Appendix F

WRRTF-13 Post-ROD Sampling Data and RBCA Analysis

Appendix F

WRRTF-13 Post-ROD Sampling Data and RBCA Analysis

Post-Record of Decision (ROD) sampling at WRRTF-13 began February 28, 2000, and concluded March 2, 2000. The sample locations and sampling approach are given in the post-ROD field sampling plan (DOE/ID-10710, Revision 0, February 2000).

Seven borehole locations were selected based on site history to bias the samples toward areas of highest contamination. Borehole 1 was placed at the former location of tank TAN-738, which was known to have leaked. Borehole 2 was placed adjacent to tanks TAN-738 and -739. Boreholes 3 through 6 were placed along transfer piping that was known to have leaked. Finally, Borehole 7 was placed at the former location of tank TAN-787. Figure F-1 shows the borehole locations at the WRRTF-13 site.

A minimum of four samples was taken from each borehole. Three of the samples taken were determined by taking photo-ionization detector (PID) or flame ionization detector (FID) readings to determine the highest hydrocarbon concentrations. The three samples from each borehole with the highest PID or FID readings were sent to the laboratory for analysis. In addition, a composite sample was taken from each borehole and analyzed. Further details of the sampling procedures and nature and extent of contamination are presented in the post-ROD field sampling plan (DOE/ID-10710, Revision 0, February 2000).

A Risk-Based Corrective Action (RBCA) analysis was performed on the data received from the analytical laboratory. The maximum concentration of each detected contaminant from all the samples collected was compared to the State of Idaho RBCA Tier 0 and Tier 1 screening concentrations. The maximum concentrations from this site exceeded both the Tier 0 and Tier 1 RBCA screening concentrations. To complete the RBCA analysis, a Tier 2 evaluation was done using the RBCA Software (State of Idaho RBCA Tier 2 Software Version 1.0 July 1997). Input data to the RBCA software included: (1) maximum concentrations; (2) current land use is occupational; (3) future land use will be residential; (4) no surficial contaminated soil (which precluded calculating resident child risks due to soil ingestion); and (4) identifying that the groundwater class is 2 since this flow rate is closer to the Snake River Plain Aquifer flow rate. The output for this evaluation is provided in Appendix F. As presented on page F1-1, the cumulative risk at this site for the residential scenario is 1.17E-08 and the cumulative Hazard Index (HI) is 0.96. The cumulative risk for an industrial scenario is 2.65E-09, and the cumulative HI is 0.42. The Subsurface Soil Indoor Inhalation exposure pathway is the main contributor to the cumulative HI. The results of the RBCA Tier 2 analysis are below the Tier 2 evaluation criteria of 1 E-05 cumulative risk and a HI of 1.

Based on the results of the RBCA analysis, no further excavation is necessary at the Fuel Leak site (WRRTF-13). Post-ROD sampling has determined that the site poses an acceptable risk to both occupational and residential occupation scenarios.

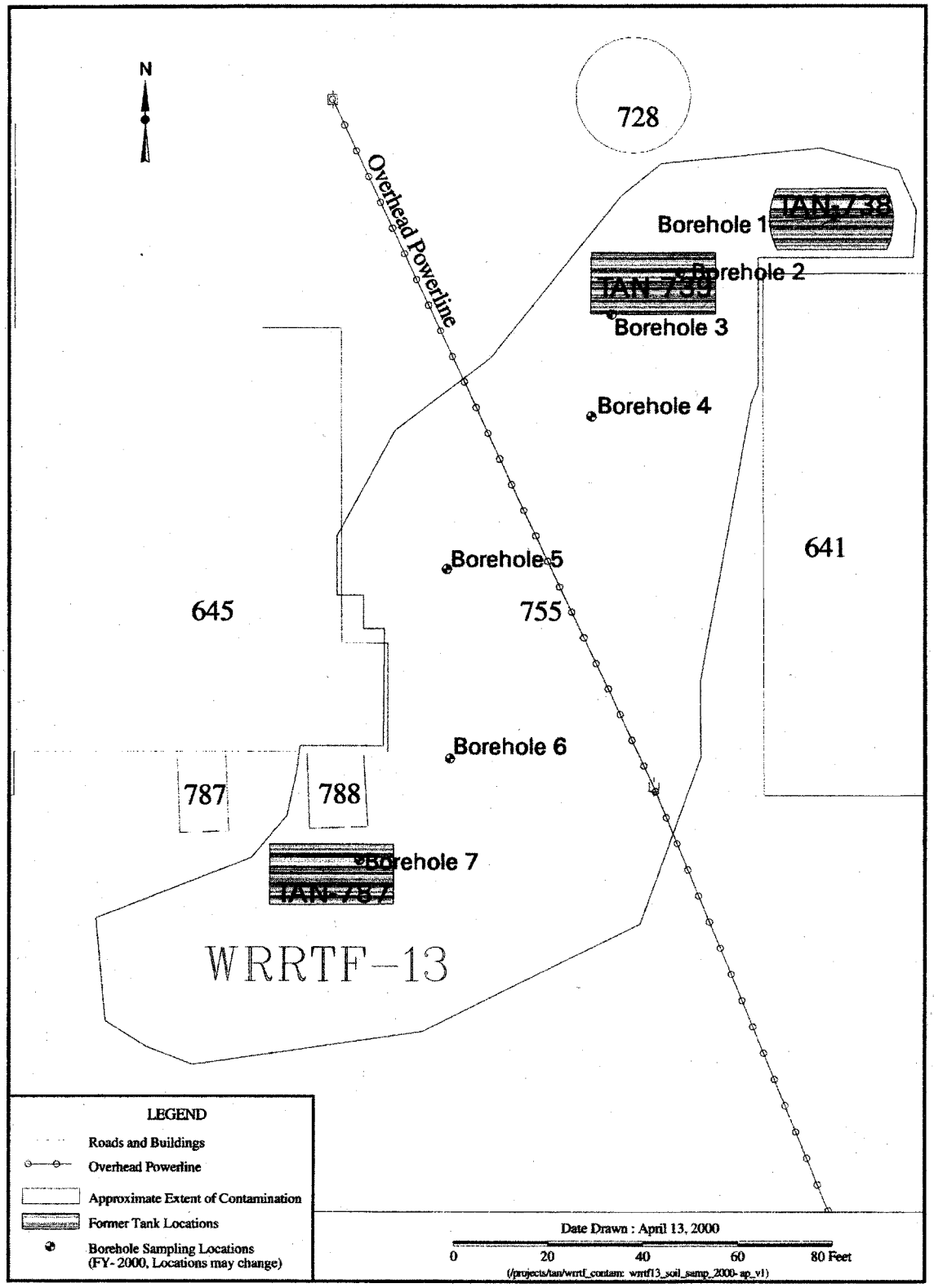

Figure F-1. Sampling locations at the Fuel Leak site (WRTF-13).

Attachment F1

WRRTF-13 RBCA Analysis Output

SUMMARY OF RISK AND HAZARD INDEX

Source	Pathway		Resident Adult		Commercial Worker	
			Risk	HI	Risk	HI
Surficial Soil	Dermal Contact, Ingestion, and Inhalation		0.00E+00	0.00E+00	0.00E+00	0.00E+00
Subsurface Soil	Indoor Inhalation		0.00E+00	9.36E-01	0.00E+00	4.02E-01
	Outdoor Inhalation		0.00E+00	7.22E-04	0.00E+00	8.45E-04
	Subtotal		**0.00E+00**	**9.37E-01**	**0.00E+00**	**4.03E-01**
Groundwater	Ingestion		1.17E-08	2.36E-02	2.65E-09	1.20E-02
	Indoor Inhalation		0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Outdoor Inhalation		0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Subtotal		**1.17E-08**	**2.36E-02**	**2.65E-09**	**1.20E-02**
TOTAL			**1.17E-08**	**9.61E-01**	**2.65E-09**	**4.15E-01**

SUMMARY OF RISK AND HAZARD INDEX

Source	Pathway		Resident Adult		Commercial Worker	
			Risk	HI	Risk	HI
Surficial Soil	Dermal Contact, Ingestion, and Inhalation		**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
Subsurface Soil	Indoor Inhalation		0.00E+00	9.36E-01	0.00E+00	4.02E-01
	Outdoor Inhalation		0.00E+00	7.22E-04	0.00E+00	8.45E-04
	Sub-total		**0.00E+00**	**9.37E-01**	**0.00E+00**	**4.03E-01**
Groundwater	Ingestion		1.17E-08	2.36E-02	2.65E-09	1.20E-02
	Indoor Inhalation		0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Outdoor Inhalation		0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Sub-total		**1.17E-08**	**2.36E-02**	**2.65E-09**	**1.20E-02**
TOTAL			**1.17E-08**	**9.61E-01**	**2.65E-09**	**4.15E-01**

Chemical of Concern	CARCINOGENIC RISK FOR RESIDENT ADULT						
	Surface Soil Ingestion and Dermal Contact	Subsurface Soil Ingestion Dermal Contact	Surface Soil Outdoor Inhalation	Groundwater Ingestion	Groundwater Dermal Contact	Groundwater Outdoor Inhalation	Cumulative Risk
Volatile Organic Compounds							
Benzene	NC	NC	NC	NC	NC	NC	**NC**
Toluene	NC	NC	NC	NC	NC	NC	**NC**
Ethylbenzene	-	-	-	-	-	-	**0.00E+00**
Xylenes (mixed)	-	-	-	-	-	-	**0.00E+00**
Ethylene Dibromide (EDB)	NC	NC	NC	NC	NC	NC	**NC**
1,2 Dichloroethane (EDC)	NC	NC	NC	NC	NC	NC	**NC**
Methyl Tert-Butyl Ether (MTBE)	NC	NC	NC	NC	NC	NC	**NC**
PAH Compounds							
Acenapthene	NC	NC	NC	NC	NC	NC	**NC**
Anthracene	-	-	-	-	-	-	**0.00E+00**
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	**NC**
Benzo(b)fluoranthene	0.00E+00	0.00E+00	0.00E+00	6.12E-09	0.00E+00	0.00E+00	**6.12E-09**
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00	2.54E-10	0.00E+00	0.00E+00	**2.54E-10**
Benzo(a)anthracene	0.00E+00	0.00E+00	0.00E+00	5.06E-09	0.00E+00	0.00E+00	**5.06E-09**
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	**NC**
Chrysene	0.00E+00	0.00E+00	0.00E+00	2.30E-10	0.00E+00	0.00E+00	**2.30E-10**
Fluorene	-	-	-	-	-	-	**0.00E+00**
Fluoranthene	-	-	-	-	-	-	**0.00E+00**
Naphthalene	-	-	-	-	-	-	**0.00E+00**
Phenanthrene	-	-	-	-	-	-	**0.00E+00**
Pyrene	NC	NC	NC	NC	NC	NC	**NC**
User-specified Compounds							
Chemical 1	NC	NC	NC	NC	NC	NC	**NC**
Chemical 2	NC	NC	NC	NC	NC	NC	**NC**
Chemical 3	NC	NC	NC	NC	NC	NC	**NC**
Chemical 4	NC	NC	NC	NC	NC	NC	**NC**
Chemical 5	NC	NC	NC	NC	NC	NC	**NC**
TOTAL	**0.00E+00**	**0.00E+00**	**0.00E+00**	**1.17E-08**	**0.00E+00**	**0.00E+00**	**1.17E-08**

Chemical of Concern	HAZARD QUOTIENTS FOR RESIDENT ADULT						
	Surface Soil Ingestion and Dermal Contact	Subsurface Soil Indoor Inhalation	Subsurface Soil Outdoor Inhalation	Groundwater Ingestion	Groundwater Indoor Inhalation	Groundwater Outdoor Inhalation	Cumulative Hazard Index
Volatile Organic Compounds							
Benzene	NC	NC	NC	NC	NC	NC	**NC**
Toluene	NC	NC	NC	NC	NC	NC	**NC**
Ethylbenzene	0.00E+00	1.66E-01	1.45E-04	3.70E-03	0.00E+00	0.00E+00	**1.70E-01**
Xylenes (mixed)	0.00E+00	6.03E-01	5.22E-04	4.86E-04	0.00E+00	0.00E+00	**6.04E-01**
Ethylene Dibromide (EDB)	NC	NC	NC	NC	NC	NC	**NC**
1,2 Dichloroethane (EDC)	NC	NC	NC	NC	NC	NC	**NC**
Methyl Tert-Butyl Ether (MTBE)	NC	NC	NC	NC	NC	NC	**NC**
PAH Compounds							
Acenapthene	NC	NC	NC	NC	NC	NC	**NC**
Anthracene	0.00E+00	0.00E+00	0.00E+00	1.28E-05	0.00E+00	0.00E+00	**1.28E-05**
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	**NC**
Benzo(b)fluoranthene	-	-	-	-	-	-	**0.00E+00**
Benzo(k)fluoranthene	-	-	-	-	-	-	**0.00E+00**
Benzo(a)anthracene	-	-	-	-	-	-	**0.00E+00**
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	**NC**
Chrysene	-	-	-	-	-	-	**0.00E+00**
Fluorene	0.00E+00	0.00E+00	0.00E+00	1.91E-03	0.00E+00	0.00E+00	**1.91E-03**
Fluoranthene	0.00E+00	0.00E+00	0.00E+00	4.39E-04	0.00E+00	0.00E+00	**4.39E-04**
Naphthalene	0.00E+00	1.68E-01	5.48E-05	1.57E-02	0.00E+00	0.00E+00	**1.83E-01**
Phenanthrene	0.00E+00	0.00E+00	0.00E+00	1.32E-03	0.00E+00	0.00E+00	**1.32E-03**
Pyrene	NC	NC	NC	NC	NC	NC	**NC**
User-specified Compounds							
Chemical 1	NC	NC	NC	NC	NC	NC	**NC**
Chemical 2	NC	NC	NC	NC	NC	NC	**NC**
Chemical 3	NC	NC	NC	NC	NC	NC	**NC**
Chemical 4	NC	NC	NC	NC	NC	NC	**NC**
Chemical 5	NC	NC	NC	NC	NC	NC	**NC**
TOTAL	**0.00E+00**	**9.36E-01**	**7.22E-04**	**2.36E-02**	**0.00E+00**	**0.00E+00**	**9.61E-01**

