

0080246

SGW-40211
Revision 0

First Determination RCRA Groundwater Quality Assessment Plan for the Low-Level Burial Grounds Low-Level Waste Management Area - 4

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-08RL14788



CH2MHILL
Plateau Remediation Company

P.O. Box 1600
Richland, Washington 99352

RECEIVED
FEB 12 2009
EDMC

Approved for Public Release
Further Dissemination Unlimited

attached to: 0080244

First Determination RCRA Groundwater Quality Assessment Plan for the Low-Level Burial Grounds Low-Level Waste Management Area - 4

Document Type: TI

Program/Project: SGW

S. P. Luttrell
CH2M HILL Plateau Remediation Company

Date Published
January 2009

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Project Hanford Management Contractor for the
U.S. Department of Energy under Contract DE-AC06-08RL14788



P.O. Box 1600
Richland, Washington

A. D. Arndal
Release Approval

01/27/2009
Date

Approved for Public Release
Further Dissemination Unlimited

TRADEMARK DISCLAIMER

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

This report has been reproduced from the best available copy.

Printed in the United States of America

TABLE OF CONTENTS

1.0	INTRODUCTION	1
2.0	ASSESSMENT PLAN.....	1
3.0	NUMBER, LOCATION, AND DEPTH OF WELLS	3
4.0	SAMPLING AND ANALYSIS METHODS	3
4.1	SAMPLING	5
4.2	EVALUATION PROCEDURES.....	11
5.0	SCHEDULE.....	12
6.0	REFERENCES	12

FIGURE

Figure 1.	Location of Low-Level Waste Management Area-4 and Groundwater Monitoring Wells.....	2
-----------	---	---

TABLES

Table 1.	Groundwater Monitoring Wells for LLWMA-4 First Determination Assessment.....	3
Table 2.	Preservation Techniques, Analytical Methods, and Contractually Required Detection Limit for Selected Organic Constituents. (2 sheets).....	4
Table 3.	Selected 40 CFR 264, Appendix IX Groundwater Constituents for Low-Level Waste Management Area 4 First Determination Assessment. (6 sheets).....	6

LIST OF TERMS

CAS	Chemical Abstract Services
CFR	<i>Code of Federal Regulations</i>
CRDL	contract-required detection limit
EPA	U.S. Environmental Protection Agency
LLWMA	low-level waste management area
NAVD88	North American Vertical Datum of 1988
RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
TOC	total organic carbon
TPH	total petroleum hydrocarbon
Tri-Party Agreement	<i>Hanford Federal Facility Agreement and Consent Order</i>
WAC	<i>Washington Administrative Code</i>

METRIC CONVERSION CHART

Into Metric Units			Out of Metric Units		
<i>If You Know</i>	<i>Multiply By</i>	<i>To Get</i>	<i>If You Know</i>	<i>Multiply By</i>	<i>To Get</i>
Length			Length		
inches	25.4	millimeters	millimeters	0.039	inches
inches	2.54	centimeters	centimeters	0.394	inches
feet	0.305	meters	meters	3.281	feet
yards	0.914	meters	meters	1.094	yards
miles	1.609	kilometers	kilometers	0.621	miles
Area			Area		
sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.093	sq. meters	sq. meters	10.76	sq. feet
sq. yards	0.836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.6	sq. kilometers	sq. kilometers	0.4	sq. miles
acres	0.405	hectares	hectares	2.47	acres
Mass (weight)			Mass (weight)		
ounces	28.35	grams	grams	0.035	ounces
pounds	0.454	kilograms	kilograms	2.205	pounds
ton	0.907	metric ton	metric ton	1.102	ton
Volume			Volume		
teaspoons	5	milliliters	milliliters	0.033	fluid ounces
tablespoons	15	milliliters	liters	2.1	pints
fluid ounces	30	milliliters	liters	1.057	quarts
cups	0.24	liters	liters	0.264	gallons
pints	0.47	liters	cubic meters	35.315	cubic feet
quarts	0.95	liters	cubic meters	1.308	cubic yards
gallons	3.8	liters			
cubic feet	0.028	cubic meters			
cubic yards	0.765	cubic meters			
Temperature			Temperature		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius	Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity			Radioactivity		
picocuries	37	millibecquerels	millibecquerels	0.027	picocuries

