START

0024608 EDMC

WASTE CONTROL PLAN

Work Scope Description: Task (Vadose Investigation) of 100-NR-1 Operable Unit Work Plan

List constituents of concern: See attachment 1

Site Description: 100-NR-1 Operable Unit. Hanford Site, Richland, Washington.

Reference: DOE/RL 90-22 Rev: Draft C Date Approved:

Preparer/ Project /RI Coordinator: A. D. Krug (Print/Sign Name) Date: 10-9-92

Safety Class	Impact Level
3	3

Field Team Leader / Cognizant Engineer: T. Spicer IDW Coordinator: G. G. Hopkins

Planned Drilling Start and Finish Dates: From December 1992 To April 1993

Waste Storage Facility ID number(s): N/A

Field Screening Methods

Method	Frequency	Reference Procedure	Threshold	Analyst
OVM	Continuous	EII 3.4	1-1000 ppm	Geologist
GM	per RWP	WHC-CM-4-12, Sec.7	0-100,000 cpm	HPT
PAM	per RWP	WHC-CM-4-12, Sec.7	0-100,000 cpm	HPT
Ludium (14c)	Continuous	EII 3.4	0-400,000 cpm	Geologist
Colormetric Tubes	per HWOP	EII 3.2	Varies w/contaminant	Site Safety Off.

Methods of Validating Field Screening Data

Method	Frequency	Reference Procedure	Threshold	Analyst
See att. 1	See Description of Work	See att. 1	See att. 1	Weston TMA
	WHC-SD-EN-AP-084			

APPROVALS (Print/Sign Name and Date)

A. D. Krug 10/15/92
Project/RI Coordinator

T. Spicer 10/9/92
Field Team Leader/Cognizant Engineer

G. S. Corrigan 10-15-92
Quality Assurance (if required)

G. G. Hopkins 10/16/92
IDW Coordinator

N/A
Safety Function (if required)

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WASTE CONTROL PLAN

Waste site coordinate location See attachment 2.

Waste container storage area(s) coordinate location(s) As shown in attachment 2.

Requirements for soil pile sampling (if any) N/A

Nonregulated material disposal location(s) Paper, plastics, etc., will be disposed of at the Central Landfill. Nonregulated soils/slurries will be disposed of at the various well sites where they were generated, at a distance from the well head which will prevent any liquids from migrating via the well annulus back into the unconfined aquifer.

Sketch of work site

See attachment 2.

APPROVALS (Print/Sign Name and Date)

S. Cross Steven F. Cross 921029

E. Goller 10-20-92
E. Goller
DOE-RL

A D Krug 10/15/92
A. D. Krug
Project/RI Coordinator

Table QAPjP-1. Analytical Methods, Analytical Parameters, Detection Limits, and Precision and Accuracy Requirements for the 100-NR-1 Source Operable Unit. (sheet 1 of 9)

Analytical Category	Analytical Parameters	Analytical Method	CRDL or CRQL, soil[a]	Precision[b], Soil	Accuracy[b], Soil	CRDL or CRQL, Water[a]	Precision[b], Water	Accuracy[b], Water
CLP TCL volatile organics[c]	Chloromethane	c	10	c	c	10	c	c
	Bromomethane	c	10	c	c	10	c	c
	Vinyl Chloride	c	10	c	c	10	c	c
	Chloroethane	c	10	c	c	10	c	c
	Methylene Chloride	c	10	c	c	10	c	c
	Acetone	c	10	c	c	10	c	c
	Carbon Disulfide	c	10	c	c	10	c	c
	1,1-Dichloroethene	c	10	c	c	10	c	c
	1,1-Dichloroethane	c	10	c	c	10	c	c
	1,2-Dichloroethene (total)	c	10	c	c	10	c	c
	Chloroform	c	10	c	c	10	c	c
	1,2-Dichloroethane	c	10	c	c	10	c	c
	2-Butanone	c	10	c	c	10	c	c
	1,1,1-Trichloroethane	c	10	c	c	10	c	c
	Carbon Tetrachloride	c	10	c	c	10	c	c
	Bromodichloromethane	c	10	c	c	10	c	c
	1,2-Dichloropropene	c	10	c	c	10	c	c
	Trichloroethene	c	10	c	c	10	c	c
	Dibromochloromethane	c	10	c	c	10	c	c
	1,1,2-Trichloroethane	c	10	c	c	10	c	c
	Benzene	c	10	c	c	10	c	c
	trans-1,3-Dichloropropene	c	10	c	c	10	c	c
	cis-1,3-Dichloropropene	c	10	c	c	10	c	c
	Bromoform	c	10	c	c	10	c	c