Chemical of Concern	CARCINOGENIC RISK FOR COMMERCIAL WORKER						
	Surficial Soil: Ingestion, Inhalation and Dermal Contact	Subsurface Soil: Indoor Inhalation	Subsurface Soil: Outdoor Inhalation	Groundwater: Ingestion	Groundwater: Indoor Inhalation	Groundwater: Outdoor Inhalation	Cumulative Risk
Volatile Organic Compounds							
Benzene	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	-	-	-	-	-	-	NC
Xylenes (mixed)	-	-	-	-	-	-	NC
Ethylene Dibromide (EDB)	NC	NC	NC	NC	NC	NC	NC
1,2 Dichloroethane (EDC)	NC	NC	NC	NC	NC	NC	NC
Methyl Tert-Butyl Ether (MTBE)	NC	NC	NC	NC	NC	NC	NC
PAH Compounds							
Acenapthene	NC	NC	NC	NC	NC	NC	NC
Anthracene	-	-	-	-	-	-	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	0.00E+00	0.00E+00	0.00E+00	1.39E-09	0.00E+00	0.00E+00	NC
Benzo(k)fluoranthene	0.00E+00	0.00E+00	0.00E+00	5.76E-11	0.00E+00	0.00E+00	NC
Benzo(a)anthracene	0.00E+00	0.00E+00	0.00E+00	1.15E-09	0.00E+00	0.00E+00	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC
Chrysene	0.00E+00	0.00E+00	0.00E+00	5.22E-11	0.00E+00	0.00E+00	NC
Fluorene	-	-	-	-	-	-	NC
Fluoranthene	-	-	-	-	-	-	NC
Naphthalene	-	-	-	-	-	-	NC
Phenanthrene	-	-	-	-	-	-	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC
User-specified Compounds							
Chemical 1	NC	NC	NC	NC	NC	NC	NC
Chemical 2	NC	NC	NC	NC	NC	NC	NC
Chemical 3	NC	NC	NC	NC	NC	NC	NC
Chemical 4	NC	NC	NC	NC	NC	NC	NC
Chemical 5	NC	NC	NC	NC	NC	NC	NC
TOTAL	**0.00E+00**	**0.00E+00**	**0.00E+00**	**2.65E-09**	**0.00E+00**	**0.00E+00**	**2.65E-09**

Chemical of Concern	HAZARD QUOTIENTS FOR COMMERCIAL WORKER						
	Surface Soil Ingestion Exposure	Subsurface Soil Indoor Inhalation	Subsurface Soil Outdoor Inhalation	Groundwater Ingestion	Groundwater Indoor Inhalation	Groundwater Outdoor Inhalation	Cumulative Hazard Index
Volatile Organic Compounds							
Benzene	NC	NC	NC	NC	NC	NC	NC
Toluene	NC	NC	NC	NC	NC	NC	NC
Ethylbenzene	0.00E+00	8.55E-02	1.85E-04	1.89E-03	0.00E+00	0.00E+00	NC
Xylenes (mixed)	0.00E+00	3.02E-01	6.46E-04	2.48E-04	0.00E+00	0.00E+00	NC
Ethylene Dibromide (EDB)	NC	NC	NC	NC	NC	NC	NC
1,2 Dichloroethane (EDC)	NC	NC	NC	NC	NC	NC	NC
Methyl Tert-Butyl Ether (MTBE)	NC	NC	NC	NC	NC	NC	NC
PAH Compounds							
Acenapthene	NC	NC	NC	NC	NC	NC	NC
Anthracene	0.00E+00	0.00E+00	0.00E+00	6.54E-06	0.00E+00	0.00E+00	NC
Benzo(a)pyrene	NC	NC	NC	NC	NC	NC	NC
Benzo(b)fluoranthene	-	-	-	-	-	-	NC
Benzo(k)fluoranthene	-	-	-	-	-	-	NC
Benzo(a)anthracene	-	-	-	-	-	-	NC
Benzo(g,h,i)perylene	NC	NC	NC	NC	NC	NC	NC
Chrysene	-	-	-	-	-	-	NC
Fluorene	0.00E+00	0.00E+00	0.00E+00	9.75E-04	0.00E+00	0.00E+00	NC
Fluoranthene	0.00E+00	0.00E+00	0.00E+00	2.24E-04	0.00E+00	0.00E+00	NC
Naphthalene	0.00E+00	1.50E-02	1.40E-05	8.01E-03	0.00E+00	0.00E+00	NC
Phenanthrene	0.00E+00	0.00E+00	0.00E+00	6.74E-04	0.00E+00	0.00E+00	NC
Pyrene	NC	NC	NC	NC	NC	NC	NC
User-specified Compounds							
Chemical 1	NC	NC	NC	NC	NC	NC	NC
Chemical 2	NC	NC	NC	NC	NC	NC	NC
Chemical 3	NC	NC	NC	NC	NC	NC	NC
Chemical 4	NC	NC	NC	NC	NC	NC	NC
Chemical 5	NC	NC	NC	NC	NC	NC	NC
TOTAL	**0.00E+00**	**4.02E-01**	**8.45E-04**	**1.20E-02**	**0.00E+00**	**0.00E+00**	**4.15E-01**

SUMMARY OF REPRESENTATIVE CONCENTRATIONS OF CHEMICALS IN SOIL AND GROUNDWATER

Chemical of Concern	Surficial Soil			Subsurface Soil			Groundwater			CRF (unit)	Leaching to Groundwater (From External Model)	
	Conc. [mg/kg]	No. of Samples	Method of Calculation	Conc. [mg/kg]	No. of Samples	Method of Calculation	Conc. [mg/L]	No. of Samples	Method of Calculation	Value [-]	Wet Soil Conc. [mg/kg]	Mass Loading [g/yr]
Volatile Organic Compounds												
☐ Benzene					32	Not Detected				1	1	35.01
☐ Toluene					32	Not Detected				1	1	27.44
☑ Ethylbenzene				6	32	Max Detected				1	1	10.79
☑ Xylenes (mixed)				16	32	Max Detected				1	1	11.42
☐ Ethylene Dibromide (EDB)										1	1	70.12
☐ 1,2 Dichloroethane (EDC)										1	1	65.41
☐ Methyl Tert-Butyl Ether (MTBE)										1	1	70.33
PAH Compounds												
☐ Acenapthene					30	Not Detected				1	1	3.98
☑ Anthracene				1.397	30	Max Detected				1	1	
☐ Benzo(a)pyrene					30	Not Detected				1	1	
☑ Benzo(b)fluoranthene				0.6948	30	Max Detected				1	1	
☑ Benzo(k)fluoranthene				0.5372	30	Max Detected				1	1	
☑ Benzo(a)anthracene				1.443	30	Max Detected				1	1	
☐ Benzo(g,h,i)perylene					30	Not Detected				1	1	
☑ Chrysene				1.167	30	Max Detected				1	1	
☑ Fluorene				11	30	Max Detected				1	1	3.98
☑ Fluoranthene				12.97	30	Max Detected				1	1	
☑ Naphthalene				17.26	30	Max Detected				1	1	16.82
☑ Phenanthrene				14.6	30	Max Detected				1	1	2.11
☐ Pyrene					30	Not Detected				1	1	
User-specified Compounds												
☐ Chemical 1												
☐ Chemical 2												
☐ Chemical 3												
☐ Chemical 4												
☐ Chemical 5												

Note: See Guidance Document or discuss with IDEQ Project Officer for definition of Representative Concentrations
CRF = Concentration Reduction Factor. Refer to Guidance Document for details. Default value = 1

COMPLETE PATHWAY(S) AND ROUTE(S) OF EXPOSURE

Receptor, Source, and Route	Residential (Child and Adult)	Commercial
Surficial Soil (Ingestion, Inhalation, and Dermal Contact)	☑ YES	☑ YES
Subsurface Soil		
Outdoor Inhalation of Volatile Emission	☑ YES	☑ YES
Indoor Inhalation of Volatile Emission	☑ YES	☑ YES
Groundwater		
Outdoor Inhalation of Volatile Emission	☑ YES	☑ YES
Indoor Inhalation of Volatile Emission	☑ YES	☑ YES
Protection of Groundwater	☑ YES	☑ YES
Distance to the Target Well [ft] **500.0**		
Groundwater Class: ○ 1 ◉ 2 ○ 3		
Estimation of groundwater source concentration (choose 1 of the 3 options)		
1. Known Subsurface Soil Conc. and known CRFunsaturated ◉		
2. Specified Loading from an External Model ○		
3. Known On-site (Source) Groundwater Concentration ○		
Protection of Surface Water	☐ NO	
Distance to the Target Surface Water [ft] **10000.0**		
Surface Water Class: ◉ Domestic Water Supplies ○ Other		
Estimation of groundwater source concentration (choose 1 of the 3 options)		
1. Known Subsurface Soil Conc. and known CRFunsaturated ◉		
2. Specified Loading from an External Model ○		
3. Known On-site (Source) Groundwater Concentration ○		

EXPOSURE PARAMETERS FOR ROUTES OF EXPOSURE

Parameter	Symbol	Units	Tier 1 Default Value	Values Used	Comment
Page 1 of 2					
GLOBAL PARAMETERS:					
Acceptable Risk Level	TR	-	1.00E-06	1.00E-05	= Tier 2
Acceptable Hazard Quotient (Tier 1) / Index (Tier 2)	THQ/THI	-	0.2	1	= Tier 2
Body Weight - Adult	BW	kg	70	70	=Tier 1
Body Weight - Child	BW	kg	35	35	=Tier 1
ROUTE-SPECIFIC PARAMETERS:					
INGESTION OF, DERMAL CONTACT WITH, AND INHALATION OF VAPORS FROM SURFICIAL SOIL					
Exposure Duration:					
Residential - Adult	ED	year	9	9	=Tier 1
Residential - Child	ED	year	9	9	=Tier 1
Commercial	ED	year	4	4	=Tier 1
Exposure Frequency:					
Residential - Adult	EF	day/year	180	180	=Tier 1
Residential - Child	EF	day/year	180	180	=Tier 1
Commercial	EF	day/year	40	40	=Tier 1
Inhalation Rate:					
Residential - Adult	IRa	m^3/day	20	20	=Tier 1
Residential - Child	IRa	m^3/day	15	15	=Tier 1
Commercial	IRa	m^3/day	20	20	=Tier 1
Ingestion Rate:					
Residential - Adult	IRs	mg/day	100	100	=Tier 1
Residential - Child	IRs	mg/day	200	200	=Tier 1
Commercial	IRs	mg/day	50	50	=Tier 1
Soil to Skin Adherence Factor	M	mg/cm^2	1	1	=Tier 1
Skin Surface Area:					
Residential - Adult	SA	cm^2/day	4538	4538	=Tier 1
Residential - Child	SA	cm^2/day	2328	2328	=Tier 1
Commercial	SA	cm^2/day	1815	1815	=Tier 1

EXPOSURE PARAMETERS FOR ROUTES OF EXPOSURE

Parameter	Symbol	Units	Tier 1 Default Values	Value Used	Comment
Page 2 of 2					
INHALATION OF VAPORS FROM SUBSURFACE SOIL AND GROUNDWATER					
Inhalation Rate:					
Residential - Adult	IRa	m^3/day	20	20	=Tier 1
Residential - Child	IRa	m^3/day	15	15	=Tier 1
Commercial	IRa	m^3/day	20	20	=Tier 1
Exposure Duration:					
Residential - Adult	ED	year	9	9	=Tier 1
Residential - Child	ED	year	9	9	=Tier 1
Commercial	ED	year	4	4	=Tier 1
Exposure Frequency:					
Residential - Adult	EF	day/year	350	350	=Tier 1
Residential - Child	EF	day/year	350	350	=Tier 1
Commercial	EF	day/year	250	250	=Tier 1
INGESTION OF GROUNDWATER					
Ingestion Rate:					
Residential - Adult	IRw	L/day	1.4	1.4	=Tier 1
Residential - Child	IRw	L/day	1	1	=Tier 1
Commercial	IRw	L/day	1	1	=Tier 1
Exposure Duration:					
Residential - Adult	ED	year	9	9	=Tier 1
Residential - Child	ED	year	9	9	=Tier 1
Commercial	ED	year	4	4	=Tier 1
Exposure Frequency:					
Residential - Adult	EF	day/year	350	350	=Tier 1
Residential - Child	EF	day/year	350	350	=Tier 1
Commercial	EF	day/year	250	250	=Tier 1

Ref.: IDEQ, 1996. RBCA Guidance Document for Petroleum Releases

FATE AND TRANSPORT PARAMETERS FOR PATHWAYS

Parameter	Symbol	Units	Tier 1 Default Values	Values Used	Comment
Page 1 of 2					
SITE PARAMETERS:					
Source Area	A	cm^2	2250000	2250000	=Tier 1
Width of Source Area	W	cm	1500	1500	=Tier 1
Depth to Subsurface Soil Sources	Ls	ft	3 or 15	3	=Tier 1
Thickness of Subsurface Soil Source	ds	ft	6	6	=Tier 1
AMBIENT AIR PARAMETERS:					
Ambient Air Mixing Zone Height	δ_a	cm	200	200	=Tier 1
Wind Speed in Ambient Air Mixing Zone	Ua	cm/s	225	225	=Tier 1
Averaging Time for Vapor Flux - Residential	τ	sec	283800000	283800000	=Tier 1
Averaging Time for Vapor Flux - Commercial	τ	sec	126130000	126130000	=Tier 1
SOIL PARAMETERS:					
Dry Soil Bulk Density	ρ_s	g/cm^3	1.64	1.64	=Tier 1
Fractional Organic Carbon Content					
Surficial Soil	foc	g-C/g-soil	0.01	0.01	=Tier 1
Subsurface Soil	foc	g-C/g-soil	0.001	0.001	=Tier 1
Thickness of Capillary Fringe	hcapi	cm	5	5	=Tier 1
Thickness of Vadose Zone	hv	cm	variable	205	Calculated
Total Soil Porosity	θ_T	-	0.38	0.38	=Tier 1
Volumetric Water Content in Capillary Fringe	θ_{wcap}	-	0.342	0.342	=Tier 1
Volumetric Water Content in Vadose Zone	θ_{wv}	-	0.21 / 0.26	0.21	=Tier 1
Volumetric Water Content in Foundation/Wall Cracks	θ_{wcrack}	-	0.21 / 0.26	0.21	=Tier 1
Volumetric Air Content in Capillary Fringe	θ_{acap}	-	0.038	0.038	Calculated
Volumetric Air Content in Vadose Zone	θ_{av}	-	0.17 / 0.12	0.17	Calculated
Volumetric Air Content in Foundation/Wall Cracks	θ_{acrack}	-	0.17 / 0.12	0.17	Calculated

FATE AND TRANSPORT PARAMETERS FOR PATHWAYS

Parameter	Symbol	Units	Tier 1 Default Value	Value Used	Comment
Page 2 of 2					
GROUNDWATER PARAMETERS:					
Depth to Groundwater	Lgw	cm	variable	210	Calculated
Total Soil Porosity in the Saturated Zone	θ_T	-	0.38	0.38	=Tier 1
Dry Soil Bulk Density in the Saturated Zone	ρ_s	g/cm^3	1.64	1.64	=Tier 1
Fractional Organic Carbon Content in the Sat. Zone	foc	g-C/g-soil	0.001	0.001	=Tier 1
Dispersivities for Groundwater Modeling					
Longitudinal	α_x	cm	variable	1524	Calculated
Transverse	α_y	cm	variable	508	Calculated
Vertical	α_z	cm	variable	76.2	Calculated
Dispersivities for Surface Water Modeling					
Longitudinal	α_x	cm	variable	30480	Calculated
Transverse	α_y	cm	variable	10160	Calculated
Vertical	α_z	cm	variable	1524	Calculated
Groundwater Darcy Velocity	Ugw	cm/year	Zone-specific	150	Zone-specific
Groundwater Mixing Zone Thickness	δ_{gw}	cm	152	152	=Tier 1
Infiltration Rate of Water through Soil	IR	cm/year	Zone-specific	10	Zone-specific
ENCLOSED SPACE PARAMETERS:					
Enclosed Space Air Exchange Rate:					
Residential	ER	1/sec	0.00014	0.00014	=Tier 1
Commercial	ER	1/sec	0.00023	0.00023	=Tier 1
Enclosed Space Volume/Infiltration Area Ratio:					
Residential	Lb	cm	200	200	=Tier 1
Commercial	Lb	cm	300	300	=Tier 1
Enclosed Space Foundation or Wall Thickness					
Residential	Lcrack	cm	15	15	=Tier 1
Commercial	Lcrack	cm	15	15	=Tier 1
Areal Fraction of Cracks in Foundation/Walls					
Residential	η	-	0.01	0.01	=Tier 1
Commercial	η	-	0.01	0.01	=Tier 1

