ATTACHMENT 1

OPERABLE UNIT CONSOLIDATION PLAN

Operable Unit Consolidation Plan

In July 1996, DOE, Kaiser-Hill, RMRS, CDPHE and EPA developed a proposal for Operable Unit (OU) consolidation that was adopted as Attachment 1 in RFCA. Based on the RFCA accelerated actions taken to date, the RFCA Parties have determined that the 1996 OU Consolidation Plan should be modified to reflect the current status. The changes are based on the following:

1. OUs 1 and 3 have been remediated in accordance with the final Corrective Action Decision/Record of Decisions (CAD/ROD) for these OUs.
2. The Parties believe that the IHSSs contained in OUs 5, 6 and 7 (as modified July 1996) can be efficiently consolidated into the Buffer Zone OU to reduce the number of OUs that may need individual CAD/RODs.

As a consequence, the Map in Attachment 2 to RFCA has been modified to reflect the OU Consolidation Plan changes deleting OUs 5, 6 and 7 as separate OUs.

The primary benefit of consolidating OUs is the reduced process and administrative requirements. Coordinating the regulatory jurisdictional boundaries with the OU consolidation boundaries also eases the administrative management of the OUs. The resulting cost savings can be applied to environmental remediation or other higher priority tasks at RFETS. In addition, less time and resources will be spent generating and reviewing documents, and more time and resources can be spent on risk reduction. Consolidation will also facilitate a more integrated approach to Site-Wide planning, which will include Site-Wide prioritized remediation.

Contaminant types and distribution, impact on surrounding areas, future potential for contamination, future land uses, water management requirements, regulatory changes and modifications to the Soil Action Levels and the implementation of an integrated risk-based accelerated action approach were considered in developing the consolidation strategy. Based on these considerations, the existing operable units are consolidated in the following manner:

Table 1

OUs	Consisting of	Lead Regulatory Agency
OU 1	Current OU 1 IHSSs; CAD/ROD completed	EPA
OU 3	Current OU 3 IHSSs; CAD/ROD completed	EPA
OU11	Current OU11 IHSSs; CAD/ROD completed	CDPHE
OU15	Current OU15 IHSSs; CAD/ROD completed	CDPHE
OU16	Current OU16 IHSSs; CAD/ROD completed	CDPHE
Industrial Area OU	All IHSSs from OUs 4, 8, 9, 12, 13, 14, IHSSs 115 and 196 from OU 5, and IHSSs 143 and 165 from OU 6, plus all OU 10 IHSSs except IHSSs 170, 174a and 174b (PU&D yard)	CDPHE
Buffer Zone OU	All IHSSs from OUs 2, 5 except IHSSs 115 and 196 (Original Landfill), 6 except IHSSs 143 (Old Outfall) and 165 (Triangle Area), 7, and IHSSs 170, 174a and 174b from OU 10	EPA

CDPHE is the lead regulatory agency for the Industrial Area OU and the EPA is the lead regulatory agency for the Buffer Zone OU. Attachment 2 of RFCA shows the revised OUs and the lead regulatory agency for each area.

Proposed OUs	Consisting of	Lead Regulatory Agency
OU 1	Current OU 1 IHSSs	EPA
OU 3	Current OU 3 IHSSs	EPA
OU 5	Current OU 5 IHSSs except IHSSs 115 and 196 (Original Landfill) *	EPA
OU 6	Current OU 6 IHSSs except IHSSs 143 (Old Outfall) and 165 (Triangle Area) *	EPA
OU 7	Current OU 7 IHSSs	EPA
Industrial Area OU	All IHSSs from OUs 4, 8, 9, 12, 13, 14, IHSSs 115 and 196 from OU 5, and IHSSs 143 and 165 from OU 6, plus all OU 10 IHSSs except IHSSs 170, 174a and 174b (PU&D yard)	CDPHE
Buffer Zone OU	All IHSSs from OU 2, and IHSSs 170, 174a and 174b from OU 10,	EPA

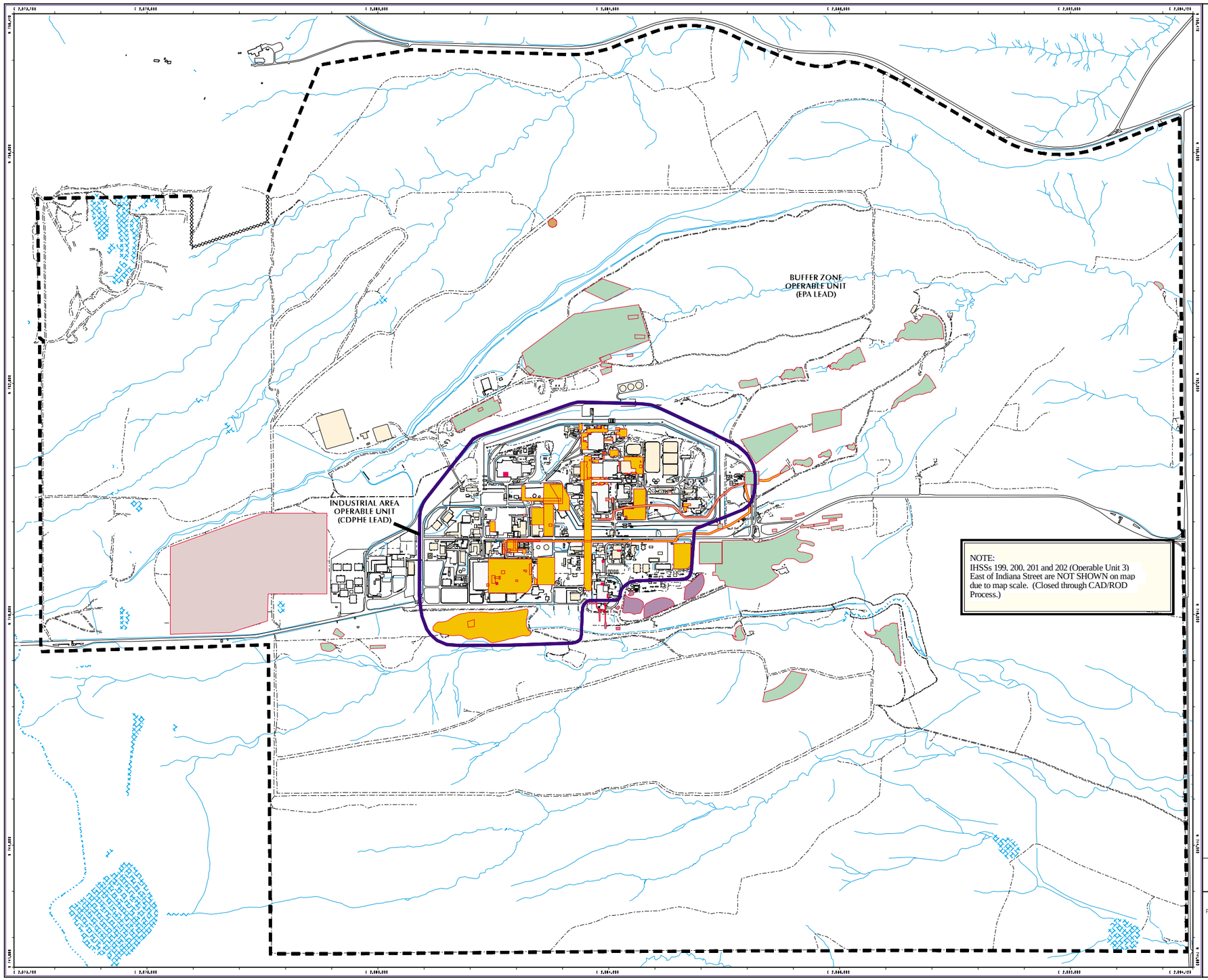
* Affected IHSSs in OUs 5 and 6 will be identified on the OU Consolidation Map (Attachment 2).