Table QAPjP-1. Analytical Methods, Analytical Parameters, Detection Limits, and Precision and Accuracy Requirements for the 100-NR-1 Source Operable Unit. (sheet 2 of 9)

Analytical Category	Analytical Parameters	Analytical Method	CRDL or CRQL, soil[a]	Precision[b], Soil	Accuracy[b], Soil	CRDL or CRQL, Water[a]	Precision[b], Water	Accuracy[b], Water
CLP TCL volatile organics[a] (Cont.)	4-Methyl-2-pentanone	c	10	c	c	10	c	c
	2-Hexanone	c	10	c	c	10	c	c
	Tetrachloroethene	c	10	c	c	10	c	c
	Toluene	c	10	c	c	10	c	c
	1,1,2,2-Tetrachloroethane	c	10	c	c	10	c	c
	Chlorobenzene	c	10	c	c	10	c	c
	Ethyl Benzene	c	10	c	c	10	c	c
	Styrene	c	10	c	c	10	c	c
	Xylenes (total)	c	10		c	10	c	c
CLP TCL semi-volatile organics[a]	Phenol	c	330	c	c	10	c	c
	bis(2-Chloroethyl) ether	c	330	c	c	10	c	c
	2-Chlorophenol	c	330	c	c	10	c	c
	1,3-Dichlorobenzene	c	330	c	c	10	c	c
	1,4-Dichlorobenzene	c	330	c	c	10	c	c
	1,2-Dichlorobenzene	c	330	c	c	10	c	c
	2-Methylphenol	c	330	c	c	10	c	c
	2,2'-oxybis (1-Chloropropane)	c	330	c	c	10	c	c
	4-Methylphenol	c	330	c	c	10	c	c
	N-Nitroso-di-n-dipropylamine	c	330	c	c	10	c	c
	Hexachloroethane	c	330	c	c	10	c	c
	Nitrobenzene	c	330	c	c	10	c	c
	Isophorone	c	330	c	c	10	c	c
	2-Nitrophenol	c	330	c	c	10	c	c

Table QAPjP-1. Analytical Methods, Analytical Parameters, Detection Limits, and Precision and Accuracy Requirements for the 100-NR-1 Source Operable Unit. (sheet 3 of 9)

Analytical Category	Analytical Parameters	Analytical Method	CRDL or CRQL, soil[a]	Precision[b], Soil	Accuracy[b], Soil	CRDL or CRQL, Water[a]	Precision[b], Water	Accuracy[b], Water
CLP TCL semi-volatile organics[a] (Cont.)	2,4-Dimethylphenol	c	330	c	c	10	c	c
	bis(2-Chloroethoxy) methane	c	330	c	c	10	c	c
	2,4-Dichlorophenol	c	330	c	c	10	c	c
	1,2,4-Trichlorobenzene	c	330	c	c	10	c	c
	Naphthalene	c	330	c	c	10	c	c
	4-Chloroaniline	c	330	c	c	10	c	c
	Hexachlorobutadiene	c	330	c	c	10	c	c
	4-Chloro-3-methylphenol	c	330	c	c	10	c	c
	2-Methylnaphthalene	c	330	c	c	10	c	c
	Hexachlorocyclopentadiene	c	330	c	c	10	c	c
	2,4,6-Trichlorophenol	c	330	c	c	10	c	c
	2,4,5-Trichlorophenol	c	800	c	c	25	c	c
	2-Chloronapthalene	c	330	c	c	10	c	c
	2-Nitroaniline	c	800	c	c	25	c	c
	Dimethylphthalate	c	330	c	c	10	c	c
	Acenaphthylene	c	330	c	c	10	c	c
	2,6-Dinitrotoluene	c	330	c	c	10	c	c
	3-Nitroaniline	c	800	c	c	25	c	c
	Acenaphthene	c	330	c	c	10	c	c
	2,4-Dinitrophenol	c	800	c	c	25	c	c
	4-Nitrophenol	c	800	c	c	25	c	c
	Dibenzofuran	c	330	c	c	10	c	c
	2,4-Dinitrotoluene	c	330	c	c	10	c	c
	Diethylphthalate	c	330	c	c	10	c	c

Table QAPjP-1. Analytical Methods, Analytical Parameters, Detection Limits, and Precision and Accuracy Requirements for the 100-NR-1 Source Operable Unit. (sheet 4 of 9)