Ref.: IDEQ, 1996. RBCA Guidance Document for Petroleum Releases

Toxicological Properties of Chemicals of Concern

Chemical of Concern	Weight of Evidence	Slope Factor (kg-day/mg) Oral (SFo)	Slope Factor (kg-day/mg) Inhalation (SFi)	Source	Reference Dose (mg/kg-day) Oral (RfDo)	Reference Dose (mg/kg-day) Inhalation (RfDi)	Source	Oral Absorption Factor (RAFo)	Dermal Absorption Fraction (RAFd)
Volatile Organic Compounds									
Benzene	A	0.029	0.029	IRIS	NA	0.00171	IRIS	1	0.08
Toluene	D	NAP	NAP		0.2	0.114	IRIS	1	0.12
Ethylbenzene	D	NAP	NAP		0.1	0.286	IRIS	1	0.2
Xylenes (mixed)	D	NAP	NAP		2	0.2	IRIS	1	0.12
Ethylene Dibromide (EDB)	B2	85	0.76	IRIS	NA	0.000057	IRIS	1	0.1
1,2 Dichloroethane (EDC)	B2	0.091	0.091	IRIS	NA	0.00286	IRIS	1	0.1
Methyl Tert-Butyl Ether (MTBE)	ND	NAP	NAP		0.005	0.857	ECAO	1	0.1
PAH Compounds									
Acenapthene	ND	NAP	NAP		0.06	NA	IRIS	1	0.18
Anthracene	D	NAP	NAP		0.3	NA	IRIS	1	0.26
Benzo(a)pyrene	B2	7.3	6.1	IRIS	NAP	NAP		1	0.18
Benzo(b)fluoranthene	B2	0.73	0.61	ECAOb	NAP	NAP		1	0.18
Benzo(k)fluoranthene	B2	0.073	0.061	ECAOb	NAP	NAP		1	0.18
Benzo(a)anthracene	B2	0.73	0.61	ECAOb	NAP	NAP		1	0.18
Benzo(g,h,i)perylene	D	NAP	NAP		0.03	NA	TPHCWG	1	0.18
Chrysene	B2	0.0073	0.0061	ECAOb	NAP	NAP		1	0.18
Fluorene	D	NAP	NAP		0.04	NA	IRIS	1	0.18
Fluoranthene	D	NAP	NAP		0.04	NA	IRIS	1	0.18
Naphthalene	D	NAP	NAP		0.04	NA	ECAOa	1	0.18
Phenanthrene	D	NAP	NAP		0.04	NA	TPHCWG	1	0.18
Pyrene	D	NAP	NAP		0.03	NA	IRIS	1	0.18
User-specified Compounds									
Chemical 1		NA	NA		NA	NA			
Chemical 2		NA	NA		NA	NA			
Chemical 3		NA	NA		NA	NA			
Chemical 4		NA	NA		NA	NA			
Chemical 5		NA	NA		NA	NA			

Note:

The oral slope factor or reference dose is used to quantify inhalation and dermal exposure where specific values are not available.

NA : Not available

NAP: Not applicable

Sources:

IRIS, 1996. Integrated Risk Information System. United States Environmental Protection Agency. July 1996

ECAO. March 1997. US EPA Region 3. Risk Based Concentration Table.

ECAOa. 1995. Information provided via the EPA Risk Hotline.

ECAOb, 1993. United States Environmental Protection Agency. Provisional Guidance for Quantitative Risk Assessment of PAHs. EPA/600/R-93/089.

TPHCWG,1996. Total Petroleum Hydrocarbon Criteria Working Group. Methodology.Volume 6. Draft. May 17, 1996.

(*): Dermal Absorption Fraction: Massachusetts Dept. of Environmental Protection , 1992. Documentation for the Risk Assessment Shortform-Residential Scenario, Policy #WSC/ORS-142-92. Appendix C- Relative Absorption Factors.

Physical and Chemical Properties of Chemicals of Concern

Chemical of Concern	CAS Reg. Number	Molecular Weight (g/mole)	First Order Degradation Rate (1/day)	Water Solubility (mg/L)	Vapor Pressure (mm Hg)	Henry's Law Constant (unitless)	Organic Carbon Adsorption Coefficient Koc (mL/g)	Diffusion Coefficient in Air (cm²/s)	Diffusion Coefficient in Water (cm²/s)	Density (g/cm³)
Volatile Organic Compounds										
Benzene	71-43-2	78.11	0.00E+00	1780	95	0.22	83	0.092	1.10E-05	0.877
Toluene	108-88-3	92.1	0.00E+00	515	28	0.28	135	0.085	9.40E-06	0.867
Ethylbenzene	100-41-4	106.2	0.00E+00	152	7	0.321	676	0.076	8.50E-06	0.867
Xylenes (mixed)	1330-20-7	106.2	0.00E+00	198	8	0.286	692	0.071	8.50E-06	0.88
Ethylene Dibromide (EDB)	106-93-4	187.9	0.00E+00	3400	11	0.0129	44	0.083	8.00E-06	2.17
1,2 Dichloroethane (EDC)	107-06-2	99	0.00E+00	8690	64	0.0447	14.1	0.091	9.90E-06	1.253
Methyl Tert-Butyl Ether (MTBE)	1634-04--4	88.2	0.00E+00	51000	245	0.0239	11.2	0.0791	9.41E-05	0.74
PAH Compounds										
Acenapthene	83-32-9	154.2	0.00E+00	3.47	4.50E-03	9.70E-02	4.60E+03	0.0421	7.69E-06	1.23
Anthracene	120-12-7	178.2	0.00E+00	0.045	1.08E-05	2.60E-03	1.86E+04	0.0324	7.74E-06	1.24
Benzo(a)pyrene	50-32-8	252.3	0.00E+00	0.003	5.50E-09	4.80E-05	1.95E+06	0.043	9.00E-06	1.35
Benzo(b)fluoranthene	205-99-2	252.3	0.00E+00	0.014	5.00E-07	4.84E-04	5.50E+05	0.0226	5.56E-06	ND
Benzo(k)fluoranthene	207-08-9	252.3	0.00E+00	0.0043	9.59E-11	1.60E-03	1.02E+06	0.0226	5.56E-06	ND
Benzo(a)anthracene	56-55-3	228.3	0.00E+00	0.014	2.20E-08	1.83E-04	1.38E+06	0.051	9.00E-06	1.274
Benzo(g,h,i)perylene	191-24-2	276.3	0.00E+00	0.00026	1.01E-10	5.70E-06	1.58E+06	0.049	5.65E-05	ND
Chrysene	218-01-9	228.3	0.00E+00	0.002	6.30E-09	4.27E-05	2.45E+05	0.0248	6.21E-06	1.274
Fluorene	86-73-7	166.2	0.00E+00	1.82	6.67E-04	3.11E-03	7.30E+03	0.0363	7.88E-06	1.203
Fluoranthene	206-44-0	202.3	0.00E+00	0.237	1.00E-05	2.64E-04	3.80E+04	0.0302	6.35E-06	1.252
Naphthalene	91-20-3	128.2	0.00E+00	31	8.20E-02	1.75E-02	1.29E+03	0.059	7.50E-06	1.162
Phenanthrene	85-01-8	178.2	0.00E+00	1.07	2.10E-04	1.62E-03	1.41E+04	0.0333	7.47E-06	0.98
Pyrene	129-0-0	202.3	0.00E+00	0.148	5.00E-06	4.88E-04	6.46E+04	0.0272	7.24E-06	1.271
User-specified Compounds										
Chemical 1										
Chemical 2										
Chemical 3										
Chemical 4										
Chemical 5										

Attachment F2

WRRTF-13 Post-ROD Sampling Data Summary

SAMPLE ID	1RD064		1RD065		1RD066		1RD092		1RD067		1RD068		1RD069		1RD070	
Borehole Number	Borehole 1		Borehole 1		Borehole 1		Borehole 1		Borehole 1		Borehole 2		Borehole 2		Borehole 2	
Sample Date	3/2/00		3/2/00		3/2/00		3/2/00		3/2/00		3/1/00		3/1/00		3/1/00	
Interval Depth	20 - 23 ft		23 - 25 ft		31 - 33 ft		Basalt (34.5 - 35 ft)		Composite (8 - 35 ft)		14 - 17 ft		17 - 20 ft		20 - 23 ft	
PID/FID readings	2500 ppm		2800 ppm		1401 ppm		1401 ppm		No reading		562 ppm		619 ppm		606 ppm	
Date BTEX analyze																
Date PAH analyze																
	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag
Benzene	1.1	U	1.1	U	1.1	U	1.3	U	1.2	U	1.2	U	1.2	U	1.2	U
Ethylbenzene	4.9		2.8		3.5		1.5		1.4		2.7		2.6		**6.0**	
Toluene	1.1	U	1.1	U	1.1	U	1.3	U	1.2	U	1.2	U	1.2	U	1.2	U
Total Xylenes	15		11		6.4		1.7		3.8		1.2	U	1.2	U	7.9	
Acenapthene	0.6592	U	0.6632	U	0.6567	U	0.7985	U	0.7033	U	0.03518	U	0.03607	U	0.6484	U
Anthracene	0.8838		**1.397**		1.154		0.7985	U	0.7033	U	0.2091		0.1816		0.7449	
Benzo(a)anthracene	0.9412		1.134		**1.443**		0.6856		0.4341		0.2268		0.1944		0.8225	
Benzo(b)fluoranthene	**0.6948**		0.4404		0.3335		0.5186		0.3731		0.01759	U	0.01804	U	0.3242	U
Benzo(k)fluoranthene	**0.5372**		0.3329		0.3283	U	0.4651		0.3516	U	0.01759	U	0.01804	U	0.3242	U
Benzo(a)pyrene	0.3296	U	0.3316	U	0.3283	U	0.3992	U	0.3516	U	0.01759	U	0.01804	U	0.3242	U
Benzo(g,h,i)perylene	0.6592	U	0.6632	U	0.6567	U	0.7985	U	0.7033	U	0.03518	U	0.03607	U	0.6484	U
Chrysene	0.3296	U	0.3316	U	0.3283	U	0.6150	U	0.4510		0.01759	U	0.01804	U	0.3242	U
Fluorene	2.807		3.037		3.482		1.252		1.122		0.4367		0.3209		1.710	
Fluoranthene	8.096		**12.970**		10.020		4.573		3.802		1.510		1.374		7.574	
Napthalene	11.270		**17.260**		14.570		5.777		4.681		0.2982		0.2944		5.801	
Phenanthrene	10.100		14.600		12.590		5.039		4.092		1.438		1.395		7.957	
Pyrene	0.6592	U	0.8936		0.6567	U	0.7985	U	0.7033	U	0.03518	U	0.03607	U	0.6484	U

SAMPLE ID	1RD07101		1RD07102		1RD072		1RD072 - Mistake		1RD073		1RD074		1RD075		1RD076	
Borehole Number	Borehole 2		Borehole 2		Borehole 3		Borehole 3		Borehole 3		Borehole 3		Borehole 3		Borehole 4	
Sample Date	3/1/00		3/1/00		3/1/00		3/1/00		3/1/00		3/1/00		3/1/00		2/29/00	
Interval Depth	Composite (2.5 - 33 ft)		Composite (2.5 - 33 ft)		8 - 11 ft		8 - 11 ft		14 - 17 ft		20 - 23 ft		Composite (2.5 - 33 ft)		11 - 14 ft	
PID/FID readings	No reading		No reading		2800 ppm		2800 ppm		1200 ppm		1583 ppm		w		138 ppm	
Date BTEX analyze															3/6/00	
Date PAH analyze															3/8/00	
	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag
Benzene	1.2	U	1.1	U	1.2	U	1.2	U	1.2	U	1.1	U	1.2	U	1.2	U
Ethylbenzene	1.8		1.4		3.2		2.8		2.7	U	5.3		3.8		2.7	
Toluene	1.2	U	1.1	U	1.2	U	1.2	U	1.2	U	1.1	U	1.2	U	1.2	U
Total Xylenes	1.2	U	1.1	U	6.0		5.8		5.3		**16**		14		4.7	
Acenapthene	0.7186	U	0.6884	U					0.7022	U	0.6821	U	0.7076	U	0.35	U
Anthracene	0.7186	U	0.6884	U					0.7022	U	0.8798		0.7076	U	0.35	U
Benzo(a)anthracene	0.413		0.3442	U					0.4395		0.9651		0.6497		0.18	U
Benzo(b)fluoranthene	0.4472		0.3442	U					0.3511	U	0.3411	U	0.3538	U	0.18	U
Benzo(k)fluoranthene	0.3593	U	0.3442	U					0.3511	U	0.3411	U	0.3538	U	0.18	U
Benzo(a)pyrene	0.3593	U	0.3442	U					0.3511	U	0.3411	U	0.3538	U	0.18	U
Benzo(g,h,i)perylene	0.7186	U	0.6884	U					0.7022	U	0.6821	U	0.7076	U	0.35	U
Chrysene	0.3593	U	0.3442	U					**1.167**		0.3411		0.3538	U	0.18	U
Fluorene	0.7186	U	0.8967						0.7022	U	2.119		1.001		1.8	
Fluoranthene	2.646		3.320						2.629		7.748		3.670		1.4	
Napthalene	1.596		2.443						3.808		10.58		5.280		1.4	
Phenanthrene	2.635		3.268						2.244		7.839		3.779		1.4	
Pyrene	0.7186	U	0.6884	U					0.7022	U	0.6821	U	0.7076	U	0.35	U

