INTERIM CHANGE NOTICE
(ICN)

A. Document No.: PNNL-14859 **Revision No.:** 2 **Document Title:** *Interim Status Groundwater Monitoring Plan for Low-Level Waste Management Areas 1 to 4, RCRA Facilities, Hanford, Washington.* **Document's Original Author:** P.E. Dresel	**Implementation Date of ICN:** 01/19/07 **Change Requested By:** P.E. Dresel

B. Action:

Make changes in the monitoring plan as described below in Section D. Attach this ICN to the front of the document.

C. Effect of Change:

This ICN updates the interim status monitoring plan to reflect the current wells in the monitoring networks.

D. Reason for Change/Description of Change:

Reason for Change: Well 299-W10-20 has gone dry and can no longer be sampled. Tables A.1 through A.4 and Table A.10 updated. Figure A.3 updated.

Description of Change: Remove Appendix A, replace with the attached.

E. Document Management Decisions: See attached distribution list.

F. Task Manager Approval Signature (Please Sign and Date) S.P. Luttrell Date: 1/16/2007	Type of Change: (Check one): ___ Minor ☒ Major

Project Quality Engineer Approval: _____ Date: 01162007
N.J. Fix

Author Approval: P E Dresel Date: 1/16/2007
P.E. Dresel

Appendix A

Sampling and Analysis Plan for Hanford Site Low-Level Waste Management Areas 1 to 4 RCRA Interim Status Groundwater Detection Monitoring

This sampling and analysis plan (SAP) implements the *Resource Conservation and Recovery Act* (RCRA) interim status detection monitoring for the Low-Level Waste Management Areas (LLWMAs) 1, 2, 3, and 4. The plan specifies wells (Tables A.1 through A.4), constituents (Tables A.5 and A.6), and frequency of sampling to be scheduled (Tables A.7 through A.10).

Specific constituents required for monitoring at the LLWMAs are set out in Section 3 of the monitoring plan. Table A.5 groups these constituents (where appropriate) by analytical method and defines required practical quantitation limits (PQLs). Laboratory PQLs for the methods used must be equal to or lower than the required PQL. For multi-constituent methods, this table specifies the minimum constituent list required – supplemental constituents may be reported as provided by the laboratory contract. The required PQL is for undiluted samples of normal aliquot size. In some cases, it may be necessary for the laboratory to dilute samples or use a smaller aliquot, which will affect the sample-specific detection limit. Table A.5 also describes commonly used analytical methods for the convenience of the reader. However, other methods that meet the requirements are allowed. More information on methods typically used by the project is given in Hartman (2000).

Sample size, bottle type, and preservatives required for the sampling are defined to meet laboratory method and quality assurance (QA) requirements by the Groundwater Performance Assessment Project's Sampling and Analysis Task. Samples for metals analysis are to be filtered through 0.45 μm filters (in the field where practicable) as specified in Table A.5.

LLWMA-2 upgradient well 299-W34-7 has shown unusual groundwater composition in recent years. This includes elevated levels of chloride, nitrate, sulfate, calcium, total organic carbon, and total organic halides (see Section 2.3.2.2). Well 299-W34-7 was monitored for an expanded list of constituents listed in Table A.6 until it went dry. Upgradient well 299-E27-10 has shown lower levels of increase in these constituents. It will be monitored for the list in Table A.6 during fiscal year 2007 then will revert to the shorter list used for the other wells monitoring this unit.

Monitoring well locations for currently active and dry wells at and surrounding the LLWMAs are shown in Figures A.1 through A.4. These figures include some wells that are not part of the RCRA monitoring network.

Table A.1. Well Information for Low-Level Waste Management Area 1

Well Name	Well ID	Elev Top Screen (m msl)	Elev Bottom Screen (m msl)	Water-Level Elevation (m msl)	Water-Level Date	Thickness Water Column[(a)] (m)
299-E28-26	A4822	124.9	118.8	122.073	8/29/2006	3.3
299-E28-27	A4823	125.6	119.5	122.078	8/29/2006	2.6
299-E28-28	A4824	125.6	119.5	122.026	8/29/2006	2.5
299-E32-2	A4830	126.1	120.0	122.036	7/18/2006	2.0
299-E32-3	A4831	125.8	119.7	122.066	7/18/2006	2.4
299-E32-4	A4832	125.0	118.9	122.026	7/18/2006	3.1
299-E32-5	A4833	125.6	119.2	122.084	7/18/2006	2.9
299-E32-6	A4834	125.8	119.4	122.071	7/18/2006	2.7
299-E32-7	A4835	125.8	119.4	122.056	7/18/2006	2.7
299-E32-8	A4836	125.2	118.9	122.074	7/18/2006	3.2
299-E32-9	A4837	125.7	119.4	122.048	7/18/2006	2.6
299-E32-10	A5432	125.9	119.8	122.046	8/29/2006	2.3
299-E33-28	A4852	125.1	119.0	122.058	8/29/2006	3.0
299-E33-29	A4853	125.7	119.6	122.033	8/29/2006	2.5
299-E33-30	A4855	125.1	119.0	122.074	8/29/2006	3.0
299-E33-34	A4859	126.5	120.3	122.067	8/29/2006	1.8
299-E33-35	A4860	126.6	120.2	122.033	8/29/2006	1.8

(a) Water column thickness is an estimate due to measurement uncertainties.
Note: Shaded wells are dry or produce too little water to sample.