Analytical Category	Analytical Parameters	Analytical Method	CRDL or CRQL, soil[a]	Precision[b], Soil	Accuracy[b], Soil	CRDL or CRQL, Water[a]	Precision[b], Water	Accuracy[b], Water
CLP TCL semi-volatiles[a] (cont.)	4-Chlorophenyl-phenylether	c	330	c	c	10	c	c
	Fluorene	c	330	c	c	10	c	c
	4-Nitroaniline	c	800	c	c	25	c	c
	4,6-Dinitro-2-methylphenol	c	800	c	c	25	c	c
	N-nitrosodiphenylamine	c	330	c	c	10	c	c
	4-Bromophenyl-phenylether	c	300	c	c	10	c	c
	Hexachlorobenzene	c	300	c	c	10	c	c
	Pentachlorophenol	c	800	c	c	25	c	c
	Phenanthrene	c	330	c	c	10	c	c
	Anthracene	c	330	c	c	10	c	c
	Carbazole	c	330	c	c	10	c	c
	Di-n-butylphthalate	c	330	c	c	10	c	c
	Fluoranthene	c	330	c	c	10	c	c
	Pyrene	c	330	c	c	10	c	c
	Butylbenzylphthalate	c	330	c	c	10	c	c
	3-3'-Dichlorobenzidine	c	330	c	c	10	c	c
	Benzo(a)anthracene	c	330	c	c	10	c	c
	Chrysene	c	330	c	c	10	c	c
	bis(2-Ethylhexyl)phthalate	c	330	c	c	10	c	c
	Di-n-octylphthalate	c	330	c	c	10	c	c
	Benzo(b)fluoranthene	c	330	c	c	10	c	c
	Benzo(k)fluoranthene	c	330	c	c	10	c	c
	Benzo(a)pyrene	c	330	c	c	10	c	c
	Indeno(1,2,3-cd)pyrene	c	330	c	c	10	c	c

Table QAPjP-1. Analytical Methods, Analytical Parameters, Detection Limits, and Precision and Accuracy Requirements for the 100-NR-1 Source Operable Unit. (sheet 5 of 9)

Analytical Category	Analytical Parameters	Analytical Method	CRDL or CRQL, soil[a]	Precision[b], Soil	Accuracy[b], Soil	CRDL or CRQL, Water[a]	Precision[b], Water	Accuracy[b], Water
	Dibenz(a,h)anthracene	c	330	c	c	10	c	c
	Benzo(g,h,i)perylene	c	330	c	c	10	c	c
CLP TCL Pesticides/Aroclors[e]	alpha-BHC	c	1.7	c	c	0.05	c	c
	beta-BHC	c	1.7	c	c	0.05	c	c
	delta-BHC	c	1.7	c	c	0.05	c	c
	gamma-BHC (Lindane)	c	1.7	c	c	0.05	c	c
	Heptachlor	c	1.7	c	c	0.05	c	c
	Aldrin	c	1.7	c	c	0.05	c	c
	Heptachlor epoxide	c	1.7	c	c	0.05	c	c
	Endosulfan I	c	1.7	c	c	0.05	c	c
	Dieldrin	c	3.3	c	c	0.10	c	c
	4,4'-DDE	c	3.3	c	c	0.10	c	c
	Endrin	c	3.3	c	c	0.10	c	c
	Endosulfan II	c	3.3	c	c	0.10	c	c
	4,4'-DDD	c	3.3	c	c	0.10	c	c
	Endosufan sulfate	c	3.3	c	c	0.10	c	c
	4,4'-DDT	c	3.3	c	c	0.10	c	c
	Methoxychlor	c	17.0	c	c	0.50	c	c
	Endrin ketone	c	3.3	c	c	0.10	c	c
	Endrin aldehyde	c	3.3	c	c	0.10	c	c
	alpha-Chlordane	c	1.7	c	c	0.05	c	c
	gamma-Chlordane	c	1.7	c	c	0.05	c	c
	Toxaphene	c	170.0	c	c	5.0	c	c
	Aroclor-1016	c	33.0	c	c	1.0	c	c

Table QAPjP-1. Analytical Methods, Analytical Parameters, Detection Limits, and Precision and Accuracy Requirements for the 100-NR-1 Source Operable Unit. (sheet 6 of 9)