SAMPLE ID	1RD077		1RD078		1RD079		1RD080		1RD081		1RD082		1RD08301		IRD08302	
Borehole Number	Borehole 4		Borehole 4		Borehole 4		Borehole 5		Borehole 5		Borehole 5		Borehole 5		Borehole 5	
Sample Date	2/29/00		2/29/00		2/29/00		2/29/00		2/29/00		2/29/00		2/29/00		2/29/00	
Interval Depth	14 - 17 ft		17 - 20 ft		Composite (5 - 34 ft)		14 - 17 ft		17 - 20 ft		22 - 25 ft		Composite (5 - 25 ft)		Composite (5 - 25 ft)	
PID/FID readings	158 ppm		163 ppm		No reading		68 ppm		60 ppm		82 ppm		No reading		No reading	
Date BTEX analyze	3/7/00		3/7/00		3/7/00		3/7/00		3/7/00		3/7/00		3/7/00		3/7/00	
Date PAH analyze	3/8/00		3/8/00		3/8/00		3/8/00		3/8/00		3/8/00		3/8/00		3/8/00	
	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag
Benzene	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.1	U	1.2	U	1.2	U
Ethylbenzene	5.9		1.9		1.2	U	1.2	U	1.2	U	1.7		1.2	U	1.2	U
Toluene	1.2	U	1.2	U	1.2	U	1.2	U	1.2	U	1.1	U	1.2	U	1.2	U
Total Xylenes	11		4.3		1.2	U	1.2	U	1.2	U	1.1	U	1.2	U	1.2	U
Acenapthene	0.35	U	0.9	U	0.86	U	0.9	U	0.92	U	0.85	U	0.88	U	0.36	U
Anthracene	0.35	U	0.9	U	0.86	U	0.9	U	0.92	U	0.85	U	0.88	U	0.36	U
Benzo(a)anthracene	0.23		0.45	U	0.43	U	0.45	U	0.46	U	0.68		0.44	U	0.18	U
Benzo(b)fluoranthene	0.17	U	0.45	U	0.43	U	0.45	U	0.46	U	0.43	U	0.44	U	0.18	U
Benzo(k)fluoranthene	0.17	U	0.45	U	0.43	U	0.45	U	0.46	U	0.43	U	0.44	U	0.18	U
Benzo(a)pyrene	0.17	U	0.45	U	0.43	U	0.45	U	0.46	U	0.43	U	0.44	U	0.18	U
Benzo(g,h,i)perylene	0.35	U	0.9	U	0.86	U	0.9	U	0.92	U	0.85	U	0.88	U	0.36	U
Chrysene	0.17	U	0.45	U	0.43	U	0.45	U	0.46	U	0.43	U	0.44	U	0.18	U
Fluorene	0.35	U	0.9	U	0.86	U	0.9	U	0.92	U	0.85	U	0.88	U	0.36	U
Fluoranthene	2.3		3.3	U	2.1		1.7		4.5		7.5		2.4		1.7	
Napthalene	2.4		2.5	U	1.5		0.9	U	1.5		6.2		1.1		0.6	
Phenanthrene	2.1		2.5	U	2.3		0.94		2.2		8		1.9		1	
Pyrene	0.35	U	0.9	U	0.86	U	0.9	U	0.92	U	0.85	U	0.88	U	0.36	U

SAMPLE ID	1RD084		1RD085		1RD086		1RD087		1RD088		1RD089		1RD090		1RD091	
Borehole Number	Borehole 6		Borehole 6		Borehole 6		Borehole 6		Borehole 7		Borehole 7		Borehole 7		Borehole 7	
Sample Date	2/28/00		2/28/00		2/28/00		2/28/00		2/28/00		2/28/00		2/28/00		2/28/00	
Interval Depth	8 - 11 ft		14 - 17 ft		17 - 21.5 ft		Composite (5 - 24 ft)		12 - 15 ft		18 - 21 ft		23 - 26 ft		Composite (12 - 26 ft)	
PID/FID readings	4 ppm		4.1 ppm		7 ppm		No reading		59 ppm		47 ppm		68 ppm		No reading	
Date BTEX analyze	3/6/00		3/6/00		3/6/00		3/6/00		3/6/00		3/6/00		3/6/00		3/6/00	
Date PAH analyze	3/6/00		3/6/00		3/6/00		3/6/00		3/8/00		3/8/00		3/8/00		3/8/00	
	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag	Contaminant Concentration (mg/kg)	Flag
Benzene	1.2	U	1.2	U	1.1	U	1.2	U	1.2	U	1.2	U	1.1	U	1.2	U
Ethylbenzene	1.2	U	1.2	U	1.1	U	1.2	U	2.9		1.5		4.5		2.2	
Toluene	1.2	U	1.2	U	1.1	U	1.2	U	1.2	U	1.2	U	1.1	U	1.2	U
Total Xylenes	1.2	U	1.2	U	1.1	U	1.2	U	1.2	U	1.2	U	1.6		1.2	U
Acenapthene	0.035	U	0.036	U	0.034	U	0.035	U	0.89	U	0.88	U	0.84	U	0.9	U
Anthracene	0.035	U	0.036	U	0.034	U	0.035	U	0.89	U	0.88	U	0.95		0.9	U
Benzo(a)anthracene	0.017	U	0.018	U	0.017	U	0.018	U	0.48		0.69		0.79		0.45	U
Benzo(b)fluoranthene	0.017	U	0.018	U	0.017	U	0.018	U	0.45	U	0.44	U	0.42	U	0.45	U
Benzo(k)fluoranthene	0.017	U	0.018	U	0.017	U	0.018	U	0.45	U	0.44	U	0.42	U	0.45	U
Benzo(a)pyrene	0.017	U	0.018	U	0.017	U	0.018	U	0.45	U	0.44	U	0.42	U	0.45	U
Benzo(g,h,i)perylene	0.035	U	0.036	U	0.034	U	0.035	U	0.89	U	0.88	U	0.84	U	0.9	U
Chrysene	0.017	U	0.018	U	0.017	U	0.018	U	0.45	U	0.44	U	0.42	U	0.45	U
Fluorene	0.035	U	0.036	U	0.034	U	0.035	U	6.6		8.5		11		6.3	
Fluoranthene	0.035	U	0.036	U	0.034	U	0.035	U	9.2		9.4		10		7.3	
Napthalene	0.035	U	0.036	U	0.034	U	0.035	U	4.4		7.2		10		5.2	
Phenanthrene	0.035	U	0.036	U	0.034	U	0.035	U	6.7		7.8		10		6.2	
Pyrene	0.035	U	0.036	U	0.034	U	0.035	U	0.89	U	0.88	U	0.84	U	0.9	U

Appendix G

Comment Resolution Forms for Draft Remedial Design/Remedial Action Work Plan and Associated Documents

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PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: *Comprehensive Remedial Design/Remedial Action Work Plan for the Test Area North, Operable Unit 1-10, Group 1 Sites (Draft), Field Sampling Plan for Remedial Design/Remedial Action Sampling and Field Screening of Group 1 Sites at Waste Area Group 1, Operable Unit 1-10 (Draft), Operations and Maintenance Plan for Test Area North, Operable Unit 1-10 (Draft), Waste Management Plan for the Test Area North, Operable Unit 1-10 Group 1 Sites Remedial Action (Draft)*

DATE: June 21, 2000 **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
GENERAL COMMENTS				
1	General	General	The RD/RA WP and associated documents need to be modified to reflect all the field work at TSF-26 (i.e. stockpile and wooden box bagging and placement into the RPSSA) and TSF-06 (i.e. rad survey of the overburden, removal of contaminated material greater than the FRG and placement into the RPSSA, scraping of the remaining overburden, and then rad survey of the native TSF-06 soil) that has been performed to support the post-ROD sampling	Comment Noted: The RD/RAWP will document all field work at these two sites to support post-ROD sampling and will be included in section 2.9 of the RD/RAWP. All supporting documents will reference back to Section 2.9 of the RD/RAWP.
2	General	General	Please include air modeling (CAP-88) for the soils removal at TSF-26. This site is not currently included in the modeling.	Comment Noted: Work at TSF-26 soils removal will be included in the re-run of the air modeling software CAP-88.
3	General	General	Please revise section 5.2.9, Waste Management to provide additional clarification of the definition for the AOC and the definition of onsite for waste management purposes.	Comment Incorporated: Section 5.2.9 has been revised to read as follows: "Remedial actions planned at Test Area North under the OU 1-10 Record of Decision and this RD/RAWP will generate secondary waste, including industrial, low-level, and mixed waste. These waste streams will be managed within the CERCLA Area of Contamination (AOC) associated with the corresponding remedial actions. The AOC for the TSF-06 and TSF-26 sites, for waste management purposes, is shown in Figure 5-2. Treatment, storage, and disposal facilities within the boundaries of the INEEL (e.g. WROC, RWMC, ICDF) are considered to be onsite for the purpose of CERCLA waste management.

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DATE: June 21, 2000 **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
3 (cont.)				All waste streams generated as a result of the remedial action will be managed in accordance with the Waste Management Plan for TAN OU 1-10 Group 1 Sites Remedial Action (INEEL 2000b)."
4	General	General	Please revise the cost estimate and schedule based on current INEEL Detailed Work Plan.	Comment Incorporated: The RD/RAWP cost estimate and schedule will be modified based on the current INEEL Detailed Work Plan between the draft final and final.
5	General	General	Please modify the text where it references IDHW or DEQ to reflect the recent change to Idaho Department of Environmental Quality (IDEQ).	Comment Incorporated, the text will be modified.

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DATE: June 21, 2000 **REVIEWER:** DOE

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
6	General	General	Please revise the O&M Plan to improve the organization of Sections 3, 4, and 5 to more clearly address implementation requirements, inspection requirements, and reporting requirements for the four areas of ICs, EM, O&M, and 5-year reviews.	Comment Incorporated: Sections 3, 4, and 5 of the document have been revised to more clearly present: Section 3 - A description of the requirements for institutional controls, environmental monitoring, site specific operations and maintenance, and five-year reviews. Section 4 - A description of operations and maintenance implementation including organization and responsibilities and requirements for conducting monitoring, maintenance, inspections, and repairs. Section 5 - A summary of reporting requirements for institutional controls, environmental monitoring, site specific operations and maintenance, and five-year reviews. Section 1 has been revise to present the above summary of the subsequent sections.

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DATE: June 9, 2000 **REVIEWER:** IDHW/DEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
GENERAL COMMENTS				
1			In the OU 1-10 ROD, the Disposal Pond (TSF-07) discussion in the Description of Selected Remedies indicates that soil sampling will be performed at the pond for the same contaminants found in the TSF-05 injection well in order to support an NLCI determination for the TSF-07 surface soils. However, the RD/RA workplan does not describe any sampling to complete the task, or conversely, indicate why the task was not necessary. IDEQ/RCRA has indicated that an NLCI determination is only required for volumes of soil that are destined for disposal, and that is why NLCI sampling at TSF-07 was probably not discussed. However, an explanation is required in the appropriate section of this document explaining why this sampling will not be done, otherwise there is the appearance of non-compliance with the ROD.	The commentor is correct that an explanation is needed. A new second paragraph (above the note) will be added to Section 1.3.1.2 that states, "The OU 1-10 ROD states that no-longer contained-in (NLCI) sampling will be performed at the Disposal Pond (TSF-07). However, the IDEQ has indicated that a NLCI determination is used to remove RCRA waste codes for generated wastes. The Limited Action remedy at the Disposal Pond will not generate wastes that will require a NLCI determination for disposal. Therefore, a NLCI determination and NLCI sampling are not required for the Disposal Pond (TSF-07)."
Specific Comments				
1	Last bullet on page	P. 1-2	Please provide an estimate as to when the design drawings will be completed, i.e., will the results of the post-ROD sampling at TSF-06 Area B and TSF-26 be available in time to incorporate these results into the draft final of this document. A comment response will suffice rather than any changes to text.	The design drawings will not be incorporated into the final revision of this document. These drawings will be sent once available. The project team will provide these drawings to IDEQ and EPA as preliminary drawings for conference call discussion as soon as they are prepared. When the drawings are finalized they will be incorporated into the RD/RAWP through an INEEL Document Action Request (DAR).
2	Figure 1-2 and 1-3	P. 1-5 and 1-6	Realizing that this is a draft, please ensure in the final that the shading denoting the sites is more distinct.	Shading in Figures 1-2 and 1-3 will be darkened in future revisions of this document to ensure the contaminated areas are very distinct.

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DATE: June 9, 2000 **REVIEWER:** IDHW/DEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
3	Table 1-1	P. 1-7	For the FRGs shown, indicate in a footnote which FRGs are linked to a period of institutional control.	Due to the addition of Tables 1-1 and 1-2, the original Table 1-1 is now Table 1-3. Footnote "a" will be added following 23.3 pCi/g in the rows for the Soil Contamination Area South of the Turntable (TSF-06, Area B), Disposal Pond (TSF-07), and the PM-2A Tanks (TSF-26). Footnote "a" will state, "The final remediation goal of 23.3 pCi/g for Cs-137 at this site will allow unrestricted land use in 100 years. Therefore, institutional controls will be used at this site until it is available for unrestricted land use. The WAG 1 institutional control plan (DOE-ID 2000a) will implement all institutional control requirements for WAG 1."
4	1.2.1	P. 1-7	First paragraph -- The description (dimensions) of the Soil Contamination Area in this paragraph does not concur with the shaded area shown on Figure 1-2, which depicts a rectangular area along Snake Avenue (described in the second paragraph) rather than the triangular area described in this paragraph. It is assumed the narrative is describing the total area surveyed for contamination in Area B; regardless the narrative and figure do not concur, and a suggestion would be to add additional brief text to explain the difference between the text description and figure. An alternative suggestion would be to simply put the **reference to "(Figure 1-2)"** into the second paragraph after the dimensions for the contaminated area. Then the dimensions and text would appear to be more in agreement.	**First paragraph:** The major portion of the triangular area at TSF-06 Area B was remediated during the OU 10-06 removal action, and the remaining contamination is in a rectangular pattern along and under Snake Avenue, as indicated in Figure 1-2. However, the commentor is correct that Section 1.2.1 and the shaded area at TSF-06 Area B do not necessarily concur. Figure 1-2 will be revised in this RD/RAWP to indicate the triangular shape bounded by Snake Avenue on the south and formed by the former railroad track turntable on the north, the track on the east, and the road on the west will be shaded and labeled TSF-06 Area B. An additional label will be used to indicate a differently shaded area (the rectangular area currently shown as TSF-06 Area B in Figure 1-2) that is the remaining contamination at TSF-06 Area B. This shaded area will also include the section of Snake Avenue adjacent to TSF-06 Area B. It is correct that only the remaining contamination at TSF-06 Area B will be remediated.