1.0 INTRODUCTION

Groundwater beneath Low-Level Waste Management Area-4 (LLWMA-4) (Figure 1) has been monitored under the *Resource, Conservation, and Recovery Act of 1976* (RCRA) in interim status under a groundwater indicator parameters evaluation program in accordance with *Washington Administrative Code* (WAC) 173-303-400 (and by reference, 40 *Code of Federal Regulations* [CFR] 265.92) (*Interim Status Groundwater Monitoring Plan for Low-Level Waste Management Areas 1 to 4, RCRA Facilities, Hanford, Washington* [PNNL-14859 and related ICN-1, ICN-2]). In a sample collected August 11, 2008, sample results from downgradient well 299-W15-224 exceeded the critical mean value of 790 µg/L for total organic carbon (TOC), which is an indicator parameter. The concentrations ranged between 1,090 and 1,300 µg/L (eight data points from duplicate, quadruplicate samples). The well was resampled for verification on October 21, 2008, and the results were 2,100 and 2,200 µg/L TOC. Because the values exceed the critical mean, the results indicate that LLWMA-4 may be impacting groundwater quality.

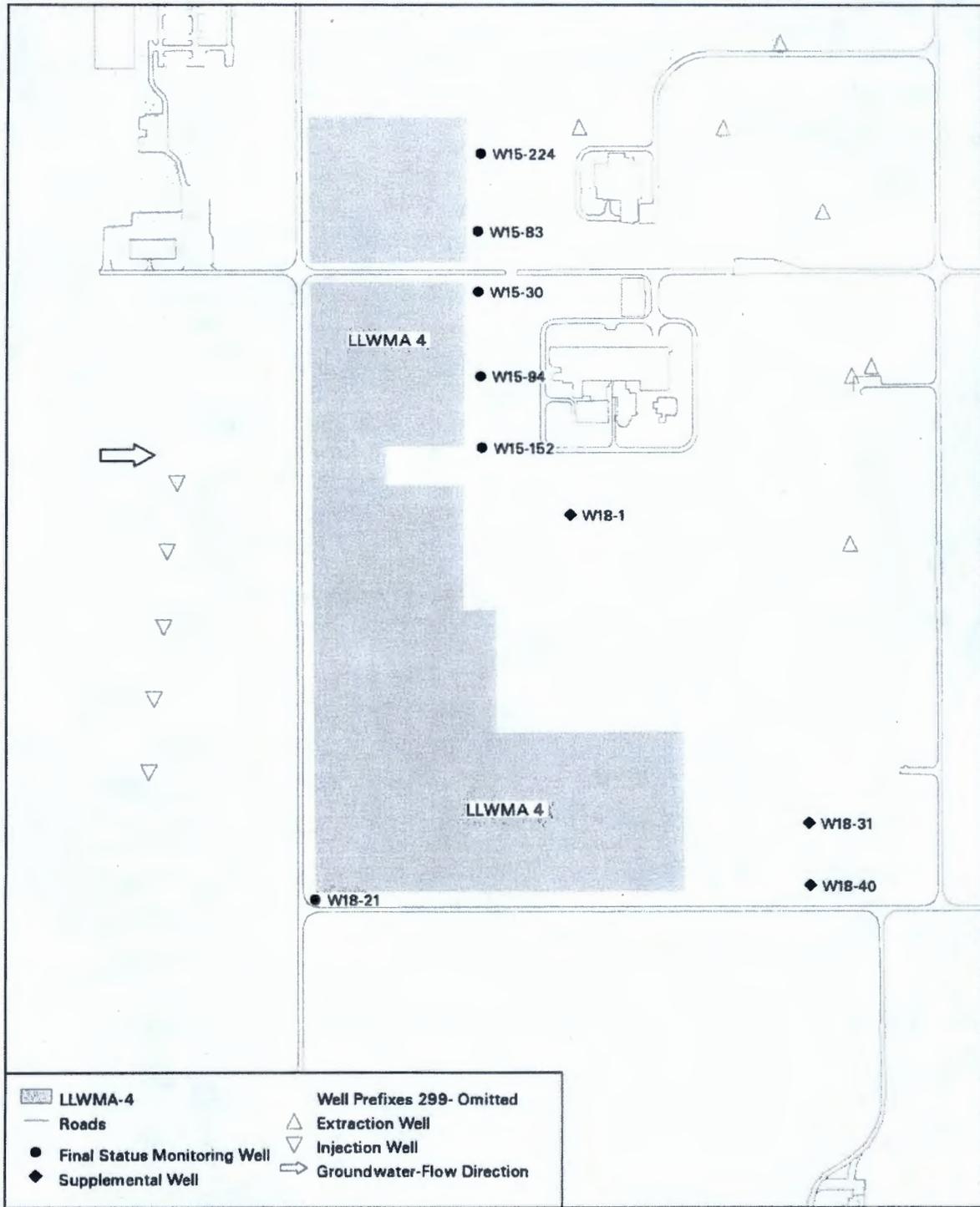
The regional carbon tetrachloride plume in the 200 West Area has been documented as the cause of elevated total organic halides at LLWMA-4 in the past, but that plume does not appear to be the cause of recent high concentrations of TOC. Carbon tetrachloride and TOC are not correlated in the well, and the level of carbon tetrachloride combined with other hydrocarbons is far below what is expected to yield 2,000 µg/L TOC.