CDPHE is the lead regulatory agency for the Industrial Area OU and the EPA is the lead regulatory agency for the Buffer Zone OU. Attachment 2 of RFCAshows the new OUs and the lead regulatory agency for each area.

Groundwater at the Site will be managed in an integrated fashion. The Working Group does not recommend that a separate operable unit be created for groundwater as closure is not anticipated in the near-term and the added resource costs of creating an OU do not outweigh the benefits.

ATTACHMENT 2

SITE MAP



RFCA Attachment 2
Consolidated Operable Units

See paragraph 67 of RFCA

EXPLANATION

- Industrial Area OU
- Buffer Zone OU
- Operable Unit 1 (Closed through CAD/ROD Process)
- Operable Unit 11 (Closed through CAD/ROD Process)
- Operable Unit 15 (Closed through CAD/ROD Process)
- Operable Unit 16 (Closed through CAD/ROD Process)
- Individual Hazardous Substance Site (IHSS)
- Landlord responsibility for approximately 25 acres of land in the northwestern part of Rocky Flats was transferred from the Rocky Flats Field Office to the Golden Field Office, effective July 16, 2003, for expansion of the National Wind Technology Center.

Other Map Features

- Buildings and other structures
- Demolished buildings and Other Structures
- Solar Evaporation Ponds (SEPs)
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Rocky Flats Environmental Technology Site boundary
- Paved roads
- Dirt roads
- Industrial Area Operable Unit Boundary

DATA SOURCE BASE FEATURES:
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas.
Digitized from the orthophotographs. 1/95
Individual Hazardous Substance Sites (IHSSs)
DOE, 1992, HRR Report and Subsequent Updates.

NOTES:
All IHSS and PAC's Boundaries are Approximate. For more detail, please contact Environmental Restoration (X4605) for the following document:

Historical Release Report (HRR) and updates thereto

Scale = 1 : 21330
1 inch represents approximately 1778 feet

150 0 500 1000 ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy

Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

Prepared by: CH2MHILL

Prepared for: KAISER-HILL COMPANY

April 13, 2004

NT_Svr w:/projects/fy2003/03-0355/con_ou_2_b-size_v2.aml

ATTACHMENT 3

RFETS INDIVIDUAL HAZARDOUS SUBSTANCE SITE (IHSS) LIST

Cross Reference List of IHSSs/PACs/UBCs

IHSS	OU	Old OU	PAC/UBC	Description
101*	IA	4	000-101	207 Solar Evaporation Ponds
102	1	1	800-102	Oil Sludge Pit
103	1	1	800-103	Chemical Burial
104	1	1	800-104	Liquid Dumping
105.1	1	1	800-105.1	Bldg. 881 Westernmost Out of Service Fuel Tanks .
105.2	1	1	800-105.2	Bldg. 881 Easternmost Out of Service Fuel Tanks
106	1	1	800-106	Bldg. 881, Outfall
107	1	1	800-107	Bldg. 881, Hillside Oil Leak
108	BZ	2	900-108	Trench T-1
109	BZ	2	900-109	Trench T-2 - Ryan's Pit
110	BZ	2	NE-110	Trench T-3
111.1	BZ	2	NE-111.1	Trench T-4
111.2	BZ	2	NE-111.2	Trench T-5
111.3	BZ	2	NE-111.3	Trench T-6
111.4	BZ	2	NE-111.4	Trench T-7
111.5	BZ	2	NE-111.5	Trench T-8
111.6	BZ	2	NE-111.6	Trench T-9
111.7	BZ	2	NE-111.7	Trench T-10
111.8	BZ	2	NE-111.8	Trench T-11
112	BZ	2	900-112	903 Pad (IAG Name: 903 Drum Storage Area)
113	BZ	2	900-113	Mound Area
114*	BZ	7	NW-114	Present Landfill
115	IA	5	SW-115	Original Landfill
116.1	IA	12	400-116.1	West Loading Dock, Building 447 (IAG Name: West Loading Dock Area)
116.2	IA	12	400-116.2	South Loading Dock, Building 444 (IAG Name: South Loading Dock Area)
117.1	IA	13	500-117.1	North Site Chemical Storage
117.2	IA	13	500-117.2	Middle Site Chemical Storage
117.3	IA	13	600-117.3	Chemical Storage – South Site
118.1	IA	8	700-118.1	Multiple Solvent Spills West of Building 730
118.2	IA	8	700-118.2	Multiple Solvent Spills South End of Building 776
119.1	1	1	900-119.1	West Scrap Metal Storage Area and Solvent Spill
119.2	1	1	900-119.2	East Scrap Metal Storage Area and Solvent Spill
120.1	IA	12	600-120.1	Fiberglassing Area North of Building 664
120.2	IA	12	600-120.2	Fiberglassing Area West of Building 664
121#	IA	9	000-121	Original Process Waste Lines (includes Tanks T-2, T-3, T-10, T-14, T-16, T-40)
122#	IA	9	400-122	Underground Concrete Tank
123.1+	IA	8	700-123.1	Valve Vault 7
123.2#	IA	9	700-123.2	Valve Vault West of Building 707
124.1#	IA	9	700-124.1	30,000 Gallon Tank (Tank #68)
124.2#	IA	9	700-124.2	14,000 Gallon Tank (Tank #66)
124.3#	IA	9	700-124.3	14,000 Gallon Tank (Tank #67)
125#	IA	9	700-125	Holding Tank (Tank #66) (This is the same tank identified in IHSS 124.2)
126.1#	IA	9	700-126.1	Westernmost Out-of-Service Waste Tank
126.2#	IA	9	700-126.2	Easternmost Out-of-Service Waste Tank
127	IA	9	700-127	Low-Level Radioactive Waste Leak