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PROJECT DOCUMENT REVIEW RECORD

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DATE: June 9, 2000 **REVIEWER:** IDHW/DEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
4 (cont.)			Second paragraph -- this paragraph would be more comprehensive if it described the "contaminated soil/overburden/contaminated soil" stratigraphy as described by BBWI personnel in the May 17th WAG-1 weekly conference call. A discussion of the complexity of the stratigraphy of the contaminated soils would amply illustrate the need for the planned detailed surveys and verification sampling. Also, there is no reference to Snake Avenue or its potential removal, verification sampling, and replacement as part of the RA. This should be included here, and in other sections of the text where warranted. Third paragraph -- The final remediation goal (FRG) appears, from the narrative, to be 2.3 pCi/g which will negate the need for ICs, but is not consistent with the ROD. If so, then an explanation should be added as a footnote in Table 1-1 to qualify the apparent discrepancy between the text and Table. Also, please explain how this level will be detected (i.e. for the soil samples collected, what will be the detection limit and what will be the length (counting period) of the test or analysis).	**Second paragraph:** At the end of the second paragraph, (which is now after the third sentence) the following sentences will be added, "This additional soil, added in 1992, is referred to as the TSF-06 overburden, and the underlying contaminated soil is referred to as the TSF-06 native soil. Since 1992, the TSF-06 overburden has been contaminated with Cs-137 by windblown contamination from stockpiles at the PM-2A Tanks site (Section 1.2.3). Post-ROD sampling was performed on the TSF-06 overburden to identify the contaminated area. In order to complete post-ROD sampling, the TSF-06 overburden was removed; soil greater than the FRG was placed in soil bags for disposal and soil less than the FRG was stockpiled separately. Section 2.9.1 further explains the sampling and removal of TSF-06 overburden. Post-ROD radiological sampling of the TSF-06 native soil further identified areas that are greater than the 23.3 pCi/g Cs-137 FRG." Information regarding the potential contamination under Snake Avenue and it's planned removal and sampling will be added to the third paragraph. **Third paragraph:** The FRG of 2.3 pCi/g for TSF-06 Area B that is in this section of the RD/RAWP (and is also in the FSP) are incorrect and will be modified to 23.3 pCi/g. Through post-ROD sampling at TSF-06, it is believed that 2.3 pCi/g can not be achieved to preclude the use of institutional controls. Therefore, the FRG for TSF-06 Area B, as stated in the ROD, is 23.3 pCi/g, and institutional controls will be required. The third sentence in the paragraph will be changed to, "Contaminated soil exceeding the Cs-137 FRG of 23.3 pCi/g will be excavated to a maximum depth of 3 m (10 ft) bgs."

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DATE: June 9, 2000 **REVIEWER:** IDHW/DEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
4 (cont.)				To add information about possible contamination under Snake Avenue, and the Snake Avenue removal, new sentences will be added after the revised second sentence (above), which state, "Cesium-137 contaminated soil is suspected to extend underneath Snake Avenue. The TSF-06 remedial action will include removing the Snake Avenue asphalt, sampling the underlying soils for Cs-137, and excavating soils exceeding the Cs-137 FRG of 23.3 pCi/g under Snake Avenue, to a maximum depth of 3 m (10 ft) bgs."
5	1.2.4 Last paragraph	P. 1-9	Please note that the statement in the next to last sentence, "..., no excavation will be performed at the Fuel Leak site.", is dependent on the review of the RBCA analysis in Appendix G. This statement, here and elsewhere in this draft, may be subject to revision in the draft final based on the Appendix G review and subsequent, if any, changes required.	The commentor is correct that it is not yet finalized whether the Fuel Leak site will not require remedial action. However, after conversations with DEQ RBCA personnel, the project team believes the RBCA model is accurate and that it verifies the site does not require remedial action. No changes were made to the text.
6	1.3.1.1	P. 1-10	Please make the information provided here concerning the FRG consistent with the information provided in Table 1-1, or, as suggested in previous comments, footnoting the table.	The third sentence will be revised to, "Excavation will involve removal of soils above 23.3 pCi/g Cs-137 to a maximum depth of 3 m (10 ft), and includes contaminated soil that may be identified under Snake Avenue as part of the TSF-06, Area B remedial action."
7	2.2.2 Second bullet	P. 2-2	This statement is consistent with the Section 1.3.1.1 discussion, but is not consistent with Table 1-1. Please consider changes as noted in previous comments.	The second bullet will be revised to, "Excavation of contaminated soil exceeding the 23.3 pCi/g Cs-137 FRG, and storage of the waste in a CERCLA Storage Area until shipment to the disposal facility" The last bullet will be revised to, "Institutional controls will be required based upon the results of confirmation sampling at the completion of the remedial action."
8	2.6 Number 3	P. 2-4	A HWD should determine "where" waste generated from a remedial action will be disposed, not "when" the waste will be disposed.. If there is agreement, please change.	The second sentence in Item #3 was revised as suggested to, "This will determine where waste generated from the remedial action will be disposed."

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DATE: June 9, 2000 **REVIEWER:** IDHW/DEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
9	3.4.2	P. 3-2	Portions of this discussion are not clear. A suggested revision of the fifth sentence would be; "Where confirmation sampling of the excavated areas indicates that contamination greater than the FRG remains below the 3 foot depth, these areas will be backfilled with 0.5 feet of clean native fill, compacted, and reseeded, pending additional work during the Group II remedial action." Is the addition of a small amount of soil where contamination is still present after the excavation being done to reduce any more windblown contamination, and what will be the fate of these areas during the Group II work? Also, it is not clear as to how this will impact the tank vicinity surface area Reading this section literally, it appears that a depression will result that could facilitate infiltration down and around the PM-2A tanks through an area of potential soil contamination. Please elaborate on this	The fifth sentence was revised for clarity, and now states, "Where confirmation sampling of the excavated areas indicates that contamination greater than the FRG remains below 3 m (10 ft) from surrounding land surface elevation, these areas will be backfilled with 0.15 m (0.5 ft) of clean native fill, pending additional excavation or backfilling during the Group 2 remedial action." The commentor is correct that this small amount of soil will be placed over remaining contaminated soil to prevent further windblown contamination. This small amount of fill will be excavated during the Group 2 remedial action and will be considered contaminated. A column of Cs-137 soil contamination is already known to exist to at least 17 ft with Cs-137 concentrations that are above the FRG of 23.3 pCi/g but that do not pose a risk to groundwater. The infiltration may drive the contaminated soil column somewhat deeper, however, institutional controls will be needed at this site and preventing this infiltration is not necessary
10	Table 4-4 (ARARs)	P. 4-12	Table 4-4 lists "Tank Closure and Post Closure Care" (40 CFR 264 197(a)) with a footnote. The footnote states "This ARAR will not be applicable if a no-longer contained in determination is approved by IDHW for the site." However, there is no plan to sample to the depths necessary to completely evaluate potential releases from the tank The HWMA/RCRA tanks closure care is applicable and sampling must be performed along the sidewalls and/or beneath the tanks to evaluate potential releases from the tanks. As any actions such as this will be more appropriately associated with the Group II sites Work Plan, this issue is not necessarily relevant for Group I, but needs to be resolved prior to the issuance of the Group II draft RD/RA workplan.	This ARAR will have footnote "b" removed and a footnote "c" will be added following "Tank Closure and Post Closure Care". Footnote "c" will state, "The compliance strategy for this ARAR will be addressed in the OU 1-10 Group 2 RD/RAWP." Also, the compliance strategy for this ARAR will be deleted and N/A will be placed in this column.
11	Figure 5-1	P. 5-3	*The start and finish for line 49 represents only 22 days for comment resolution* and incorporation for a primary document, less than half the time provided in the FFA/CO. If this figure is meant to represent a working schedule, it should be stated in the title.	This figure was meant to represent a working schedule for this Group 1 RD/RAWP. An updated schedule will be provided in the draft final revision of this document with project working schedules for post-ROD sampling (completed), preparation of this RD/RAWP (in progress), and the remedial action.

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DATE: June 9, 2000 **REVIEWER:** IDHW/DEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
12	Table 5-1	P. 5-4	The time frames for the Remedial Design steps in this table do not concur entirely with the time frames shown in Figure 5-1, and are not entirely consistent with this being a primary document. Please explain.	This table shows the enforceable date of the Draft submittal of this RD/RAWP and the associated FFA/CO review periods, which are different than the project working schedule shown in Figure 5-1. This table will also be updated in the draft final revision of this document.
13	Appendix D	P. D-1 to D-2	The following are specific comments associated with this appendix: 1. Page D-1, fourth paragraph: The assumption is made that organic contaminants would not migrate via the air pathway. This is incorrect since organic contaminants can migrate by evaporation or coalescing with particulate matter that becomes airborne. 2. Attachment D1, page D1-1, second assumption: The average percentage of silt in the applicable soil is cited as 4.7%. Please indicate how this information was determined. 3. Attachment D-1, page D1-1, Table D1-1: The average vehicle weight was determined with the exclusion of the 14 dump trucks. Indicate what assumption was made to exclude the dump trucks from the overall average weight.	1. This paragraph has been revised as follows: "The contaminant of concern (COC) for the TSF-06 and TSF-26 site is Cs-137, as identified in the OU 1-10 Remedial Investigation/Feasibility study. The maximum concentration as reported in the RI/FS is 150 pCi/g at the TSF-06 site and 4400 pCi/g from the TSF-26 site. These activities were used to estimate emissions for both Cs-137 and its daughter Ba-137m. Based on process knowledge, the PM-2A Tanks received waste that contained trichloroethene, 1,1,1-trichloroethane, and carbon tetrachloride. These constituents were sampled for and analyzed during the port-ROD sampling at the TSF-26 stockpiles and wooden box. All three of these constituents were non-detect and therefore, only the radionuclide/particulate emissions were modeled for these sites. 2. Based upon samples previously taken at TAN, the average silt percentage is 8.07% and this revised number will be used in the CAP-88 model. 3. The dump trucks will be eliminated from the model re-run due to the fact that the dump trucks will not enter the exclusion zone and will not drive over the contaminated soil.

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DATE: June 9, 2000 **REVIEWER:** IDHW/DEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
13 (cont.)			4. Attachment D-1, page D1-2: The section of AP-42 utilized for calculating emissions from unpaved roads that was utilized in the calculations was dated 01/95 and 01/96. The most recent revision, dated 09/98, should be utilized. The emission factor, E, is determined by the following equation: $E = \frac{k(s/12)^a (W/3)^b}{(M/0.2)^c}$ where k, a, b, and c are particle size specific. 5. Attachment D2: In order to reproduce the CAP88-PC modeling calculations, additional input parameters such as Run Options, Source Data, and Ag Data should be included. In addition to this information, the met data (WNDFILES) for Test Area North should also be included.	4. The most recent AP-42 equation will be used.. 5 All input screen printouts will be provided in the Draft Final revision of this document.
14	Appendix G	P. G1-7 to G1-8	WRRTF-13 Post-ROD Sampling Data and RBCA Analysis Based on the results of the RBCA analysis in Appendix G, DOE states elsewhere in the document (see Specific Comment 5) that "no excavation will be performed at the Fuel Leak site. However, in reviewing the RBCA print-outs in Appendix G, the following problems associated with the analysis were found: On Page G1-7, *Complete Pathway(s) and Route(s) of Exposure*, it is indicated in the "Protection of Groundwater" category that the groundwater is a class 2. This is not correct. Groundwater in the Snake River Plain aquifer is a Class 1 groundwater.	Groundwater class 2 was chosen for the model based upon significant INEEL groundwater modeling experience. Groundwater class 2 flow is at a rate of approximately 1 ft/day. Actual Snake River Plain Aquifer flow at the INEEL is known to be approximately 4.5 ft/day. Groundwater class 2 is a more conservative assumption to use than the true known flow rate. In the June 27, 2000 conference call with Mr. Bruce Wicherski of IDEQ, the groundwater class 2 assumption was discussed and agreed to be acceptable for use in the Appendix G RBCA model.

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DATE: June 9, 2000 **REVIEWER:** IDHW/DEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
14 (cont.)			On Page G1-8, *Exposure Parameters for Routes of Exposure*, the "Exposure Frequency" for the days of exposure per year were cut to 180 days which it states are the Tier 1 default parameters. This is incorrect. Table 6-1 of the Idaho RBCA manual provides "350 days" for a Tier 1 default for the exposure frequency. It is recommended that the parameters that were used be reviewed, and the model be rerun with the suggested changes and submitted again for DEQ review.	The commentor is correct that Table 6-1 of the Idaho RBCA manual provides 350 days for a Tier 1 default for the exposure frequency for surficial soil. However, the Idaho RBCA model uses 180 days for a Tier 1 default for the exposure frequency for surficial soil. It was confirmed with Mr. Bruce Wicherski of IDEQ during the June 27, 2000 conference call that 180 days for a residential scenario, and 40 days for a commercial scenario are the correct numbers for surficial soil. No changes were made to the RBCA model. The June 27, 2000 conference call with Mr. Bruce Wicherski of IDEQ provided guidance on several aspects of textual explanation provided as page G-1 in Appendix G. This page will be revised for the draft final revision of this RD/RAWP.
Field Sampling Plan				
15	General		Discuss the fact that there appears to be no discussion of the sampling or analyses for the portion of Snake Avenue adjacent to TSF-06 that will be surveyed for contamination. This omission was also noted in the RD/RA Workplan. This discussion would be pertinent to several sections of this document, as in the RD/RA Workplan.	This FSP primarily addresses confirmation sampling at TSF-06 Area B, and also that portion of TSF-06 that extends underneath Snake Avenue. Please note in Table 3-1 that soil sampling underneath Snake Avenue is discussed and is included with the TSF-06 Area B site. The commentor is correct that information regarding pre-excavation sampling is not included in this FSP, and should be included to identify areas underneath Snake Avenue that exceed the FRG. A new first paragraph will be added to Section 1.1.1 that states, "Pre-excavation sampling underneath Snake Avenue will be conducted during the remedial action to determine the extent of contamination and the volume requiring excavation. Sampling will be conducted after the removal of the Snake Avenue asphalt adjacent to TSF-06 Area B. The asphalt will be scanned by radiological control (RADCON) personnel to determine whether it is contaminated. The Cs-137 contaminated soil underneath the asphalt will be located and delineated using a 3-step sampling approach to identify areas with Cs-137 concentrations greater than the final remediation goal (FRG) of 23.3 pCi/g. The first two sampling steps

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15 (cont.)				involve the use of field screening instruments, described in detail later in this document. Biased samples (determined from the results of the first two field screening sampling steps) will be taken and submitted for a 20-minute gamma spectrometric analysis to identify areas requiring excavation." A new row will be added to Table 3-1, similar to the first row in Table 3-1 from the OU 1-10 post-ROD FSP that lists the data quality objectives for the 3-step sampling that will be conducted underneath the Snake Avenue asphalt. Section 4.2.1 will be revised and divided into two subsections, Section 4.2.1.1 titled "Pre-excavation Soil Sampling Under Snake Avenue" and Section 4.2.1.2 titled "Confirmation Sampling". The opening paragraph of Section 4.2.1 will be changed to, "Two types of sampling will be conducted at the Soil Contamination Area South of the Turntable (TSF-06 Area B): (1) pre-excavation soil sampling under Snake Avenue, and (2) confirmation sampling following removal of contaminated soil, including underneath Snake Avenue. The following sections detail the remedial action sampling activities that will be conducted for the Soil Contamination Area South of the Turntable (TSF-06 Area B)." The new Section 4.2.1.1 will be modeled after Section 4.2.1.1 in the post- ROD FSP since this is the same sampling methodology that will be used. The new Section 4.2.1.2 will contain the information that is currently in Section 4.2.1. The sampling and analysis plan tables that are in Appendix A will include additional sample locations for the pre-excavation sampling under the Snake Avenue asphalt. In addition, more text will be included throughout the document that makes it very clear that confirmation sampling will be performed for both TSF-06 Area B and the soil underneath Snake Avenue.