2.0 ASSESSMENT PLAN

The groundwater assessment will be carried out in two parts. The first part of the assessment will consist of a "first determination" to evaluate specific organic compounds to determine whether they are present in groundwater. The well information is provided in Table 1. A special sampling of well 299-W15-224 was performed on December 18, 2008, to analyze an extended list of volatile organic compounds, semi-volatile organic compounds, and total petroleum hydrocarbons (TPHs) (diesel and gas). All of the results are not yet available but will be reviewed and evaluated as they are received from the laboratory. If these results do not indicate the presence of dangerous waste or other constituents that would explain the elevated TOC, wells 299-W15-224, 299-W15-83, and 299-W15-30 will be sampled for analysis of 40 CFR 264 ("Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities"), Appendix IX¹ organic constituents and other constituents potentially responsible for elevated TOC. Additional constituents will include TPHs and parameters to investigate possible sewage disposal impacts from septic disposal systems used earlier. If dangerous waste or 40 CFR 264, Appendix IX organic constituents are below their respective contract-required detection limit (CRDL), it will be concluded that LLWMA-4 has not impacted groundwater quality, and the indicator parameter evaluation program for groundwater monitoring will be reinstated.

¹ The U.S. Department of Energy is proposing to use 40 CFR 264, Appendix IX ("Standards for Owners and Operator of Hazardous Waste Treatment, Storage, and Disposal Facilities"; Ground-Water Monitoring List") in order to be consistent with the final status requirements in WAC 173-303-645 ("Dangerous Waste Regulations"; "Releases from Regulated Units"), and that all Hanford treatment, storage, and disposal units must be closed to final status standards in accordance with the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al. 2003), Section 5.3. Otherwise, the interim status requirements would result in a different conclusion.

Figure 1. Location of Low-Level Waste Management Area-4 and Groundwater Monitoring Wells.



can_smo08_15 August 04, 2008 2:41 PM

Table 1. Groundwater Monitoring Wells for LLWMA-4 First Determination Assessment.

Well Name	Screened Interval (m) NAVD88	Water level (m) NAVD88 (March 2007)	Water Remaining (m) (March 2007)	Monitoring Objective
299-W15-224	125.9 to 136.5	135.89	10	Downgradient chemistry; central
299-W15-83	126.2 to 137.2	136.11	9.9	Downgradient chemistry; north
299-W15-30	130.7 to 142.9	136.28 ^a	5.6	Downgradient chemistry; north

NOTE: All wells constructed to standards of WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," resource protection wells.

^a January 2007 measurement date.