Table A.2. Well Information for Low-Level Waste Management Area 2

Well Name	Well ID	Elev Top Screen (m msl)	Elev Bottom Screen (m msl)	Water-Level Elevation (m msl)	Water-Level Date	Thickness Water Column[(a)] (m)
299-E27-10	A4808	126.2	120.0	122.064	4/17/2006	2.1
299-E27-11	A4809	126.0	119.6	122.027	9/12/2006	2.4
299-E27-17	A4815	125.4	119.0	122.061	9/12/2006	3.1
299-E27-8	A4817	125.8	119.7	122.071	9/12/2006	2.4
299-E27-9	A4818	125.3	119.4	122.088	9/12/2006	2.7
299-E34-10	A4875	126.5	120.1	122.063	9/12/2006	2.0
299-E34-11	A4876	125.2	122.0	122.339	7/15/2003	0.3
299-E34-12	A5433	126.6	120.3	122.029	10/19/2005	1.7
299-E34-2	A4877	125.8	119.7	122.091	4/28/2006	2.4
299-E34-3	A4878	128.0	121.9	122.348	7/21/2003	0.4
299-E34-4	A4879	131.6	125.5	Dry when drilled	--	--
299-E34-5	A4880	128.7	122.6	122.761	7/27/2004	0.2
299-E34-6	A4881	129.6	123.5	123.522	12/10/1993	0.0
299-E34-7	A4882	125.2	122.0	122.126	10/5/2004	0.2
299-E34-9	A4884	127.0	120.6	122.033	8/30/2006	1.4
299-E35-1	A4885	124.0	124.0	123.909	6/8/1998	-0.1

(a) Water column thickness is an estimate due to measurement uncertainties. Uncertainties may result in negative values.
Note: Shaded wells are dry or produce too little water to sample.

Table A.3. Well Information for Low-Level Waste Management Area 3

Well Name	Well ID	Elev Top Screen (m msl)	Elev Bottom Screen (m msl)	Water-Level Date	Water-Level Elevation (m msl)	Thickness Water Column[(a)] (m)
299-W10-13	A4890	144.2	138.1	3/19/2002	138.138	0.0
299-W10-14	A4891	83.4	77.3	3/14/2006	136.792	59.5
299-W10-19	A5438	141.9	135.8	6/16/2005	136.774	1.0
299-W10-20	A5439	142.2	136.1	9/25/2006	136.39	0.3
299-W10-21	A5440	142.1	136.0	12/8/2005	135.947	-0.1
299-W10-29	C4988	not available	not available	new well	--	~10.7
299-W10-30	C4989	137.0	126.3	new well	--	~10.7
299-W10-31	C5194	136.5	125.8	new well	--	~10.7
299-W6-2	A4997	143.2	136.8	9/21/2001	136.954	0.2
299-W7-1	A5004	142.7	136.3	3/25/2005	136.982	0.7
299-W7-10	A5005	143.2	137.0	3/19/2001	136.88	-0.1
299-W7-11	A5006	142.2	136.0	3/22/2004	137.017	1.1
299-W7-12	A5007	141.8	135.5	3/16/2006	136.544	1.0
299-W7-2	A5008	144.7	138.6	6/12/1997	138.881	0.3
299-W7-3	A5009	69.6	63.2	4/12/2006	135.84	72.6
299-W7-4	A5010	143.1	134.0	4/12/2006	136.051	2.1
299-W7-5	A5011	142.1	136.0	3/25/2005	136.274	0.2
299-W7-6	A5012	143.5	137.4	3/23/2003	136.545	-0.9
299-W7-7	A5013	142.8	136.5	3/25/2005	136.399	-0.1
299-W7-8	A5014	142.7	136.4	1/23/2002	136.583	0.2
299-W7-9	A5015	144.0	137.7	3/23/2003	137.61	0.0
299-W8-1	A5016	142.3	136.1	4/12/2006	136.874	0.8
299-W9-1	A5017	144.2	138.1	3/23/2003	137.847	-0.2

(a) Water column thickness is an estimate due to measurement uncertainties. Uncertainties may lead to negative values
Note: Shaded wells are dry or produce too little water to sample.

Table A.4. Well Information for Low-Level Waste Management Area 4

Well Name	Well ID	Elev Top Screen (m msl)	Elev Bottom Screen (m msl)	Water-Level Date	Water-Level Elevation (m msl)	Thickness Water Column[(a)] (m)
299-W15-15	A4919	145.2	136.0	7/20/2006	137.261	1.2
299-W15-152	C4685	137.5	126.8	8/17/2006	136.592	9.8
299-W15-16	A4920	145.8	136.6	7/21/2004	137.001	0.4
299-W15-17	A4921	80.5	77.4	8/28/2006	136.5	59.1
299-W15-18	A4922	146.0	136.9	3/20/2002	137.848	0.9
299-W15-19	A4923	145.8	139.4	6/11/1998	139.426	0.0
299-W15-20	A4924	146.0	139.6	9/28/1998	139.449	-0.1
299-W15-224	C4986	136.5	125.9	7/20/2006	136.04	10.2
299-W15-23	A4926	146.7	140.4	6/11/1998	140.062	-0.3
299-W15-24	A4927	146.3	139.9	9/30/1998	139.946	0.1
299-W15-30	B2410	142.8	130.6	8/17/2006	136.364	5.7
299-W15-83	C4683	137.1	126.2	7/24/2006	136.329	10.2
299-W15-94	C4684	137.4	126.8	8/17/2006	136.48	9.7
299-W18-21	A4933	144.7	135.5	7/21/2006	137.442	1.9
299-W18-22	A4934	77.3	67.9	7/21/2006	137.193	69.3
299-W18-23	A4935	145.7	136.3	8/22/2006	137.561	1.2
299-W18-24	A4936	146.4	137.3	3/20/2003	137.52901	0.3
299-W18-26	A4938	145.5	139.1	10/12/1999	139.353	0.3
299-W18-27	A4939	144.3	137.9	3/23/2004	137.799	-0.1
299-W18-28	A4940	143.8	137.4	3/25/2005	137.562	0.2
299-W18-29	A4941	168.1	163.3	6/13/1997	164.177	0.9
299-W18-32	A5441	144.9	138.7	7/27/2001	138.691	0.0