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16	General		It is assumed that the field screening and soil sampling described throughout this document, such as in Section 6.0 for example, is for verification or confirmation of the Remedial Action meeting the FRG. However, the narratives on this point are not always clear, and a minimal addition of text explanation would help at times in explaining exactly what will be accomplished by work such as field screening or soil sampling.	The three objectives of the FSP are: (1) determine areas underneath Snake Avenue that require excavation to meet the 23.3 pCi/g Cs-137 FRG, (2) verify remedial action excavation met the FRG of 23.3 pCi/g Cs-137 at TSF-06 Area B, including underneath the Snake Avenue asphalt, and (3) verify remedial action excavation met the FRG of 23.3 pCi/g Cs-137 at TSF-26 in the Group 1 excavation to a maximum depth of 3 m (10 ft) below surrounding land surface (remainder of TSF-26 will be addressed in Group 2 remedial action). All sampling will be performed for Cs-137 and will use field screening to identify the "hottest" areas, or areas with the most Cs-137 contamination, prior to taking a physical sample. This information will be included in Section 1.1 and will also be incorporated throughout the document to ensure the purpose of the sampling is very clear.
17	1.1.4	P. 1-2	The Fuel Leak site *may* not require RD/RA sampling, but that is conditional based on the final version of the RBCA modeling (Appendix G of the Workplan) for this site, which continues to be under review.	The commentor is correct that it is not yet finalized whether the Fuel Leak site will not require remedial action and subsequent RD/RA confirmation sampling. However, after conversations with DEQ RBCA personnel, the project team believes the RBCA model is accurate and that it verifies the site does not require remedial action and subsequent RD/RA confirmation sampling. Section 1.1.4 will be modified to state, "The Fuel Leak site (WRRTF-13) will not require RD/RA sampling because site concentrations are below risk-based levels determined from the State of Idaho Risk Based Corrective Action (RBCA) guidance. Details of the RBCA analysis are further discussed in Appendix G of the Group 1 Remedial Design/Remedial Action Work Plan (RD/RAWP) (DOE-ID 2000). Therefore, the Fuel Leak site (WRRTF-13) will not be addressed further in this FSP."

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18	2.1.1	P. 2-4	The comments for this section are the same as can be found for Specific Comment 4 of the RD/RA Workplan. Briefly, the narrative describing the contaminated areas and the corresponding areas on Figure 2-3 do not necessarily concur; the discussion appears to infer that the apparent site boundaries are the same as the area of contamination to be remediated, but Figure 2-3 indicates a rectangular (shading) area to be remediated.	The major portion of the triangular area at TSF-06 Area B was remediated during the OU 10-06 removal action, and the remaining contamination is in a rectangular pattern along and under Snake Avenue, as indicated in Figure 2-3. However, the commentor is correct that Section 2.1.1 and the shaded area at TSF-06 Area B do not necessarily concur. Figure 2-3 will be revised in this FSP to indicate the triangular shape bounded by Snake Avenue on the south and formed by the former railroad track turntable on the north, the track on the east, and the road on the west will be shaded and labeled TSF-06 Area B. An additional label will be used to indicate a differently shaded area (the rectangular area currently shown as TSF-06 Area B in Figure 2-3) that is the remaining contamination at TSF-06 Area B. This shaded area will also include the section of Snake Avenue adjacent to TSF-06 Area B. It is correct that only the remaining contamination at TSF-06 Area B will be remediated.
19	2.3.1 Second Paragraph	P. 2-7	The last part of the first sentence, "which includes potentially underneath the adjacent road, Snake Avenue." is not clear and needs to be revised.	The dimensions given address both the TSF-06 Area B contamination and the potential contamination that may exist in the soil under Snake Avenue. This sentence, which is now moved up into the end of the first paragraph of Section 2.3.1, will be revised to, "Although previous removal actions were executed in the Soil Contamination Area South of the Turntable under OU 10-06, Cs-137 contamination remains within an approximately 30.5- by 152-m (100- by 500-ft) area, which includes potentially contaminated soil underneath the adjacent Snake Avenue."

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20	2.3.2 Second Paragraph	P. 2-8	The significance of the depth of 0-2ft for the "remaining surface soils" is not understood. The depth in the WP to be potentially remediated is consistently referred to as approximately 0 to 3ft bgs. Please clarify.	This paragraph does not adequately address the current nature and extent of contamination at TSF-26, which is the intent of this section. Therefore, this paragraph will be revised to, "Contaminated soil was removed at the PM-2A Tanks in 1996 as part of the OU 10-06 removal action. Three soil stockpiles and the wooden box remained at the PM-2A Tanks site following the OU 10-06 removal action. During OU 1-10 post-ROD sampling conducted in March and April 2000 at the PM-2A Tanks, it was determined these stockpiles and wooden box created an occupational hazard to TAN workers due to windblown spread of contamination. The stockpiles and wooden box were placed in soil bags to eliminate the possibility of windblown contamination. The soil bags were moved to a CERCLA Storage Area at the Radioactive Parts Security Storage Area (RPSSA), which is within the AOC for both TSF-26 and TSF-06. Post-ROD radiological sampling further identified areas within the PM-2A Tanks site that are greater than the 23.3 pCi/g Cs-137 FRG. Further information about the post-ROD sampling activities are described in Section 2.9 of the Group 1 Remedial Design/Remedial Action Work Plan (RD/RAWP) (DOE-ID 2000)."
Operations And Maintenance Plan				
21	3.1, fifth sentence	3-1	The last part of the sentence, "... hypothetical current or future residential scenario" should be changed to "... hypothetical current *industrial* or future residential scenario".	Institutional control determinations in the OU 1-10 Record of Decision were based upon risk less than 1E-04 for current and future industrial scenarios, and also for current and future residential scenario. Although it is understood that DOE will manage the land use at the INEEL for the next 100 years, this in itself is a form of institutional control, by restricting the land use to industrial. Therefore, institutional control determinations also considered current residential scenarios. This sentence will be changed to, "Institutional controls will not be required if all contaminated media are removed to basalt, if contamination concentrations are comparable to local background values, or if residual concentrations are less than or equal to a 1E-04 risk-based soil concentration for a hypothetical current or future residential scenario, or current or future industrial scenario (DOE-ID 1999)."

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22	3.2, fourth sentence	3-1	Please explain the significance of the year 2071 in terms of the year sampling is to be performed to determine if the Disposal Pond can be released for unrestricted land use.	The average concentration used in the RI/FS to evaluate the Disposal Pond (TSF-07) site was 14.5 pCi/g. The samples from the site were taken from 1988 to 1991. The Cs-137 concentrations in the Disposal Pond will decay to acceptable levels for unrestricted land use (2.3 pCi/g) in 80 years. Since the last samples were taken in 1991, 80 years from 1991 is the year 2071. Therefore, the average concentrations in the Disposal Pond are expected to decay to 2.3 pCi/g by the year 2071. The sampling that is described for year 2071 will confirm that the site is available for unrestricted land use, and that the limited action was successful. The sentence will be revised to, "Selected sampling will be performed at the Disposal Pond in Year 2071 (date when average concentrations for Cs-137 are expected to decay to 2.3 pCi/g for unrestricted land use) to determine if the site can be released for unrestricted land use."
23	5.1	5-1	There appears to be a lack of specificity in this section, and the following sections, under "Reporting Requirements". Rather than go into detail on this, refer to for example the equivalent sections in the O&M Plan for TRA, OU 2-13, specifically Section 4. Inspection and Maintenance. In this section can be found "Table 4-2 Summary of the OU2-13 inspection schedules". This table summarizes both the inspections (what will be inspected) and the frequency per the specific inspections. This example of specificity is more informative than what is presented in the OU 1-10 O & M Plan.	Section 5.1 is intended to provide the reporting requirements for inspection activities and should not include information about the frequency or type of inspections. Rather, Section 4.2.1 should contain this information. Therefore, to revise Section 5.1, the first two paragraphs will be moved and placed in Section 4.2.1 and the revised Section 5.1 will contain only the last paragraph of the section, which discusses the inspection reporting requirements. Table 4-1 was modeled after the OU 2-13 O&M Plan and is designed to give the inspection schedule for OU 1-10 sites.
Waste Management Plan				
24	3.1.1 Last paragraph	3-2	The discussion for TSF-06 Area B (specifically sentence 3 of this paragraph) is not consistent with the RD/RA Workplan nor the Field Sampling Plan in that there is no reference to an FRG of 2.3pCi/g as a clean-up goal that will preclude the use of institutional controls at this site. Please change or explain why this is different.	The FRG of 2.3 pCi/g for TSF-06 Area B that was in the RD/RAWP and FSP were incorrect and will be modified to 23.3 pCi/g. Through post-ROD sampling at TSF-06, it is believed that 2.3 pCi/g could not be achieved to preclude the use of institutional controls. Therefore, the FRG for TSF-06 Area B, as stated in the ROD, is 23.3 pCi/g, and institutional controls will be required. No text was modified.

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25	3.1.4	3-3 and 3-4	This discussion is very comprehensive in that it presents a complete picture of the work that may occur at WRRTF-13, including the potential excavation and land farming of the diesel contaminated soils, and subsequent confirmation sampling. However, the last paragraph of this section on page 3-4 should state that the sampling and excavation *may* not be required based on the results of the RBCA evaluation. The outcome of that evaluation is still pending the review of Appendix G of the draft RD/RA Workplan.	All text in Section 3.1.4 will be deleted except the last paragraph.

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GENERAL COMMENTS				
1	WAG 1 schedule		A brief summary of the proposed grouping of source areas, and the timetable for cleanup of each, would show the logical sequence in the overall cleanup of WAG 1. Although Section 1 groups sources at OU 1-10 into two groups, it does not state that these are indeed Group 1 and Group 2 sources, or what the proposed timetable is for cleanup of each group. Please add this information.	Comment incorporated: The last paragraph on page 1-1 incorporated comment and has been modified as follows: The purpose of the RI/FS was to ...The selected remedies, as identified in the ROD, are specific to each site. Of the eight sites requiring remedial action under the OU 1-10 ROD, four are addressed in this Comprehensive Remedial Design/Remedial Action Work Plan for the Test Area North, Operable Unit 1-10, Group 1 Sites. These sites and the planned remedial action start dates as outlined in the OU 1-10 RD/RA Scope of Work are in Table 1-1. SITE — Start Date Soil Contamination Area South of the Turntable (TSF-06, Area B) — May 22, 2001 Disposal Pond (TSF-07) — November 14, 2000 PM-2A Tanks (TSF-26) soil excavation. — May 22, 2001 Fuel Leak site (Water Reactor Research Test Facility [WRRTF]-13). — April 2, 2001 However, as identified in Section 1.3.1.4 of this RD/RA WP, remedial action at WRRTF-13 will not be required. These schedules in no way preclude starting the remedial action at these sites earlier than planned, nor provide an enforceable schedule to start the remedial action.

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1 (con't)				The remaining sites, in addition to the PM-2A Tank content removal, will be addressed in the Comprehensive Remedial Design/Remedial Action Work Plan for the Test Area North, Operable Unit 1-10, Group 2 Sites scheduled to be submitted to the Agencies as a primary Draft June 2001. The Group 2 sites addressed and the planned remedial action start dates as outlined in the OU 1-10 RD/RA Scope of Work are in Table 1-2. For the OU 1-10 Group 2 sites, the schedules may be modified further in the Group 2 sites RD/RAWP. SITE — Start Date Intermediate-Level (Radioactive) Waste Disposal System (TSF-09) — October 15, 2002 Contaminated Tank Southeast of Tank V-3 (TSF-18) — October 15, 2002 PM-2A Tanks (TSF-26) tank content Removal. — August 20, 2002 TSF Burn Pit (TSF-03) — March 23, 2004 WRRTF Burn Pits I, II, III and IV (WRRTF-01) — March 23, 2004

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2	RBCA Analysis		A Tier II RBCA analysis was done without a prior Tier-0 or Tier-1 RBCA analysis. While the RBCA guidance manual for the State of Idaho (Idaho 1996) recommends Tier 0 and Tier-1 as preliminary screening, a Tier II should adequately evaluate risks from petroleum contamination for the purpose of this RD/RAWP. However, text should include discussion of the pathways of concern, and the future uses anticipated at this site. This would clarify how this analysis was done, and what the Tier II results mean.	Comment noted. Section 1.2.4 last paragraph, last two sentences were deleted and three new paragraphs with the following text was added: Post-ROD sampling at WRRTF-13 began February 28, 2000 and concluded March 2, 2000. The sample locations and sampling approach are given in the post-ROD field sampling plan (DOE-ID 2000c). Seven borehole locations were selected based on site history to bias the samples toward areas of highest contamination. Borehole 1 was placed at the former location of tank TAN-738, which was known to have leaked, Borehole 2 was placed adjacent to tanks TAN-738 and –739. Boreholes 3 through 6 were placed along transfer piping that was known to have leaked. Finally, Borehole 7 was placed at the former location of tank TAN-787. A Risk Based Corrective Action (RBCA) analysis was performed on the data received from the analytical laboratory. The maximum concentration of each detected contaminant from all the samples collected were compared to the State of Idaho RBCA Tier 0 and Tier 1 screening concentrations. The maximum concentrations from this site exceeded both the Tier 0 and Tier 1 RBCA screening concentrations. To complete the RBCA analysis a Tier 2 evaluation was done using the RBCA Software (State of Idaho RBCA Tier 2 Software Ver 1.0 July 1997). Input data to the RBCA software included: maximum concentrations, current land use is occupational, future land use will be residential, no surficial contaminated soil (which precluded calculating resident child risks due to soil ingestion), and identifying that the groundwater class is 2 since this flow rate is closer to the Snake River Plain Aquifer flow rate. The output for this evaluation is provided in Appendix G. As presented on page G1-1, the cumulative risk at this site for the residential scenario is 1.17E-08 and the cumulative Hazard Index (HI) is 0.96. The cumulative risk for an industrial scenario is 2.65E-09 and the cumulative HI is 0.42. The Subsurface Soil Indoor Inhalation exposure pathway is the main contributor to the cumulative HI. The results of the RBCA Tier 2 analysis are below the Tier 2 evaluation criteria of 1E-05 cumulative risk and a HI of 1.