^b Perforated carbon steel casing. Partial annular seal.

^c October 2005 measurement date.

LLWMA = Low-Level Waste Management Area

NAVD88 = North American Vertical Datum of 1988

WAC = Washington Administrative Code

If results from the "first determination" indicate the presence of dangerous waste or other constituents in 40 CFR 264, Appendix IX above the respective CRDL, the second part of assessment will be initiated by expanding this assessment plan to assess the rate and extent of migration of dangerous constituents² and concentrations in groundwater.

Details of the "first determination" portion of the assessment are provided below.

3.0 NUMBER, LOCATION, AND DEPTH OF WELLS

Three monitoring wells in the LLWMA-4 network will be sampled if the December 18, 2008, sample analysis results do not indicate the presence of dangerous waste or other constituents that would explain the elevated TOC. The well information is provided in Table 1. The wells are screened at the water table and are compliant with WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells." Groundwater flow direction is from west to east (Figure 1), and the downgradient wells are located east of LLWMA-4. These wells are considered adequate for the "first determination" to evaluate potential groundwater contamination that may have impacted groundwater in well 299-W15-224.

The remainder of the wells in the LLWMA-4 monitoring network may be included if groundwater monitoring continues under a groundwater quality assessment program expanded for the second part of the assessment.

4.0 SAMPLING AND ANALYSIS METHODS

The indicator parameter exceeding its critical mean was TOC. Therefore, the groundwater analytes will include the organic compounds portion of the 40 CFR 264, Appendix IX constituent list, plus TPH for oil, gas, and diesel. The field parameters of temperature and pH will be measured, as well as TOC so it can continue to be compared to previous measurements

² DOE is proposing to use the definition of dangerous constituent in WAC 173-303-645(4) for the purposes of groundwater monitoring in order to be consistent with final status requirements.

and any other detected analytes. Coliform bacteria and chemical oxygen demand will be analyzed to evaluate possible impacts of earlier sewage disposal to septic drain field systems.

General analysis groups, analytical methods, and CRDLs for key constituents are provided in Table 2. The list of organic constituents from 40 CFR 264, Appendix IX that will be requested if necessary is provided in Table 3 with respective Chemical Abstract Services (CAS) registry numbers. The routine analyses, including for anions and metals, will continue as described in the original groundwater monitoring plan (PNNL-14859, and ICN-1, ICN-2).

Table 2. Preservation Techniques, Analytical Methods, and Contractually Required Detection Limit for Selected Organic Constituents. (2 sheets)

Constituent	Collection and Preservation ^{a,b}	Analysis Methods ^c	Contract Required Detection Limit ($\mu\text{g/L}$) ^d
Pesticides			
Endrin	G, none	SW-846 ^c , #8081A	0.1
Methoxychlor			0.5
Toxaphene			2
Lindane (four isomers)			0.05
Herbicides			
2,4-D	G, none	SW-846, #8151A	20
2,4-5-TP silvex			1
2,4,5-T			1
Volatile Organic Analyses			
Carbon tetrachloride	G, no headspace	SW-846, #8260B	5
Benzene			5
Methyl ethyl ketone			10
Toluene			5
1,1,1-trichloroethane			5
1,1,2-trichloroethane			5
Trichloroethylene			5
Tetrachloroethylene			5
Xylene-o, p			10
Chloroform			5
1, 1-dichloroethane			10
1, 2-dichloroethane			5
Trans-1, 2-dichloroethylene			5
Methylene chloride			5
Vinyl chloride			10
Xylene-m			10
Methyl isobutyl ketone			10
Acetone by VOA			20
Tetrahydrofuran			50

Table 2. Preservation Techniques, Analytical Methods, and Contractually Required Detection Limit for Selected Organic Constituents. (2 sheets)