(a) Water column thickness is an estimate due to measurement uncertainties. Uncertainties may result in negative values.
Note: Shaded wells are dry or produce too little water to sample.

Table A.5. Analytes, Required Detection Limits, and Filtration Requirements for Constituents at the Low-Level Waste Management Areas

Analytical Group	Required Constituents	Required PQL[a]	Filtration	Suggested Method
pH	pH	NA	Unfiltered	Field[b]
Specific Conductance	Specific Conductance	NA	Unfiltered	Field[b]
Turbidity	Turbidity	5 NTU	Unfiltered	Field[b]
Temperature	Temperature	NA	Unfiltered	Field[b]
Dissolved Oxygen	Dissolved Oxygen	NA	Unfiltered	Field[b]
Total Organic Carbon	Total Organic Carbon	1000 µg/L	Unfiltered	9060[c]
Total Organic Halides	Total Organic Halides	5 µg/L	Unfiltered	9020[c]
Alkalinity	Alkalinity	5000 µg/L	Unfiltered	310.1[d]
Anions	Chloride	200 µg/L	Unfiltered	300.0[d]
	Nitrate	100 µg/L		
	Nitrite	100 µg/L		
	Sulfate	500 µg/L		
Metals	Calcium	5000 µg/L	Filtered	6010[c]
	Iron	100 µg/L		
	Magnesium	5000 µg/L		
	Manganese	15 µg/L		
	Nickel	40 µg/L		
	Sodium	5000 µg/L		
	Potassium	5000 µg/L		
Lead	Lead	3 µg/L	Filtered	6020[c]
Mercury	Mercury	0.2 µg/L	Filtered	7470[c]
Volatile Organic Compounds	Carbon Tetrachloride	5 µg/L	Unfiltered	8260[c]
	Chloroform	5 µg/L		
	Trichloroethene	5 µg/L		
	Tetrachloroethene	5 µg/L		
	Benzene	5 µg/L		
	Toluene	5 µg/L		
	Ethylbenzene	5 µg/L		
	Xylene (total)	10 µg/L		

Table A.5. (contd)

Analytical Group	Required Constituents	Required PQL[a]	Filtration	Suggested Method
Phenols	2,3,4,6-Tetrachlorophenol	20 µg/L	Unfiltered	8040[c] or 8270[c]
	2,4,5-Trichlorophenol	60 µg/L		
	2,4,6-Trichlorophenol	10 µg/L		
	2,4-Dichlorophenol	10 µg/L		
	2,4-Dimethylphenol	10 µg/L		
	2,4-Dinitrophenol	25 µg/L		
	2,6-Dichlorophenol	25 µg/L		
	2-Chlorophenol	10 µg/L		
	2-Methylphenol (cresol, o-)	10 µg/L		
	2-Nitrophenol	20 µg/L		
	2-secButly-4,6-Dinitrophenol (DNBP)	10 µg/L		
	4,6-Dintro-2-methylphenol	10 µg/L		
	4-Chloro-3-methylphenol	10 µg/L		
	4-Nitrophenol	20 µg/L		
	Pentachlorophenol	10 µg/L		
	Phenol	10 µg/L		
Polychlorinated biphenyls	Arochlor-1016	0.5 µg/L	Unfiltered	8082[c]
	Arochlor-1221	0.5 µg/L		
	Arochlor-1232	0.5 µg/L		
	Arochlor-1242	0.5 µg/L		
	Arochlor-1248	0.5 µg/L		
	Arochlor-1254	0.5 µg/L		
	Arochlor-1260	0.5 µg/L		

(a) Required maximum practical quantitation limit (PQL) as defined in laboratory contract.
(b) Field methods are project specific implementations; see Hartman (2000).
(c) EPA 1986.
(d) EPA 1979.

Table A.6. Supplemental Constituents for Well 299-E27-10 (FY 2007 only)

Analytical Group	Required Constituents	Required PQL[a] (µg/L)	Filtration	Suggested Method
Total Petroleum Hydrocarbons	Diesel range Gasoline range	500	Unfiltered	8015-M[b]
Oil and Grease		2000	Unfiltered	
Coliform bacteria		NA	Unfiltered	
Volatile Organic Compounds - Appendix IX	1,1,1,2-Tetrachloroethane	5	Unfiltered	8260[c]
	1,1,1-Trichloroethane	5		
	1,1,2,2-Tetrachloroethane	5		
	1,1,2-Trichloroethane	5		
	1,1-Dichloroethane	5		
	1,1-Dichloroethene	5		
	1,2,3-Trichloropropane	5		
	1,2-Dibromo-3-chloropropane	5		
	1,2-Dibromoethane	5		
	1,2-Dichloroethane	5		
	1,2-Dichloroethene(Total or cis- & trans-)	20		
	1,2-Dichloropropane	5		
	1,4-Dioxane	20		
	2-Butanone	10		
	4-Methyl-2-Pentanone	10		
	Acetone	20		
	Acetonitrile	100		
	Acrolein	100		
	Allyl chloride	10		
	Acrylonitrile	100		
	Benzene	5		
	Bromodichloromethane	5		
	Bromoform	5		
	Bromomethane	10		
	Carbon disulfide	5		
	Carbon tetrachloride	5		
	Chlorobenzene	5		
	Chloroethane	10		
	Chloroform	5		
	Chloromethane	10		
	cis-1,3-Dichloropropene	5		
	Dibromochloromethane	5		
	Dibromomethane	10		
	Ethyl methacrylate	10		
	Ethylbenzene	5		
	Iodomethane	10		