Analytical Category	Analytical Parameters	Analytical Method	CRDL or CRQL, soil[a]	Precision[b], Soil	Accuracy[b], Soil	CRDL or CRQL, Water[a]	Precision[b], Water	Accuracy[b], Water
CLP TCL Pesticides/Aroclors[a] (Cont.)	Aroclor-1221	c	33.0	c	c	1.0	c	c
	Aroclor-1232	c	67.0	c	c	2.0	c	c
	Aroclor-1242	c	33.0	c	c	1.0	c	c
	Aroclor-1248	c	33.0	c	c	1.0	c	c
	Aroclor-1254	c	33.0	c	c	1.0	c	c
	Aroclor-1260	c	33.0	c	c	1.0	c	c
CLP TAL Inorganics[a]	Aluminum	c	20	c	c	200	c	c
	Antimony	c	6	c	c	60	c	c
	Arsenic	c	1	c	c	10	c	c
	Barium	c	20	c	c	200	c	c
	Beryllium	c	.5	c	c	5	c	c
	Cadmium	c	.5	c	c	5	c	c
	Calcium	c	500	c	c	5000	c	c
	Chromium	c	1	c	c	10	c	c
	Cobalt	c	5	c	c	50	c	c
	Copper	c	2.5	c	c	25	c	c
	Iron	c	10	c	c	100	c	c
	Lead	c	.3	c	c	3	c	c
	Magnesium	c	500	c	c	5000	c	c
	Manganese	c	1.5	c	c	15	c	c
	Mercury	c	.02	c	c	0.2	c	c
	Nickel	c	4	c	c	40	c	c
	Potassium	c	500	c	c	5000	c	c
	Selenium	c	.5	c	c	5	c	c

Table QAPjP-1. Analytical Methods, Analytical Parameters, Detection Limits, and Precision and Accuracy Requirements for the 100-NR-1 Source Operable Unit. (sheet 7 of 9)

Analytical Category	Analytical Parameters	Analytical Method	CRDL or CRQL, soil[a]	Precision[b], Soil	Accuracy[b], Soil	CRDL or CRQL, Water[a]	Precision[b], Water	Accuracy[b], Water
CLP TAL Inorganics[a] (cont.)	Silver	c	1	c	c	10	c	c
	Sodium	c	500	c	c	5000	c	c
	Thallium	c	1	c	c	10	c	c
	Vanadium	c	5	c	c	50	c	c
	Zinc	c	2	c	c	20	c	c
	Cyanide	c	10	c	c	10	c	c
Anions	Ammonia as Nitrogen	350.3[d]	N/A	N/A	N/A	30	±20	75-125
	Chloride	EPA 300/modified[e], 325.3[d], or 325.2[d]	N/A	N/A	N/A	10,000	±20	75-125
	Fluoride	EPA 300/modified[e] or 340.2	0.5	±35	75-125	100	±20	75-125
	Nitrate	EPA 300/modified[e], 352.1[d], 353.3[d], 353.2[d], or 354.1[d]	1.0	±35	75-125	100	±20	75-125
	Phosphate	EPA 300/modified[e], 365.1[d], 365.2[d], 365.3[d]	N/A	N/A	N/A	500	±20	75-125
	Sulfate	EPA 300/modified[e], 375.2[d], 375.3[d], 375.4[d]	20.0	±35	75-125	2,000	±20	75-125
	Sulfide	9030[f]	N/A	N/A	N/A	5	±20	75-125

Table QAPjP-1. Analytical Methods, Analytical Parameters, Detection Limits, and Precision and Accuracy Requirements for the 100-NR-1 Source Operable Unit. (sheet 8 of 9)