Constituent	Collection and Preservation ^{a,b}	Analysis Methods ^c	Contract Required Detection Limit ($\mu\text{g/L}$) ^d
P-dichlorobenzene			5
Semi-Volatile Organic Analyses			
Bis(2ethylhexyl)phthalate (DEHP)	Amber glass, cool to 4°C	SW-846, #8270D	10
Cresol (o,p,m)			10
n-nitrosodimethylamine			10
Other			
Coliform bacteria	P, none	SW-846, #9223 ^f	2.2 ^g
Chemical oxygen demand	P,G, H ₂ SO ₄ to pH<2	EPA, 410.4	10000
Oil and grease	G, HCl or H ₂ SO ₄ to pH<2	EPA, 413.1	2,000
		SW-846, #9070	1,000
Total petroleum hydrocarbons	G, HCl to pH <2	EPA, 418.1	500
Total organic carbon	G, HCl or H ₂ SO ₄ to pH<2	SW-846, #9060	1,000

^a P = plastic; G = glass.

^b All samples will be cooled to 4°C upon collection.

^c Constituents grouped together are analyzed by the same method, unless otherwise indicated.

^d Detection limit units, except where indicated.

^e EPA SW-846, *Methods for Evaluation of Solid Waste, Physical/Chemical Methods*.

^f Enzyme substrate test.

^g Most probable number.

EPA = U.S. Environmental Protection Agency

4.1 SAMPLING

Sampling methods will be consistent with current sample collection, preservation, documentation, shipment, and chain-of-custody requirements. Three wells will be sampled if the December 18, 2008, sample analysis results do not indicate a source of the elevated TOC. If constituents identified in 40 CFR 264, Appendix IX are detected above CRDLs, sampling and analysis will again be performed in these wells for the specific constituents detected to confirm the presence of these constituents.

Table 3. Selected 40 CFR 264, Appendix IX
Groundwater Constituents for Low-Level Waste Management Area 4
First Determination Assessment. (6 sheets)

Common Name	CAS Number ^a
1,1,1,2-Tetrachloroethane	630-20-6
1,1,1-Trichloroethane; Methylchloroform	71-55-6
1,1,2,2-Tetrachloroethane	79-34-5
1,1,2-Trichloroethane	79-00-5
1,1-Dichloroethane	75-34-3
1,1-Dichloroethylene; Vinylidene chloride	75-35-4
1,2,3-Trichloropropane	96-18-4
1,2,4,5-Tetrachlorobenzene	95-94-3
1,2,4-Trichlorobenzene	120-82-1
1,2-Dibromo-3-chloropropane; DBCP	96-12-8
1,2-Dibromoethane; Ethylene dibromide	106-93-4
1,2-Dichloroethane; Ethylene dichloride	107-06-2
1,2-Dichloropropane	78-87-5
1,4-Dioxane	123-91-1
1,4-Naphthoquinone	130-15-4
1-Naphthylamine	134-32-7
2,3,4,6-Tetrachlorophenol	58-90-2
2,3,7,8-TCDD; 2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6
2,4,5-T; 2,4,5-Trichlorophenoxyacetic acid	93-76-5
2,4,5-Trichlorophenol	95-95-4
2,4,6-Trichlorophenol	88-06-2
2,4-D; 2,4-Dichlorophenoxyacetic acid	94-75-7
2,4-Dichlorophenol	120-83-2
2,4-Dimethylphenol	105-67-9
2,4-Dinitrophenol	51-28-5
2,4-Dinitrotoluene	121-14-2
2,6-Dichlorophenol	87-65-0
2,6-Dinitrotoluene	606-20-2
2-Acetylaminofluorene; 2-AAF	53-96-3
2-Chloronaphthalene	91-58-7
2-Chlorophenol	95-57-8
2-Hexanone	591-78-6
2-Methylnaphthalene	91-57-6
2-Naphthylamine	91-59-8
2-Picoline	109-06-8
3,3[prime]-Dichlorobenzidine	91-94-1
3,3[prime]-Dimethylbenzidine	119-93-7

Table 3. Selected 40 CFR 264, Appendix IX
Groundwater Constituents for Low-Level Waste Management Area 4
First Determination Assessment. (6 sheets)