Table A.6. (contd)

Analytical Group	Required Constituents	Required PQL[(a)] (µg/L)	Filtration	Suggested Method
	Methacrylonitrile	10		
	Methyl methacrylate	10		
	Methylenechloride	5		
	Styrene	5		
	Tetrachloroethene	5		
	Toluene	5		
	trans-1,2-Dichloroethylene	5		
	trans-1,4-Dichloro-2-butene	5		
	Trichloroethene	5		
	Trichloromonofluoromethane	10		
	Vinyl acetate	50		
	Vinyl chloride	10		
	Xylenes (total or m- & o- & p-)	10		
Semi-Volatile Organic Compounds - Appendix IX	1,2,4,5-Tetrachlorobenzene	20		8270[(c)]
	1,2,4-Trichlorobenzene	10		
	1,2-Dichlorobenzene	10		
	1,3-Dichlorobenzene	10		
	1,4-Dichlorobenzene	10		
	1,4-Naphthoquinone	50		
	1-Naphthylamine	25		
	2,4,5-Trichlorophenol	10		
	2,4,6-Trichlorophenol	10		
	2,4-Dichlorophenol	10		
	2,4-Dimethylphenol	10		
	2,4-Dinitrophenol	25		
	2,4-Dinitrotoluene	10		
	2,6-Dichlorophenol	25		
	2,6-Dinitrotoluene	10		
	2-Acetylaminofluorene	25		
	2-Chloronaphthalene	10		
	2-Chlorophenol	10		
	2-Methylnaphthalene	10		
	2-Methylphenol (cresol, o-)	10		
	2-Naphthylamine	25		
	2-Nitroaniline	10		
	2-Nitrophenol	20		
	2-Picoline	20		
	3,3'-Dichlorobenzidine	10		
	3-Methylcholanthrene	50		
	3-Nitroaniline	10		
	4,6-Dinitro-2methyl phenol	10		

Table A.6. (contd)

Analytical Group	Required Constituents	Required PQL[(a)] (µg/L)	Filtration	Suggested Method
	4-Aminobiphenyl	50		
	4-Chloro-3-methylphenol	10		
	4-Chloroaniline	10		
	4-Chlorophenylphenyl ether	10		
	4-Methylphenol (cresol, p-)	10		
	4-Nitroaniline	10		
	4-Nitrophenol	20		
	4-Nitroquinoline-1-oxide	25		
	5-Nitro-o-toluidine	20		
	Acenaphthene	10		
	Acenaphthylene	10		
	Acetophenone	10		
	Aniline	10		
	Anthracene	10		
	Benzo(a)anthracene	10		
	Benzo(a)pyrene	10		
	Benzo(b)fluoranthene	10		
	Benzo(ghi)perylene	10		
	Benzo(k)fluoranthene	10		
	Bis(2-Chloroethoxy)methane	10		
	Bis(2-chloro-1-methylethyl)ether	10		
	Bis(2-chloroethyl) ether	10		
	Bis(2-ethylhexyl) phthalate	10		
	Butylbenzylphthalate	10		
	Chlorobenzilate	20		
	Chrysene	10		
	Diallate	20		
	Dibenz[a,h]anthracene	10		
	Dibenzofuran	10		
	Diethylphthalate	10		
	Dimethoate	20		
	Dimethyl phthalate	10		
	Di-n-butylphthalate	10		
	Di-n-octylphthalate	10		
	Disulfoton	50		
	Ethyl methanesulfonate	10		
	Famphur	200		
	Fluoranthene	10		
	Fluorene	10		
	Hexachlorobenzene	10		
	Hexachlorobutadiene	10		

Table A.6. (contd)

Analytical Group	Required Constituents	Required PQL[(a)] (µg/L)	Filtration	Suggested Method
	Hexachlorocyclopentadiene	10		
	Hexachloroethane	10		
	Hexachlorophene	500		
	Hexachloropropene	25		
	Indeno(1,2,3-cd)pyrene	10		
	Isodrin	20		
	Isophorone	10		
	Isosafrole	20		
	Kepone	100		
	m-Dinitrobenzene	15		
	Methapyrilene	100		
	Methyl methanesulfonate	10		
	Methyl parathion	50		
	Naphthalene	10		
	Nitrobenzene	10		
	Nitrosopyrrolidine	10		
	N-Nitrosodiethylamine	10		
	N-Nitrosodimethylamine	10		
	N-Nitrosodi-n-butylamine	10		
	N-Nitroso-di-n-dipropylamine	10		
	N-Nitrosodiphenylamine	10		
	N-Nitrosomethylethylamine	10		
	N-Nitrosomorpholine	10		
	N-Nitrosopiperidine	20		
	O,O,O-Triethyl phosphorothioate	50		
	O,O-Diethyl 0-2-pyrazinyl phosphorothioate	20		
	o-Toluidine	20		
	Parathion	50		
	Pentachlorobenzene	10		
	Pentachloroethane	20		
	Pentachloronitrobenzene (PCNB)	50		
	Pentachlorophenol	20		
	Phenacetin	20		
	Phenanthrene	10		
	Phenol	10		
	Phorate	50		
	p-Phenylenediamine	400		
	Pronamide	20		

