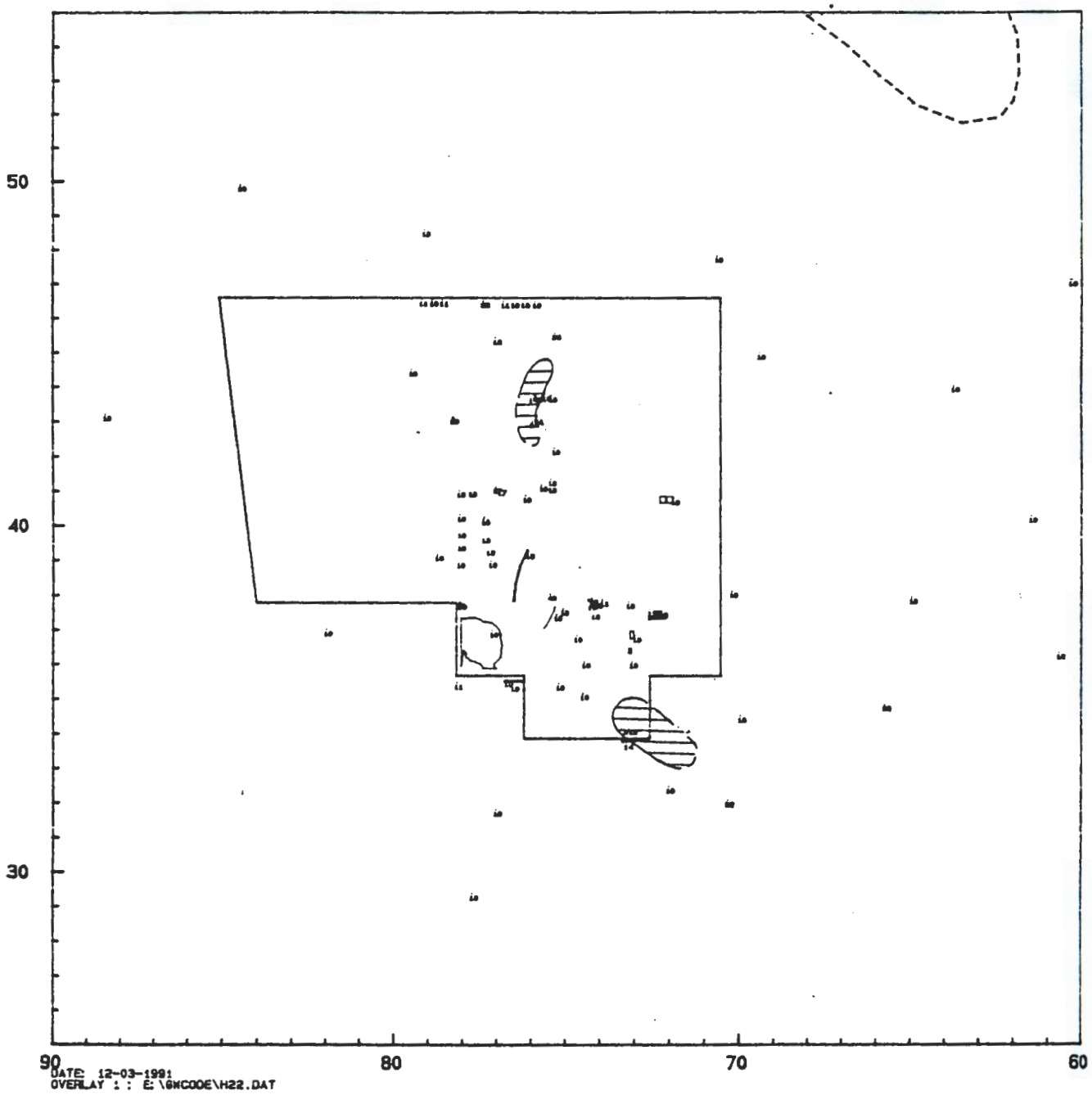
Areas where the basalt surface is generally above the water table.

Facility/area boundary.

10 - 49 ppb

>50 ppb

Detection limit — 5 ppb
Wa. Water Quality Standard — 0.5 ppb
Drinking Water Standard — 50 ppb
Maximum Concentration Limit — 50 ppb



200 AAMS
Chromium Plume Map
200-West Area
December 1991

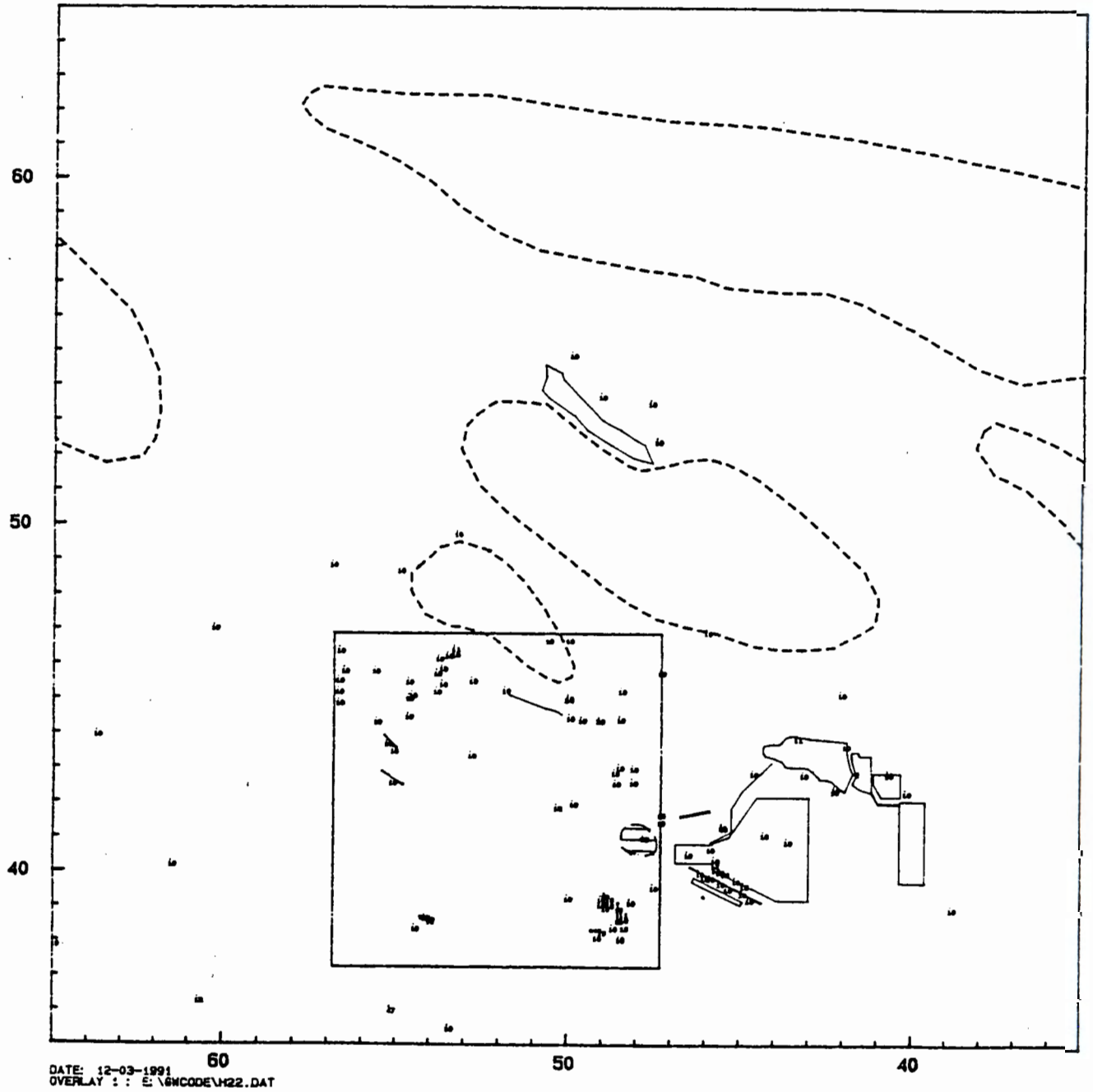
Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

Facility/area boundary.

>=50 ppb

Detection limit — 10 ppb
Wa. Water Quality Standard — 50 ppb
Drinking Water Standard — 50 ppb
Maximum Concentration Limit — 50 ppb



200 AAMS
Chromium Plume Map
200-East Area
December 1991

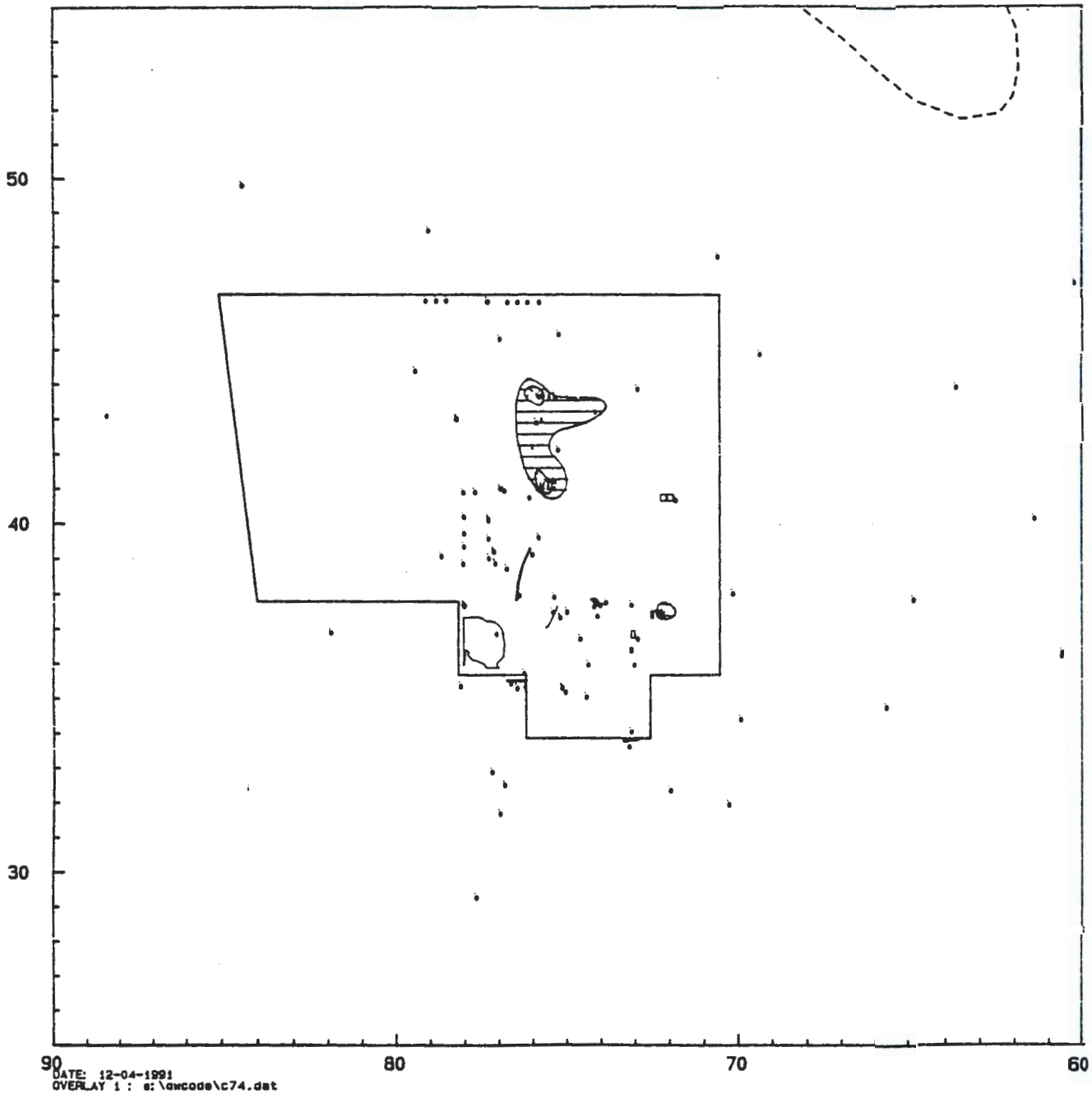
. Monitoring well symbol
7 and analytical value.

Areas where the basalt surface is generally above the water table.

Facility/area boundary.

>=50 ppb

Detection limit——— 10 ppb
Wa. Water Quality Standard— 50 ppb
Drinking Water Standard——— 50 ppb
Maximum Concentration Limit— 50 ppb



200 AAMS
Fluoride Plume Map
200-West Area
December 1991

. 7 Monitoring well symbol and analytical value.

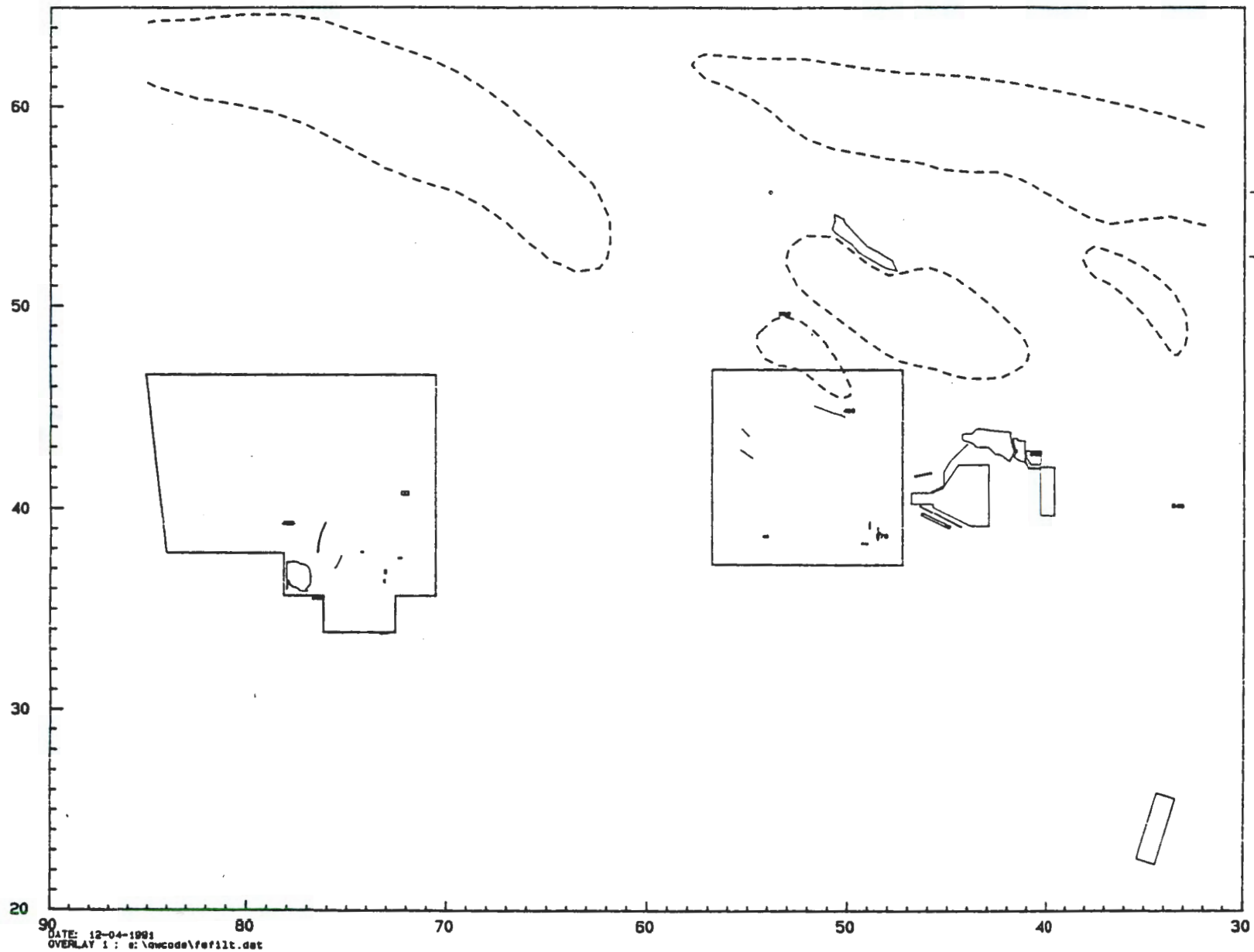
Areas where the basalt surface is generally above the water table.

Facility/area boundary.

1 - 3 ppm

>=4 ppm

Detection limit——————0.5 ppm
Drinking Water Standard——— 4 ppm
Maximum Concentration Limit— 4 ppm



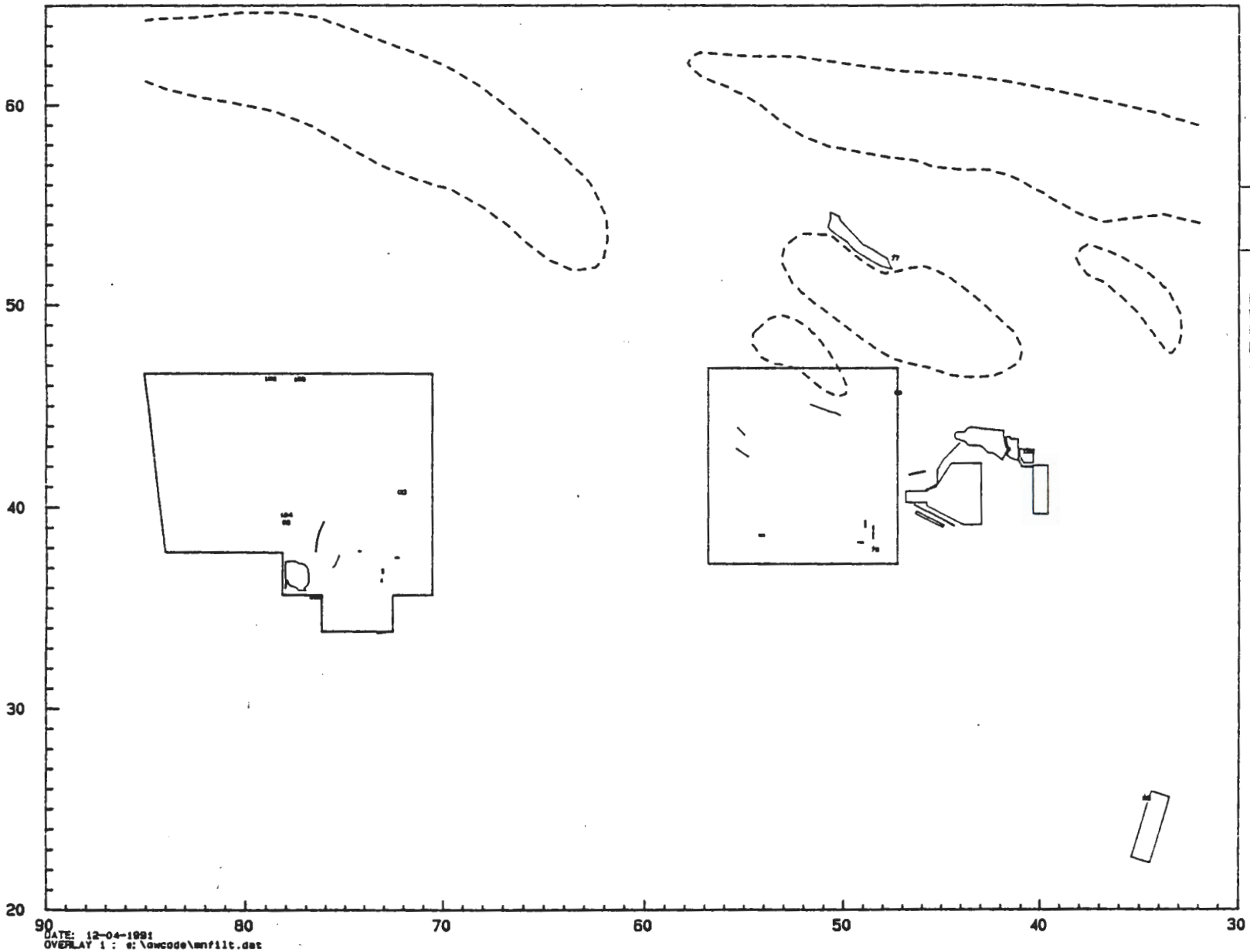
200 AAMS
Iron Detections Map
December 1991

Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

Facility/area boundary.