Analytical Category	Analytical Parameters	Analytical Method	CRDL or CRQL, soil[a]	Precision[b], Soil	Accuracy[b], Soil	CRDL or CRQL, Water[a]	Precision[b], Water	Accuracy[b], Water
Radionuclides	Hydrogen-3	Water 906.0[g]	N/A	N/A	N/A	400 pCi/L	±20	75-125
	Carbon-14	i	i	i	i	i	i	i
	Strontium-90	Sr-01[i]	1 pCi/g	±35	75-125	10 pCi/L	±20	75-125
	Technetium-99	Tc-01[i]	N/A	N/A	N/A	10 pCi/L	±20	75-125
	Alpha Spectrometry (uranium-235, uranium-238, plutonium-239, plutonium-240, and americium-241)	ASTM D 3084[k]	1 pCi/g	±35	75-125	3 pCi/L	±20	75-125
	Gross alpha	Water 900[g] Soil[h]	1pCi/g	±35	75-125	3pCi/L	±20	75-125
	Gross beta	Water 900[g] Soil[h]	4 pCi/g	±35	75-125	4 pCi/L	±20	75-125
	Gamma Spectrometry (report all identifiable and quantifiable isotopes)	Water 901.1[g] Soil[h]	0.5 pCi/g	±35	75-125	5 pCi/L	±20	75-125
Other groundwater parameters	Alkalinity	310.1[d]	N/A	N/A	N/A	10,000	±20	75-125
	Chemical Oxygen Demand	410.1[d]	N/A	N/A	N/A	1,000	±20	N/A
	Specific Conductance	[l]	N/A	N/A	N/A	25	±20	N/A
	pH	[l]	N/A	N/A	N/A	N/A	N/A	N/A
	Temperature	[l]	N/A	N/A	N/A	N/A	±1°C	N/A
	Dissolved Oxygen	360.1[d]	N/A	N/A	N/A	100	±20	N/A
	Total Dissolved Solids	160.1[d]	N/A	N/A	N/A	10,000	±20	N/A
	Total Organic Carbon	415.1[d]	N/A	N/A	N/A	1,000	±20	75-125
	Total Organic Halides	9020[f]	N/A	N/A	N/A	5	±20	75-125
	Turbidity	180.1[d]	N/A	N/A	N/A	0.05 NTU	±.05 NTU	N/A

Table QAPjP-1. Analytical Methods, Analytical Parameters, Detection Limits, and Precision and Accuracy Requirements for the 100-NR-1 Source Operable Unit. (sheet 9 of 9)

Analytical Category	Analytical Parameters	Analytical Method	CRDL or CRQL, soil[a]	Precision[b], Soil	Accuracy[b], Soil	CRDL or CRQL, Water[a]	Precision[b], Water	Accuracy[b], Water

[a] For all CLP analytical categories, CRDL refers to the Contract Required Detection Limit specified on the *US EPA Contract Laboratory Program Statement of Work for Inorganics Analysis* (EPA 1991a); CRQL refers to the Contract Required Quantitation Limit specified in the *US EPA Contract Laboratory Program Statement of Work for Organics Analysis* (EPA 1991b). CRQLs are provided for all other (non-CLP) categories, and represent maximum values that can be reliably achieved by analytical laboratories under routine normal conditions. Unless otherwise specified, all inorganic soil values are expressed in mg/Kg, and all organic soil values are expressed as µg/Kg; CLP Target Compound List (TCL) values for inorganic soil CRDLs are the lower of the values specified in the CLP SOW (EPA 1991a). All CRDL/CRQL values for water are expressed in µg/L. Laboratory agreements for services shall require updating as necessary to accommodate periodic updates of the CLP SOWs (EPA 1991a and 1991b).

[b] Acceptable ranges for precision and accuracy for EPA Contract Laboratory Program (CLP) TCL organics and TAL inorganic parameters shall be as specified for each analyte by the applicable CLP Statements of Work (SOWs; see EPA 1990a and 1990b). For all other parameters, the ranges provided shall be considered maximum values that can be reliably achieved by the laboratories under routine normal conditions. Precision is expressed as Relative Percent Difference (RPD); accuracy is expressed as percent recovery (%R). In all cases, these limits apply to sample results greater than five times the CRDL or CRQL, and shall be considered requirements in the absence of known or suspected interferences which may hinder achieving the limit by the analytical laboratory.

[c] As specified in the CLP SOWs for organic and inorganic analysis; all analytical methods, CRDLs, CRQLs, and precision and accuracy requirements shall be as specified therein without modification.

[d] Methods specified are from *Methods for Chemical Analysis of Water and Wastes* (Kopp and McKee 1983).

[e] Method specified is from *Determination of Inorganic Anions in Aqueous and Solid Samples by Ion Chromatography* (Lindahl 1984), and is a modification of EPA method 300.0.

[f] Methods specified are from *Test Methods for Evaluating Solid Waste* (EPA 1986).

[g] Method specified is from *Prescribed Procedures for Measurement of Radioactivity in Drinking Water* (Krieger and Whittaker 1980).