Table A.6. (contd)

Analytical Group	Required Constituents	Required PQL[(a)] (μg/L)	Filtration	Suggested Method
	Pyrene	10		
	Pyridine	20		
	Safrol	20		
	sym-Trinitrobenzene	100		
	Tetraethyl dithiopyrophosphate	50		

(a) Required PQL: Required maximum practical quantitation limit (PQL) as defined in laboratory contract.
(b) Modified from EPA-SW-846 method (EPA 1986).
(c) EPA 1986.

Table A.7. Sampling Matrix for Low-Level Waste Management Area 1

Well Name	Purpose	WAC Compliant	RCRA Required Constituents[a]											Supporting Constituents[b]					
				Contamination Indicator Parameters				Groundwater Quality Parameters											
								Anions[d]		Metals (filtered)[d]									
			Water Level[c]	pH[c]	Specific Conductance[c]	Total Organic Carbon	Total Organic Halides	Chloride	Sulfate	Sodium	Iron	Manganese	Phenols[d]	Temperature[c]	Turbidity[c]	Dissolved Oxygen[c]	Alkalinity	Lead (Filtered)	Mercury (filtered)
299-E28-26	Upgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E28-27	Upgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E28-28	Upgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E32-2	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E32-3	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E32-4	Upgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E32-5	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E32-6	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E32-7	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E32-8	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E32-9	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E32-10	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E33-28	Upgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E33-29	Upgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E33-30	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E33-34	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A
299-E33-35	Upgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A

(a) Constituents and parameters required by 40 CFR 265.92.
(b) Constituents not required by RCRA but needed to support interpretation.
(c) Field measurement.
(d) Analytes include but not limited to constituents listed in Table A.5.
C = Well is constructed as a WAC 173-160, Part Two resource protection well.
A = To be sampled annually.
S = To be sampled semiannually.
S4 = To be sampled semiannually with quadruplicate samples taken.

Table A.8. Sampling Matrix for Low-Level Waste Management Area 2

Well Name	Purpose	WAC Compliant	RCRA Required Constituents[a]											Supporting Constituents[b]											
				Contamination Indicator Parameters				Groundwater Quality Parameters																		
								Anions[d]		Metals (filtered)[d]																
			Water Level[c]	pH[c]	Specific Conductance[c]	Total Organic Carbon	Total Organic Halides	Chloride	Sulfate	Sodium	Iron	Manganese	Phenols[d]	Temperature[c]	Turbidity[c]	Dissolved Oxygen[c]	Alkalinity	Lead (Filtered)	Mercury (Filtered)	PCBs	VOA Appendix IX	Semi VOA Appendix IX	Oil and Grease	Total Petroleum Hydrocarbon	Colliform
299-E27-8	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A					
299-E27-9	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A					
299-E27-10	Upgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A	S[e]	S[e]	S[e]	S[e]	S[e]
299-E27-11	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A					
299-E27-17	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A					
299-E34-2	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A					
299-E34-9	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A					
299-E34-10	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A					
299-E34-12	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A					

(a) Constituents and parameters required by 40 CFR 265.92
(b) Constituents not required by RCRA but needed to support interpretation.
(c) Field measurement.
(d) Analytes include but not limited to constituents listed in Table A.5.
(e) Analytes include but not limited to constituents listed in Table A.6. Analysis for FY 2007 only
C = Well is constructed as a WAC 173-160, Part Two resource protection well.
A = To be sampled annually.
S = To be sampled semiannually.
S4 = To be sampled semiannually with quadruplicate samples taken.

Table A.9. Sampling Matrix for Low-Level Waste Management Area 3

Well Name	Purpose	WAC Compliant	RCRA Required Constituents[a]											Supporting Constituents[b]						
				Contamination Indicator Parameters				Groundwater Quality Parameters												
								Anions[d]		Metals (filtered)[d]										
			Water Level[c]	pH[c]	Specific Conductance[c]	Total Organic Carbon	Total Organic Halides	Chloride	Sulfate	Sodium	Iron	Manganese	Phenols[d]	Temperature[c]	Turbidity[c]	Dissolved Oxygen[c]	Alkalinity	Lead (Filtered)	Mercury (Filtered)	VOAs[d]
299-W7-3	Deep downgradient supplemental	C	S	S	S	S	S	S		S			A	S	S	S	A	A	A	A
299-W7-4	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A
299-W8-1	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A
299-W10-14	Deep upgradient supplemental	C	S	S	S	S	S	S		S			A	S	S	S	A	A	A	A
299-W10-29	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A
299-W10-30	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A
299-W10-31	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A

(a) Constituents and parameters required by 40 CFR 265.92.
(b) Constituents not required by RCRA but needed to support interpretation.
(c) Field measurement.
(d) Analytes include but not limited to constituents listed in Table A.5.
C = Well is constructed as a WAC 173-160, Part Two resource protection well.
A = To be sampled annually.
S = To be sampled semiannually.
S4 = To be sampled semiannually with quadruplicate samples taken.