Detection limit — 30 ppb
Drinking Water Standard — 300 ppb
Maximum Concentration Limit — 300 ppb
Secondary MCL — 300 ppb



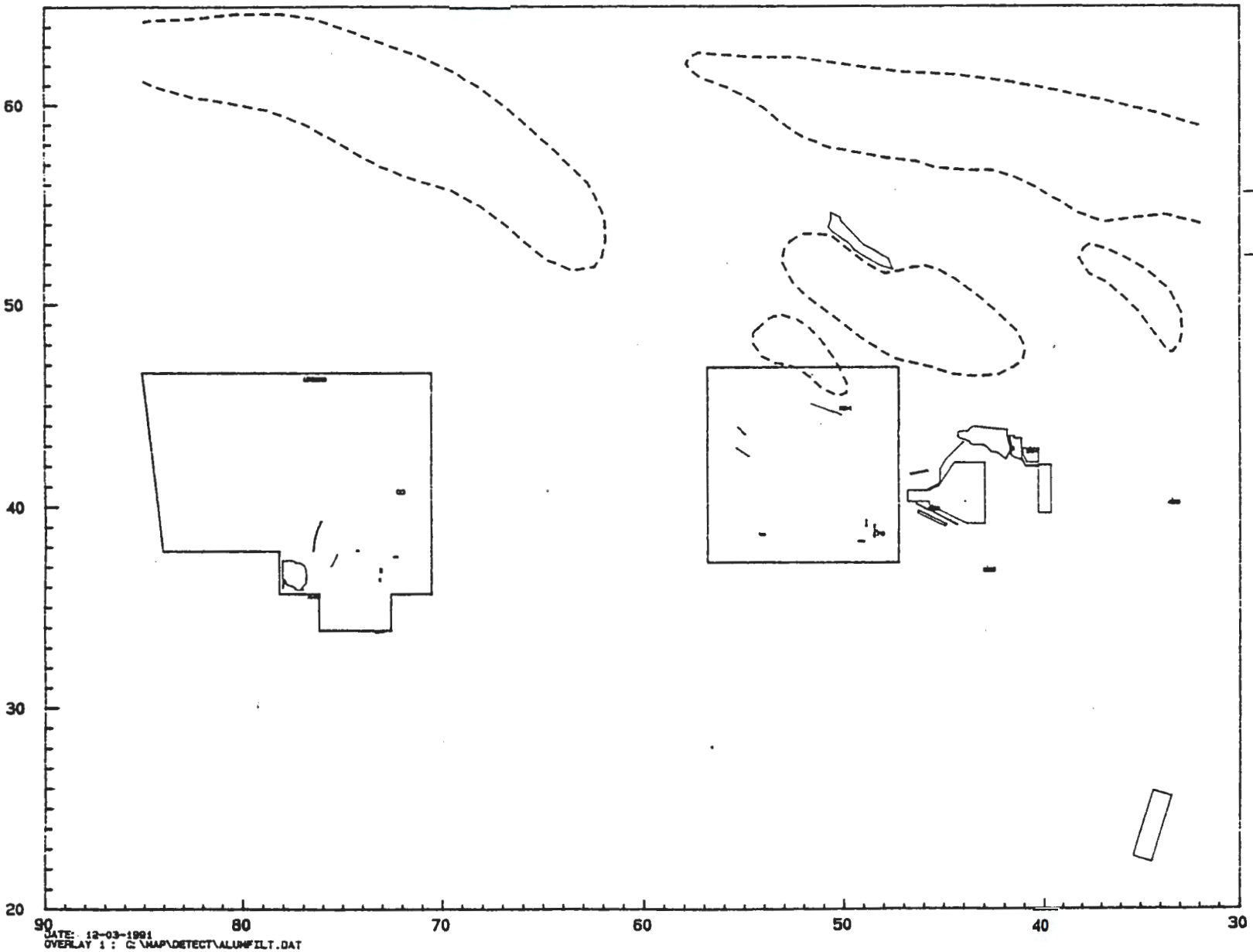
200 AAMS
Manganese Detections Map
December 1991

. 7 Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

Facility/area boundary.

Detection limit	5 ppb
Wa. Water Quality Standard	50 ppb
Drinking Water Standard	50 ppb
Maximum Concentration Limit	50 ppb
Secondary MCL	50 ppb



200 AAMS
Aluminum Detections Map
December 1991

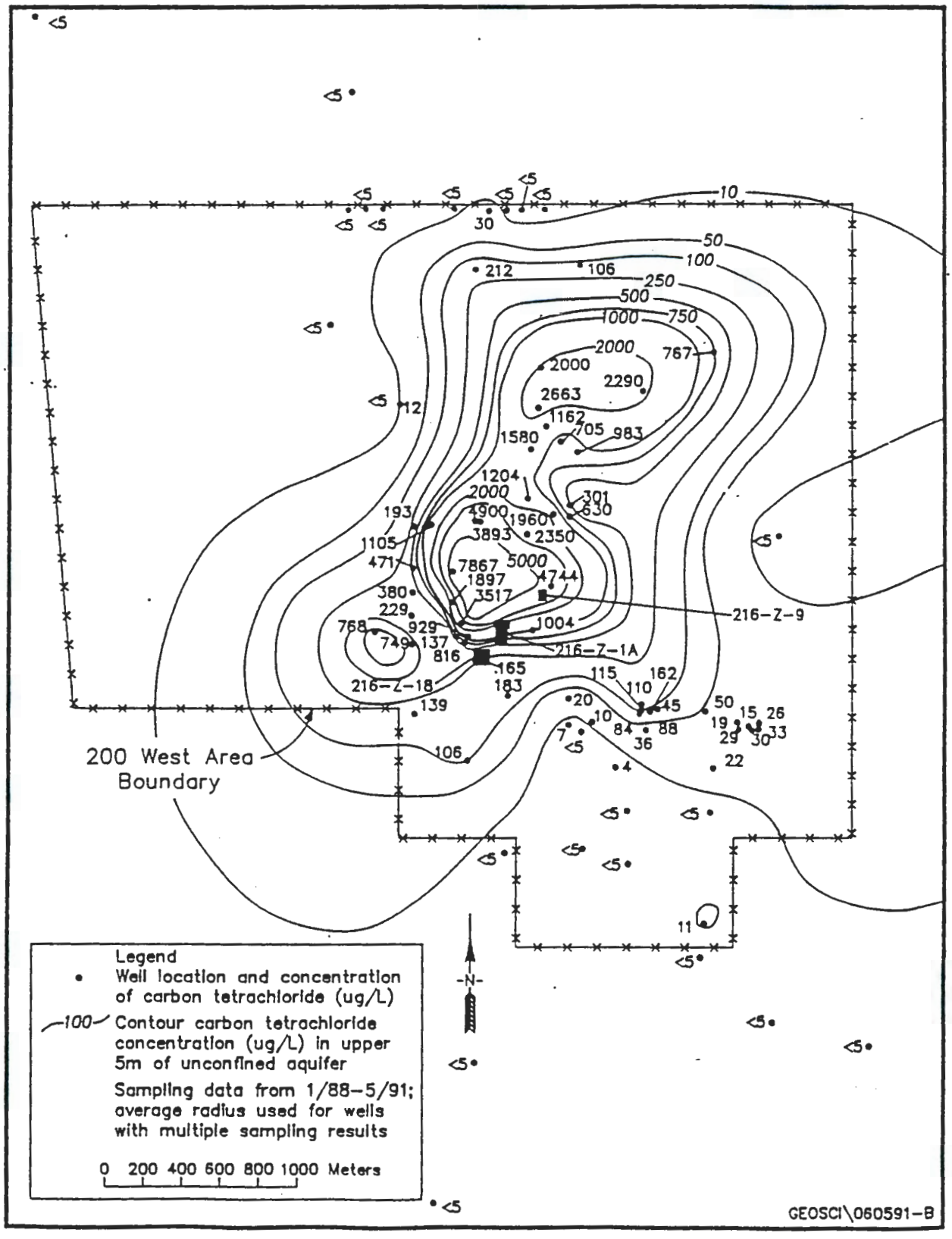
Monitoring well symbol and analytical value.

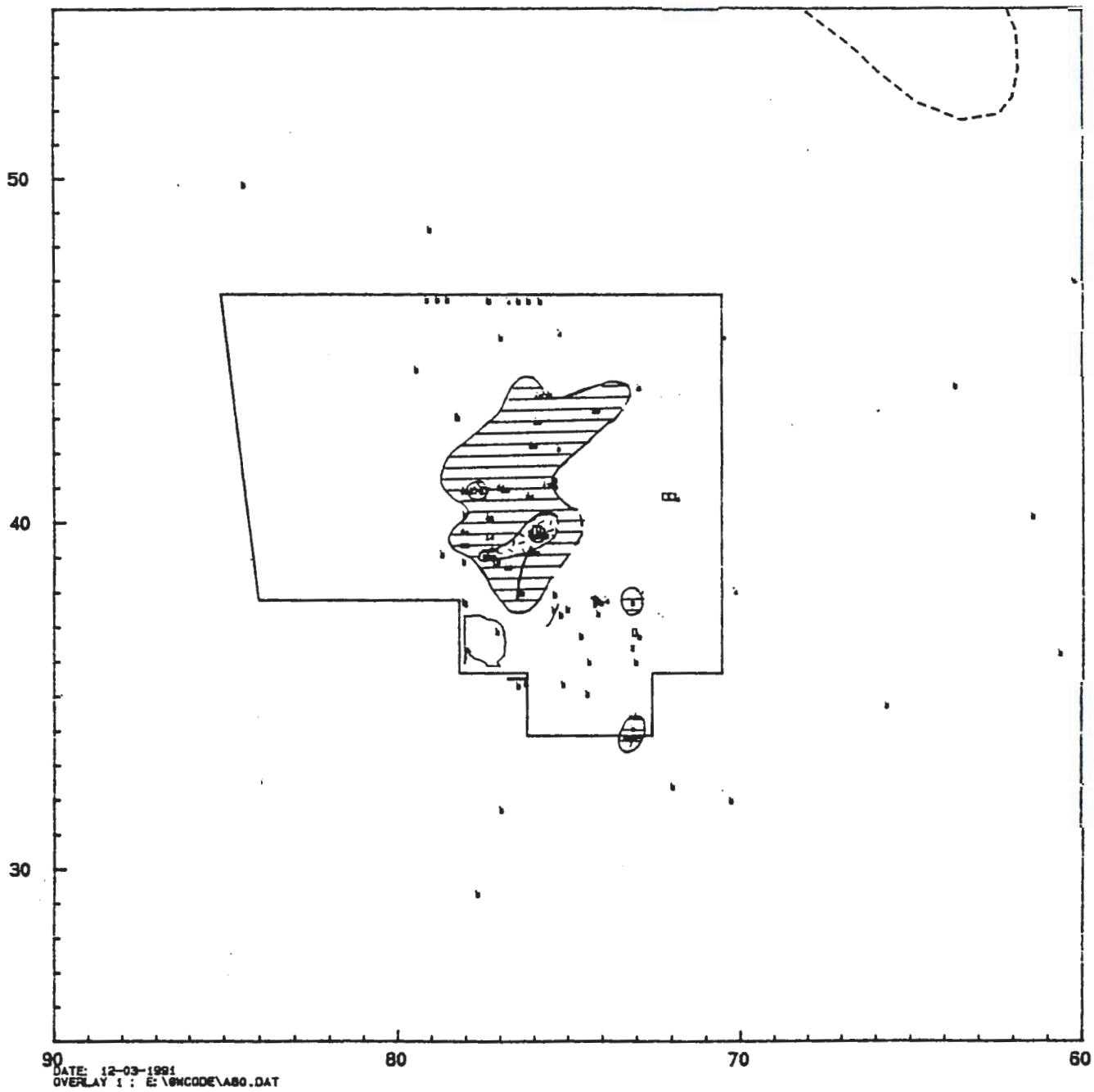
Areas where the basalt surface is generally above the water table.

Facility/area boundary.

Detection limit——————150 ppb
Drinking Water Standard——— 50 ppb

Figure B-27. Carbon Tetrachloride Concentration Contours in the 200 West Area Ground Water, 1988-1991.





200 AAMS
Chloroform Plume Map
200-West Area
December 1991

. 7 Monitoring well symbol and analytical value.

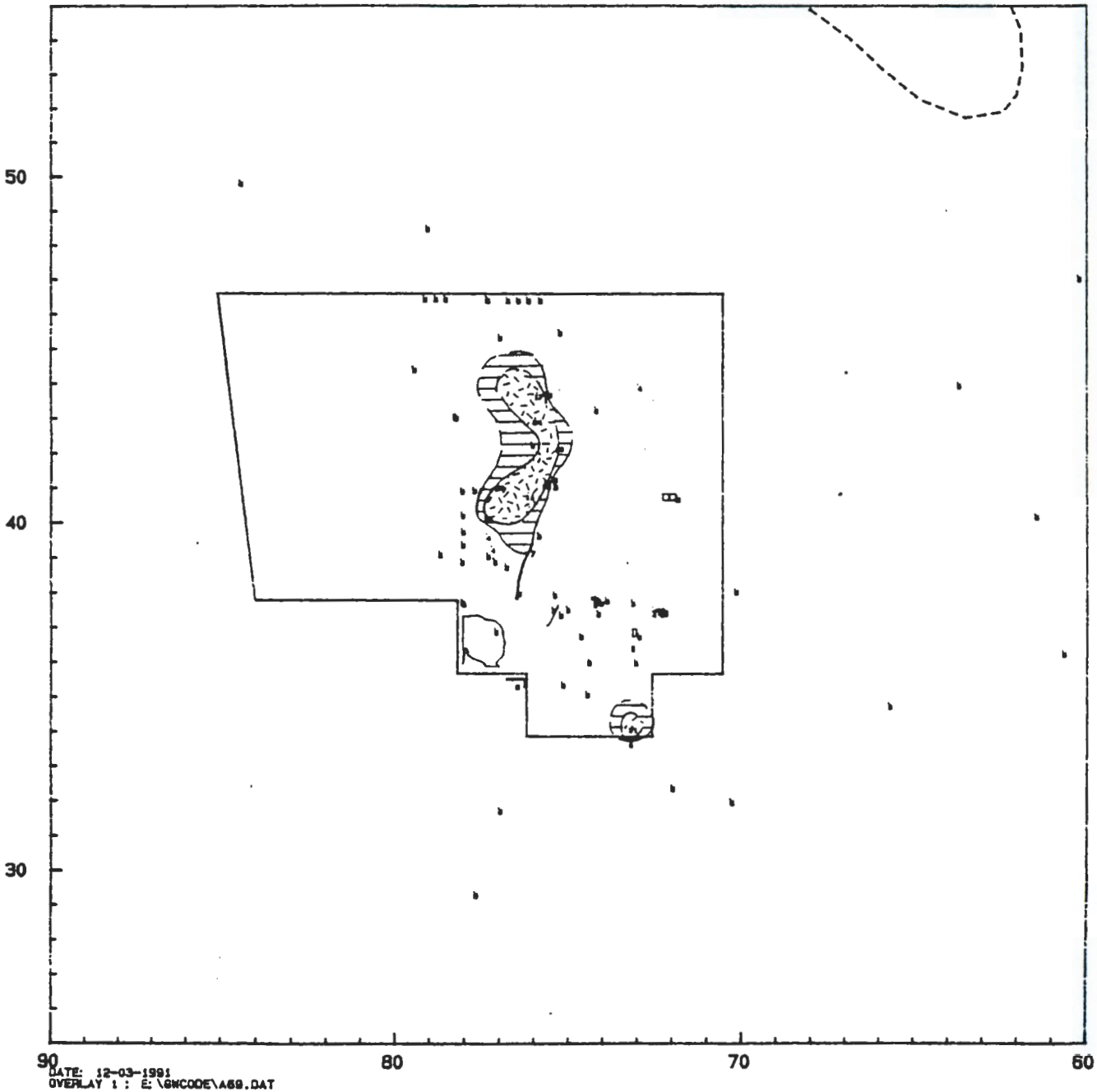
Areas where the basalt surface is generally above the water table.

Facility/area boundary.

7 - 69 ppb

>=70 ppb

Detection limit———— 5 ppb
Wa. Water Quality Standard—— 7 ppb
Drinking Water Standard———100 ppb
Maximum Concentration Limit—100 ppb



200 AAMS
Trichloroethylene Plume Map
200-West Area
December 1991

Monitoring well symbol and analytical value.

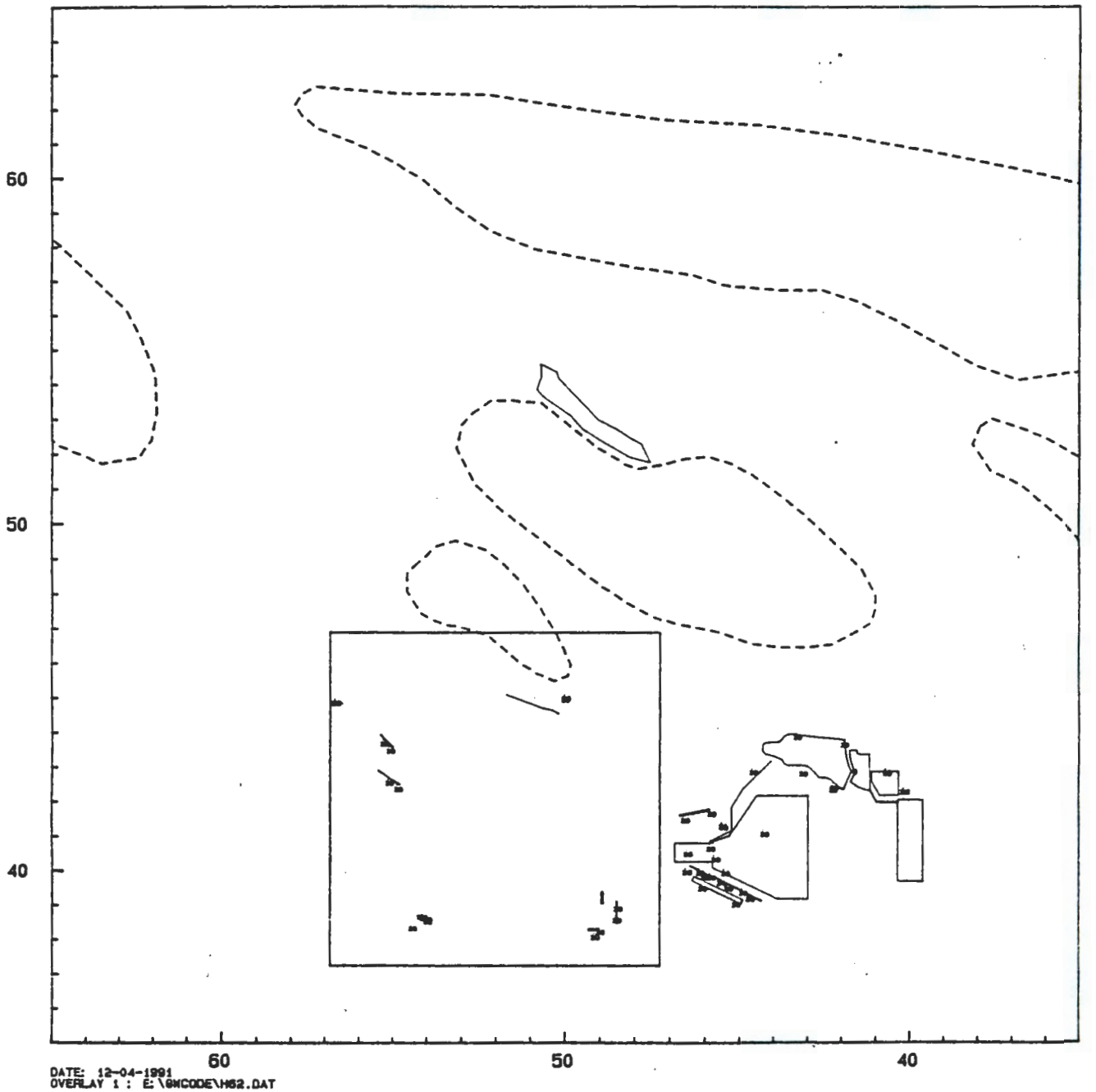
Areas where the basalt surface is generally above the water table.

Facility/area boundary.