Cross Reference List of IHSSs/PACs/UBCs

IHSS	OU	Old OU	PAC/UBC	Description
128	IA	13	300-128	Oil Burn Pit No. 1
129*	IA	10	400-129	Building 443 Oil Leak
130	1	1	900-130	Contaminated Soil Disposal Area East of Bldg. 881
131	IA	14	700-131	Radioactive Site - 700 Area Site #1
132	IA	9	700-132	Radioactive Site - 700 Area Site #4
133.1	BZ	5	SW-133.1	Ash Pit 1
133.2	BZ	5	SW-133.2	Ash Pit 2
133.3	BZ	5	SW-133.3	Ash Pit 3
133.4	BZ	5	SW-133.4	Ash Pit 4
133.5	BZ	5	SW-133.5	Incinerator Facility
133.6	BZ	5	SW-133.6	Concrete Wash Pad
134N	IA	13	300-134N	Lithium Metal Destruction Site
134S	IA	13	300-134S	Lithium Metal Destruction Site
135	IA	8	300-135	Cooling Tower Blowdown
136.1	IA	12	400-136.1	Cooling Tower Pond West of Building 444 (IAG Name: Cooling Tower Pond Northeast Corner of Building 460)
136.2	IA	12	400-136.2	Cooling Tower Pond East of Building 444 (IAG Name: Cooling Tower Pond West of Building 460)
137	IA	8	700-137	Cooling Tower Blowdown Buildings 712 and 713 (IAG Name: Cooling Tower Blowdown Building 774)
138	IA	8	700-138	Cooling Tower Blowdown Building 779
139.1N (a)	IA	8	700-139.1N(a)	Caustic/Acid Spills Hydroxide Tank Area
139.1N (b)	IA	8	700-139.1N(b)	Caustic/Acid Spills Hydroxide Tank Area
139.1S	IA	8	700-139.1S	Caustic/Acid Spills Hydroxide Tank Area
139.2	IA	8	700-139.2	Caustic/Acid Spills Hydrofluoric Acid Tanks
140	BZ	2	900-140	Hazardous Disposal Area (IAG Name: Reactive Metal Destruction Site)
141	BZ	6	900-141	Sludge Disposal
142.1	BZ	6	NE-142.1	Pond A-1
142.2	BZ	6	NE-142.2	Pond A-2
142.3	BZ	6	NE-142.3	Pond A-3
142.4	BZ	6	NE-142.4	Pond A-4
142.5	BZ	6	NE-142.5	Pond B-1
142.6	BZ	6	NE-142.6	Pond B-2 (PAC NE-1404 overlaps with IHSS 142.6)
142.7	BZ	6	NE-142.7	Pond B-3
142.8	BZ	6	NE-142.8	Pond B-4
142.9	BZ	6	NE-142.9	Pond B-5
142.10	BZ	5	SE-142.10	Pond C-1
142.11	BZ	5	SE-142.11	Pond C-2
142.12	BZ	6	NE-142.12	Flume Pond (IAG Name: Newly Identified Pond A-5)
143	IA	6	700-143	Bldg. 771 Outfall
144N	IA	8	700-144(N)	Sewer Line Overflow (IAG Name: Sewer Line Break)
144S	IA	8	700-144(S)	Sewer Line Overflow (IAG Name: Sewer Line Break)
145	1	1	800-145	Sanitary Waste Line Leak
146.1¤	IA	9	700-146.1	Concrete Process Waste Tanks 7,500 Gallon Tank (31)

Cross Reference List of IHSSs/PACs/UBCs

IHSS	OU	Old OU	PAC/UBC	Description
146.2¤	IA	9	700-146.2	Concrete Process Waste Tanks 7,500 Gallon Tank (32)
146.3¤	IA	9	700-146.3	Concrete Process Waste Tanks 7,500 Gallon Tank (34W)
146.4¤	IA	9	700-146.4	Concrete Process Waste Tanks 7,500 Gallon Tank (34E)
146.5¤	IA	9	700-146.5	Concrete Process Waste Tanks 3,750 Gallon Tank (30)
146.6¤	IA	9	700-146.6	Concrete Process Waste Tanks 3,750 Gallon Tank (33)
147.1#	IA	9	700-147.1	Process Waste Line Leaks (IAG Name: Maas Area)
147.2	IA	12	800-147.2	Bldg. Conversion Activity Contamination Area
148	IA	13	100-148	Waste Spills
149.1	IA	9	700-149.1	Effluent Pipe
149.2	IA	9	700-149.2	Effluent Pipe
150.1	IA	8	700-150.1	Radioactive Site North of Building 771 (IAG Name: Radioactive Leak North of Building 771)
150.2	IA	8	700-150.2	Radioactive Site West of Buildings 771 and 776 (IAG Name: Radioactive Leak West of Building 771)
150.3	IA	8	700-150.3	Radioactive Site Between Buildings 771 & 774 (IAG Name: Radioactive Leak Between Buildings 771 & 774)
150.4	IA	8	700-150.4	Radioactive Site Northwest of Building 750 (IAG Name: Radioactive Leak East of Building 750)
150.5	IA	8	700-150.5	Radioactive Site West of Building 707 (IAG Name: Radioactive Leak West of Building 707)
150.6	IA	8	700-150.6	Radioactive Site South of Building 779 (IAG Name: Radioactive Leak South of Building 779)
150.7	IA	8	700-150.7	Radioactive Site South of Building 776 (IAG Name: Radioactive Leak South of Building 776)
150.8	IA	8	700-150.8	Radioactive Site Northeast of Building 779 (IAG Name: Radioactive Leak Northeast of Building 779)
151	IA	8	300-151	Tank 262 Fuel Oil Spills
152	IA	13	600-152	Fuel Oil Tank 221 Spills
153	BZ	2	900-153	Oil Burn Pit No. 2
154	BZ	2	900-154	Pallet Burn Site
155	BZ	2	900-155	903 Lip Area
156.1	IA	14	300-156.1	Building 371 Parking Lot
156.2	BZ	6	NE-156.2	Soil Dump Area Between the A and B Series Drainages
157.1	IA	13	400-157.1	Radioactive Site North Area
157.2	IA	12	400-157.2	Radioactive Site South Area
158	IA	13	500-158	Radioactive Site – Building 551
159	IA	9	500-159	Radioactive Site – Building 559
160	IA	14	600-160	Radioactive Site Building 444 Parking Lot
161	IA	14	600-161	Radioactive Site - Building 664
162	IA	14	000-162	Radioactive Site - 700 Area Site # 2
163.1	IA	8	700-163.1	Radioactive Site 700 Area Site No.3 Wash Area
163.2	IA	8	700-163.2	Radioactive Site 700 Area Site No.3 Buried Slab
164.1	IA	14	600-164.1	Radioactive Slab from Bldg. 771
164.2	IA	14	800-164.2	Radioactive Site 800 Area Site #2, Building 886 Spills
164.3	IA	14	800-164.3	Radioactive Site 800 Area Site #2, Building 889 Storage Pad
165	IA	6	900-165	Triangle Area