Common Name	CAS Number ^a
3-Methylcholanthrene	56-49-5
4,4[prime]-DDD	72-54-8
4,4[prime]-DDE	72-55-9
4,4[prime]-DDT	50-29-3
4,6-Dinitro-o-cresol	534-52-1
4-Aminobiphenyl	92-67-1
4-Bromophenyl phenyl ether	101-55-3
4-Chlorophenyl phenyl ether	7005-72-3
4-Methyl-2-pentanone; Methyl isobutyl ketone	108-10-1
4-Nitroquinoline 1-oxide	56-57-5
5-Nitro-o-toluidine	99-55-8
7,12-Dimethylbenz[a]anthracene	57-97-6
Acenaphthene	83-32-9
Acenaphthylene	208-96-8
Acetone	67-64-1
Acetonitrile; Methyl cyanide	75-05-8
Acetophenone	98-86-2
Acrolein	107-02-8
Acrylonitrile	107-13-1
Aldrin	309-00-2
Allyl chloride	107-05-1
alpha, alpha-Dimethylphenethylamine	122-09-8
alpha-BHC	319-84-6
Aniline	62-53-3
Anthracene	120-12-7
Aramite	140-57-8
Benzene	71-43-2
Benzo[a]anthracene; Benzanthracene	56-55-3
Benzo[a]pyrene	50-32-8
Benzo[b]fluoranthene	205-99-2
Benzo[ghi]perylene	191-24-2
Benzo[k]fluoranthene	207-08-9
Benzyl alcohol	100-51-6
beta-BHC	319-85-7
Bis(2-chloro-1-methylethyl) ether; 2,2[prime]-Di-chlorodiisopropyl ether.	108-60-1
Bis(2-chloroethoxy)methane	111-91-1
Bis(2-chloroethyl)ether	111-44-4

Table 3. Selected 40 CFR 264, Appendix IX
Groundwater Constituents for Low-Level Waste Management Area 4
First Determination Assessment. (6 sheets)

Common Name	CAS Number ^a
Bis(2-ethylhexyl) phthalate	117-81-7
Bromodichloromethane	75-27-4
Bromoform; Tribromomethane	75-25-2
Butyl benzyl phthalate; Benzyl butyl phthalate	85-68-7
Carbon tetrachloride	56-23-5
Chlordane	57-74-9
Chlorobenzene	108-90-7
Chlorobenzilate	510-15-6
Chloroethane; Ethyl chloride	75-00-3
Chloroform	67-66-3
Chloroprene	126-99-8
Chrysene	218-01-9
cis-1,3-Dichloropropene	10061-01-5
delta-BHC	319-86-8
Diallate	2303-16-4
Dibenz[a,h]anthracene	53-70-3
Dibenzofuran	132-64-9
Dibromochloromethane; Chlorodibromomethane	124-48-1
Dichlorodifluoromethane	75-71-8
Dieldrin	60-57-1
Diethyl phthalate	84-66-2
Dimethoate	60-51-5
Dimethyl phthalate	131-11-3
Di-n-butyl phthalate	84-74-2
Di-n-octyl phthalate	117-84-0
Dinoseb; DNBP; 2-sec-Butyl- 4,6-dinitrophenol	88-85-7
Diphenylamine	122-39-4
Disulfoton	298-04-4
Endosulfan I	959-98-8
Endosulfan II	33213-65-9
Endosulfan sulfate	1031-07-8
Endrin aldehyde	7421-93-4
Endrin	72-20-8
Ethyl methacrylate	97-63-2
Ethyl methanesulfonate	62-50-0
Ethylbenzene	100-41-4
Famphur	52-85-7
Fluoranthene	206-44-0

Table 3. Selected 40 CFR 264, Appendix IX
Groundwater Constituents for Low-Level Waste Management Area 4
First Determination Assessment. (6 sheets)