7-9 ppb

>=10 ppb

Detection limit 5 ppb
Wa. Water Quality Standard 3 ppb
Drinking Water Standard 5 ppb



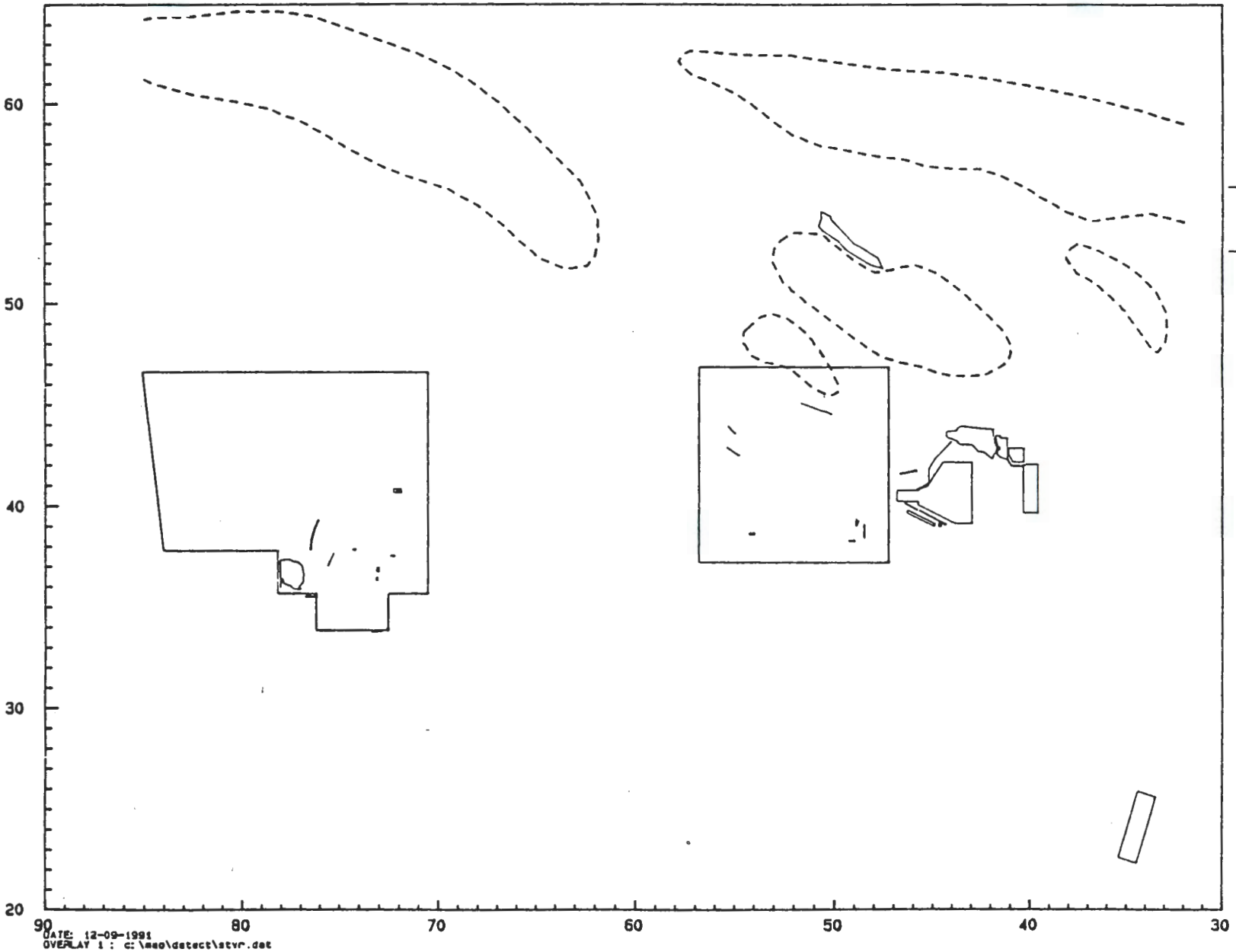
200 AAMS
Hydrazine Detections Map
200-East Area
December 1991

Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

Facility/area boundary.

Detection limit——————— 30 ppb
Wa. Water Quality Standard——0.3 ppb



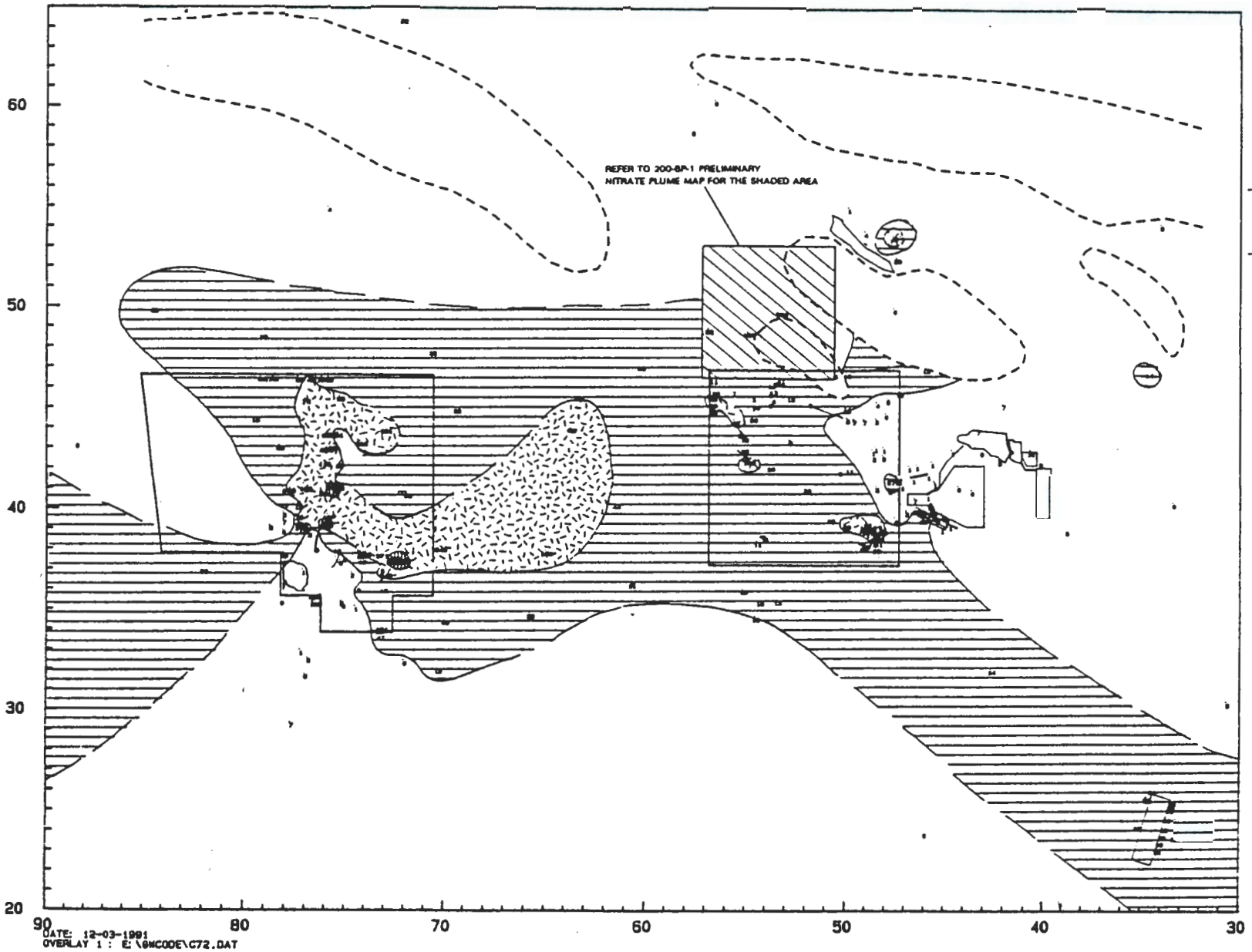
200 AAMS
Styrene Detections Map
December 1991

. Monitoring well symbol
, and analytical value.

— — Areas where the basalt surface is generally above the water table.

——— Facility/area boundary.

Detection limit——————— 5 ppb
Drinking Water Standard——— 50 ppb



200 AAMS
Nitrate Plume Map
December 1991

Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

Facility/area boundary.

10 - 44 ppm

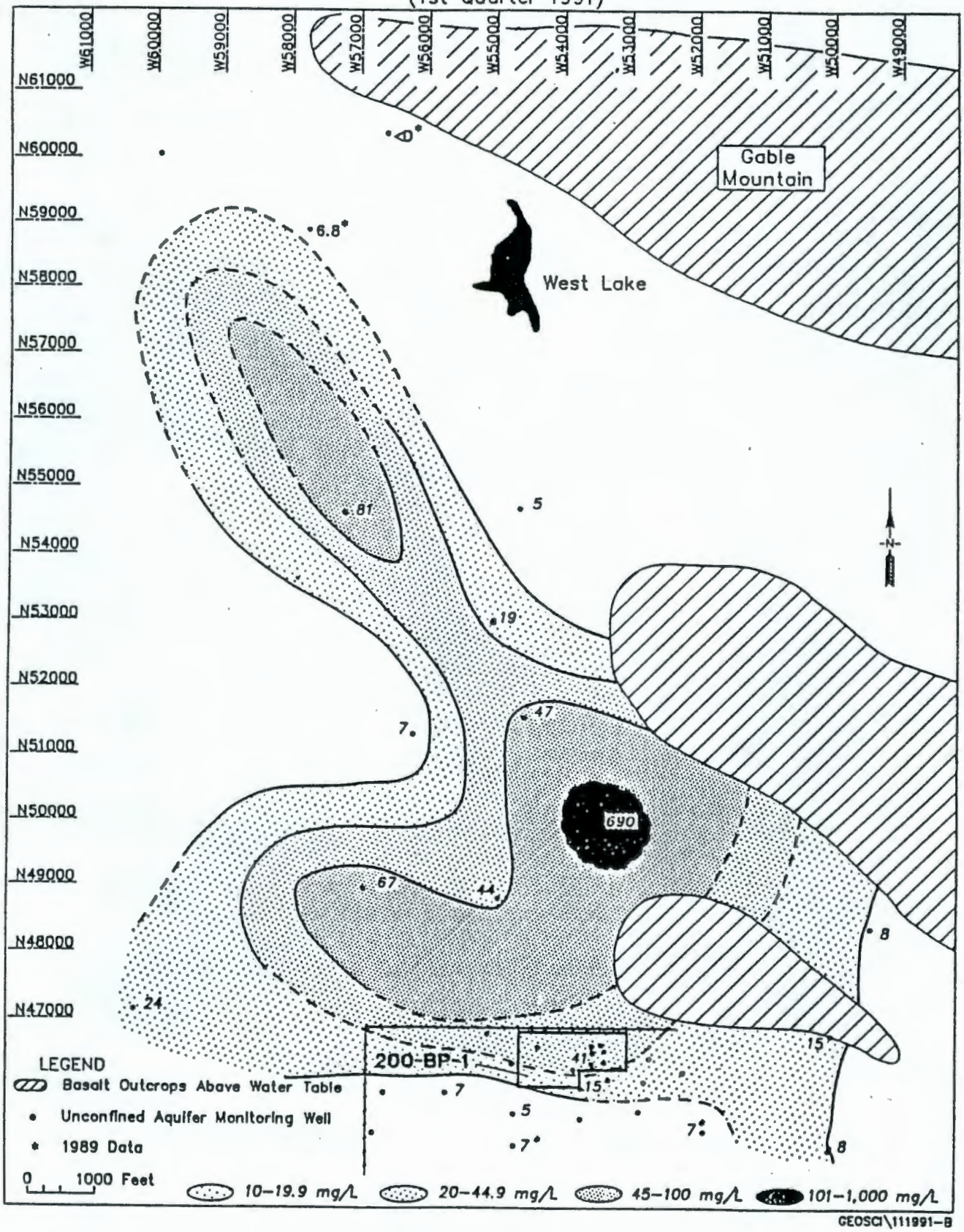
45 - 449 ppm

>=450 ppm

Detection limit——————0.5 ppm
Drinking Water Standard——— 45 ppm
Maximum Concentration Limit— 45 ppm

Preliminary Plume Map - Nitrate

(1st Quarter 1991)



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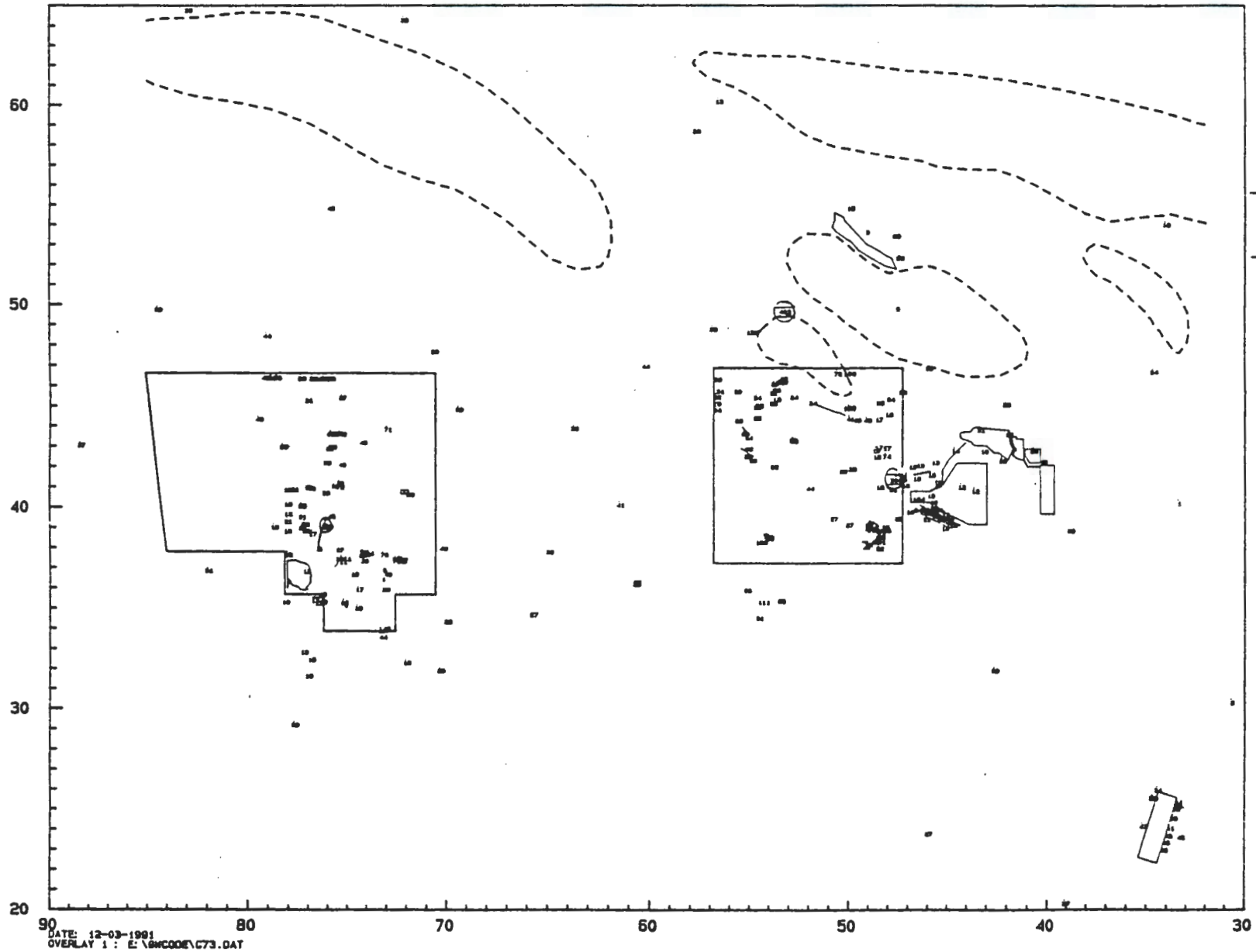


200 AAMS
Sulfate Plume Map
December 1991

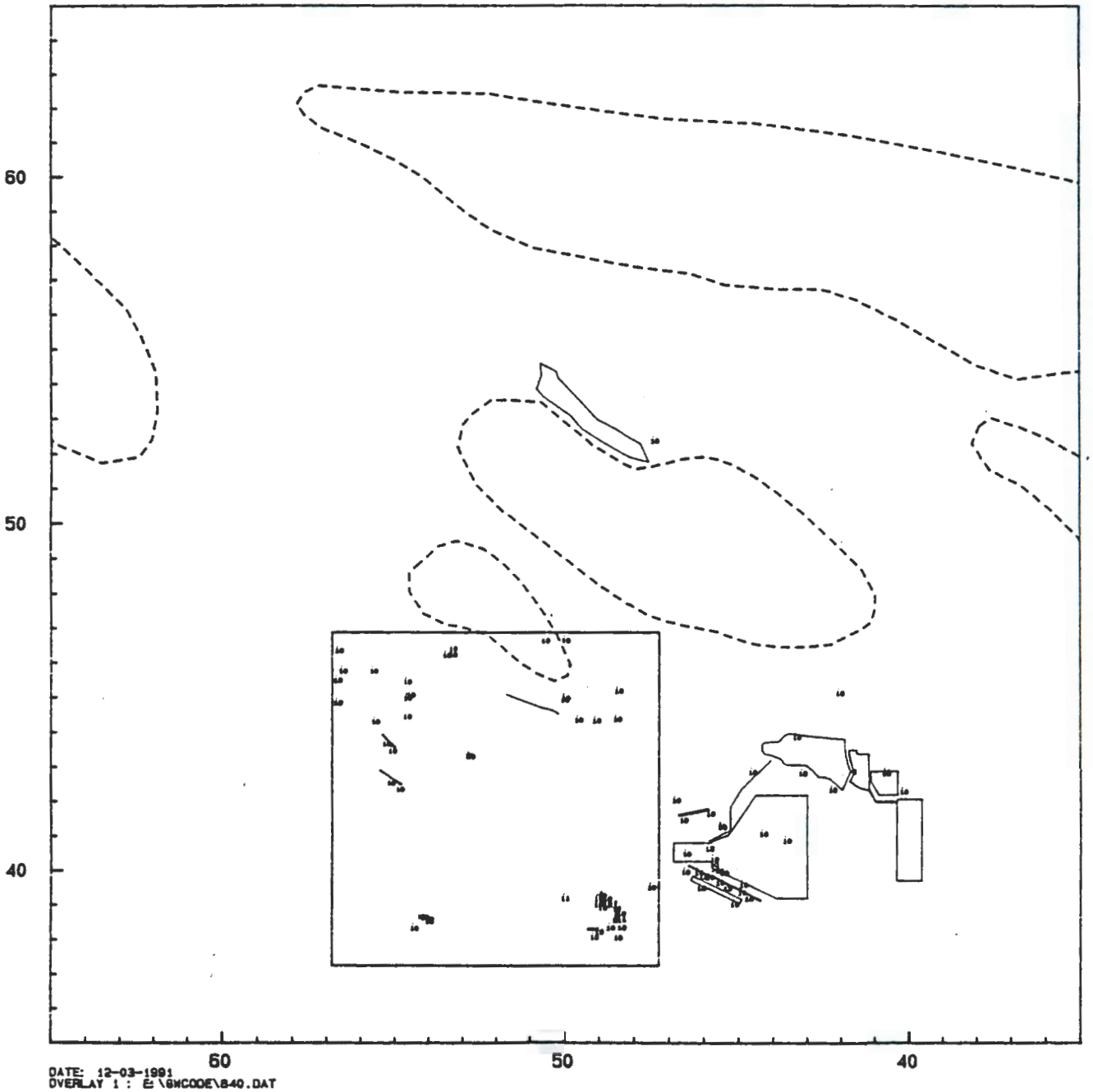
Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

Facility/area boundary.