Cross Reference List of IHSSs/PACs/UBCs

IHSS	OU	Old OU	PAC/UBC	Description
166.1	BZ	6	NE-166.1	Trench A
166.2	BZ	6	NE-166.2	Trench B
166.3	BZ	6	NE-166.3	Trench C
167.1*	BZ	6	NE-167.1	Landfill North Area Spray Field
167.2*	BZ	6	NE-167.2	Pond Area Spray Field (Center Area)
167.3*	BZ	6	NE-167.3	South Area Spray Field
168*•	11	11	000-168	West Spray Field
169	IA	13	500-169	Waste Drum Peroxide Burial
170	BZ	10	NW-170	PU&D Storage Yard - Waste Spills
171	IA	13	300-171	Solvent Burning Ground
172	IA	8	000-172	Central Avenue Waste Spill
173	IA	8	900-173	South Dock - Building 991 (IAG Name: Radioactive Site - 900 Area)
174A*	BZ	10	NW-174A	PU&D Yard Container Storage Area
174B*	BZ	10	NW-174B	PU&D Container Storage Facilities
175*	IA	10	900-175	S&W Building 980 Container Storage Facility
176	IA	10	900-176	S&W Contractor Storage Yard
177*	IA	10	800-177	Building 885 Drum Storage and Paint Storage (IAG Name: Building 885 Drum Storage Area)
178*•	15	15	800-178	Building 881 Drum Storage Area
179*•	15	15	800-179	Building 865 Drum Storage; refer to OU 15 CAD/ROD)
180*•	15	15	800-180	Building 883 Drum Storage; refer to OU 15 CAD/ROD)
181*	IA	10	300-181	Building 334 Cargo Container Area
182*	IA	10	400-182	Building 444/453 Drum Storage Area
183	BZ	2	900-183	Gas Detoxification Area
184	IA	8	900-184	Building 991 Steam Cleaning Area
185•	16	16	700-185	Solvent Spill
186	IA	13	300-186	Valve Vault 12
187	IA	12	400-187	Sulfuric Acid Spill (IAG Name: Acid Leaks [2])
188	IA	8	300-188	Acid Leak
189	IA	12	600-189	Nitric Acid Tanks
190	IA	13	000-190	Caustic Leak (also referred to as Central Avenue Ditch)
191	IA	13	400-191	Hydrogen Peroxide Spill
192	16	16	000-192	Antifreeze Discharge
193	16	16	400-193	Steam Condensate Leak
194	16	16	700-194	Steam Condensate Leak
195	16	16	NW-195	Nickel Carbonyl Disposal
196	IA	5 and 16	SW-196	Water Treatment Plant Backwash Pond
197	16	16	500-197	Scrap Metal Sites
199	3	3	OFF-SITE AREA 1	Off-Site Area 1
200	3	3	OFF-SITE AREA 2	Great Western Reservoir
201	3	3	OFF-SITE AREA 3	Standley Lake
202	3	3	OFF-SITE AREA 4	Mower Reservoir

Cross Reference List of IHSSs/PACs/UBCs

IHSS	OU	Old OU	PAC/UBC	Description
203*	BZ	7	NW-203	Inactive Hazardous Waste Storage Area
204*•	15	15	400-204	Original Uranium Chip Roaster
205*	IA	10	400-205	Building 460 Sump #3 Acid Side
206*	IA	10	300-206	Inactive D-836 Hazardous Waste Tank
207*	IA	10	400-207	Inactive 444 Acid Dumpster
208*	IA	10	400-208	Inactive 444/447 Waste Storage Area
209	BZ	5	SE-209	Surface Disturbance Southeast of Bldg. 881
210*	IA	10	900-210	Building 980 Cargo Container, Unit 16
211*•	15	15	800-211	Building 881 Drum Storage, Unit 26
212+	15	15	300-212	Building 371 Drum Storage Area, Unit 63 Note: This IHSS was permitted through the approval of permit modification number 8 on January 6, 1995. This IHSS was approved for No Further Accelerated Action in 2002 since there are no documented spills and the room has an epoxy coated concrete floor. The room itself is identified in the Building 371/374 Decommissioning Operations Plan (dated March 21, 2001, Revision 0) in Appendix A as RCRA unit number 371.1 (old number 63), room 3420 as a RCRA unit undergoing closure.
213+	IA	10	900-213	Unit 15, 904 Pad Pondcrete Storage
214+	IA	10	700-214	750 Pad Pondcrete & Saltcrete Storage, Unit 25
215#	IA	9	700-215	Process Waste Tank T-40, Unit 55.13
216.1	BZ	6	NE-216.1	East Spray Fields - North Area
216.2	BZ	2	NE-216.2	East Spray Field
216.3	BZ	2	NE-216.3	East Spray Field
217*•	15	15	800-217	Building 881, CN- Bench Scale Treatment, Unit 32
NA	IA	NA	000-500	Sanitary Sewer System
NA	BZ	NA	000-501	Roadway Spraying (originally identified as 000-501 in HRR Quarterly update No. 4; reassigned as 100-613 in the HRR Quarterly Update No. 7)
NA	IA	NA	000-502	ITS Water Spill (identified in HRR Quarterly Update No.2 as 000-502; reassigned as 900-1310 in HRR Quarterly Update No. 7; the number 000-502 is no longer in use.)
NA	IA	NA	000-503	Solar Pond Water Spill Along Central Avenue (originally identified as 000-503 in HRR Quarterly update No. 4; reassigned as NE-1409 in the HRR Quarterly Update No. 7)
NA	IA	NA	000-504	New Process Waste Lines
NA	IA	NA	000-505	Storm Drains
NA	IA	NA	100-600	Mercury Spill-Valve Vault 124-B, Building 124
NA	IA	NA	100-601	Building 123 Phosphoric Acid Spill
NA	IA	NA	100-602	Building 123 Process Waste Line Break
NA	IA	NA	100-603	Building 123 Bioassay Waste Spill
NA	BZ	NA	100-604	T130 Complex Sewer Line Leaks
NA	IA	NA	100-605	Building 115 Hydraulic Oil Spill
NA	IA	NA	100-606	Building 125 TCE Spill
NA	IA	NA	100-607	Building 111 Transformer PCB Leak
NA	IA	NA	100-608	Building 131 Transformer Leak
NA	IA	NA	100-609	Building 121 Security Incinerator
NA	IA	NA	100-610	Asbestos Release – Building 123
NA	IA	NA	100-611	Building 123 Scrubber Solution Spill
NA	IA	NA	100-612	Battery Solution Spill - Building 119

Cross Reference List of IHSSs/PACs/UBCs

IHSS	OU	Old OU	PAC/UBC	Description
NA	BZ	NA	100-613	Asphalt Surface in Lay-down Yard North of Building 130 (identified as 000-501 in HRR Quarterly Update No. 4; reassigned as 100-613 in HRR Quarterly Update No. 7).
NA	IA	NA	300-700	Scrap Roofing Disposal
NA	IA	NA	300-701	Sulfuric Acid Spill – Building 371
NA	IA	NA	300-702	Pesticide Shed
NA	IA	NA	300-703	Building 331 North Area
NA	IA	NA	300-704	Roof Fire, Building 381
NA	IA	NA	300-705	Potassium Hydroxide Spill North of Building 374
NA	IA	NA	300-706	Evaporator Tanks North of Building 374
NA	IA	NA	300-707	Sanitizer Spill
NA	IA	NA	300-708	Transformers North of Building 371
NA	IA	NA	300-709	Transformer Leak 334-1
NA	IA	NA	300-710	Gasoline Spill North of Building 331
NA	IA	NA	300-711	Nickel-Cadmium Battery Acid Spill Outside of Building 373
NA	IA	NA	300-712	0.5-Gallon Antifreeze Spilled by Street Sweeper Outside of Building 373
NA	IA	NA	300-713	Caustic Spill North of Building 331
NA	IA	NA	300-714	Laundry Waste Water Spill from Tank T-803, North of Building 374
NA	IA	NA	300-715	Battery Acid Spill
NA	IA	NA	400-800	Transformer 443-1
NA	IA	NA	400-801	Transformer, Roof of Building 447
NA	IA	NA	400-802	Storage Area, South of Building 334
NA	IA	NA	400-803	Miscellaneous Dumping, Building 460 Storm Drain
NA	IA	NA	400-804	Road North of Building 460
NA	IA	NA	400-805	Building 443 Tank #9 Leak
NA	IA	NA	400-806	Catalyst Spill, Building 440
NA	IA	NA	400-807	Sandblasting Area
NA	IA	NA	400-808	Vacuum Pump Leak - Building 442
NA	IA	NA	400-809	Oil Leak - 446 Guard Post
NA	IA	NA	400-810	Beryllium Fire - Building 444
NA	IA	NA	400-811	Transformer 443-2, Building 443
NA	IA	NA	400-812	Tank T-2 Spill in Building 460
NA	IA	NA	400-813	RCRA Tank Leak in Building 460
NA	IA	NA	400-814	Air Conditioner Compressor Release, Bldg. 444 Roof
NA	IA	NA	400-815	RCRA Tank Leak in Building 460
NA	IA	NA	400-820	Central Avenue Ditch Soil Spreading (identified in HRR Quarterly Update No. 6 as 400-820, reassigned as 600-1004 in HRR Quarterly Update No. 7; the number 400-820 is no longer in use).
NA	IA	N/A	500-900	Transformer Leak – 515/516
NA	IA	N/A	500-901	Transformer Leak – 555
NA	IA	N/A	500-902	Transformer Leak – 559
NA	IA	NA	500-903	RCRA Storage Unit #1
NA	IA	NA	500-904	Transformer Leak – 223-1/223-2
NA	IA	NA	500-905	Transformer Leak – 558-1
NA	IA	NA	500-906	Asphalt Surface Near Building 559
NA	IA	NA	500-907	Tanker Truck Release of Hazardous Waste from Tank 231B