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3	Excavated Materials		This RD/RAWP does not state whether the contaminated soils will be staged on-site after excavation, or immediately loaded for transport to the receiving facility (ICDF, RWMC, or other). If there is to be any intermediate staging, this RD/RAWP should describe how this staging will occur so that soils at the staging area are unaffected by contaminants in the staged soil. Also, please state whether staging will be the responsibility of the contractor or the subcontractor, and reflect this information in the specifications and the cost analysis.	Comment Noted: The soil will be stored until shipment to a disposal facility. The second bullet in section 2.2.2 and section 2.2.4 is modified as follows: • "Excavation of contaminated soil exceeding the 23.3 pCi/g Cs-137 FRG, and storage of the waste in a CERCLA Storage Area until shipment to the disposal facility" Setting up the CSA will be the responsibility of the BBWI contractor. Based on the current planning, the excavation and disposal of the contaminated soil at TSF-26 and TSF-06 will be done by the BBWI contractor. A subcontractor will be used to replace the road.
			Also, will excavated materials be sampled for contaminants? From the text, it appears that confirmation samples only will be collected from the excavation. The receiving facility may have sampling and analysis requirements prior to receipt of materials for disposal. Please clarify whether excavated materials will be sampled for any analysis prior to disposal. It is assumed that discussions with the proposed receiving facilities are ongoing, and that those facilities' needs for any additional sampling and analysis are known at this time; however, please include this information in the RD/RAWP. Also please state whether such sampling is the responsibility of the contractor or the subcontractor, and, if appropriate, reflect this responsibility in the specifications and cost analysis.	Comment Noted: The excavated soil may be sampled either as in-situ or ex-situ to obtain a No-longer Contained-in determination if needed from the State of Idaho IDEQ. Currently the waste profiles have been given to the RWMC and ICDF and both of them are able to take the waste that will be generated from these sites. The sampling will be conducted by the contractor (BBWI), and since the excavation and the sampling will be performed by the BBWI contractor the specifications do not need to be modified. The cost estimate has been modified to be consistent with the most current INEEL Detailed Work Plan

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4	Appendix D		A. The air emissions modeling is based on emission calculations using outdated equations from AP-42. Emission factors calculated using the most current version of AP-42 (Section 13.2.2, dated 9/98) results in significantly higher emission factor values. These higher emission factor values would be expected to result in higher predicted ambient concentrations and higher body burdens and risks predicted by the CAP-88 model. The entire analysis should be redone using the most recent version of AP-42.	Comment Incorporated: The most recent AP-42 equation will be used. The modeling will also includes air emissions from the PM-2A surficial soils removal.
			B. Using the equations and parameter values presented in Attachment D1, it was not possible to recreate the emission factors for unpaved roads or for pickup and dropping. If re-analysis is performed (as suggested in the previous comment), these values would be expected to change. However, sufficient information should be submitted so that these emission factors can be recreated, whether the analysis is redone or not.	Comment Noted: This information has been included to facilitate recreating emission factors.
			C. The air emissions model assumptions include a dust suppression rate of 95% based on a water application rate of 0.5 l/m^2. Part 3, Section 3.3 of Appendix B, however, makes no such requirement on the contractor, and appears to suggest that the use of water spray is at the discretion of the contractor, providing that he "minimizes the creation and emission of dust." Section 3.3 of Appendix B should be revised to ensure that dust suppression at the required rate of removal will be achieved by the contractor. The section also mentions to the contractor's use of "visual observation," but Section 5.2.8 of the main body of the document indicates that a radiation control engineer and CIH will specify air monitoring requirements, including perhaps wind monitoring. Appendix B should be revised to eliminate this ambiguity.	Comment Noted: Dust suppression was not included in the CAP88-PC re-run to demonstrate the worst case scenario. Even without dust suppression the exposure is below acceptable levels. However, due to INEEL procedures, dust suppression will be implemented to control fugitive dust.
			D. Input parameters for CAP-88 were not provided, and therefore the calculations could not be checked. If a re-analysis is submitted, the CAP-88 input parameters should be provided to allow for independent verification of the predicted concentrations, body burden, and associated risks.	Comment Incorporated: Input parameters for CAP88-PC have been included in Appendix D

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Specific Comments				
1	1.2.2	P. 1-7	This section describes the Disposal Pond (TSF-07). The description states that the Disposal Pond is 35 acres in size. Further descriptions state the following sub-areas within TSF-07: 30 acres that never received wastewater, 2.5 acres that are still in use, and 5 acres in the northeast corner on the eastern edge of the pond which is contaminated. This totals to 37.5 acres, not 35 acres. Please explain the difference between the total area, and the sum of the sub-areas (possibly a typo?).	Comment Noted. This section has been modified as follows. The Disposal Pond is a 14-ha (35-acre), unlined disposal pond in the southwest portion of TSF. The Disposal Pond is surrounded by a 1.5-m (5-ft) tall berm. Based on available field screening data, 12-ha (30-acre) of Disposal Pond have never received wastewater and is not contaminated. The remaining 2-ha (5-acre) in the northeast corner and on the eastern edge of the pond has been contaminated with Cs-137 and metals. However, it was assumed in the RI/FS that the area of contamination covers the entire main pond and overflow pond surfaces. Previous sampling activities indicate that the Cs-137 has migrated to approximately 3-m (11-ft) below the bottom of the pond in this area. Historically, the pond received sanitary waste discharges, low-level radioactive waste, industrial wastewater, and treated sewage effluent. The Disposal Pond replaced the TSF-05 Injection Well, and began receiving wastewater in September, 1972. The pond received wastewater from a variety of sources that included sanitary waste discharges, low-level radioactive waste, cold process water, and treated sewage effluent that originated from TAN service buildings and processes. Current discharges to a 1-ha (2.5 acres) portion of the Disposal Pond are permitted by the State of Idaho to receive sanitary and industrial waste (DOE-ID1997a). In addition a section of the pond was portioned in 1992-1993 for discharge of treated effluent from the *TSF-05 Injection Well Contaminated Groundwater OU 1-074 Interim Action* (DOE-ID 1997b). This active portion of the pond will undergo assessments when operation cease. The last paragraph of section 1.2.2 remains unchanged.

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2	1.2.3	P. 1-8	This section describes the PM-2A Tanks Site Soil Contamination Area (TSF-26). Text at the bottom of the page states that remaining remedial actions at this site will be performed under a subsequent work plan. For completeness, the text should state what remedial actions remain at this site after cleanup of the PM-2A Tanks Site Soil Contamination Area.	Comment Incorporated: In the fifth paragraph of this section, the text has been modified as follows: The PM-2A Tank remedial action that will occur under this work plan will be placement of clean fill material over the entire area to mitigate further contaminant migration until remedial action at this site can occur, and excavation and disposal of soils greater than the FRG of 23.3 pCi/g Cs-137, to a maximum depth of 3 m (10 ft). The remaining remedial action at this site will include removal and disposal of the tank contents, decontamination of the tanks, filling the tanks with inert material, and backfilling the PM-2A area to surrounding contours. This remaining work will be performed under the Group 2 RD/RAWP. Waste management for this site will depend upon a no-longer contained-in determination, which will be prepared and submitted to IDEQ.
3	1.3.1.4	P. 1-10	Recommend that the text be revised to reflect the current understanding of the site, specifically in regards to the risk posed and action required.	Comment Incorporated: This section has been modified as follows: **Fuel Leak Site (WRRTF-13).** The selected remedy for the Fuel Leak site is Excavation and Land Farming of contaminated soil exceeding the FRG. Post-ROD sampling was conducted at this site as discussed in Section 1.2.4 of this RD/RAWP. Based on the sample results and the current and future land use assumptions for this site, the RBCA Tier 2 evaluation as presented in Appendix G, requires no remedial action activities. Therefore, remedial action at the WRRTF-13 site will not be discussed any further in this document.
4	2.2.2 and 2.2.4	P. 2-2 and 2-3	These two sections describe design criteria for TSF-06, Area B, and for the PM-2A Tanks. Soil at TSF-06, Area B will be excavated to remove contaminated soils exceeding 2.3 picocuries per gram (pCi/gm), while soils at PM-2A will be excavated to remove contaminated soil exceeding 23.3 pCi/gm. In both cases, removal of surface soil is involved, and the contaminant of concern in both cases is cesium-137. Please explain the difference in the targeted concentrations in cesium-137.	Comment noted: Please refer to EPA General Comment #3 resolution.

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5	2.2.2	P. 2-2	Last bullet. This bullet should be removed since the clean up level has been changed	Comment noted: Please refer to IDEQ Specific Comment #7 for the RD/RAWP.
6	2.7.4	P. 2-6	Update this section to reflect the new knowledge of the site.	Comment noted: This section has been deleted per the new text in Section 1.3.1.4 which states that there is no need for remedial action based on post-ROD sample analytical results.
	2.9.1	P. 2-6	This section summarizes post-ROD sampling at TSF-06, which was contaminated through windblown deposition of contaminated soils from the PM-2A tanks area. Text in this section states that waste material from this location (including sampling wastes and PPE) are suspected to contain trichloroethene, 1,1,1-trichloroethane, carbon tetrachloride, and acetone. Please explain the reason why these contaminants are suspected; would it be from the PPE and sampling wastes?	Comment Noted: This site has been identified as being contaminated by windblown from the PM-2A site. Through process knowledge, the PM-2A site has received these constituents. Even though these are VOCs and are unlikely to be in the soil at TSF-06, the State of Idaho IDEQ would not allow that these be removed. These constituents carry a RCRA waste codes of F001 and the soil in this area is considered to be RCRA listed until a no-longer contained-in determination is granted by IDEQ. It also needs to be noted that this section has been modified to reflex the work that has already been conducted at this site. Modifications to Section 2.9.1 and 2.9.2 are as follows: **2.9.1 Soil Contamination Area South of the Turntable (TSF-06, Area B)** During post-ROD sampling activities it was identified through investigations with TAN Operations personnel and research into the history of the site, that the remaining contamination in the 152 m (500 ft) by 15 m (50 ft) area (not including the road), had 0.3 m (1 ft) to 0.6 m (2 ft) feet of clean fill material placed in this area by TAN Operations Radiation Control to shield from radioactive material. This overburden material was rad surveyed using the procedure as identified in the post-ROD field sampling plan (DOE-ID 2000c) and contaminated material with concentrations greater than the FRG of 23.3 pCi/g Cs-137 was removed, placed into soil bags, and is being stored in the Radioactive Part s Security Storage Area RPSSA at TAN as a potentially mixed and PCB waste until

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7 (con't)				shipment to a disposal facility on or off the INEEL occurs. The potential presence of PCBs will be managed according to 40 CFR 761.50 (b)(7)(ii). The contamination in the overburden came from windblown contamination from the PM-2A soil stockpiles. Once a NLCI determination is obtained for the stockpiles a NLCI determination for the overburden material will be generated based on the soil stockpile data and will be disposed of as low-level waste only. A total of approximately 270 m^3 (350 yd^3) of contaminated material was removed and the remaining overburden material that was below the FRG for Cs-137 was scraped to the side to facilitate post-ROD rad surveying of the native soil. The rad survey of the native soil will identify areas where the soil concentration exceeds the FRG of 23.3 pCi/g Cs-137. **2.9.2 PM-2A Tanks Site Soil Contamination Area (TSF-26)** Post-ROD sampling activities at the PM-2A Tanks will include sampling and analysis for: (1) three soil stockpiles, (2) wooden box, and (3) Cs-137 contamination delineation. Waste material generated at the PM-2A Tanks, including personal protective equipment PPE and sampling wastes, will be managed as potentially RCRA-listed (F001) waste, due to the suspected presence of trichloroethene, 1,1,1-trichloroethane, and carbon tetrachloride. The potential presence of PCBs will be managed according to 40 CFR 761.50(b)(7)(ii), taking into account the results of post-ROD PCB sampling at the site. The following subsections further describe each of the three sampling activities at the PM-2A Tanks. ***2.9.2.1 Soil Stockpiles.*** Three soil stockpiles remain at the PM-2A Tanks after the 1996 OU 10-06 removal action. Sampling data will be used to support a no-longer contained-in determination for the stockpiles. The stockpiled soils will be sampled for contaminants known to have been present in the PM-2A Tanks. Analyses will include Universal Treatment Standard metals, toxicity characteristic leaching procedure metals, Contract Laboratory Program (CLP) VOCs, CLP SVOCs, PCBs, and gamma spectroscopy. Once the samples were collected from the stockpiles, they were excavated and placed into soil bags and are being stored in the RPSSA at TAN until shipment to

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7 (con't)				a disposal facility occurs. A total of 107 m^3 (140 yd^3) of contaminated waste was generated. **2.9.2.2 *Wooden Box.*** The top of what appeared to be a wooden box was discovered at the PM-2A Tanks during the 1996 OU 10-06 removal action. It was not sampled nor removed during the OU 10-06 removal action because the contents of the box were unknown. Samples will be collected from inside the wooden box and analyzed for Universal Treatment Standard (UTS) metals, toxicity characteristic leaching procedure TCLP metals, CLP VOCs, CLP SVOCs, PCBs, and gamma spectroscopy. Data obtained will be used to complete the OU 1-10 RD/RA work plan and to determine the appropriate disposition for the contents of the wooden box. Once the samples were collected from the wooden box, it was excavated with additional soil surrounding the wooden box and placed into soil bags and are being stored in the RPSSA at TAN until shipment to a disposal facility occurs. A total of 8 m^3 (10 yd^3) of contaminated waste was generated. **2.9.2.3 *Cs-137 Contamination Delineation.*** The boundaries of Cs-137 contaminated soil at the PM-2A Tanks will be located and delineated using a three-step sampling approach to identify areas with Cs-137 concentrations greater than the FRG of 23.3 pCi/g. Biased samples (determined from the results of the first two field screening sampling steps) will be taken and submitted for a 20-minute gamma spectrometric analysis to identify areas requiring excavation. Once the areas requiring excavation are identified, additional samples will be collected to obtain data for a no-longer contained-in determination. Both the radiological sampling and no-longer contained-in sampling are described in the post-ROD Field Sampling Plan (DOE-ID 2000d). The data gathered during the post-ROD sampling activities will be used to support waste disposal and identify where Cs-137 soil concentrations exceed the FRG of 23.2 pCi/g.
8	2.9.1	P 2-7	*First full sentence on the page. Update the citation to 761.50(b)(7)(ii).*	*The citation is for management of PCBs and after further evaluation it is correct.*

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9	3.4.3	P. 3-2	Delete the first sentence of the section.	Comment noted: This section has been deleted. See comment resolution to EPA Specific Comment item number 6.
10	Table 4-2	P. 4-4	First RCRA citation. Please explain the compliance strategy and how WDDF meets the citation.	Comment Noted: The INEEL Waste Determination and Disposal Form (WDDF) is a form that is used at the INEEL to walk the generator through the requirements of 40 CFA 262.11.
11	5.1.1	P. 5-1	Note that there are changes, e.g. the change in cleanup level at TSF-06, and the no risk determination at WRRTF-13.	Comment Noted: The change to the clean up level at TSF-06 has been changed back to 23.3 pCi/g Cs-137 per the FRG as identified in the OU 1-10 ROD. However, this section has been modified as follows: "Based on Post-ROD sampling at WRRTF-13, and a Tier 2 State of Idaho RBCA evaluation (see Appendix F), no remedial action is required at WRRTF-13 as identified in Sections 1.2.4 and 1.3.1.4. The construction completion report as discussed in the scope of work has been renamed the final inspection report to be more consistent with the FFA/CO and RD/RA guidance terminology."