>=250 ppm

Detection limit——————0.5 ppm
Wa. Water Quality Standard——250 ppm
Drinking Water Standard———250 ppm
Maximum Concentration Limit—250 ppm



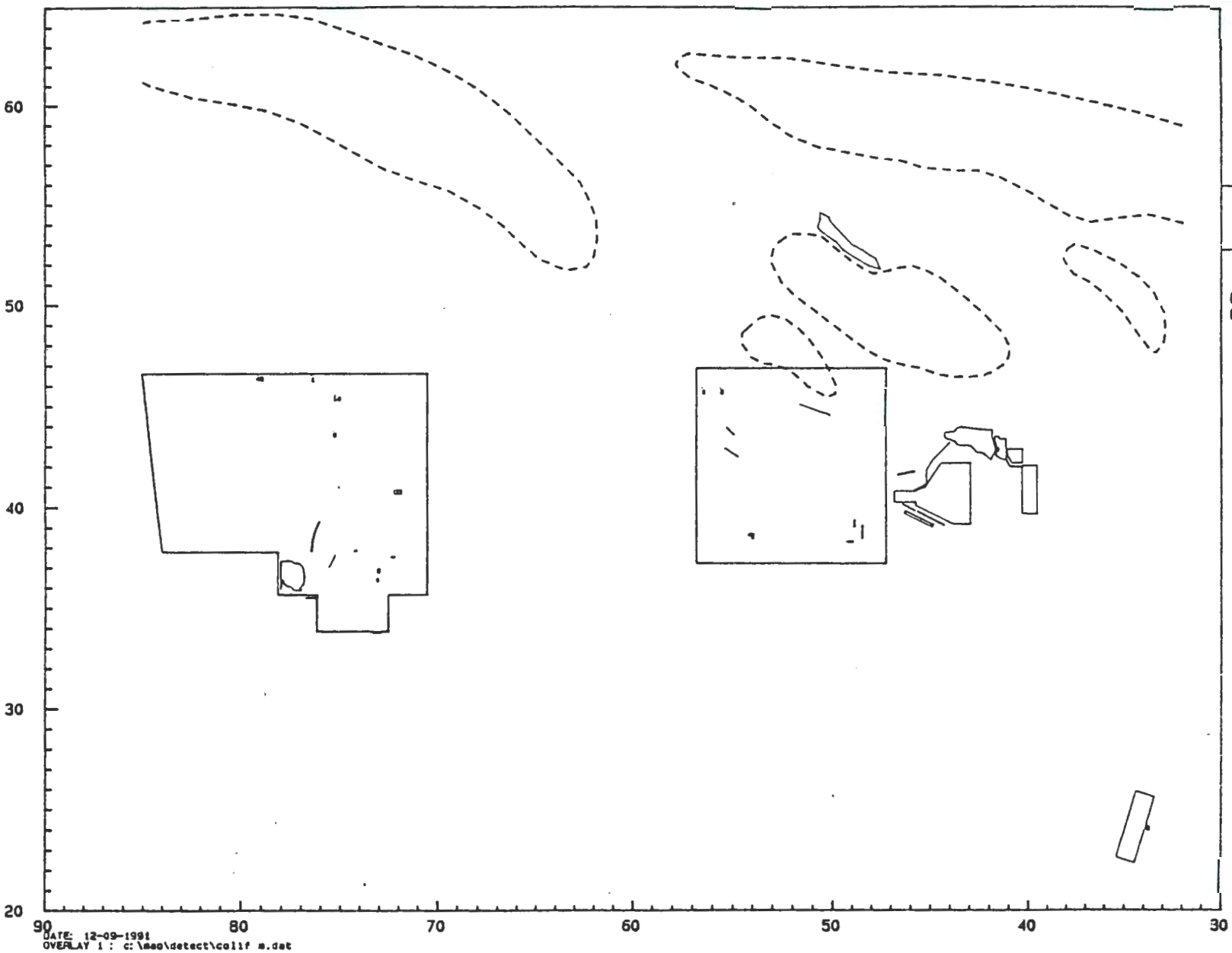
200 AAMS
Bis(2-ethylhexyl)phthalate
Detections Map
200-East Area
December 1991

. Monitoring well symbol
7 and analytical value.

— — Areas where the basalt surface is generally above the water table.

——— Facility/area boundary.

Detection limit———————— 10 ppb
Wa. Water Quality Standard——0.5 ppb



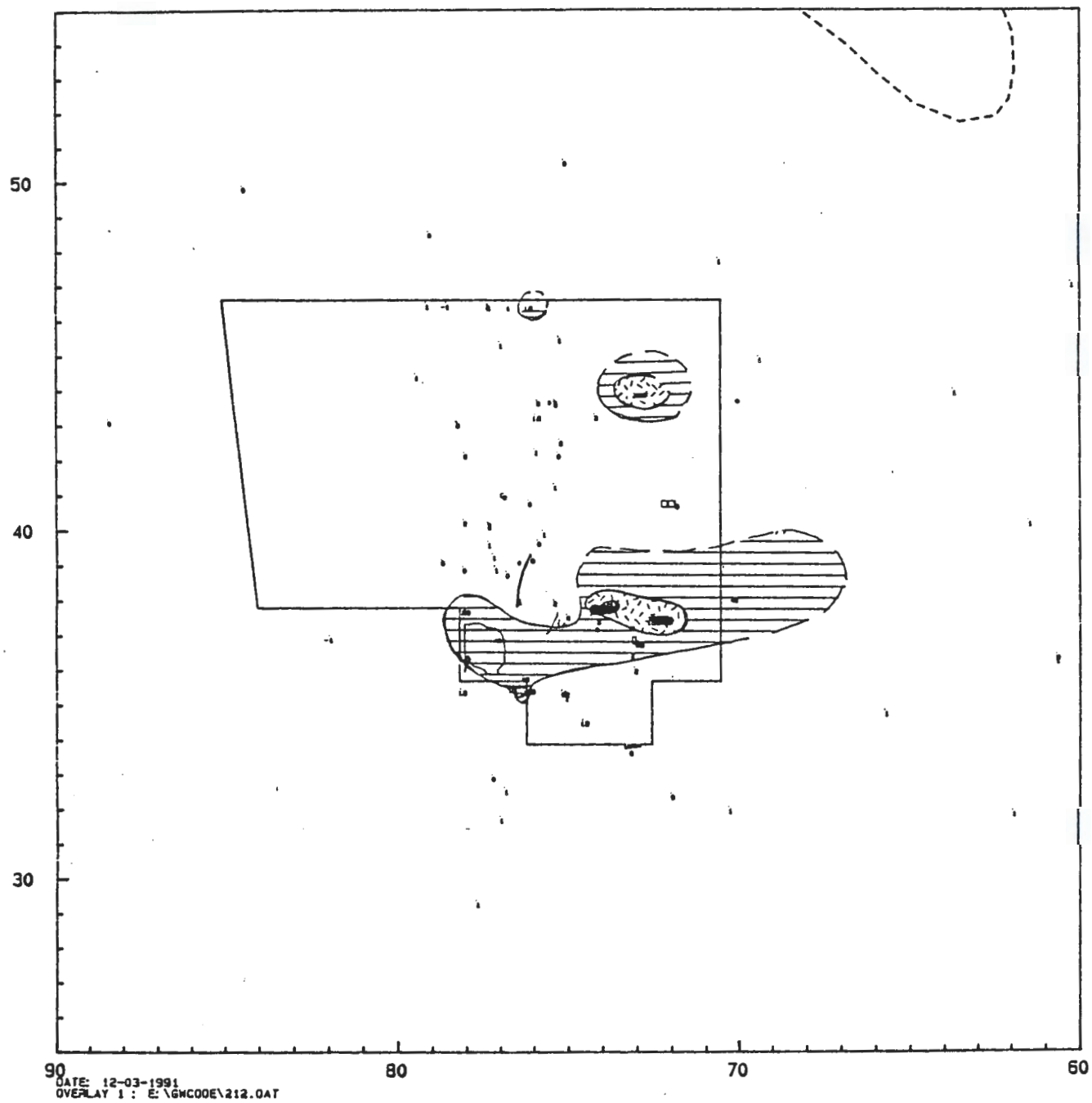
200 AAMS
Coliform Detections Map
December 1991

. Monitoring well symbol
7 and analytical value.

Areas where the basalt surface is generally above the water table.

Facility/area boundary.

Detection limit — 1 ppb
Drinking Water Standard — 1 ppb



200 AAMS
Gross Alpha Plume Map
200-West Area
December 1991

Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

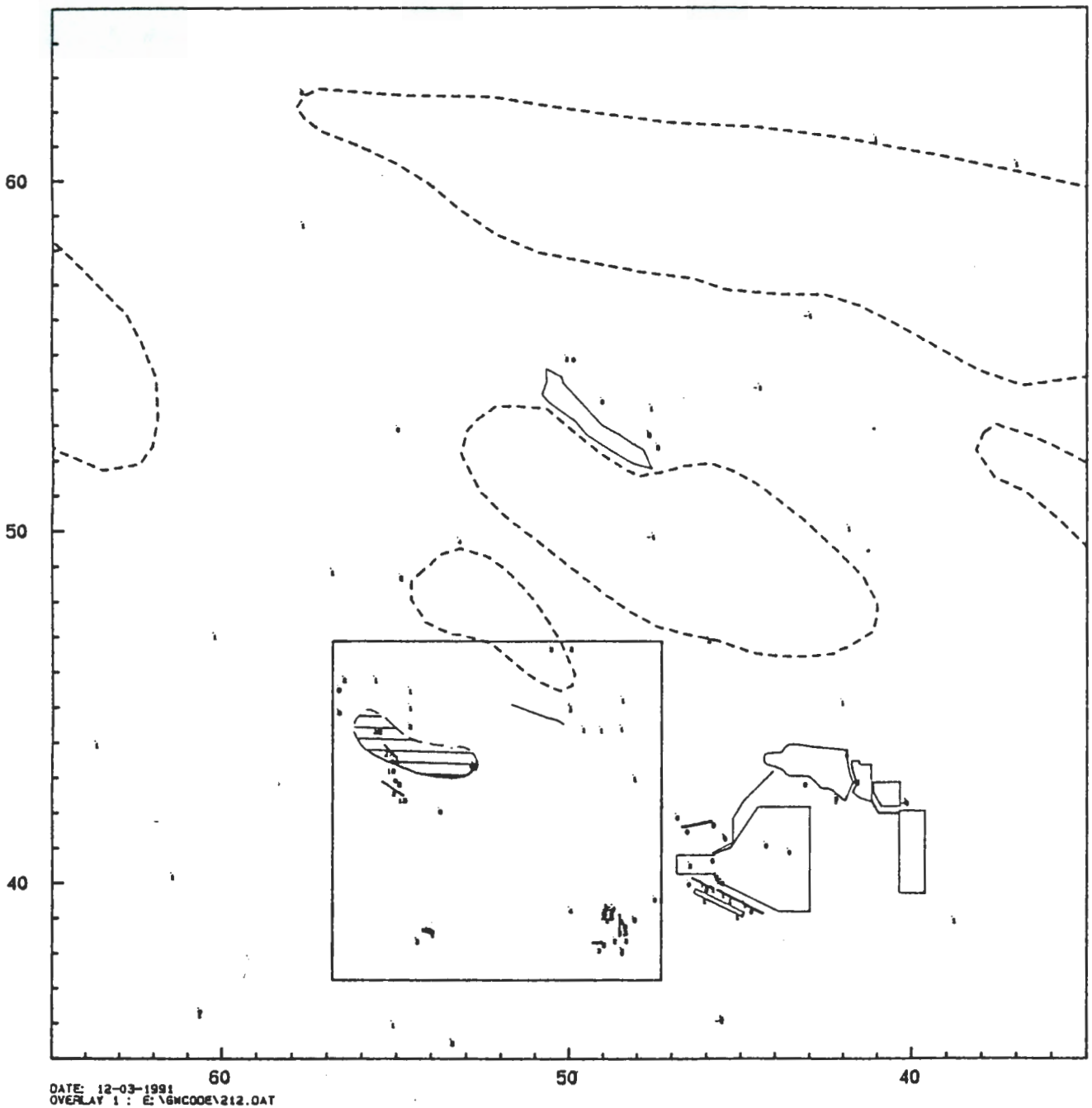
Facility/area boundary.

15 - 149 pCi/L

150 - 1499 pCi/L

>=1500 pCi/L

Detection limit———— 4 pCi/L
Drinking Water Standard——— 15 pCi/L
Wa. Water Quality Standard—— 15 pCi/L



200 AAMS
Gross Alpha Plume Map
200-East Area
December 1991

Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

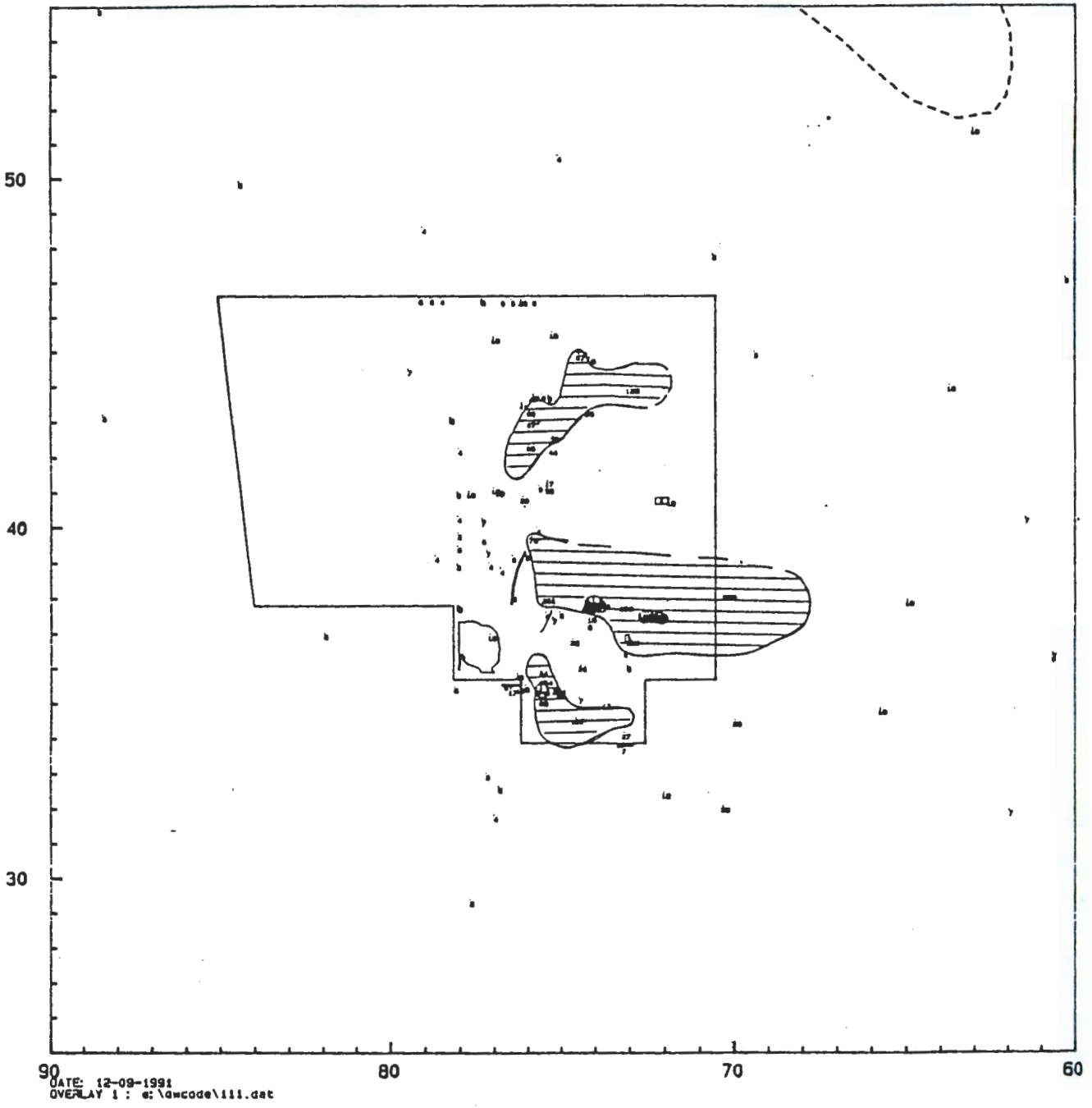
Facility/area boundary.

15 - 149 pCi/L

150 - 1499 pCi/L

>=1500 pCi/L

Detection limit — 4 pCi/L
Drinking Water Standard — 15 pCi/L
Wa. Water Quality Standard — 15 pCi/L



200 AAMS
Gross Beta Plume Map
200-West Area
December 1991

Monitoring well symbol and analytical value.

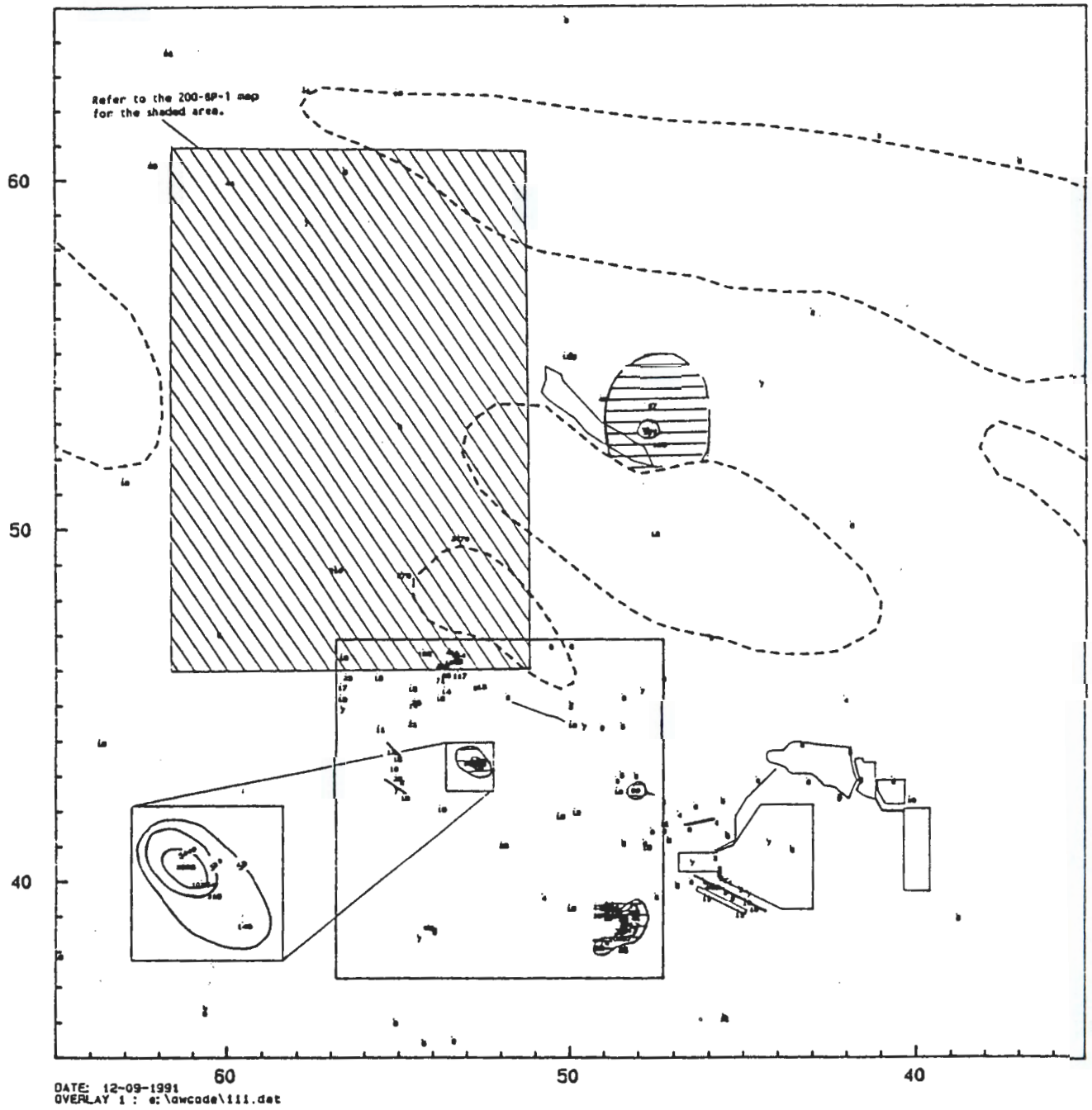
Areas where the basalt surface is generally above the water table.

Facility/area boundary.

50 - 499 pCi/L

>=500 pCi/L

Detection limit — 8 pCi/L
Drinking Water Standard — 50 pCi/L
Wa. Water Quality Standard — 50 pCi/L



200 AAMS
Gross Beta Plume Map
200-East Area
December 1991

Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

Facility/area boundary.