Cross Reference List of IHSSs/PACs/UBCs

IHSS	OU	Old OU	PAC/UBC	Description
NA	IA	NA	500-908	Oil Released from Air Compressor
NA	IA	NA	500-909	Release of Spent Photographic Fixer Solution
NA	IA	NA	600-1000	Transformer Storage Building 662
NA	IA	NA	600-1001	Temporary Waste Storage Building 663
NA	IA	NA	600-1001(a)	Waste Oil Identified in PAC-1001
NA	IA	NA	600-1002	Transformer Storage - West of Building 666
NA	IA	NA	600-1003	Transformers North and South of 661-675 Substation
NA	IA	NA	600-1004	Central Avenue Ditch Cleaning Incident (identified in HRR Quarterly update No. 6; reassigned as 400-820 in HRR Quarterly update No. 7)
NA	IA	NA	600-1005	Former Pesticide Storage Area
NA	IA	NA	700-1100	French Drain North of Building 776/777
NA	IA	NA	700-1101	Laundry Tank Overflow - Building 732
NA	IA	NA	700-1102	Transformer Leak – 776-4
NA	IA	NA	700-1103	Leaking Transformers - Building 707
NA	IA	NA	700-1104	Leaking Transformers - Building 708
NA	IA	NA	700-1105	Transformer Leak - 779-1/779-2
NA	IA	NA	700-1106	Process Waste Spill - Portal 1
NA	IA	NA	700-1107	Compressor Waste Oil Spill - Building 776
NA	IA	NA	700-1108	771/774 Footing Drain Pond
NA	IA	NA	700-1109	Uranium Incident - Building 778
NA	IA	NA	700-1110	Nickel Carbonyl Burial West of Building 771
NA	IA	NA	700-1111	Leaking Transformer - Building 750
NA	IA	NA	700-1112	Leaking Transformer - 776-5
NA	IA	NA	700-1113	Water Released from 207C Solar Evaporation Pond
NA	IA	NA	700-1114a	Release During Liquid Transfer Operations from Bldg. 774
NA	IA	NA	700-1114b	Release During Liquid Transfer Operations from Bldg. 774
NA	IA	NA	700-1115	Identification of Diesel Fuel in Subsurface Soils
NA	IA	NA	700-1116	Leaking Transformer South of Building 776
NA	IA	NA	700-1117	Building 701 Water Line, Soil Put-back
NA	IA	NA	800-1200	Valve Vault 2
NA	IA	NA	800-1201	Radioactive Site South of Building 883
NA	IA	NA	800-1202	Sulfuric Acid Spill, Building 883
NA	IA	NA	800-1203	Sanitary Sewer Line Break Between Buildings 865 and 886
NA	IA	NA	800-1204	Building 866 Spills
NA	IA	NA	800-1205	Building 881, East Dock
NA	IA	NA	800-1206	Fire, Building 883
NA	IA	NA	800-1207	Transformer 883-4
NA	IA	NA	800-1208	Transformer 881-4
NA	IA	NA	800-1209	Leaking Transformers, 800 Area
NA	IA	NA	800-1210	Transformers 865-1 and 865-2
NA	IA	NA	800-1211	Capacitor Leak, Building 883
NA	IA	NA	800-1212	Building 866 Sump Spill
NA	IA	NA	900-1300	RO Plant Sludge Drying Beds
NA	IA	NA	900-1301	Building 991 Enclosed Area
NA	IA	NA	900-1302	Gasoline Spill
NA	IA	NA	900-1303	Natural Gas Leak

Cross Reference List of IHSSs/PACs/UBCs

IHSS	OU	Old OU	PAC/UBC	Description
NA	IA	NA	900-1304	Chromic Acid Spill - Building 991
NA	IA	NA	900-1305	Building 991 Roof
NA	IA	NA	900-1306	Transformers 991-1 and 991-2
NA	IA	NA	900-1307	Explosive Bonding Pit (originally identified as 900-1307 in the 1997 Annual Update to the HRR; reassigned as 900-1318 in the 1998 Annual HRR Update)
NA	IA	NA	900-1308	Gasoline Spill Outside of Building 980
NA	BZ	NA	900-1309	OU 2 Field Treatability Unit Spill
NA	IA	NA	900-1310	ITS Water Spill (identified as 000-502 in HRR Quarterly Update No. 2; reassigned 900-1310 in HRR Quarterly Update No. 7)
NA	IA	NA	900-1311	Septic Tank East of Building 991
NA	IA	NA	900-1312	OU-2 Water Spill
NA	IA	NA	900-1313	Seep Area Near OU-2 Influent
NA	IA	NA	900-1314	Solar Evaporation Pond 207B Sludge Release
NA	IA	NA	900-1315	Tanker Truck Release on East Patrol Road, North of Spruce Ave.
NA	BZ	NA	900-1316	Elevated Chromium (total) Identified During Geotechnical Drilling
NA	IA	NA	900-1317	Soil Released from Wooden Crate in 964 Laydown Yard
NA	IA	NA	900-1318	Release of F001 Listed Waste Water to Soil (identified as 900-1307 in 1997Annual Update to the HRR; reassigned 900-1318 in 1998 Annual Update to the HRR).
NA	BZ	NA	NE-1400	Tear Gas Powder Release
NA	BZ	NA	NE-1401	NE Buffer Zone Gas Line Break
NA	BZ	NA	NE-1402	East Inner Gate PCB Spill
NA	BZ	NA	NE-1403	Gasoline Spill - Building 920 Guard Post
NA	BZ	NA	NE-1404	Diesel Spill at Pond B-2 Spillway (PAC NE-1404 overlaps with IHSS 142.6. Originally identified as NE-1404 in HRR Quarterly update No. 2; reassigned as NE-1405 in HRR Quarterly Update No. 7)
NA	BZ	NA	NE-1405	Diesel Fuel Spill at Field Treatability Unit (orginally identified as NE-1404 in HRR Quarterly update No. 2; reassigned NE-1405 in HRR Quarterly Update No. 7)
NA	BZ	NA	NE-1406	771 Hillside Sludge Release
NA	BZ	NA	NE-1407	OU 2 Treatment Facility
NA	BZ	NA	NE-1408	OU 2 Test Well (formerly NE-1406)
NA	BZ	NA	NE-1409	Modular Tanks and 910 Treatment System Spill (originally identified as 000-503 in HRR Quarterly update No. 4; reassigned as NE-1409 in HRR Quarterly Update No. 7))
NA	BZ	NA	NE-1410	Diesel Fuel Spill at Field Treatability Unit
NA	BZ	NA	NE-1411	Diesel Fuel Overflowed from Tanker at OU 2 Field Treatability Unit
NA	BZ	NA	NE-1412	Trench T-12 Located in OU 2 East Trenches
NA	BZ	NA	NE-1413	Trench T-13 Located in OU 2 East Trenches
NA	BZ	NA	NW-1500	Diesel Spill at PU&D Yard (originally identified as NW-175 in HRR Quarterly update No. 3; reassigned as NW-1500 in HRR Quarterly update No. 7))
NA	BZ	NA	NW-1501	Asbestos Release at PU&D Yard (originally identified as NW-176 in HRR Quarterly update No. 3; reassigned as NW-1501 in HRR Quarterly update No. 7)
NA	BZ	7	NW-1502	Improper Disposal of Diesel-Contaminated Material at Landfill (originally identified as NW-177 in HRR Quarterly update No. 2; reassigned as NW-1502 in HRR Quarterly update No. 7)
NA	BZ	7	NW-1503	Improper Disposal of Fuel-Contaminated Material at Landfill