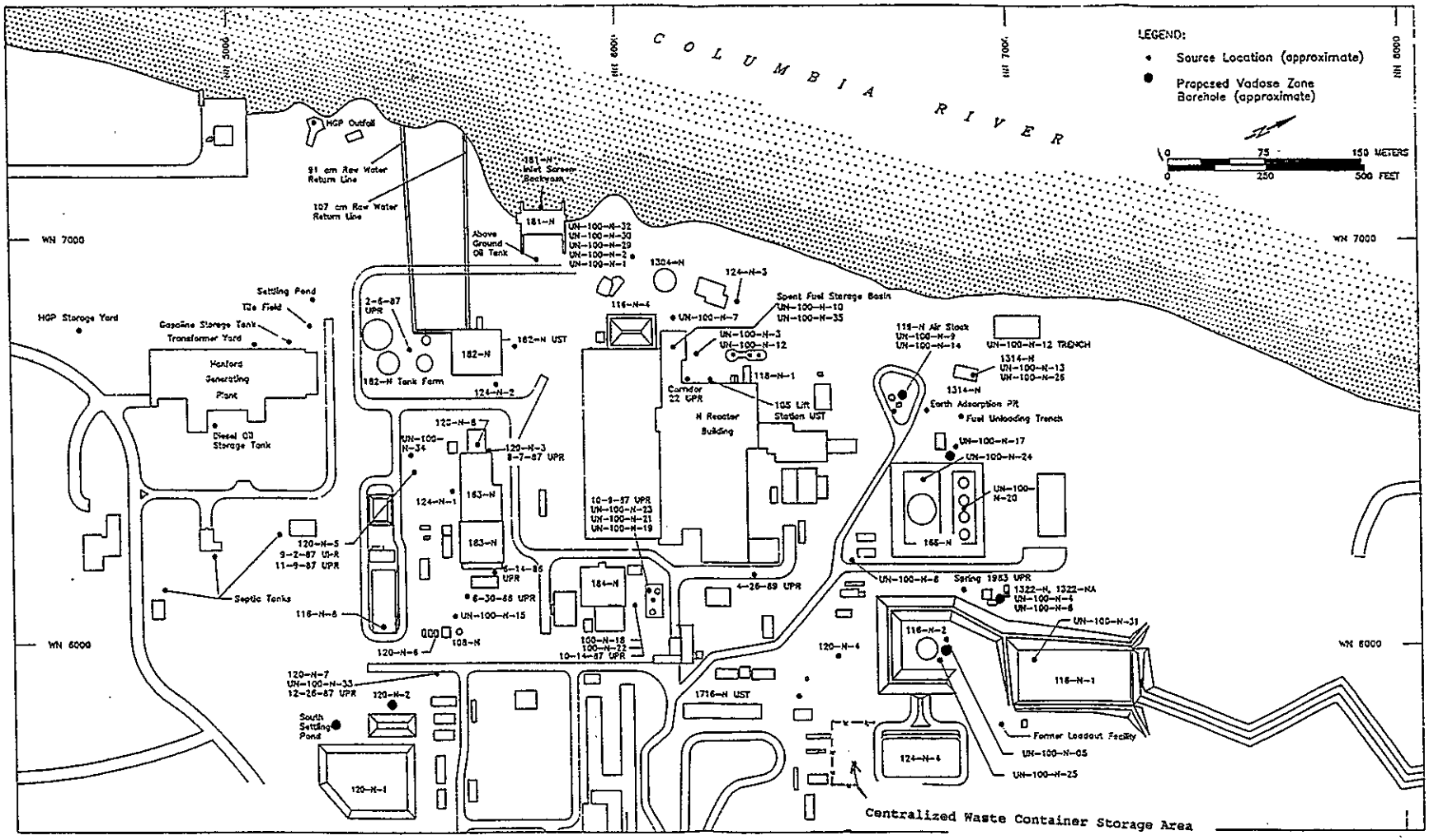
[h] Method shall be based on the specified water method, modified to allow distillation of the parameter of interest in a soil sample and shall be submitted for Westinghouse Hanford review and approval prior to use.

[i] Methods, CRQLs, and maximum ranges for precision and accuracy shall be developed and approved in compliance with Westinghouse Hanford or Westinghouse Hanford-approved participant contractor or subcontractor procedures.

[j] Methods specified are from the *EML Procedures Manual* (Volchok and dePlanque 1982).

[k] Method specified is from the *1991 Annual Book of ASTM Standards* (ASTM 1991).

[l] Parameter shall be measured in the field in compliance with EII 5.8, "Groundwater Sampling" (WHC 1991b).



Proposed Vadose Zone Boreholes in the 100-NR-1 Operable Unit.

Attachment 2