Table A.10. Sampling Matrix for Low-Level Waste Management Area 4

Well Name	Purpose	WAC Compliant	RCRA Required Constituents[a]												Supporting Constituents[b]						
				Contamination Indicator Parameters				Groundwater Quality Parameters													
								Anions[d]		Metals (filtered)[d]											
			Water Level[c]	pH[c]	Specific Conductance[c]	Total Organic Carbon	Total Organic Halides	Chloride	Sulfate	Sodium	Iron	Manganese	Phenols[d]	Temperature[c]	Turbidity[c]	Dissolved Oxygen[c]	Alkalinity	Lead (Filtered)	Mercury (Filtered)	VOAs[d]
299-W15-15	Upgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A
299-W15-17	Downgradient supplemental	C	S	S	S	S	S	S		S			A	S	S	S	A	A	A	A
299-W15-30	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A
299-W18-21	Upgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A
299-W18-22	Upgradient supplemental	C	S	S	S	S	S	S		S			A	S	S	S	A	A	A	A
299-W18-23	Upgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A
299-W15-83	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A
299-W15-94	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A
299-W15-152	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A
299-W15-224	Downgradient	C	S	S4	S4	S4	S4	S		S			A	S	S	S	A	A	A	A

(a) Constituents and parameters required by 40 CFR 265.92.
(b) Constituents not required by RCRA but needed to support interpretation.
(c) Field measurement.
(d) Analytes include but not limited to constituents listed in Table A.5.
C = Well is constructed as a WAC 173-160, Part Two resource protection well.
A = To be sampled annually.
S = To be sampled semiannually.
S4 = To be sampled semiannually with quadruplicate samples taken.