Cross Reference List of IHSSs/PACs/UBCs

IHSS	OU	Old OU	PAC/UBC	Description
NA	BZ	7	NW-1504	Improper Disposal of Thorosilane-Contaminated Material at Landfill
NA	BZ	NA	NW-1505	North Firing Range
NA	BZ	NA	SE-1600	Pond 7-Steam Condensate Releases
NA	BZ	NA	SE-1601	Pond 8 - Cooling Tower Discharge Releases
NA	BZ	NA	SE-1602	East Firing Range
NA	BZ	NA	SW-1700	Fuel Spill into Woman Creek Drainage
NA	BZ	5	SW-1701	Recently Identified Ash Pit (Also referred to as TDEM-1)
NA	BZ	5	SW-1702	Recently Identified Ash Pit (Also referred to as TDEM-2)
NA	IA	NA	UBC-122	Building 122 (UBC-122)
NA	IA	NA	UBC-123	Building 123 (UBC-123)
NA	IA	NA	UBC-125	Building 125 (UBC-125)
NA	IA	NA	UBC-331	Building 331 (UBC-331)
NA	IA	NA	UBC-371	Building 371 (UBC-371)
NA	IA	NA	UBC-374	Building 374 (UBC-374)
NA	IA	NA	UBC-439	Building 439 (UBC-439)
NA	IA	NA	UBC-440	Building 440 (UBC-440)
NA	IA	NA	UBC-441	Building 441 UBC-441)
NA	IA	NA	UBC-442	Building 442 (UBC-442)
NA	IA	NA	UBC-444	Building 444 (UBC-444)
NA	IA	NA	UBC-447	Building 447 (UBC-447)
NA	IA	NA	UBC-528	Building 528 (UBC-528)
NA	IA	NA	UBC-559	Building 559 (UBC-559)
NA	IA	NA	UBC-701	Building 701 (UBC-701)
NA	IA	NA	UBC-707	Building 707 (UBC-707)
NA	IA	NA	UBC-731	Building 731 (UBC-731)
NA	IA	NA	UBC-770	Building 770 UBC-770)
NA	IA	NA	UBC-771	Building 771(UBC-771)
NA	IA	NA	UBC-774	Building 774 (UBC-774)
NA	IA	NA	UBC-776	Building 776 (UBC-776)
NA	IA	NA	UBC-777	Building 777 (UBC-777)
NA	IA	NA	UBC-778	Building 778 (UBC-778)
NA	IA	NA	UBC-779	Building 779 (UBC-779)
NA	IA	NA	UBC-865	Building 865 (UBC-865)
NA	IA	NA	UBC-881	Building 881 (UBC-881)
NA	IA	NA	UBC-883	Building 883 (UBC-883)
NA	IA	NA	UBC-886	Building 886 (UBC-886)
NA	IA	NA	UBC-887	Building 887 (UBC-887)
NA	IA	NA	UBC-889	Building 889 (UBC-889)
NA	IA	NA	UBC-991	Building 991 (UBC-991)

Notes:

NA - Not Applicable
IHSS 198 was deleted in 1990

* Denotes IHSSs that are RCRA interim status units per the Historical Release Report (See RFCA Attachment 12 for reference.)

Cross Reference List of IHSSs/PACs/UBCs

• Denotes IHSSs that have been closed through the CAD/ROD process.
¤ Denotes tanks that were formerly part of the Original Process Waste Line and were removed in 1972.
# Denotes IHSSs that are part of the Original Process Waste Line (OPWL) system. These IHSSs are not subject to RCRA interim status closure requirements according to RFCA Attachment 10.
+ Denotes IHSSs that are associated with or derived from RCRA permitted units.

ATTACHMENT 4

ENVIRONMENTAL RESTORATION RANKING

ENVIRONMENTAL RESTORATION RANKING

A prioritized list of Environmental Restoration (ER) locations was originally developed to select the top priority locations for remediation. (See RFCA Appendix 3, Implementation Guidance Document Appendix P for a description of the methodology used to develop the prioritized list.) Effective with the March 21, 2000 update to RFCA, the ER Ranking was determined by the RFCA Parties to no longer be the sole source for identifying the remedial action sequence. Instead, the Parties recognized that future remedial actions should be based on opportunity and decontamination and decommissioning (D&D) schedules. The preparation and annual updating of an ER Ranking list was appropriate in the early years of conducting accelerated actions at Rocky Flats when the site closure baseline was still under development so that work activities could be prioritized. However, there is now a detailed baseline and schedule for closing the entire site that addresses the sequencing of D&D and ER projects, and therefore, the RFCA Project Coordinators believe that subsequent revisions are unlikely. The ER Ranking was most recently updated in September 2001. That version is included in this updated attachment. The RFCA Parties have determined that this will be the last update.

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
IHSS	900	112	903 Pad		1		41426	6764	655	48845	10	2	2	1	40	yes
IHSS	900	155	903 Lip Area		2		41426	6764	655	48845	10	2	2	1	40	yes
IHSS	700	118.1	Solvent Spills W B730		3	1194	1194	2325	2	4715	8	1.5	2	1	24	yes
IHSS	000	101	Solar Ponds		4		2403	312	435	3150	7	2	1	1	14	yes
IHSS	000	121	OPWL		5		1013	n	n	1013	7	1	1	2	14	yes
TNK	000	T29	Tank 29 - OPWL		6	15	<1	<1	4110	4125	7	1	2	1	14	yes
PLM		CTPLM	Carbon Tet Plume		7		50000000	n	n	50000000	10	1	1	1	10	yes
PLM		RPPLM	903 Pad/Ryan's Pit Plume		8		73365			73365	10	1	1	1	10	yes
IHSS	900	165	Triangle Area		9		215	17	188	420	5	2	1	1	10	yes
IHSS	300	171	Fire Training		10		134	n	<1	134	4	1	2	1	8	no
PLM		881PLM	881 Hillside Plume		11		9167	n	n	9167	8	1	1	1	8	yes
IHSS	NE	111.4	Trench T-7		12		<1	128	<1	128	4	1	1	2	8	yes
PLM		IAPLM	Industrial Area Plume		13		2615	n	n	2615	7	1	1	1	7	yes
IHSS	500	117.2	M. Chem. Storage Site		14		651		2	653	6	1	1	1	6	yes
IHSS	700	131	Rad Site 700 Area No.1		15		n		119	119	3	1	2	1	6	no
IHSS	600	160	Rad Site B444 Parking Lot		16		578	6	101	685	6	1	1	1	6	yes