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12	5.3	P. 5-8 to 5-11	This section, which lists supporting documents, does not include the Field Sampling Plan, which was received for review. Also, Section 5.3.4 describes a Waste Minimization Plan (not received), although a Waste Management Plan was received. Please clarify whether the Waste Minimization Plan and the Waste Management Plan are the same document.	Comment Noted: A new section was added as section 5.3.5 Confirmation Field Sampling Plan. The following sections were renumbered. The new section is as follows: **5.3.5 Remedial Action Field Sampling Plan** The remedial action field sampling plan has been prepared for the specific tasks of conducting confirmation sampling at TSF-26 and TSF-06. This document is a living document and may be updated as conditions dictate. This plan covers the following items: • Task-site responsibility • Personnel training • Sampling objectives • Sampling locations and frequency • Sampling procedures • Sampling equipment. The Waste Minimization Plan in Section 5.3.4 will be revised to the Waste Management Plan.
13	5.3.3	P. 5-9	First bullet. Please explain why isopropanol will not be used during decon.	Comment Noted: To eliminate the generation of RCRA Waste, Isopropanol will not be used.
Appendix B, Specifications				
14	1.2	P. 02200-2	This section identifies reference documents, and states that the American Society for Testing Materials is a reference, without specifying a specific ASTM method. ASTM D-698 is the only ASTM method specified in all of Section 02200. Section 1.2 should specify ASTM D-698, and any other ASTM methods to be used as part of Earthwork, which is described in this section.	Comment Noted: The ASTM reference has been deleted. Requirements for compaction of top soil in Section 3.4.3 (b) was modified as follows: Topsoil shall be compacted with a minimum of three passes of a sheepsfoot roller.

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15	3.4.3 (b)	P. 02200	Section 3.4.3 describes fill material, including topsoil; subsection (b) describes compaction. ASTM D-698 is the method specified to ensure that compaction to a minimum of 95 percent of maximum dry density is achieved. Topsoil (per Section 2.1.4) is only required to be free of rubble, litter, insect manifestation, and other deleterious matter, and be free of rocks larger than 3 inches in diameter. ASTM D-698 applies only to soils retaining less than 30 percent by weight on a 3/4" sieve (ASTM 2000). Thus, if more than 30 percent by weight of the topsoil is between 3/4" and 3", then ASTM D-698 will not apply. Either the topsoil specifications should include a size requirement consistent with ASTM D-698, or a different ASTM method should be specified.	Comment Noted: The reviewer is correct with the ASTM method evaluation. For the topsoil placement at these sites, there is no requirement to perform ASTM compaction testing. Section 3.4.3 (b) has been modified as follows: Topsoil shall be compacted with a minimum of three passes of a sheepsfoot roller.
16	1.2	P. 02222	This section lists ASTM D-1556, and ASTM D-2922 as references for this section. However, ASTM D-1556 is not used in this section; suggest that it be removed if it will not be used.	Comment Noted: The ASTM reference has been deleted, there are no requirements for compaction at this site
17	2.1.1	P. 02222-2	This section states that "Backfill material may be the materials from trench excavation or gravel as specified under Specification 02200, Earthwork." No trenching has been identified for this project: please explain where this trench excavation material originates. Gravel is also not clearly specified in Specification 02200, Section 2.1; suggest that Section 02200 should specify the size of gravel for fill material.	Comment Noted: The text in this section has been modified as follows: Backfill material may be any type of clean fill material that is accessible at TAN.
18	3.2	P. 02930-5	Maintenance. There is no description on how success of the revegetation is determine. Some text describing the % of coverage or percent of germination should be included.	Comment Noted: As identified in the OU 1-10 ROD vegetation of the TSF-06 and TSF-26 are not part of the remedy and is not required by the ROD. However, the vegetation coverage will be monitored by INEEL personnel per BBWI procedures. For soil disturbance outside facility boundaries, and environmental checklist would require a biological assessment. A biological assessment would require revegetation if applicable.

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Appendix D, Emission Calculations				
19	Table D2	P. D-2	It appears that line 3 of this table should match line 2 of Table D1-3 in the same way that line 4 of Table D-2 matches line 4 of Table D1-3, but in fact, the values are significantly lower, resulting in a much lower estimate of the radionuclide release. Please explain this discrepancy.	Comment Noted: The CAP-88 model will be re-ran and this comment is resolved
20	Attachment D1	P. D1-2	Calculations of Particulate Emissions from Unpaved Roads. The stated equation for calculation of emission factors, although outdated, is not conservative enough. The last factor in the equation should have been set to 1.0 by assuming a value of p = 1. Earlier editions of AP-42 indicated that worst case emissions were estimated by setting p = 1(assumes no rain events). The approach taken is only about 83% of the worst case analysis.	Comment Incorporated. The most current AP-42 equation will be used and dust suppression will not be used in the model re-run.

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21	Attachment D1	P. D1-2	Calculations of Particulate Emissions from Unpaved Roads. The equation used for estimating the emissions from the unpaved roads should be revised in accordance with the latest version of AP-42, Section 13.2.2, 9/98. The appropriate new equation is as follows: $E = \frac{k\,(s/12)^a\,(W/3)^b}{(M/0.2)^c}$ The following table illustrates the differences between emission factors, as calculated using the old equation (Current Value) and those calculated using the new equation (Proposed Revised Value). (Note that the revised AP-42 now presents constants only for aerodynamic diameters of 2.5, 10 and 30 micrometers.) Emission Factors PM Diameter, µm — Current Value — Proposed Revised Value 2.5 — 0.20 — 0.13 10 — 0.77 — 0.90 30 — 1.70 — 2.96 Significant differences in estimated dose and risk calculated with CAP-88 Model can be anticipated if these proposed revised values are used in the subsequent analysis. Using the PM-30 revised value, for example, and assuming a 5 mi/hr travel rate, which appears to have been used in Table D1-3, total road particulate emissions (road plus pickup/drop emissions) would be 5,909.7 lbs as compared to 2,966.3 lbs. (2,770.2 plus 196.1 lbs.) summarized in Table D-2. Radionuclide emissions would also be considerably higher, 4.02 E-04, compared to 2.02 E-04 in Table D-2.	Comment Incorporated: The most current AP-42 equation will be used in the model re-run.

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22	Attachment D1	Table D1-3	Unpaved Road and Pickup and Dropping Emission Factors and Emission Rates for Different Sizes of Particulate Matter. Particulate emission rates for the unpaved roads could not be reproduced using the information provided. If additional assumptions were used to calculate these emission rates, they should be provided.	Comment Incorporated: These assumptions have been included in Appendix D
23	Attachment D1	Table D1-3	Unpaved Road and Pickup and Dropping Emission Factors and Emission Rates for Different Sizes of Particulate Matter. Particulate emission rates for the pickup and dropping could not be reproduced using the information provided. If additional assumptions were used to develop these emission rates, they should be provided.	Comment Incorporated: These assumptions have been included in Appendix D
Appendix E, Cost Estimates				
24	Appendix E, Section 3	P. E-3	Text describing cost assumptions for both TSF-06 and TSF-26 states that "cost considerations were given to maintaining electrical service in this area during remediation activities." Please clarify what this statement means. Specification 02222, Section 3.2.1 (Appendix B) states only that any excavation within a minimum distance of any existing high voltage or high hazard electrical utility will require Lockout/Tagout or proper preparation, with a minimum 4-day notice required. Please ensure that specifications include any important requirements stated in Appendix E.	Comment Incorporated: The assumption language will be revised based on more current planning information. For TSF-06 the language will be revised to: "Costs have been included for removing and replacing a power pole along Snake Avenue within the contaminated soil area" For TSF-26 the bullet will be removed since the remedial action work will not affect TAN electrical service. A specification addressing the removal and replacement of the power pole at TSF-06 is not provided with the RD/RA WP because specification requirements are specified by the INEEL power management who will be performing the work

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25	Appendix E, Section 3	P. E-4	The section describing cost assumptions for the fuel leak source states that pre-excavation samples will be collected for RBCA analysis. It is assumed that these pre-excavation samples have already been collected, as evidenced by Appendix G of this RD/RAWP, but it is stated as a future item. Please state in this section whether this sampling and RBCA analysis has already occurred.	Comment Incorporated: Sampling and RBCA analysis is complete. The first bullet under WRRTF-13 will be revised to past tense as follows: Pre-excavation sampling was conducted at the site to determine the concentrations of gasoline and diesel constituents present. Analytical results were used in accordance with the State of Idaho RBCA and IDEQ guidance to determine the site classification and appropriate clean up levels.
Appendix G, RBCA				
26	Appendix G	P. G1-1	This page summarizes the risk and hazard indices calculated using the RBCA analysis. However, the columns for the resident child risk and hazard index are blank. Please explain this omission.	Comment noted: please refer to resolution for EPA General Comment #2.

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Field Sampling Plan				
27	1.1	P. 1-1	Cs-137 is a contaminant "marker" for remediation. Considering that additional contaminants are present and their soil mobility relative to Cs-137 are usually quite different, it is not apparent that Cs-137 will adequately track the potential range of likely contaminant concentrations. Please explain why only Cs-137 is used. Also, why is the excavation depth limited to 3 feet? Is this based on external exposure concerns only? What if 50 pCi/g Cs-137 were measured at 3 feet? What action would be taken?	Comment Noted: Per the OU 1-10 ROD the only COC at this site is Cs-137. If the Cs-137 concentrations are below the 23.3 pCi/g FRG then the soil will not be excavated. The depth of excavation at TSF-06 will be limited to 10-ft bls and the depth at TSF-26 will be limited to 10-ft below surrounding land surface and then under the OU 1-10 Group 2 sites remedial action the tank contents will be removed. In addition, a clean soil layer will be placed over the PM-2A site prior to the start of the Group 1 remedial action to prevent windblown migration to the TSF-06 site.
28	2.2.1	P. 2-6	It is stated that the excavated area was analyzed for gamma-emitting radionuclides. This analytical approach is rather limiting. Has any alpha isotopic measurements been performed for TRU nuclides? The text does not clearly state whether that a complete characterization of the probable contaminants is available. It is stated that the primary COC for the soil contamination is Cs-137, and this is based on residential screening results. One should define the nature of the residential screening (i.e., define all pathways considered). A residential screening scenario can be rather restrictive depending on available pathways.	Comment Noted: Based on the OU 1-10 Final ROD the only COC at this site is Cs-137. The information that the reviewer is asking for is in the OU 1-10 RI/FS and this section summarizes what the RI and ROD have stated.

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PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: *Comprehensive Remedial Design/Remedial Action Work Plan for the Test Area North, Operable Unit 1-10, Group 1 Sites (Draft), Field Sampling Plan for Remedial Design/Remedial Action Sampling and Field Screening of Group 1 Sites at Waste Area Group 1, Operable Unit 1-10 (Draft), Operations and Maintenance Plan for Test Area North, Operable Unit 1-10 (Draft), Waste Management Plan for the Test Area North, Operable Unit 1-10 Group 1 Sites Remedial Action (Draft)*

DATE: June 21, 2000 **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
29	4.2	P. 4-1	Soil sample collection will be biased toward areas where the radiation survey indicates the highest counts above background. It is important to define the conditions that satisfy the "above background" condition. This is not adequately defined; the survey is a key tool in the remediation effort and reliability is required.	Comment Noted This sampling will be conducted for confirmation, background counts vary due to shine from TAN-607 and other buildings around these two sites. Therefore, a RCT will walk over the entire area and places that the NaI detector begins to have higher counts he will flag that spot where he is getting the highest counts. These flagged spots will then be sampled and the samples will be sent to an on-site laboratory for a 20-minute gamma spectroscopy shipping screen. Based on the results either additional soil will need to be removed or the site will be backfilled.
30	6.1.1	P. 6-1	The operation and use of the portable gamma scintillometer is not adequately described. Is this tool a gross gamma survey instrument, or is it a portable gamma ray spectrometer? Is the sensitivity of the survey consistent with detection of 15 pCi/g Cs-137 levels? Is the chosen methodology consistent with MARSSIM (NUREG-1575) requirements? Please clarify.	Comment Noted: The gamma scintillometer is a gross gamma survey instrument and the sensitivity of the survey will not give concentrations of Cs-137 which is why soil samples will be collected. However, the sensitivity of the instrument will identify areas where the counts are higher than the surrounding. The MARSSIM (NUREG-1575) portion of the comment was withdrawn by EPA during the July 11th conference call..
31	5.1.2	P. 6-2	A Field Sampling Plan should specify sample container volumes. The referenced document does not ensure that special conditions have been considered for this FSP. For example, additional samples may be required for a certain gamma spectroscopy geometry.	The INEEL Quality Assurance Project Plan (QAPjP) specifies container volumes. No text was modified.

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DATE: June 21, 2000 **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
32	6.2.2 Last Paragraph	P. 6-5	While WERF is still accepting waste, it is this reviewers understanding that this facility will soon be shut down. Does an alternative facility exist that can receive such waste as this?	Comment Noted: The last paragraph has been modified as follows This waste will be incinerated at the INEEL Waste Experimental Reduction Facility (WERF) or other on-site/off-site approved facility. Each cardboard box is limited to a weight of 27 kg (60 lb) or less and a maximum radiation reading of 20 mrem/hr on contact. The taped boxes will be shrink-wrapped to a pallet for shipment and incinerated. The contents, weight, and radiation reading on each ...
Operations And Maintenance Plan				
33	3.1	P. 3-1	The text states that IC's will not be required if the contaminated media at a site is removed to the top of basalt. Since IC's are required as long as contamination remains on site that restricts land use, it is not clear how removing contaminated media yet leaving contamination on basalt at a site removes the need for IC's.	Comment Incorporated: The fifth sentence has been revised to, "Institutional controls will not be required if contamination concentrations are comparable to local background values, or if residual concentrations are less than or equal to a 1E-04 risk-based soil concentration for a hypothetical current or future residential scenario, or current or future industrial scenario (DOE-ID 1999)."
34	3.4.3, 2nd Paragraph	P. 3-2	Update this section to reflect current thinking, i.e. no risk, no action, no IC's	Comment Noted: The ICs will be identified in the WAG 1 Institutional Control Plan and will be covered in that plan. A reference will be added in the text (DOE-ID 2000) to refer to the IC plan.

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DATE: June 21, 2000 **REVIEWER:** EPA

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
35	5.2	P. 5-1	This section states that no routine maintenance is planned for these sites. How does one plan to address the need to insure that signs and/or fences remain in place over time?	Comment Noted: All fences and signs that are a component of the remedy (i.e. they are institutional controls) will be addressed in the WAG 1 institutional control plan. No text was modified. Please also see resolution to DOE Comment #6 for reorganization of this section.
Waste Management Plan				
36	3.1.4 Last Paragraph	P. 3-4	EPA recommends moving this paragraph to beginning of the section.	Comment Noted: This section has been modified such that the only text in this section is the last paragraph
37	4.3.1.2 and Table 3.1	P. 4-2	Apparently a typo in the text. The volume of solid, low-level, or mixed waste in the text and table does not agree.	Comment Noted: The text has been changed to 14,160.2 m^3 (18,520.4 yd^3).