Common Name	CAS Number ^a
Fluorene	86-73-7
gamma-BHC; Lindane	58-89-9
Heptachlor epoxide	1024-57-3
Heptachlor	76-44-8
Hexachlorobenzene	118-74-1
Hexachlorobutadiene	87-68-3
Hexachlorocyclopentadiene	77-47-4
Hexachloroethane	67-72-1
Hexachlorophene	70-30-4
Hexachloropropene	1888-71-7
Indeno(1,2,3-cd)pyrene	193-39-5
Isobutyl alcohol	78-83-1
Isodrin	465-73-6
Isophorone	78-59-1
Isosafrole	120-58-1
Kepone	143-50-0
m-Cresol	108-39-4
m-Dichlorobenzene	541-73-1
m-Dinitrobenzene	99-65-0
Methacrylonitrile	126-98-7
Methapyrilene	91-80-5
Methoxychlor	72-43-5
Methyl bromide; Bromomethane	74-83-9
Methyl chloride; Chloromethane	74-87-3
Methyl ethyl ketone; MEK	78-93-3
Methyl iodide; Iodomethane	74-88-4
Methyl methacrylate	80-62-6
Methyl methanesulfonate	66-27-3
Methyl parathion; Parathion methyl	298-00-0
Methylene bromide; Dibromomethane	74-95-3
Methylene chloride; Dichloromethane	75-09-2
m-Nitroaniline	99-09-2
Naphthalene	91-20-3
Nitrobenzene	98-95-3
N-Nitrosodiethylamine	55-18-5
N-Nitrosodimethylamine	62-75-9
N-Nitrosodi-n-butylamine	924-16-3
N-Nitrosodiphenylamine	86-30-6

Table 3. Selected 40 CFR 264, Appendix IX
Groundwater Constituents for Low-Level Waste Management Area 4
First Determination Assessment. (6 sheets)

Common Name	CAS Number ^a
N-Nitrosodipropylamine; Di-n-propylnitrosamine	621-64-7
N-Nitrosomethylethylamine	10595-95-6
N-Nitrosomorpholine	59-89-2
N-Nitrosopiperidine	100-75-4
N-Nitrosopyrrolidine	930-55-2
O,O,O-Triethyl phosphorothioate	126-68-1
O,O-Diethyl O-2-pyrazinyl phosphorothioate; Thionazin	297-97-2
o-Cresol	95-48-7
o-Dichlorobenzene	95-50-1
o-Nitroaniline	88-74-4
o-Nitrophenol	88-75-5
o-Toluidine	95-53-4
p-(Dimethylamino)azobenzene	60-11-7
Parathion	56-38-2
p-Chloroaniline	106-47-8
p-Chloro-m-cresol	59-50-7
p-Cresol	106-44-5
p-Dichlorobenzene	106-46-7
Pentachlorobenzene	608-93-5
Pentachloroethane	76-01-7
Pentachloronitrobenzene	82-68-8
Pentachlorophenol	87-86-5
Phenacetin	62-44-2
Phenanthrene	85-01-8
Phenol	108-95-2
Phorate	298-02-2
p-Nitroaniline	100-01-6
p-Nitrophenol	100-02-7
Polychlorinated biphenyls; PCBs	1336-36-3 ^b
Polychlorinated dibenzofurans; PCDFs	See footnote d
Polychlorinated dibenzo-p-dioxins; PCDDs	See footnote c
p-Phenylenediamine	106-50-3
Pronamide	23950-58-5
Propionitrile; Ethyl cyanide	107-12-0
Pyrene	129-00-0
Pyridine	110-86-1
Safrole	94-59-7

Table 3. Selected 40 CFR 264, Appendix IX
Groundwater Constituents for Low-Level Waste Management Area 4
First Determination Assessment. (6 sheets)

Common Name	CAS Number ^a
Silvex; 2,4,5-TP	93-72-1
Styrene	100-42-5
sym-Trinitrobenzene	4
Tetrachloroethylene; Perchloroethylene;Tetrachloroethene	127-18-4
Tetraethyl dithiopyrophosphate; Sulfotepp	3689-24-5
Toluene	108-88-3
Toxaphene	8001-35-2
trans-1,2-Dichloroethylene	156-60-5
trans-1,3-Dichloropropene	10061-02-6
trans-1,4-Dichloro-2-butene	110-57-6
Trichloroethylene; Trichloroethene	79-01-6
Trichlorofluoromethane	75-69-4
Vinyl acetate	108-05-4
Vinyl chloride	75-01-4
Xylene (total)	1330-20-7

^a Chemical Abstracts Services (CAS) registry number.