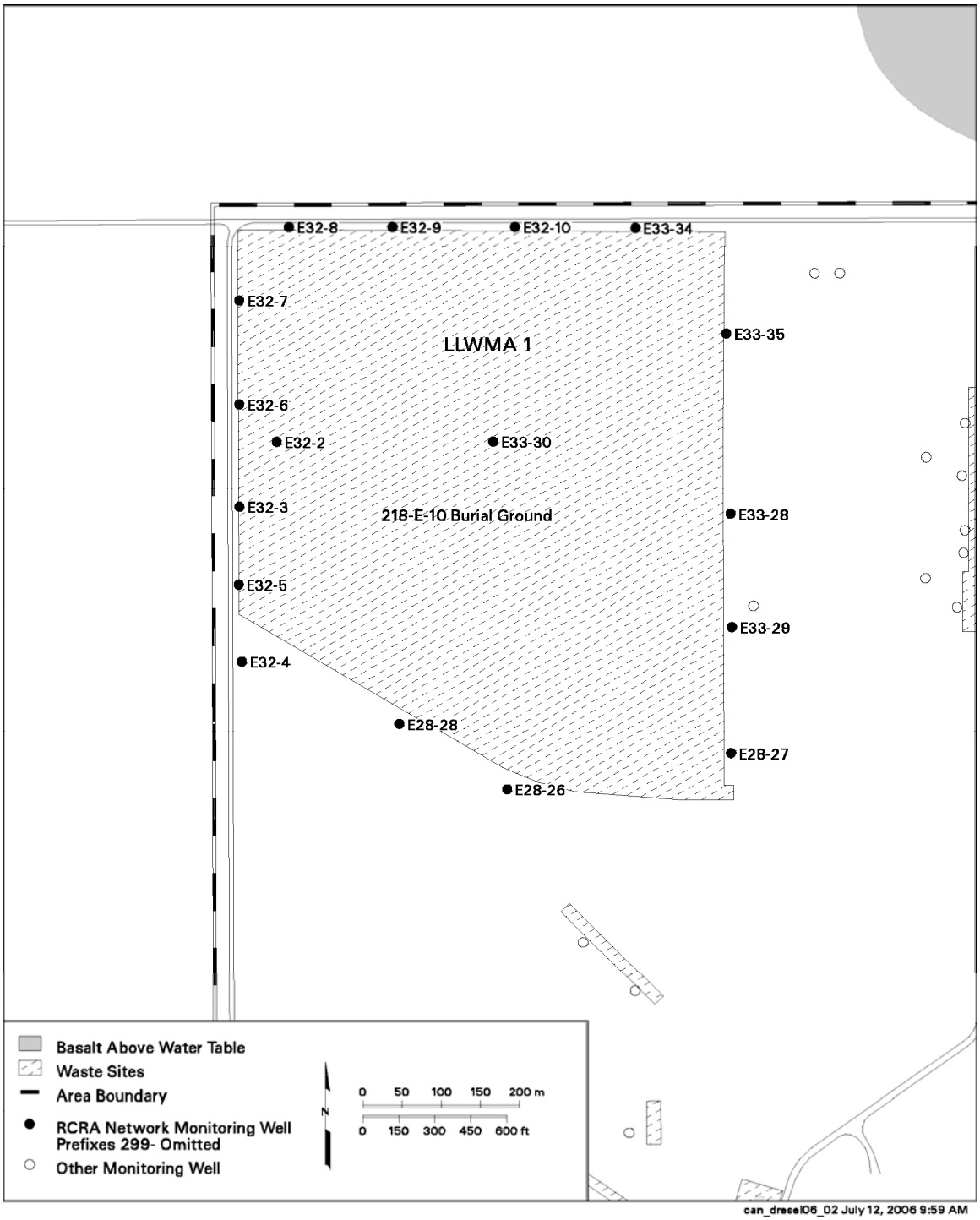

Figure A.1. Well Locations for LLWMA-1 RCRA Monitoring

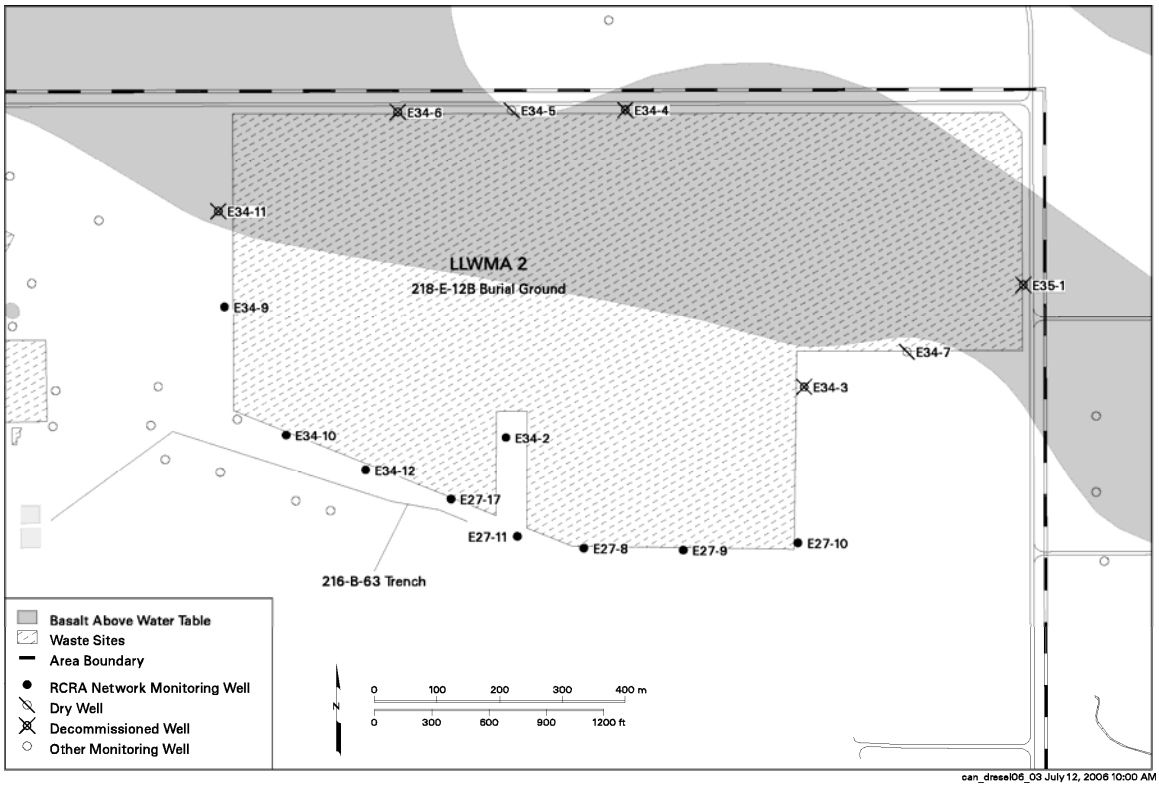

Figure A.2. Well Locations for LLWMA-2 RCRA Monitoring

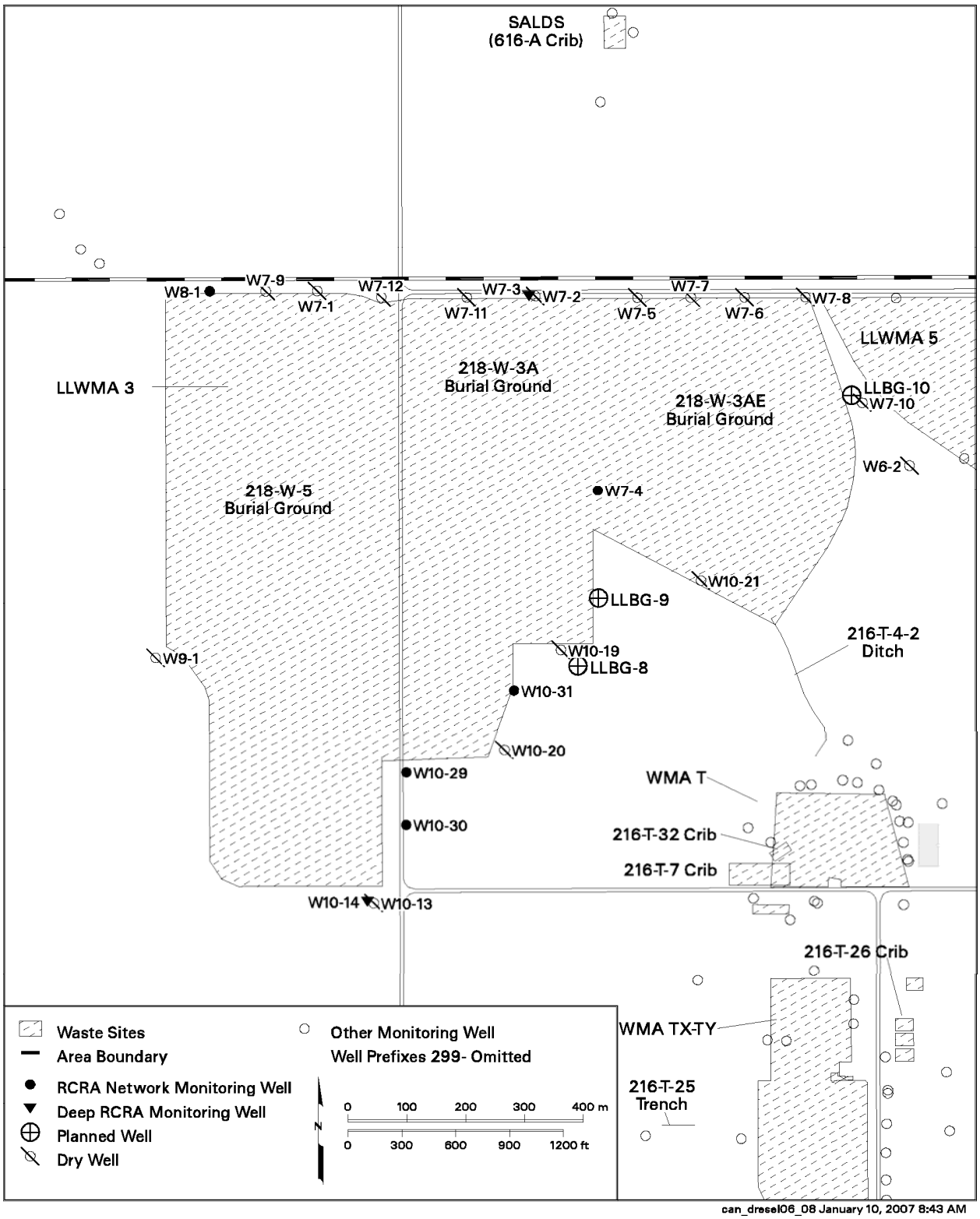