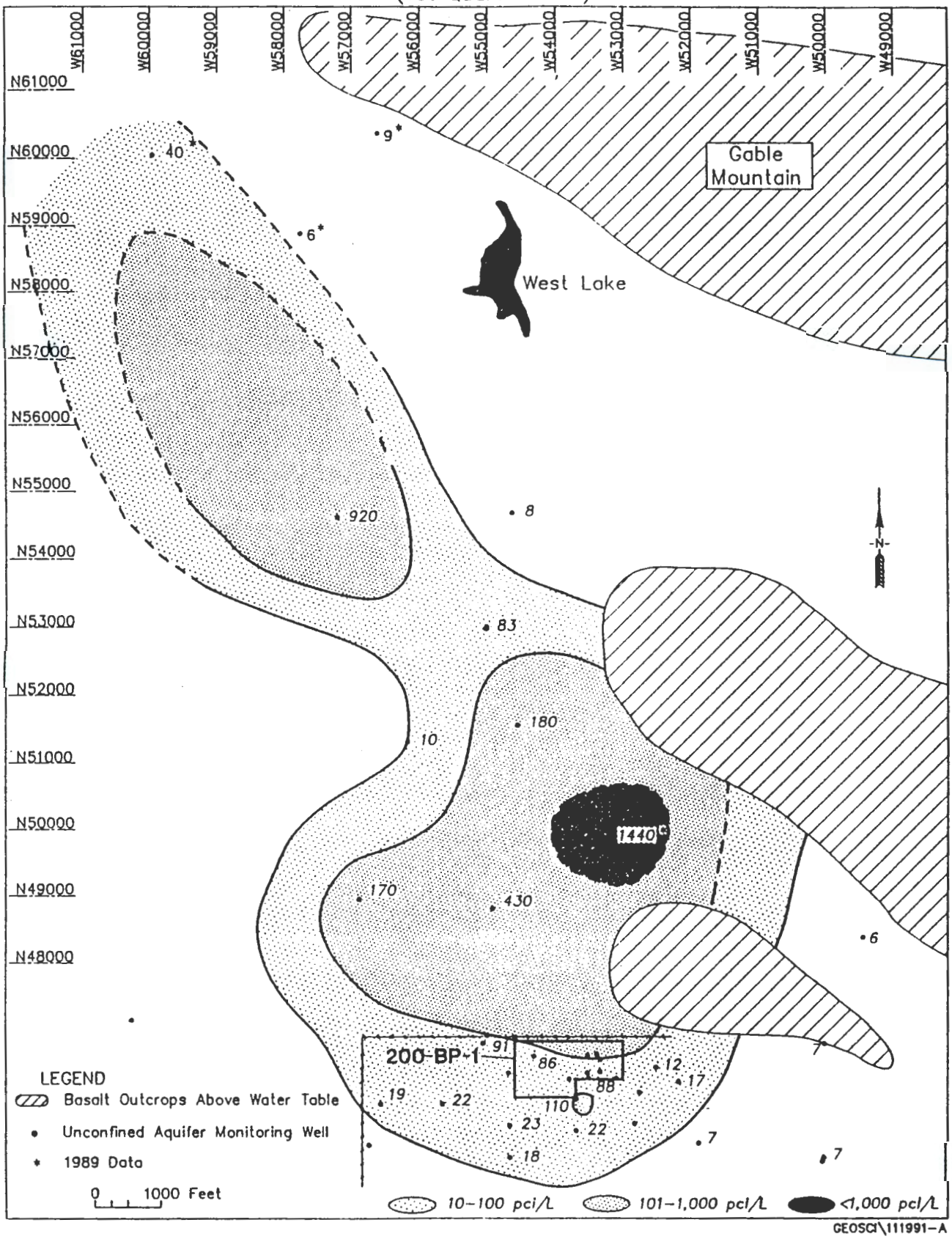
50 - 499 pCi/L

>=500 pCi/L

Detection limit — 8 pCi/L
Drinking Water Standard — 50 pCi/L
Wa. Water Quality Standard — 50 pCi/L

Preliminary Plume Map - Gross Beta

(1st Quarter 1991)



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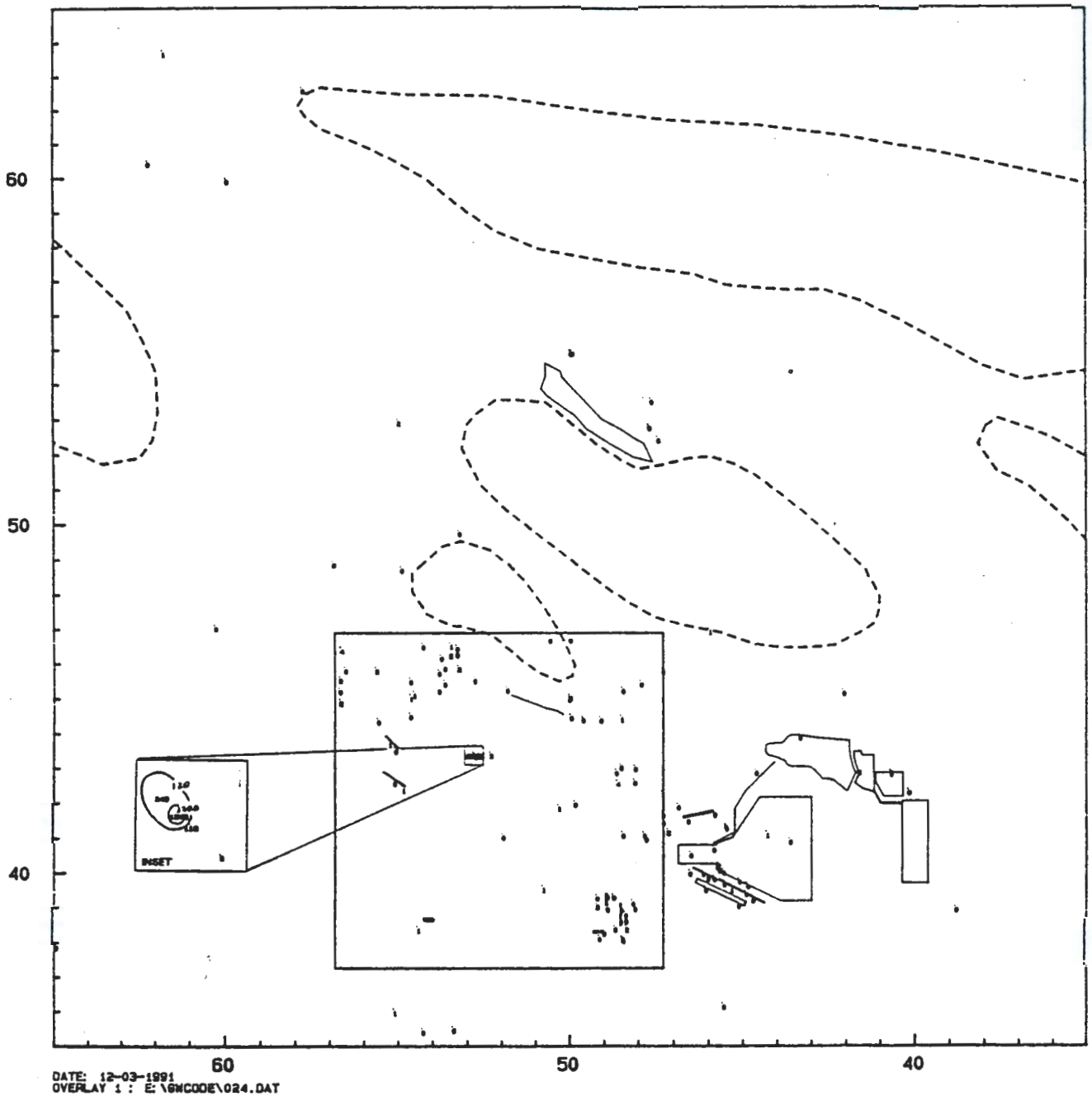


200 AAMS
Cesium-137 Plume Map
200-East Area
December 1991

Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

Facility/area boundary.

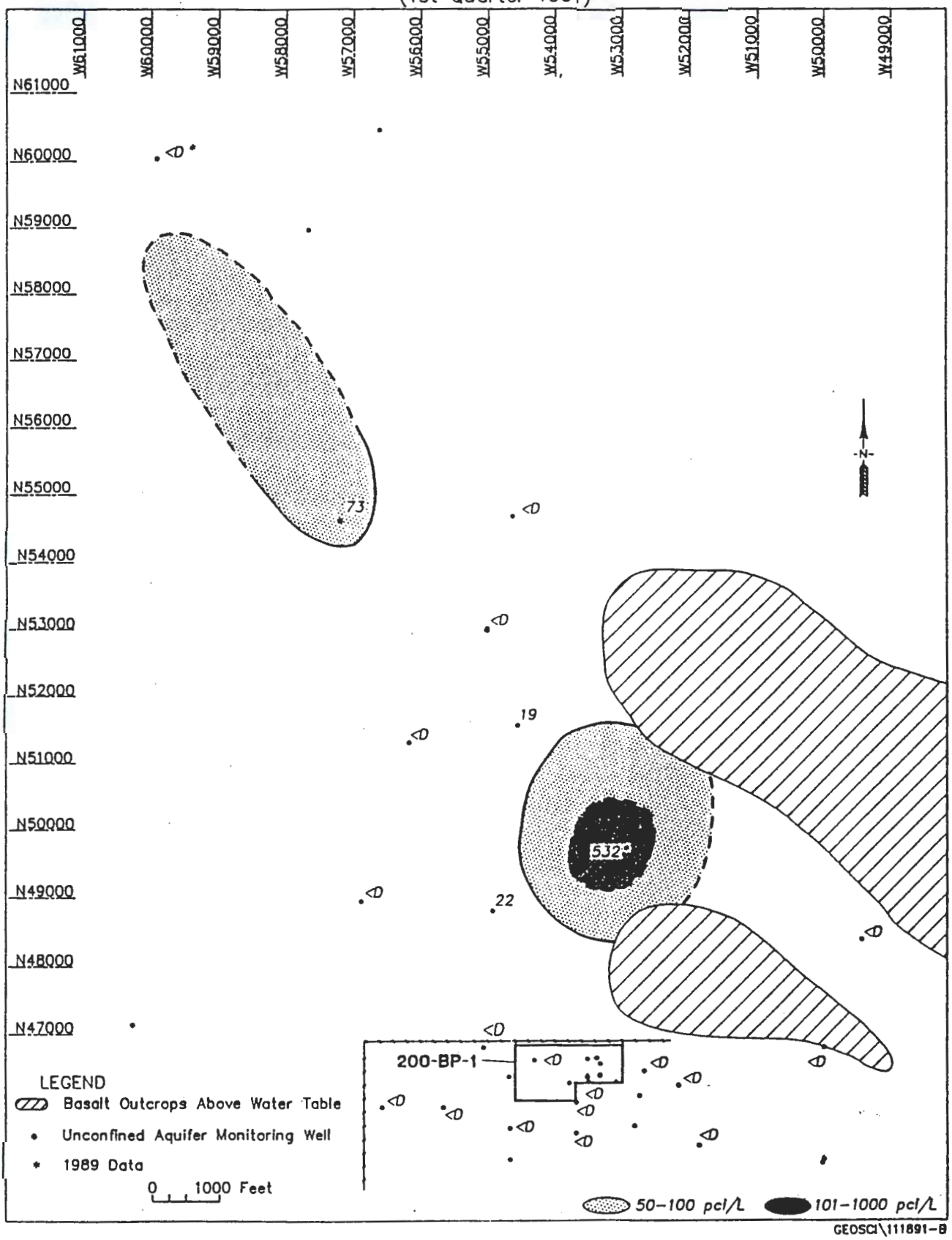
120 - 1199 pCi/L

>=1200 pCi/L

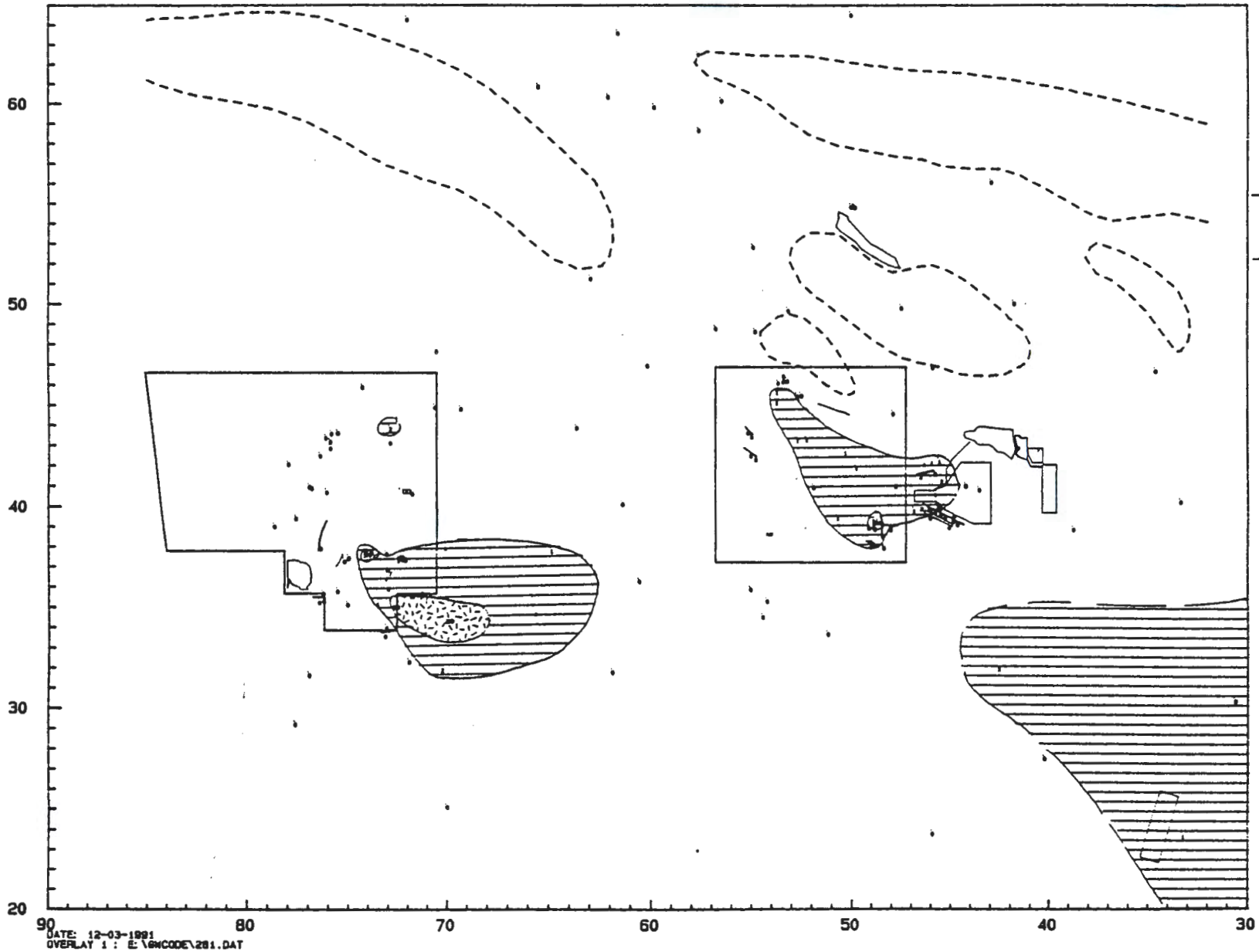
Detection limit — 20 pCi/L
Drinking Water Standard — 200 pCi/L
1/25 DCG — 120 pCi/L

Preliminary Plume Map - Cobalt 60

(1st Quarter 1991)



GEOSCI\111891-B



200 AAMS
Iodine-129 Plume Map
December 1991

Monitoring well symbol and analytical value.

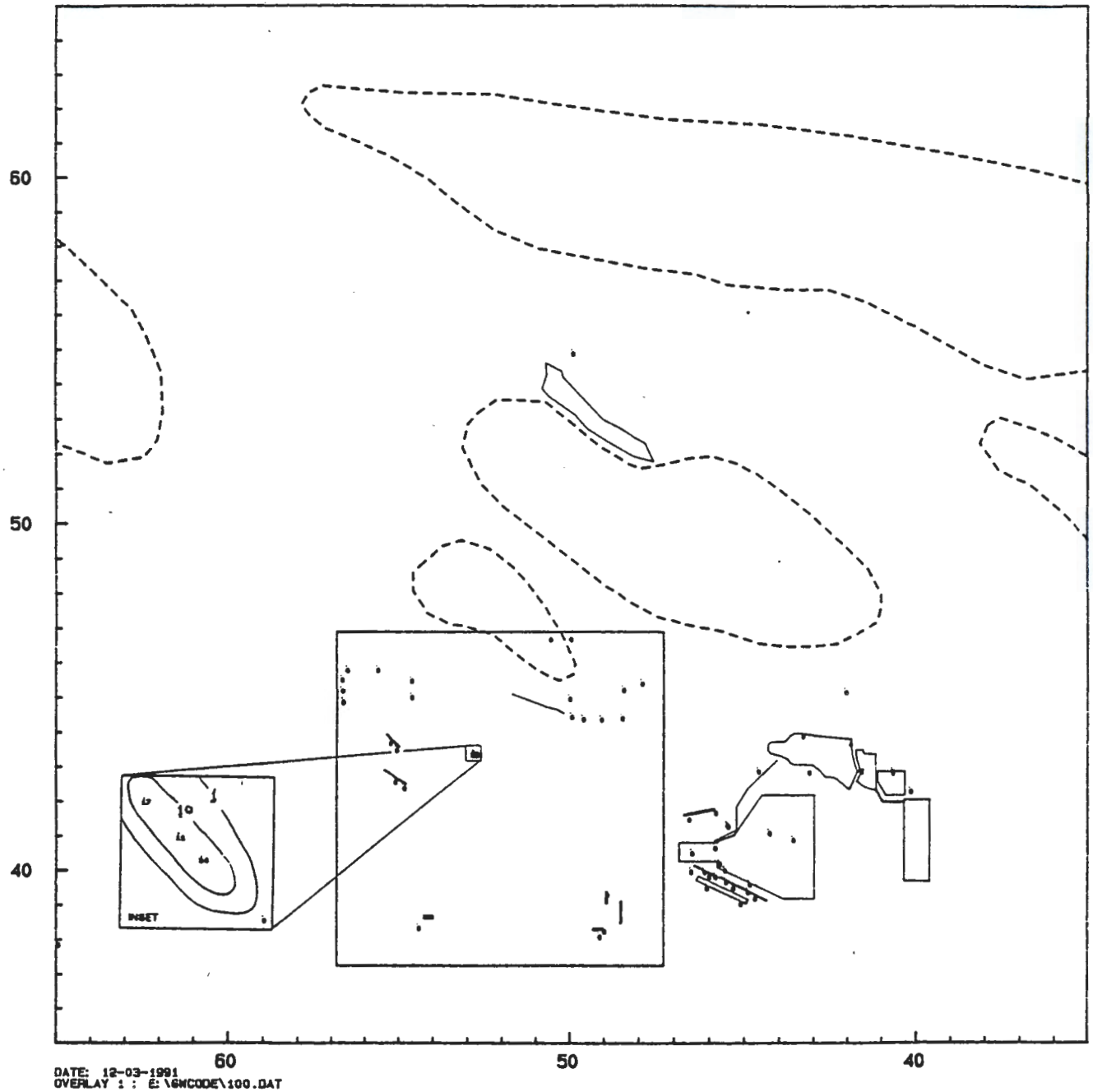
Areas where the basalt surface is generally above the water table.

Facility/area boundary.

1 - 9 pCi/L

>=10

Detection limit 1 pCi/
Drinking Water Standard 1 pCi/
Maximum Concentration Limit 1 pCi/
1/25 DCG 20 pCi/



200 AAMS
Plutonium-239/240 Plume Map
200-East Area
December 1991

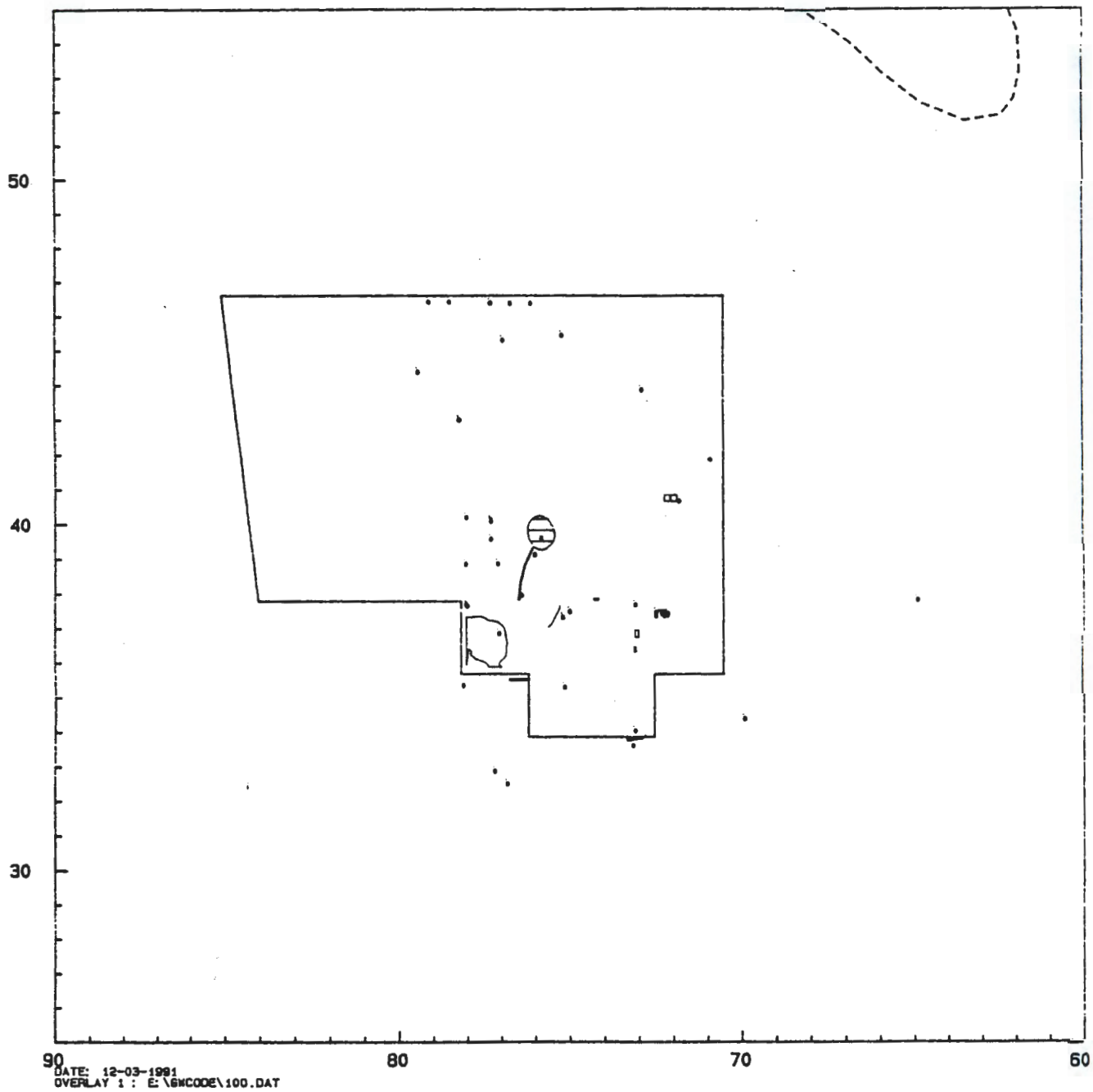
. 7 Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

Facility/area boundary.