^b Polychlorinated biphenyls contains congener chemicals, including aroclors.

^c This category contains congener chemicals, including dioxins.

^d This category contains congener chemicals, including benzofurans.

CFR = Code of Federal Regulations

LLWMA = low-level waste management area

4.2 EVALUATION PROCEDURES

Data evaluation will initially include quality assurance reviews to ensure that the requested analyses were received and meet the analytical performance requirements. The evaluation of results will primarily consist of determining if the selected analytes are detected in concentrations greater than the respective CRDLs. Data evaluation will also include the concentrations of TPHs, oil and grease, coliform bacteria, and chemical oxygen demand. The presence of these may indicate an impact from previously used nearby septic drain fields. If constituents identified in 40 CFR 264, Appendix IX are not detected above CRDLs, an indicator parameter evaluation program will then be reinstated.

If constituents identified in 40 CFR 264, Appendix IX are detected and confirmed, this assessment plan will be revised, and the second part of the assessment will be initiated.

5.0 SCHEDULE

The first sampling event will occur as soon as practical after Washington State Department of Ecology's receipt of this assessment plan. The next scheduled sampling month for LLWMA-4 is in January 2009 and will be performed as scheduled. If the December 18, 2008, sample analysis results do not indicate a source of the elevated TOC, wells 299-W15-224, 299-W15-83, and 299-W15-30 for the "first determination" will be planned for March 2009. Laboratory analysis results should be received within 45 days of sample collection and the data available to complete the "first determination" by June 30, 2009, if constituents identified in 40 CFR 264, Appendix IX are not detected.

If constituents identified in 40 CFR 264, Appendix IX are detected above CRDLs, sampling and analysis to confirm the presence of these constituents will add approximately 6 weeks to the schedule to complete the "first determination."

After the data are evaluated and conclusions are reached, a report will be transmitted to the Washington State Department of Ecology within 15 days, stating whether groundwater monitoring will return to indicator evaluation or continue with a groundwater quality assessment program.

6.0 REFERENCES

- 40 CFR 264, "Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*.
- 40 CFR 265, "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities," *Code of Federal Regulations*.
- APHA, AWWA, and WEF, 1998, *Standard Methods for the Examination of Water and Wastewater, 20th Edition*, American Public Health Association, American Water Works Association, and Water Environmental Federation, Washington, D.C.
- Ecology, EPA, and DOE, 2003, *Hanford Federal Facility Agreement and Consent Order (Tri-Party Agreement)*, 2 vols., as amended, 89-10, Rev. 6, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.
- EPA-600/4-84-017, 1984, *Test Methods for Determination of Inorganic Anions in Water by Ion Chromatography*, EPA Method 300.0, U.S. Environmental Protection Agency, Washington, D.C.
- PNNL-14859, 2004, *Interim Status Groundwater Monitoring Plan for Low-Level Waste Management Areas 1 to 4, RCRA Facilities, Hanford, Washington*, Pacific Northwest National Laboratory, Richland, Washington.
- PNNL-14859-ICN-1, 2006, *Interim Status Groundwater Monitoring Plan for Low-Level Waste Management Areas 1 to 4, RCRA Facilities, Hanford, Washington*, Pacific Northwest National Laboratory, Richland, Washington.
- PNNL-14859-ICN-2, 2007, *Interim Status Groundwater Monitoring Plan for Low-Level Waste Management Areas 1 to 4, RCRA Facilities, Hanford, Washington*, Pacific Northwest National Laboratory, Richland, Washington.

Resource Conservation and Recovery Act of 1976, Public Law 94-580, as amended, 90 Stat. 2795, 42 U.S.C. 6901, et seq.

SW-846, 1997, *Test Methods for Evaluation of Solid Waste, Physical/Chemical Methods*, 3rd edition (as amended by Update I [July 1992], Update IIA [August, 1993], Update IIB [January 1995], and Update III), U.S. Environmental Protection Agency, Washington, D.C.

WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," *Washington Administrative Code*.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*.