Figure A.3. Well Locations for LLWMA-3 RCRA Monitoring

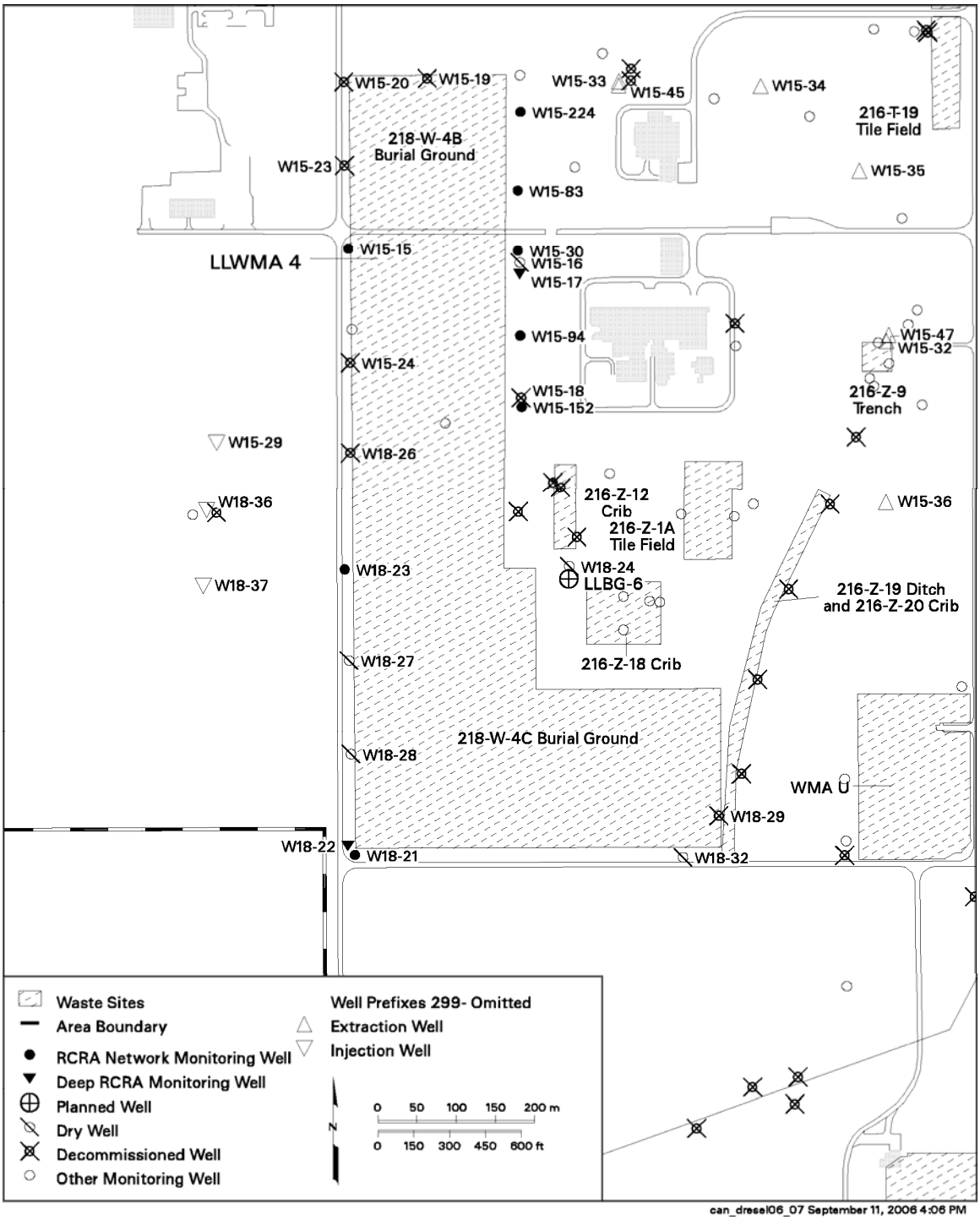

Figure A.4. Well Locations for LLWMA-4 RCRA Monitoring

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