>=1 pCi/L

Detection limit——————0.1 pCi/L
Drinking Water Standard——— 1 pCi/L
1/25 DCG——————————— 1 pCi/L



200 AAMS
Plutonium-239/240 Plume Map
200-West Area
December 1991

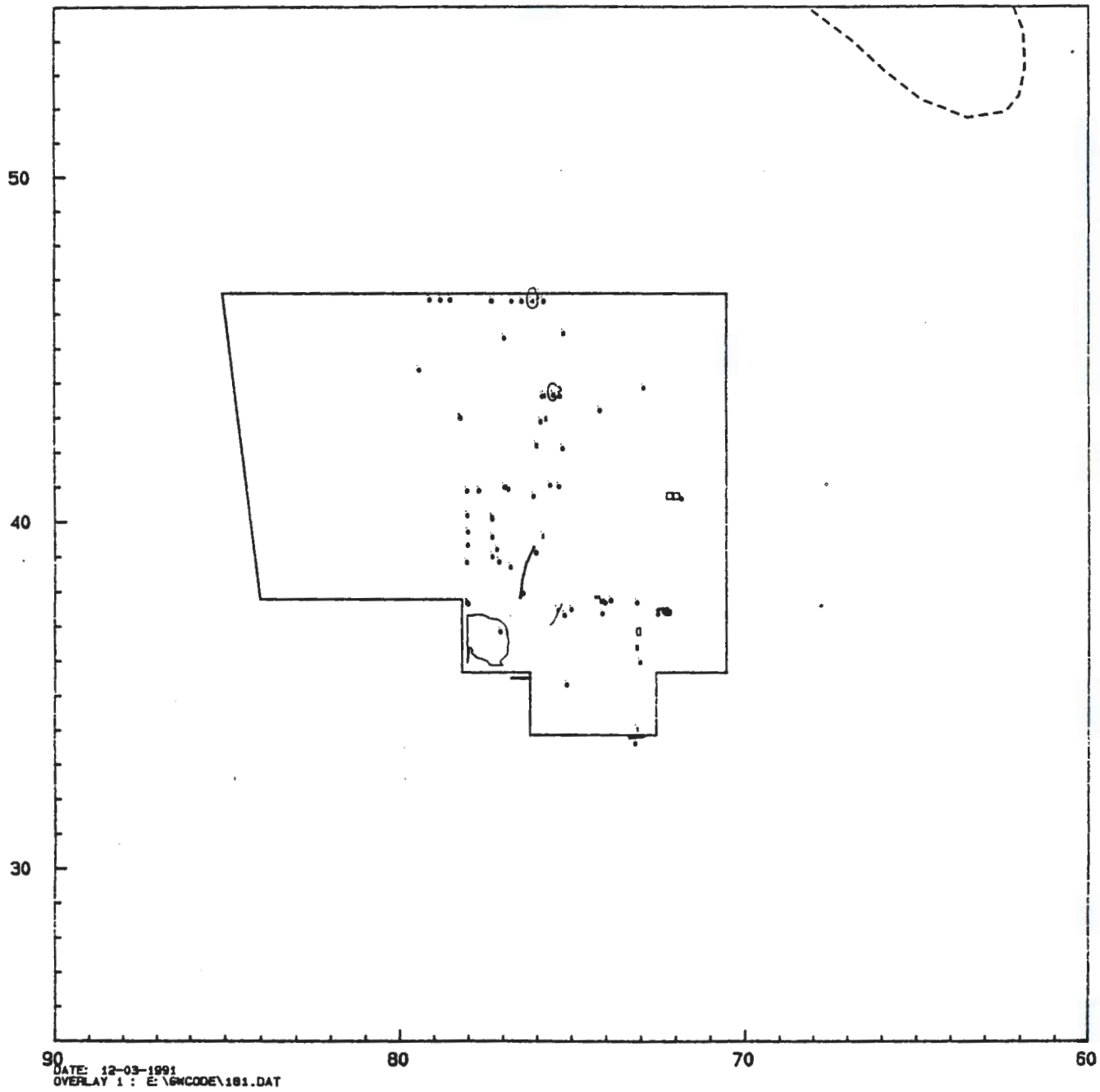
Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

Facility/area boundary.

>=1 pCi/L

Detection limit — 0.1 pCi/L
Drinking Water Standard — 1 pCi/L
1/25 DCG — 1 pCi/L



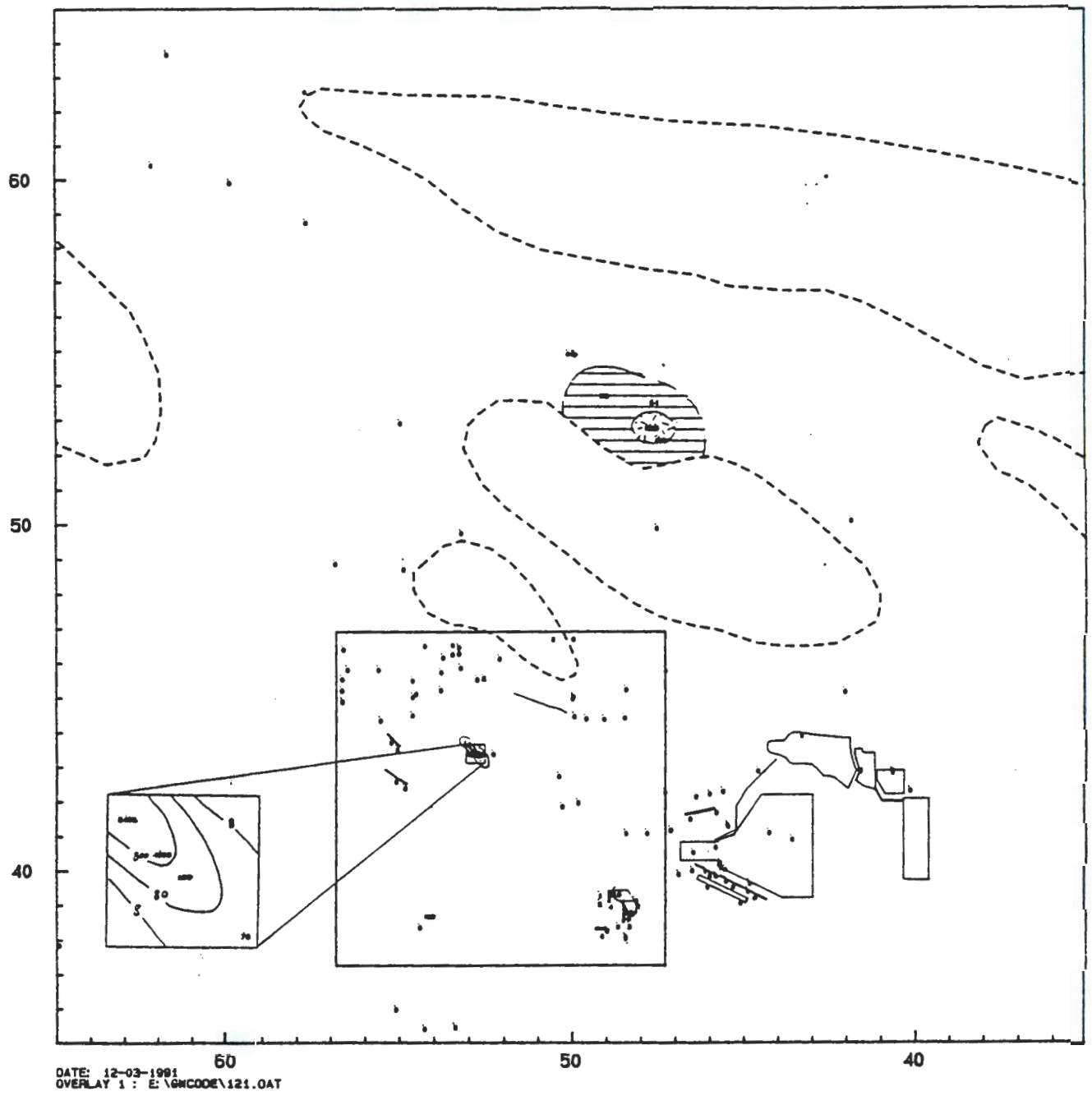
200 AAMS
Radium Detections Map
December 1991

. Monitoring well symbol
7 and analytical value.

—— —— Areas where the basalt surface is generally above the water table.

———— Facility/area boundary.

Detection limit———————— 1 pCi/L
Wa. Water Quality Standard—— 3 pCi/L
Drinking Water Standard——— 5 pCi/L
1/25 DCG————————————100 pCi/L



200 AAMS
Strontium-90 Plume Map
200-East Area
December 1991

Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

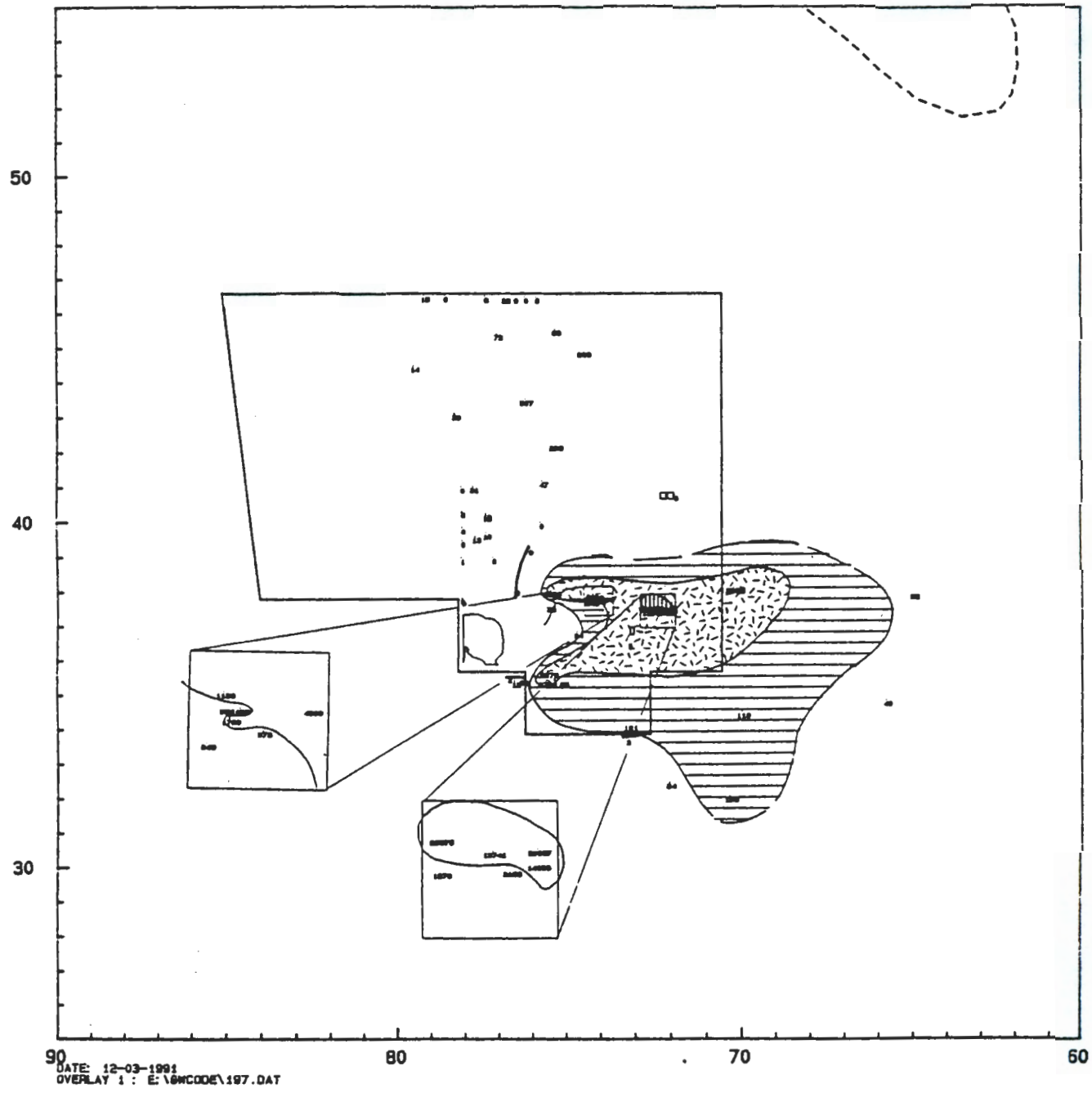
Facility/area boundary.

8 -79 pCi/L

80 - 799 pCi/L

>=800 pCi/L

Detection limit — 5 pCi/L
Wa. Water Quality Standard — 8 pCi/L
Maximum Concentration Limit — 8 pCi/L



200 AAMS
Technetium-99 Plume Map
December 1991

Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

Facility/area boundary.

100 - 999 pCi/L

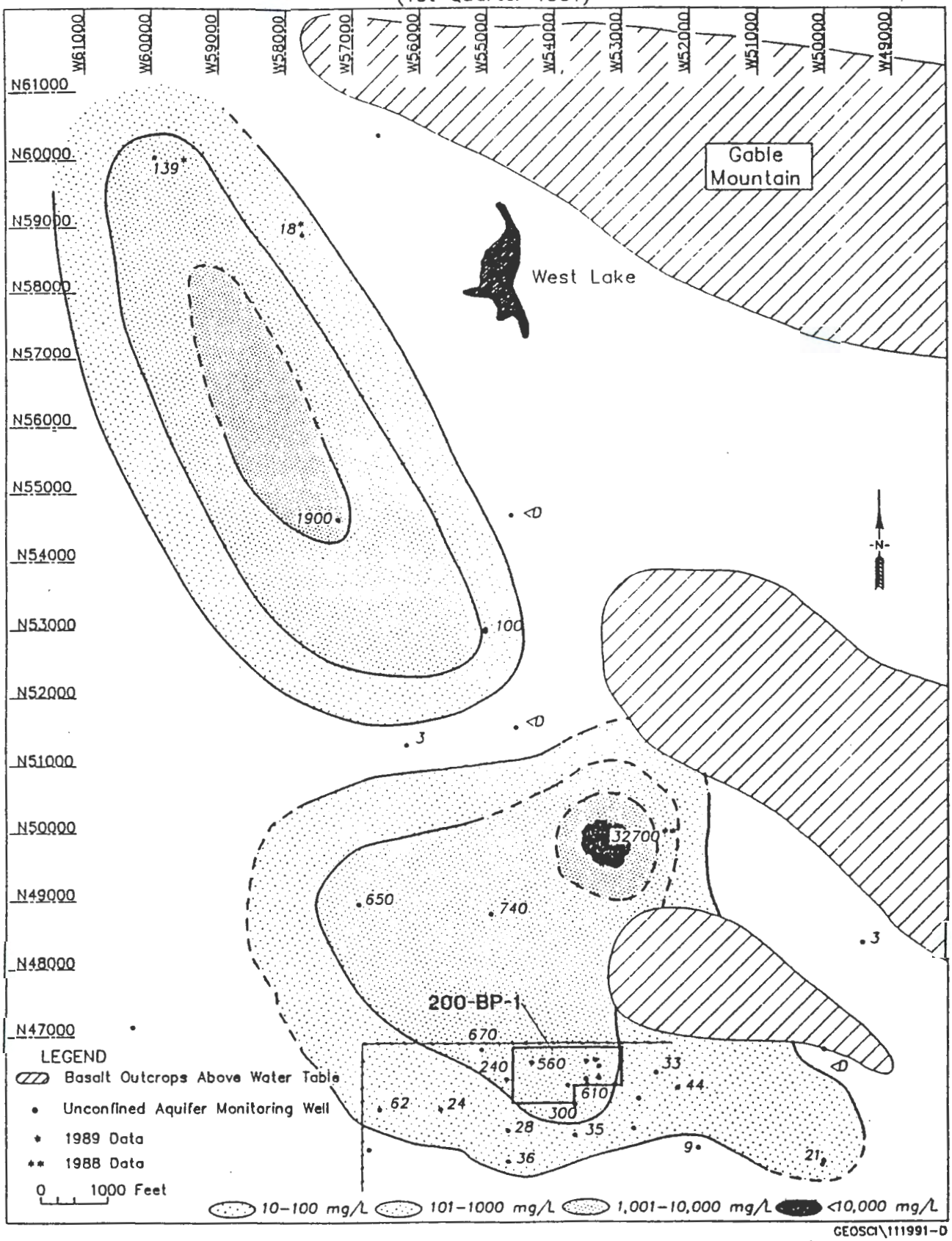
1,000 - 9,999 pCi/L

>=10,000 pCi/L

Detection limit — 15 pCi/L
Drinking Water Standard — 900 pCi/L
Maximum Concentration Limit — 900 pCi/L
1/25 DCG — 4000 pCi/L

Preliminary Plume Map - Technetium-99

(1st Quarter 1991)



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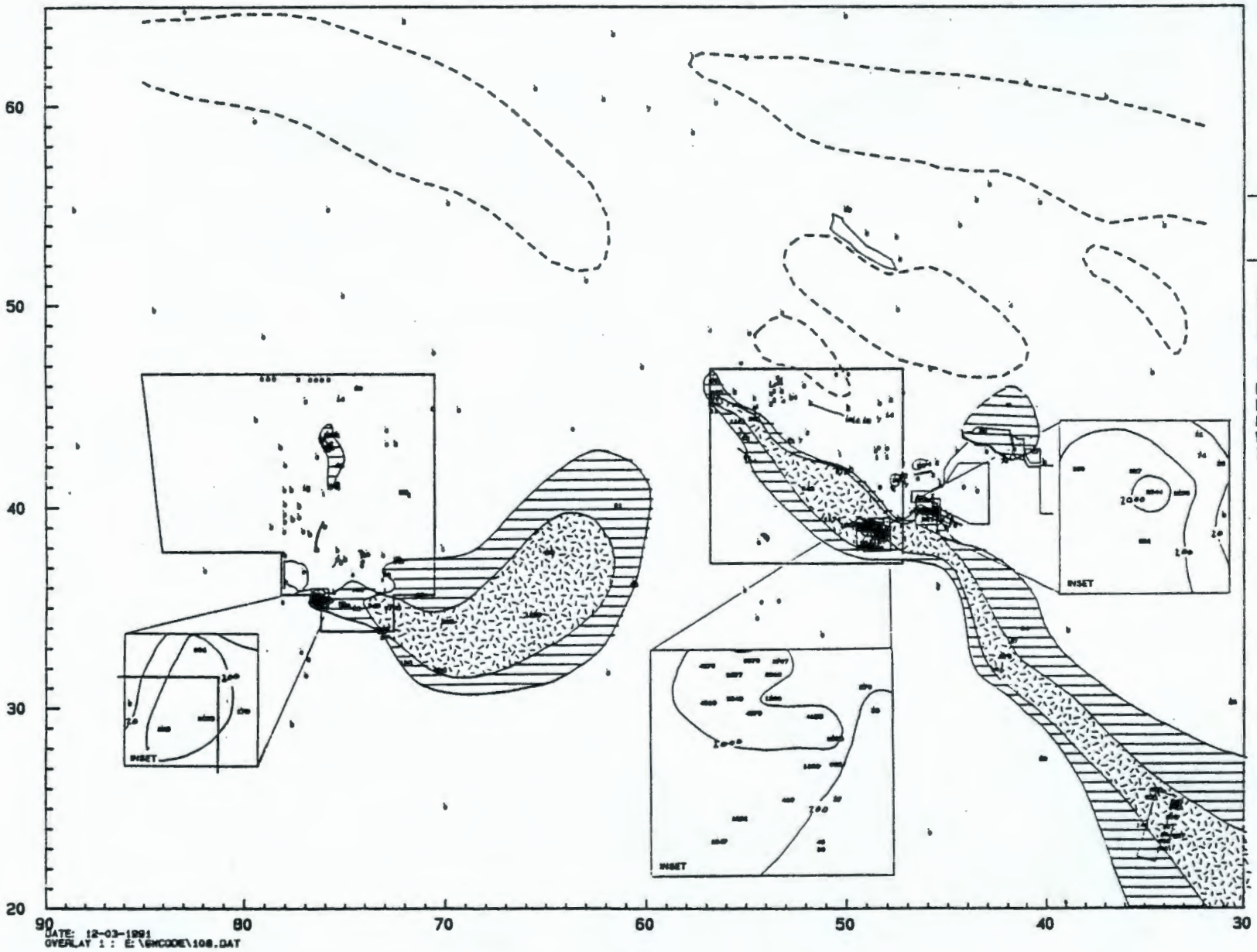


200 AAMS
Tritium Plume Map
December 1991

Monitoring well symbol and analytical value.