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
IHSS	600	161	Rad Site W of B664		17		n	5	98	103	3	1	1	2	6	no
PLM		PUDPLM	PU&D Yard Plume		18		553	n	n	553	6	1	1	1	6	no
IHSS	SW	115	Original Landfill		19		172	258	242	672	6	1	1	1	6	no
IHSS	NW	114	Present Landfill		20		415	<1	31	446	5	2	1	0.5	5	no
IHSS	700	143	Old Outfall -B771		21		46	115	92	252	5	1	1	1	5	no
IHSS	700	150.2	Rad Site W B 771/776		22		n	2	374	376	5	1	1	1	5	no
IHSS	500	158	Rad Site B551		23		418	n	3	421	5	1	1	1	5	no
UBC	800	B881	B881 UBC		24		257	7	n	264	5	1	1	1	5	yes
PLM		881APLM	B881 Area Plume		25		257			257	5	1	1	1	5	no
PLM		PLFPLM	Present Landfill Plume		26		415	n	n	415	5	2	1	0.5	5	no
IHSS	700	150.8	Rad Site S B779		27		n	n	435	435	5	1	1	1	5	no
IHSS	100	196	Backwash Pond (Listed as OU-5 on Map)		28		44	258	6	308	5	1	1	1	5	no
IHSS	400	B444	B444 UBC		29		156	n	<1	156	4	1	1	1	4	no
IHSS	700	B707	B707 UBC		30		142	n	<1	142	4	1	1	1	4	no
IHSS	500	117.1	N. Chem. Storage Site		31		n	n	29	29	2	1	1	2	4	no
IHSS	500	197	Scrap Metal Stor.		32		n	n	29	29	2	1	1	2	4	no
IHSS	700	B779	B779 UBC		33		n	n	64	64	2	1	1	2	4	no

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
IHSS	NE	111.8	Trench T-11		34		96	<1	<1	96	3	1	1	1	3	no
IHSS	600	120.2	Fiberglass Area W B664		35		n	4	98	102	3	1	1	1	3	no
IHSS	700	138	B779 Cooling Tower BD		36		n	n	97	97	3	1	1	1	3	no
IHSS	700	144 (N)	Sewer Line Overflow		37		n	94	8	102	3	1	1	1	3	no
IHSS	400	157.1	Rad Site N		38		5	n	100	105	3	1	1	1	3	no
IHSS	400	157.2	Rad Site S		39		2	2	113	117	3	1	1	1	3	no
IHSS	800	164.2	Rad Site #2 800 Area, Bldg 886 Spill		40		<1	<1	99	99	3	1	1	1	3	no
IHSS	900	176	S&W Contractor Yard		41		n	n	102	102	3	1	1	1	3	no
IHSS	700	150.1	Rad Site N B771		42		n	n	114	114	3	1	1	1	3	no
IHSS	000	162	Rad Site 700 Area		43		n	5	374	379	5	1	1	0.5	2.5	no
PLM		OLPLM	Old Landfill Plume		44		174	n	n	174	4	1	1	0.5	2	no
UBC	700	137	B.712/713 Cooling Tower BD.		45		n	n	62	62	2	1	1	1	2	no
TNK	800	T27	Tank 27 - OPWL		46		n	n	59	59	2	1	1	1	2	no
UBC	100	B123	B123 UBC		47		9	7	1	17	1	1	1	1	1	yes
IHSS	900	119.1	Solvent Spill Site OU1		48		<1	29	3	32	2	1	1	0.5	1	no
IHSS	600	120.1	Fiberglass Area N B664		49		n	n	20	20	1	1	1	1	1	no
IHSS	400	136.1	Cooling Tower Pond W of B444		50		n	n	1	1	1	1	1	1	1	no

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
IHSS	400	136.2	Cooling Tower Pond E. B444		51		n	n	4	4	1	1	1	1	1	no
IHSS	100	148	Waste Leaks		52		9	4	3	16	1	1	1	1	1	no
IHSS	700	150.3	Rad Site B 771/774		53		n	n	16	16	1	1	1	1	1	no
IHSS	700	163.1	Rad Site 700 North B774		54		n	n	2	2	1	1	1	1	1	no
IHSS	900	175	S&W B980 Cont. Storage		55		n	n	5	5	1	1	1	1	1	no
IHSS	800	177	B885 Drum Storage		56		<1	n	5	5	1	1	1	1	1	no
IHSS	400	187	Sulphuric Acid Spill B443		57		n	n	5	5	1	1	1	1	1	no
IHSS	000	190	Caustic Leak		58		12	n	4	16	1	1	1	1	1	no
IHSS	700	214	750 Pad-Pondcrete/Saltcrete Stor.		59		n	n	13	13	1	1	1	1	1	no
PAC	400	400-801	Transformer, Roof of Building 447		60		0	n	26	26	2	1	1	0.5	1	no
PAC	700	700-1108	Bowman's Pond		61		n	n	37	37	2	1	1	0.5	1	no
UBC	400	B440	B440 UBC		62		n	6	n	6	1	1	1	1	1	no
IHSS	700	149.1	Effluent Line		63		n	n	11	11	1	1	1	1	1	no
IHSS	700	149.2	Effluent Line		64		n	n	3	3	1	1	1	1	1	no
IHSS	NE	111.2	Trench T-5		65		<1	<1	1	1	1	1	1	0.5	0.5	no
IHSS	700	139.1 N(a)	Hydroxide Tank, KOHm NaOH		66		n	n	23	23	1	1	1	0.5	0.5	no

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
			condensate													
IHSS	700	139.2	HF Acid Tank		67		n	n	19	19	1	1	1	0.5	0.5	no
IHSS	900	140	Haz Disposal Area		68		n	3	n	3	1	1	1	0.5	0.5	no
IHSS	NW	170	PU&D Storage Yard		69		n	n	12	12	1	1	1	0.5	0.5	no
IHSS	NW	174a	PU&D Yard - Drum Storage		70		n	n	12	12	1	1	1	0.5	0.5	no
PAC	700	700-1105	Transformer Leak - 779-1/779-2		NR		0	n	0	0	0	1	1	0.5	0	
IHSS	NE	111.3	Trench T-6		NR		n	<1	<1	<1	0	1	1	1	0	
IHSS	NE	111.5	Trench T-8		NR		<1	<1	<1	<1	0	1	1	1	0	
IHSS	NE	111.6	Trench T-9		NR		<1	<1	<1	<1	0	1	1	1	0	
IHSS	NE	111.7	Trench T-10		NR		n	tbd	tbd	<1	0	1	1	1	0	
IHSS	400	116.1	W. Loading Dock B447		NR		n	n	<1	0	0	1	1	1	0	
IHSS	400	116.2	S. Loading Dock B 444		NR		n	n	<1	0	0	1	1	1	0	
IHSS	700	118.2	Solvent Spills N B707		NR		<1	n	<1	0	0	1	1	1	0	
IHSS	700	126.1	Process Waste Tks. - Westermost		NR	<1	n	<1	<1	<1	0	1	3	1	0	
IHSS	700	126.2	Process Waste Tks. - Eastermost		NR	<1	n	<1	<1	<1	0	1	3	1	0	
IHSS	700	127	Low Level Rad Waste Leak		NR		n	n	<1	<1	0	1	1	1	0	
IHSS	300	128	Oil Burn Pit #1		NR		<1	n	<1	0	0	1	1	1	0	