Areas where the basalt surface is generally above the water table.

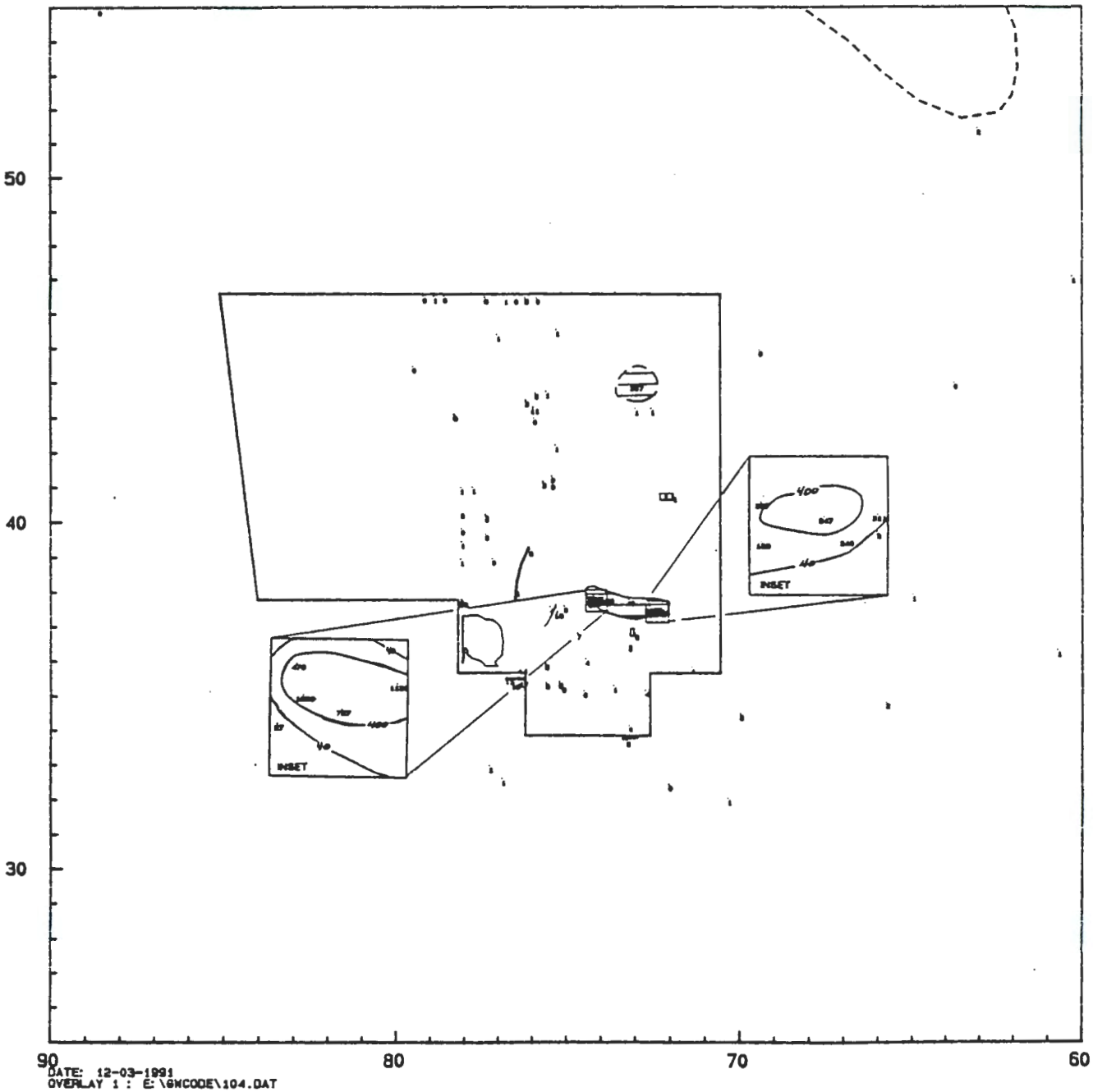
Facility/area boundary.

20 - 199 µCi/L

>200 - 1999 µCi/L

>=2000 µCi/L

Detection limit — 0.5 µCi/
Drinking Water Standard — 20 µCi/
Maximum Concentration Limit — 20 µCi/l
Wa. Water Quality Standard — 20 µCi/l
1/25 DCG — 80 µCi/l



200 AAMS
Uranium Plume Map
200-West Area
December 1991

. Monitoring well symbol
7 and analytical value.

Areas where the basalt surface is generally above the water table.

Facility/area boundary.

40 - 399 pCi/L

>=400 pCi/L

Detection limit——————0.1 pCi/L
Drinking Water Standard——— 40 pCi/L
Maximum Concentration Limit— 40 pCi/L

Appendix C

Well Selection for RLS Surveys in the S-Plant Area

This appendix presents the results of the borehole and facility evaluation that were used to select boreholes for RLS logging in the S-Plant Area. The facility data and total gamma-ray logs were reviewed by an environmental geologist and borehole geophysicist. The outcome of the evaluation process was selection of wells for the RLS survey. Since the existing data was collected under differing quality requirements, the facility and well selection was based heavily on professional judgement.

Facilities disposal or storage data and well locations were reviewed to determine if contaminant plumes existed beneath a facility and should those plumes be logged. Two criteria were used: (1) the facility should have wells that are of sufficient depth (i.e. about 100 ft) to penetrate the waste plume, and (2) the facility should have a high activity inventory relative to other facilities in the plant area. The results of this screening are presented in Table C-1.

Total gamma-ray logs for boreholes and wells in the plant area were reviewed by a logging geophysicist and radioactivity categorized into five types. The categories are: natural, probably natural, transfer line (tank farms only), possible contamination, and contamination. The categorization is tabulated in Table C-2.

Radioactive contaminated intervals were tabulated by facility and included depths to the top and bottom of the interval and the average gamma-ray activity. The results are presented in Table C-3.

The contaminated interval data and average gamma-ray activity (Table C-3) and well construction data were used with the following criteria to select wells for RLS logging in the plant area:

- Wells should be fully penetrating or a minimum depth of about 100 ft
- Wells selected should not have bentonite seal (i.e., select wells drilled prior to 1986)
- Wells should be limited to one per facility or unit (i.e., trench, tank, etc.) for a total in the plant area of no more than 10
- Wells should be in close proximity to crib distribution system or storage tank
- Wells should have contaminated interval if previously logged with total gamma-ray.

Table C-4 lists the wells selected for RLS logging and the S-Plant Area to support the 200 AAMS.

Table C-1: S-Plant aggregate area disposal facilities and RLS logging recomendations.

S-Plant

DISPOSAL FACILITY	LOG WITH RLS	COMMENTS
216-S-1 & S-2 CRIB	YES	ACTIVITY
216-S-3 FRENCH DRAIN	NO	LOW ACTIVITY
216-S-5 CRIB	YES	ACTIVITY
216-S-6 CRIB	YES	ACTIVITY
216-S-7 CRIB	YES	ACTIVITY
216-S-8 TRENCH	NO	LOW ACTIVITY
216-S-9 CRIB	YES	ACTIVITY
216-S-10D DITCH	NO	LOW ACTIVITY
216-S-10P POND	NO	LOW ACTIVITY
216-S-11 POND	NO	NO MONITORING WELLS
216-S-12 TRENCH	NO	NO LOGGING DATA
216-S-13 CRIB	YES	ACTIVITY
216-S-14 TRENCH	NO	NO MONITORING WELLS
216-S-15 POND	NO	NO MONITORINT WELLS
216-S-16D DITCH	NO	LOW ACTIVITY
216-S-16P POND	NO	NO MONITORING WELLS
216-S-17 POND	NO	NO PREVIOUS LOGGING DATA
216-S-19 POND	NO	NO PREVIOUS LOGGING DATA
216-S-23 CRIB	NO	LOW ACTIVITY
216-S-20 CRIB	YES	ACTIVITY
216-S-22 CRIB	NO	LOW ACTIVITY
216-S-25 CRIB	NO	LOW ACTIVITY
216-S-26 CRIB	NO	NO LOGGING DATA
241-S TANK FARM	YES	ACTIVITY
241-SX TANK FARM	YES	ACTIVITY

Table C-2: S Plant Aggregate Area Radioactivity Categorized by Facility and Well

Well	Tankfarm	Facility	Log Date	Category	E	N
2-W22-03					-75158	35412
2-W22-24O					-72997	35917
2-W22-24P					-72997	35917
2-W22-24Q					-72997	35917
2-W22-24R					-72997	35917
2-W22-24S					-72997	35917
2-W22-24T					-72997	35917
2-W22-27O					-74627	36203
2-W22-27P					-74627	36203
2-W22-27Q					-74627	36203
2-W22-27R					-74627	36203
2-W22-27S					-74627	36203
2-W22-51					-74150	34480
2-W22-52					-73950	34480
2-W22-53					-75955	35350
2-W22-54					-75625	35600
2-W22-55					-75625	35075
2-W22-56					-74330	34330
2-W22-57					-73750	34475
2-W22-58					-73500	34450
2-W22-59					-73170	35955
2-W22-61					-73300	34296
2-W22-63					-73260	34296
2-W22-64					-75100	35429
2-W23-006					-75550	35010
2-W23-007					-75550	35700
2-W23-229					-75620	35665
2-W26-06					-76895	32635
2-W27-01					-73242	33752
6-32-77					-77032	31812
6-35-78A					-78190	35478
6-35-78B					-78251	35498
2-W23-001	40-00-04	S Tank Farm	6/07/90	Transfer Line	-75615	35970
2-W23-012	40-10-01	S Tank Farm	10/22/91	Natural	-75625	35969
2-W23-051	40-00-02	S Tank Farm	10/11/91	Natural	-75615	36175
2-W23-052	40-02-04	S Tank Farm	10/22/91	Transfer Line	-75722	36186
2-W23-053	40-03-05	S Tank Farm	10/22/91	Natural	-75827	36186
2-W23-054	40-05-05	S Tank Farm	10/07/91	Natural	-75722	36082
2-W23-055	40-06-05	S Tank Farm	6/07/90	Natural	-75827	36082
2-W23-056	40-00-06	S Tank Farm	10/22/91	Natural	-75722	35875
2-W23-057	40-09-05	S Tank Farm	10/23/91	Natural	-75827	35980
2-W23-122	40-04-07	S Tank Farm	10/07/91	Natural	-75694	36087
2-W23-123	40-04-01	S Tank Farm	10/07/91	Natural	-75636	36161
2-W23-124	40-04-05	S Tank Farm	10/09/91	Contamination	-75631	36090
2-W23-145	40-01-01	S Tank Farm	11/12/91	Natural	-75642	36266
2-W23-146	40-01-06	S Tank Farm	11/12/91	Natural	-75665	36180
2-W23-147	40-01-08	S Tank Farm	11/12/91	Transfer line	-75707	36207
2-W23-148	40-02-01	S Tank Farm	11/12/91	Natural	-75744	36266

Table C-2: S Plant Aggregate Area Radioactivity Categorized by Facility and Well

Well	Tankfarm	Facility	Log Date	Category	E	N
2-W23-149	40-02-07	S Tank Farm	11/12/91	Natural	-75783	36183
2-W23-150	40-02-10	S Tank Farm	11/12/91	Natural	-75810	36242
2-W23-151	40-03-01	S Tank Farm	11/12/91	Natural	-75846	36266
2-W23-152	40-03-06	S Tank Farm	11/12/91	Natural	-75885	36183
2-W23-153	40-03-09	S Tank Farm	11/12/91	Natural	-75912	36242
2-W23-154	40-05-03	S Tank Farm	10/07/91	Possible Contamination	-75724	36140
2-W23-155	40-05-07	S Tank Farm	11/12/91	Natural	-75783	36081
2-W23-156	40-05-10	S Tank Farm	11/12/91	Natural	-75810	36140
2-W23-157	40-06-02	S Tank Farm	11/12/91	Natural	-75837	36156
2-W23-158	40-06-06	S Tank Farm	11/12/91	Natural	-75885	36081
2-W23-159	40-06-09	S Tank Farm	11/12/91	Natural	-75912	36140
2-W23-160	40-07-01	S Tank Farm	11/12/91	Natural	-75642	36062
2-W23-161	40-07-06	S Tank Farm	11/12/91	Natural	-75663	35972
2-W23-162	40-07-10	S Tank Farm	11/12/91	Natural	-75705	36045
2-W23-163	40-08-06	S Tank Farm	11/13/91	Natural	-75767	35979
2-W23-164	40-08-09	S Tank Farm	11/12/91	Natural	-75813	36026
2-W23-165	40-09-02	S Tank Farm	11/12/91	Natural	-75837	36054
2-W23-166	40-09-06	S Tank Farm	11/12/91	Natural	-75877	35977
2-W23-167	40-09-09	S Tank Farm	11/12/91	Natural	-75912	36038
2-W23-168	40-10-03	S Tank Farm	11/13/91	Natural	-75619	35924
2-W23-169	40-10-06	S Tank Farm	11/13/91	Natural	-75665	35874
2-W23-170	40-10-09	S Tank Farm	11/13/91	Natural	-75711	35924
2-W23-171	40-11-01	S Tank Farm	11/13/91	Natural	-75744	35960
2-W23-172	40-11-07	S Tank Farm	11/13/91	Natural	-75783	35877
2-W23-173	40-11-09	S Tank Farm	11/13/91	Natural	-75810	35936
2-W23-174	40-12-02	S Tank Farm	11/13/91	Natural	-75837	35952
2-W23-175	40-12-06	S Tank Farm	11/13/91	Natural	-75869	35874
2-W23-176	40-12-09	S Tank Farm	11/13/91	Natural	-75915	35924
2-W23-177	40-04-08	S Tank Farm	10/07/91	Transfer Line	-75698	36091
2-W23-178	40-08-01	S Tank Farm	11/12/91	Natural	-75747	36072
2-W23-179	40-01-04	S Tank Farm	11/12/91	Natural	-75620	36214
2-W23-180	40-01-10	S Tank Farm	11/12/91	Natural	-75695	36266
2-W23-181	40-02-05	S Tank Farm	11/12/91	Natural	-75753	36183
2-W23-182	40-02-11	S Tank Farm	11/12/91	Natural	-75786	36271
2-W23-183	40-03-08	S Tank Farm	11/12/91	Natural	-75910	36200
2-W23-184	40-03-11	S Tank Farm	11/12/91	Natural	-75885	36271
2-W23-185	40-07-04	S Tank Farm	11/12/91	Natural	-75620	36012
2-W23-186	40-07-08	S Tank Farm	11/12/91	Natural	-75709	36000
2-W23-187	40-07-11	S Tank Farm	11/12/91	Transfer Line	-75678	36068
2-W23-188	40-02-03	S Tank Farm	11/14/91	Contamination	-75726	36249
2-W23-189	40-02-08	S Tank Farm	10/22/91	Possible Contamination	-75815	36204
2-W23-199	40-05-08	S Tank Farm	11/12/91	Natural	-75819	36111
2-W23-200	40-09-01	S Tank Farm	11/12/91	Natural	-75859	36072
2-W23-201	40-06-08	S Tank Farm	11/12/91	Natural	-75910	36102
2-W23-202	40-08-08	S Tank Farm	11/12/91	Natural	-75799	35990
2-W23-203	40-09-08	S Tank Farm	11/12/91	Natural	-75907	35995
2-W23-204	40-10-05	S Tank Farm	11/13/91	Natural	-75632	35880
2-W23-205	40-10-08	S Tank Farm	11/13/91	Natural	-75687	35882
2-W23-206	40-11-05	S Tank Farm	11/13/91	Natural	-75747	35875
2-W23-207	40-11-08	S Tank Farm	11/13/91	Natural	-75815	35900
2-W23-208	40-12-07	S Tank Farm	11/13/91	Natural	-75901	35885

Table C-2: S Plant Aggregate Area Radioactivity Categorized by Facility and Well

Well	Tankfarm	Facility	Log Date	Category	E	N
2-W23-212	40-03-03	S Tank Farm	11/12/91	Natural	-75823	36228
2-W23-213	40-06-04	S Tank Farm	11/12/91	Natural	-75829	36101
2-W23-216	40-08-12	S Tank Farm	11/12/91	Natural	-75767	36070
2-W23-218	40-10-13	S Tank Farm	11/13/91	Natural	-75642	35959
2-W23-220	40-12-04	S Tank Farm	11/13/91	Natural	-75829	35897
2-W22-01		S-1 : S-2	7/09/79	Contamination	-75208	35455
2-W22-02		S-1 : S-2	7/09/79	Contamination	-75221	35429
2-W22-11		S-1 : S-2	2/25/86	Contamination	-75277	35450
2-W22-05		S-1 Crib	2/25/86	Natural	-75034	35411
2-W22-06		S-1 Crib	2/25/86	Contamination	-73380	35412
2-W22-10		S-1 Crib	3/23/87	Natural	-75115	35314
2-W22-15		S-1 Crib	8/20/87	Contamination	-75182	35507
2-W22-16		S-1 Crib	8/20/87	Natural	-75209	35335
2-W22-17		S-1 Crib	8/20/87	Natural	-75082	35534
2-W22-18		S-1 Crib	2/25/86	Contamination	-75094	35429
2-W22-29		S-1 Crib	2/04/86	Contamination	-75195	35428
2-W22-30		S-1 Crib	6/03/80	Contamination	-75165	35411
2-W22-31		S-1 Crib	2/14/86	Contamination	-75198	35446
2-W22-36		S-1 Crib	2/04/86	Contamination	-75221	35455
2-W22-67		S-1 Crib	8/20/87	Contamination	-75200	35400
2-W26-11		S-10 Ditch	4/13/90	Natural	-75493	33527
2-W26-09		S-10 Pond	4/13/90	Natural	-76801	32049
2-W22-07		S-12 : U-12			-73630	35337
2-W22-21		S-13 Crib	2/23/76	Contamination	-74600	34600
2-W22-04		S-2 : W-9			-74853	35408
2-W22-20		S-20 Crib	5/13/76	Natural	-73182	34175
2-W22-74		S-20 Crib	2/12/87	Contamination	-73330	34330
2-W22-08		S-22 : U-12			-72710	35409
2-W22-09		S-22 : U-12			-72710	35200
2-W22-19		S-22 Crib	3/14/84	Natural	-73099	34508

Table C-2: S Plant Aggregate Area Radioactivity Categorized by Facility and Well

Well	Tankfarm	Facility	Log Date	Category	E	N
2-W19-05		S-23 Crib	5/13/76	Natural	-74685	36850
2-W19-06		S-23 Crib	5/13/76	Probably Natural	-74710	36850
2-W22-37		S-23 Crib	5/13/76	Natural	-74845	36800
2-W22-38		S-23 Crib	5/13/76	Natural	-74670	36700
2-W23-009		S-25 Crib	2/23/76	Surface	-76300	35480
2-W23-010		S-25 Crib	5/18/76	Natural	-76535	35420
2-W23-011		S-25 Crib	5/18/76	Natural	-76725	35560
2-W26-08		S-5 : S-6	5/29/90	Natural	-76293	33474
2-W18-216		S-5 Crib			-76440	33235
2-W26-01		S-5 Crib	5/18/76	Contamination	-77493	33211
2-W26-03		S-5 Crib	5/18/76	Natural	-77269	33006
2-W26-04		S-5 Crib	5/18/76	Natural	-77201	32945
2-W26-05		S-5 Crib	5/18/76	Natural	-77223	32964
2-W26-02		S-6 Crib	5/18/76	Natural	-77500	33300
2-W26-51		S-6 Crib	8/20/87	Contamination	-77710	33240
2-W22-12		S-7 Crib	2/23/76	Contamination	-74499	35180
2-W22-13		S-7 Crib	8/20/87	Contamination	-74671	35140
2-W22-14		S-7 Crib	2/12/87	Contamination	-74513	35120
2-W22-32		S-7 Crib	5/03/79	Contamination	-74540	35151
2-W22-33		S-7 Crib	8/20/87	Contamination	-74600	35135
2-W22-25		S-9 Crib	8/19/87	Contamination	-74504	35901
2-W22-26		S-9 Crib	5/14/76	Contamination	-74450	36100
2-W22-27		S-9 Crib			-74627	36203
2-W22-34		S-9 Crib	8/19/87	Contamination	-74465	36105
2-W22-35		S-9 Crib	8/19/87	Natural	-74610	36200
2-W22-39		SX Tank Farm	2/14/91	Natural	-75442	35276
2-W23-002	41-00-03	SX Tank Farm	10/07/91	Natural	-75604	35425
2-W23-003	41-00-05	SX Tank Farm	6/19/91	Natural	-75614	35110
2-W23-005	41-00-04	SX Tank Farm	6/19/91	Natural	-75550	35200
2-W23-008		SX Tank Farm	5/18/76	Surface	-76100	35520
2-W23-014		SX Tank Farm	1/21/91	Natural	-76082	35529
2-W23-058	41-06-11	SX Tank Farm	10/21/91	Natural	-75900	35501
2-W23-059	41-02-07	SX Tank Farm	11/11/91	Natural	-75808	35520
2-W23-060	41-01-07	SX Tank Farm	10/21/91	Possible Contamination	-75665	35520
2-W23-061	41-00-02	SX Tank Farm	10/07/91	Natural	-75600	35520
2-W23-062	41-04-07	SX Tank Farm	11/11/91	Natural	-75695	35405
2-W23-064	41-11-10	SX Tank Farm	6/20/91	Contamination	-75810	35287

Table C-2: S Plant Aggregate Area Radioactivity Categorized by Facility and Well

Well	Tankfarm	Facility	Log Date	Category	E	N
2-W23-065	41-00-08	SX Tank Farm	10/21/91	Contamination	-75923	35297
2-W23-066	41-10-02	SX Tank Farm	6/19/91	Natural	-75614	35271
2-W23-067	41-10-10	SX Tank Farm	6/19/91	Natural	-75710	35273
2-W23-068	41-12-04	SX Tank Farm	6/19/91	Natural	-75829	35206
2-W23-069	41-14-04	SX Tank Farm	6/19/91	Natural	-75737	35102
2-W23-070	41-15-07	SX Tank Farm	6/19/91	Contamination	-75894	35099
2-W23-072	41-13-10	SX Tank Farm	6/19/91	Natural	-75705	35177
2-W23-073	41-07-12	SX Tank Farm	11/11/91	Natural	-75668	35397
2-W23-074	41-07-02	SX Tank Farm	10/14/91	Natural	-75631	35383
2-W23-075	41-07-03	SX Tank Farm	6/19/91	Possible Contamination	-75617	35344
2-W23-076	41-07-05	SX Tank Farm	6/20/91	Contamination	-75639	35308
2-W23-077	41-07-07	SX Tank Farm	6/20/91	Contamination	-75681	35302
2-W23-078	41-07-08	SX Tank Farm	6/19/91	Contamination	-75711	35332
2-W23-079	41-07-10	SX Tank Farm	6/19/91	Natural	-75706	35374
2-W23-080	41-10-01	SX Tank Farm	6/19/91	Possible Contamination	-75645	35290
2-W23-081	41-10-03	SX Tank Farm	6/19/91	Possible Contamination	-75617	35242
2-W23-082	41-10-05	SX Tank Farm	6/19/91	Natural	-75638	35206
2-W23-083	41-10-06	SX Tank Farm	6/19/91	Natural	-75675	35199
2-W23-084	41-10-08	SX Tank Farm	6/19/91	Natural	-75709	35227
2-W23-085	41-10-11	SX Tank Farm	6/19/91	Natural	-75690	35287
2-W23-086	41-14-03	SX Tank Farm	6/19/91	Natural	-75720	35131
2-W23-087	41-14-06	SX Tank Farm	6/19/91	Natural	-75773	35096
2-W23-088	41-14-08	SX Tank Farm	6/19/91	Natural	-75803	35112
2-W23-089	41-14-09	SX Tank Farm	6/19/91	Contamination	-75815	35151
2-W23-090	41-14-11	SX Tank Farm	6/19/91	Natural	-75796	35182
2-W23-091	41-14-02	SX Tank Farm	6/19/91	Natural	-75730	35175
2-W23-092	41-11-05	SX Tank Farm	6/19/91	Natural	-75736	35209
2-W23-093	41-11-06	SX Tank Farm	6/19/91	Natural	-75767	35194
2-W23-094	41-11-08	SX Tank Farm	6/19/91	Natural	-75805	35217
2-W23-095	41-11-09	SX Tank Farm	6/19/91	Natural	-75814	35253
2-W23-096	41-11-02	SX Tank Farm	6/19/91	Natural	-75741	35286
2-W23-097	41-11-03	SX Tank Farm	6/19/91	Natural	-75719	35253
2-W23-098	41-08-04	SX Tank Farm	6/19/91	Contamination	-75731	35316
2-W23-099	41-08-06	SX Tank Farm	6/19/91	Natural	-75767	35300
2-W23-100	41-08-07	SX Tank Farm	6/20/91	Contamination	-75804	35318
2-W23-101	41-08-11	SX Tank Farm	6/20/91	Contamination	-75789	35391
2-W23-102	41-08-02	SX Tank Farm	6/19/91	Contamination	-75744	35390
2-W23-103	41-08-03	SX Tank Farm	6/19/91	Natural	-75719	35355
2-W23-104	41-09-03	SX Tank Farm	6/20/91	Contamination	-75812	35356
2-W23-105	41-09-04	SX Tank Farm	5/02/78	Contamination	-75833	35317
2-W23-106	41-09-06	SX Tank Farm	6/19/91	Transfer Line	-75872	35297
2-W23-107	41-09-07	SX Tank Farm	6/20/91	Contamination	-75907	35319
2-W23-108	41-09-09	SX Tank Farm	10/21/91	Contamination	-75915	35360
2-W23-109	41-09-11	SX Tank Farm	6/19/91	Natural	-75889	35392
2-W23-110	41-09-02	SX Tank Farm	6/19/91	Transfer Line	-75847	35391
2-W23-111	41-12-02	SX Tank Farm	6/20/91	Contamination	-75832	35277
2-W23-112	41-12-03	SX Tank Farm	6/21/91	Contamination	-75824	35229
2-W23-113	41-12-06	SX Tank Farm	6/19/91	Natural	-75865	35195
2-W23-114	41-12-07	SX Tank Farm	6/19/91	Natural	-75895	35206
2-W23-115	41-12-09	SX Tank Farm	6/19/91	Transfer Line	-75915	35234
2-W23-116	41-12-10	SX Tank Farm	6/19/91	Natural	-75909	35272

Table C-2: S Plant Aggregate Area Radioactivity Categorized by Facility and Well

Well	Tankfarm	Facility	Log Date	Category	E	N
2-W23-117	41-15-02	SX Tank Farm	6/19/91	Natural	-75827	35168
2-W23-118	41-15-03	SX Tank Farm	6/19/91	Natural	-75824	35126
2-W23-119	41-15-05	SX Tank Farm	6/19/91	Natural	-75854	35098
2-W23-120	41-15-09	SX Tank Farm	6/21/91	Natural	-75916	35134
2-W23-121	41-15-10	SX Tank Farm	6/21/91	Natural	-75904	35177
2-W23-125	41-05-05	SX Tank Farm	11/11/91	Natural	-75750	35405
2-W23-126	41-05-07	SX Tank Farm	11/11/91	Natural	-75792	35410
2-W23-127	41-05-08	SX Tank Farm	11/11/91	Possible Contamination	-75817	35444
2-W23-128	41-05-10	SX Tank Farm	11/11/91	Possible Contamination	-75809	35475
2-W23-129	41-05-12	SX Tank Farm	11/11/91	Possible Contamination	-75760	35498
2-W23-130	41-05-02	SX Tank Farm	11/11/91	Possible Contamination	-75726	35475
2-W23-131	41-05-03	SX Tank Farm	11/11/91	Possible Contamination	-75720	35440
2-W23-132	41-01-01	SX Tank Farm	11/11/91	Possible Contamination	-75643	35590
2-W23-133	41-01-06	SX Tank Farm	11/11/91	Contamination	-75665	35508
2-W23-134	41-01-08	SX Tank Farm	11/11/91	Possible Contamination	-75705	35534
2-W23-135	41-02-02	SX Tank Farm	11/11/91	Contamination	-75745	35590
2-W23-136	41-02-08	SX Tank Farm	11/11/91	Possible Contamination	-75811	35548
2-W23-137	41-03-12	SX Tank Farm	11/11/91	Possible Contamination	-75869	35596
2-W23-138	41-03-06	SX Tank Farm	11/11/91	Natural	-75869	35508
2-W23-139	41-03-09	SX Tank Farm	11/11/91	Natural	-75913	35548
2-W23-140	41-04-01	SX Tank Farm	11/11/91	Natural	-75641	35488
2-W23-141	41-04-11	SX Tank Farm	11/11/91	Possible Contamination	-75689	35483
2-W23-142	41-06-02	SX Tank Farm	11/11/91	Possible Contamination	-75847	35488
2-W23-143	41-06-05	SX Tank Farm	11/11/91	Possible Contamination	-75838	35419
2-W23-144	41-06-09	SX Tank Farm	11/11/91	Natural	-75913	35446
2-W23-190	41-01-04	SX Tank Farm	11/11/91	Natural	-75628	35527
2-W23-191	41-01-10	SX Tank Farm	11/11/91	Possible Contamination	-75711	35567
2-W23-192	41-01-11	SX Tank Farm	11/11/91	Natural	-75680	35592
2-W23-193	41-02-11	SX Tank Farm	11/11/91	Possible Contamination	-75795	35590
2-W23-194	41-03-02	SX Tank Farm	11/11/91	Possible Contamination	-75832	35578
2-W23-195	41-03-05	SX Tank Farm	11/11/91	Possible Contamination	-75833	35520
2-W23-196	41-03-10	SX Tank Farm	11/11/91	Possible Contamination	-75900	35582
2-W23-197	41-04-03	SX Tank Farm	11/11/91	Contamination	-75616	35452
2-W23-198	41-04-05	SX Tank Farm	11/11/91	Natural	-75639	35412
2-W23-223	41-02-05	SX Tank Farm	11/11/91	Possible Contamination	-75747	35509
2-W23-225	41-04-08	SX Tank Farm	11/11/91	Natural	-75704	35427
2-W23-226	41-06-06	SX Tank Farm	11/11/91	Possible Contamination	-75869	35404
2-W23-227	41-06-23	SX Tank Farm	11/11/91	Natural	-75891	35489
2-W22-24		U-12 Crib			-72998	35917

Table C-3: S Plant Contamination Intervals and Average Gamma Activity

Well	Site	Category	Top1	Base	Value1	Top2	Base	Value2	Top3	Base	Value3	Top4	Base	Value4	Top5	Base	Value5	Top6	Base	Value6
2-W23-124	S Tank Farm	Contamination	2	37	2	37	49	17000	49	63	60	63	132	2						
2-W23-154	S Tank Farm	Possible Contamination	2	5	65	5	34	24	34	41	40	41	48	19	48	99	28			
2-W23-188	S Tank Farm	Contamination	0	18	5	18	38	24000	38	95	3									
2-W23-189	S Tank Farm	Possible Contamination	2	7	90	7	52	28	52	56	60	56	76	19	76	99	29			
2-W22-01	S-1 : S-2	Contamination	3	24	150	24	40	99999	40	80	45000	80	184	7500	184	191	40000	191	228	450
2-W22-02	S-1 : S-2	Contamination	3	24	150	24	36	99999	36	60	42000	60	186	6000	186	200	43000	200	285	70
2-W22-11	S-1 : S-2	Contamination	2	41	90	41	46	3000	46	80	170	80	142	115	142	303	80			
2-W22-06	S-1 Crib	Contamination	1	45	85	45	48	270	48	195	105									
2-W22-15	S-1 Crib	Contamination	3	45	50	45	70	9000	70	210	65									
2-W22-18	S-1 Crib	Contamination	3	44	90	44	70	8000	70	272	100									
2-W22-29	S-1 Crib	Contamination	2	27	15000	27	44	99999	44	84	25000	84	117	1000	117	160	12000			
2-W22-30	S-1 Crib	Contamination	3	30	30000	30	72	99999	72	172	30000	72	200	10000						
2-W22-31	S-1 Crib	Contamination	3	30	6000	30	63	99999	63	138	25000	138	214	9000	224	230	4000	230	249	400
2-W22-36	S-1 Crib	Contamination	3	23	700	23	53	99999	53	96	22000	96	122	9000	122	179	3000	179	204	400
2-W22-67	S-1 Crib	Contamination	4	38	95	38	52	4500	52	107	115									
2-W22-21	S-13 Crib	Contamination	3	33	50	33	40	330	40	144	95	144	201	60	201	216	120			
2-W22-74	S-20 Crib	Contamination	6	36	140	36	40	300	40	173	85									
2-W26-01	S-5 Crib	Contamination	3	61	42000	61	55	90												
2-W26-51	S-6 Crib	Contamination	1	22	30000	22	29	1200	29	51	25000	51	81	170	81	98	90			

Table C-3: S Plant Contamination Intervals and Average Gamma Activity

Well	Site	Category	Top1	Base	Value1	Top2	Base	Value2	Top3	Base	Value3	Top4	Base	Value4	Top5	Base	Value5	Top6	Base	Value6
2-W22-12	S-7 Crib	Contamination	4	18	45	18	50	6000	50	120	2500	120	155	400	155	194	70	194	203	200
2-W22-13	S-7 Crib	Contamination	3	16	50	16	41	1100	41	78	140	78	213	70						
2-W22-14	S-7 Crib	Contamination	5	22	70	22	42	5000	42	128	70	128	132	170	132	247	60			
2-W22-32	S-7 Crib	Contamination	2	14	300	14	59	45000	59	114	500	114	192	350	192	208	70			
2-W22-33	S-7 Crib	Contamination	2	14	150	14	49	30000	49	81	800	81	140	110	140	205	60			
2-W22-25	S-9 Crib	Contamination	2	25	55	25	64	35000	64	242	70									
2-W22-26	S-9 Crib	Contamination	5	40	85	40	78	30000	78	134	250	134	152	3000	152	204	150	204	286	1100
2-W22-34	S-9 Crib	Contamination	4	24	60	24	31	25000	31	41	2000	41	68	130	68	211	80			
2-W23-060	SX Tank Farm	Possible Contamination	2	9	280	9	99	26												
2-W23-064	SX Tank Farm	Contamination	0	60	2	60	75	15000	75	78	6	78	86	80	86	124	2			
2-W23-065	SX Tank Farm	Contamination	2	64	25	64	71	170	71	77	30	77	82	360	82	123	32			
2-W23-070	SX Tank Farm	Contamination	2	55	21	55	62	300	62	123	24									
2-W23-075	SX Tank Farm	Possible Contamination	2	6	29	6	11	70	11	51	25	51	64	22	64	74	32			
2-W23-076	SX Tank Farm	Contamination	0	54	0	54	61	4000	61	73	0									
2-W23-077	SX Tank Farm	Contamination	0	56	0	56	70	9000	70	73	0									
2-W23-078	SX Tank Farm	Contamination	2	54	22	54	64	20000	64	75	25									
2-W23-080	SX Tank Farm	Possible Contamination	2	64	21	64	69	70	69	133	31									
2-W23-081	SX Tank Farm	Possible Contamination	2	9	38	9	62	23	62	74	32									
2-W23-089	SX Tank Farm	Contamination	2	62	24	62	67	75	67	74	26									
2-W23-098	SX Tank Farm	Contamination	2	20	22	20	25	100	25	75	23									
2-W23-100	SX Tank Farm	Contamination	0	62	0	62	72	5000												
2-W23-101	SX Tank Farm	Contamination	0	50	0	50	63	6000	63	73	0									
2-W23-102	SX Tank Farm	Contamination	2	51	4	51	61	11000	61	73	5									
2-W23-104	SX Tank Farm	Contamination	0	61	0	61	72	5000												
2-W23-105	SX Tank Farm	Contamination	0	18	0	18	20	2	20	57	0	57	72	100	72	89	20000	89	105	25
2-W23-107	SX Tank Farm	Contamination	0	58	2	58	73	20000												
2-W23-108	SX Tank Farm	Contamination	2	63	21	63	80	55000	80	127	29									
2-W23-111	SX Tank Farm	Contamination	1	69	0	69	94	1000	94	100	3	100	107	30	107	120	1	120	123	35
2-W23-112	SX Tank Farm	Contamination	2	60	4	60	73	20000	73	74	4									
2-W23-127	SX Tank Farm	Possible Contamination	2	15	60000	15	83	22	83	123	28									

Table C-3: S Plant Contamination Intervals and Average Gamma Activity

Well	Site	Category	Top1	Base	Value1	Top2	Base	Value2	Top3	Base	Value3	Top4	Base	Value4	Top5	Base	Value5	Top6	Base	Value6
2-W23-128	SX Tank Farm	Possible Contamination	2	7	70	7	76	23	76	123	28									
2-W23-129	SX Tank Farm	Possible Contamination	2	7	90	7	123	28												
2-W23-130	SX Tank Farm	Possible Contamination	2	17	65	17	124	30												
2-W23-131	SX Tank Farm	Possible Contamination	2	12	100	12	21	40	21	66	24	66	122	30						
2-W23-132	SX Tank Farm	Possible Contamination	2	14	53	14	17	120	17	60	24	60	137	32						
2-W23-133	SX Tank Farm	Contamination	2	18	5500	18	31	32	31	37	50	37	95	28						
2-W23-134	SX Tank Farm	Possible Contamination	2	7	70	7	66	24	66	97	33									
2-W23-135	SX Tank Farm	Contamination	2	22	350	22	45	30	45	55	130	55	137	30						
2-W23-136	SX Tank Farm	Possible Contamination	2	21	65	21	46	22	46	52	50	52	73	22	73	97	28			
2-W23-137	SX Tank Farm	Possible Contamination	2	11	120	11	74	23	74	137	31									
2-W23-141	SX Tank Farm	Possible Contamination	2	8	400	8	67	23	67	100	32									
2-W23-142	SX Tank Farm	Possible Contamination	2	6	40	6	12	280	12	32	30	32	96	22						
2-W23-143	SX Tank Farm	Possible Contamination	2	5	60	5	84	20	84	138	26									
2-W23-191	SX Tank Farm	Possible Contamination	2	4	60	4	64	25	64	98	28									
2-W23-193	SX Tank Farm	Possible Contamination	2	16	140	16	31	44	31	67	23	67	97	28						
2-W23-194	SX Tank Farm	Possible Contamination	2	8	3500	8	18	54	18	60	31	60	97	24						
2-W23-195	SX Tank Farm	Possible Contamination	2	24	60	24	77	23	77	98	28									
2-W23-196	SX Tank Farm	Possible Contamination	2	14	110	14	82	21	82	96	27									
2-W23-197	SX Tank Farm	Contamination	2	18	25	18	25	550	25	58	24	58	99	31						
2-W23-223	SX Tank Farm	Possible Contamination	2	23	190	23	77	23	77	123	30									
2-W23-226	SX Tank Farm	Possible Contamination	2	11	70	11	84	20	84	122	28									

TABLE C-4: Selected RLS Survey Wells for S Plant

Well	Tank farm Well	Disposal Site	Drill Date	Drill Depth
299-W22-021		S-13 Crib	9/30/57	218
299-W22-026		S-9 Crib	12/31/63	282
299-W22-031		S-1 & 2 Crib	4/30/66	250
299-W22-032		S-7 Crib	5/31/66	210
299-W22-074		S-20 Crib	12/31/82	173
299-W23-111	41-12-02	SX Tank farm	3/31/62	123
299-W23-124	40-04-05	S Tank farm	5/31/70	135
299-W23-135	41-02-02	SX Tank farm	1/31/72	140
299-W26-001		S-5 Crib	6/30/54	54
299-W26-051		S-6 Crib	4/30/83	98

CORRESPONDENCE DISTRIBUTION COVERSHEET

Author	Addressee	Correspondence No.
S. H. Wisness, RL (C. D. Wittreich, WHC)	P. T. Day, EPA T. L. Nord, Ecology	Incoming 9200400 (Xref 9159082)

17PD

Subject: TRANSMITTAL OF 200 AGGREGATE AREA MANAGEMENT STUDY (AAMS) SAMPLING AND ANALYSIS PLAN ADDENDUMS 17317

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The attachments are the same as outgoing letter #9159082. ldp, 6-7049