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
IHSS	300	134(N)	Lithium Metal Site		NR		<1	<1	<1	<1	0	1	1	1	0	
IHSS	300	134(S)	Lithium Metal Destruction Site		NR		n	n	<1	<1	0	1	1	1	0	
IHSS	NE	142.1	Pond A-1		NR		n	<1	<1	0	0	1	1	0.5	0	
IHSS	SE	142.11	Pond C-2		NR		n	<1	<1	0	0	1	1	0.5	0	
IHSS	NE	142.12	Pond A-5		NR		<1	<1	<1	0	0	1	1	0.5	0	
IHSS	NE	142.2	Pond A-2		NR		n	<1	<1	0	0	1	1	0.5	0	
IHSS	NE	142.3	Pond A-3		NR		n	<1	<1	0	0	1	1	0.5	0	
IHSS	NE	142.4	Pond A-4		NR		<1	<1	<1	0	0	1	1	0.5	0	
IHSS	NE	142.5	Pond B-1		NR		n	<1	<1	0	0	1	1	1	0	
IHSS	NE	142.6	Pond B-2		NR		n	<1	<1	0	0	1	1	1	0	
IHSS	NE	142.7	Pond B-3		NR		n	<1	<1	0	0	1	1	1	0	
IHSS	NE	142.8	Pond B-4		NR		n	<1	<1	0	0	1	1	1	0	
IHSS	NE	142.9	Pond B-5		NR		<1	<1	<1	0	0	1	1	1	0	
IHSS	SE	142.10	Pond C-1		NR		n	<1	<1	0	0	1	1	0.5	0	
IHSS	700	146.1	Concrete Tanks		NR		n	n	n	0	0	1	1	2	0	
IHSS	700	146.2	Concrete Tanks		NR		n	n	n	0	0	1	1	2	0	
IHSS	700	146.3	Concrete Tanks		NR		n	n	n	0	0	1	1	2	0	
IHSS	700	146.4	Concrete Tanks		NR		n	n	n	0	0	1	1	2	0	

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
IHSS	700	146.5	Concrete Tanks		NR		n	n	n	0	0	1	1	2	0	
IHSS	700	146.6	Concrete Tanks		NR		n	n	n	0	0	1	1	2	0	
IHSS	700	150.4	Rad Site NW B750		NR		n	n	<1	<1	0	1	1	1	0	
IHSS	700	150.6	Rad Site S B779		NR		n	n	<1	0	0	1	1	1	0	
IHSS	700	150.7	Rad Site S B776		NR		n	n	<1	0	0	1	1	1	0	
IHSS	900	153	Oil Burn Pit No. 2		NR		<1	<1	n	<1	0	1	1	1	0	
IHSS	900	154	Pallet Burn Site		NR		n	n	<1	0	0	1	1	0.5	0	
IHSS	500	159	Rad Site B559		NR		<1	<1	n	<1	0	1	1	1	0	
IHSS	700	163.2	Americium Slab		NR		n	n	<1	0	0	1	1	1	0	
IHSS	800	164.3	Rad Site #2 800 Area, Bldg 887 Pad		NR		n	n	<1	0	0	1	1	1	0	
IHSS	500	169	Hydrogen Peroxide Drum Burial Waste		NR		n	n	n	0	0	1	1	0.5	0	
IHSS	900	173	Rad Site B991		NR		n	n	<1	0	0	1	1	0.5	0	
IHSS	400	182	444/453 Drum Stor.		NR		n	n	n	0	0	1	1	1	0	
IHSS	900	184	Rad Site 991 Steam		NR		n	n	<1	0	0	1	1	0.5	0	
IHSS	300	186	Valve Vaults 11.12.13		NR		n	n	<1	0	0	1	1	1	0	
IHSS	400	205	Sump #3 Acid Site (SE of B460)		NR		n	n	<1	0	0	1	1	1	0	
IHSS	400	207	Inactive B444 Acid Dumpster		NR		n	n	<1	0	0	1	1	1	0	

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
IHSS	400	208	Inactive 444/447 Wst Str		NR		n	n	<1	<1	0	1	1	1	0	
IHSS	900	213	904 Pad, Pondcrete Stor.		NR		n	n	n	0	0	1	1	1	0	
IHSS	NE	216.2	East Spray Field-Center Area		NR		n*	n	<1	0	0	1	1	1	0	
IHSS	NE	216.3	East Spray Field-South Area		NR		n*	n	<1	0	0	1	1	1	0	
UBC	700	B774	B774 UBC		NR		n	n	n	0	0	1	1	2	0	
TNK	700	T12	Tank 12 - OPWL		NR		n	n	n	0	0	1	1	1	0	
TNK	000	T31	Tank 31 - OPWL		NR		n	n	n	0	0	1	1	1	0	
TNK	500	T33	Tank 33 - OPWL		NR		n	n	n	0	0	1	1	1	0	
TNK	500	T34	Tank 34 - OPWL		NR		n	n	n	0	0	1	1	1	0	
TNK	500	T35	Tank 35 - OPWL		NR		n	n	n	0	0	1	1	1	0	
IHSS	700	139.1 N(a)	Hydroxide Tank, KOHm NaOH condensate		NR		n	n	n	n	0	1	1	1	0	
IHSS	700	139.1 N(b)	Hydroxide Tank		NR		n	n	n	n	0	1	1	1	0	
IHSS	700	144 (S)	Sewer Line Overflow		NR		n	n	n	n	0	1	1	1	0	
IHSS	700	147.1	MAAS Area		NR		<1	n	n	0	0	1	1	1	0	
IHSS	300	212	B371 Drum Storage		NR		n	n	n	n	0	1	1	1	0	
IHSS	700	215	Abandoned Sump near-774 Unit 55.13 T-		NR		n	n	n	0	0	1	1	1	0	

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			40													
IHSS	700	123.2	Valve Vault W. of 707		NR		n	n	n							
IHSS	700	132	Rad Site 700 Area #4		NR		n	n	n							
PAC	000	000-500	Sanitary Sewer System		NR		n	n	n							
PAC	000	000-503	Solar Pond Water Spill Along Central Ave		NR		n	n	n							
PAC	000	000-504	New Process Waste Line		NR		n	n	n							
PAC	IA	000-505	Storm Drains		NR		n	n	n							
PAC	100	100-602	Building 123 Process Waste Line Break		NR		n	n	n							
PAC	100	100-609	Building 121 Security Incinerator		NR		n	n	n							
PAC	100	100-611	Building 123 Scrubbber Solution Spill		NR		n	n	n							
PAC	100	100-613	Asphalt Surface in Lay Down N Bldg 130 (formerly 000-501)		NR		n	n	n							
PAC	300	300-702	Pesticide Shed		NR		n	n	n							
PAC	400	400-802	Storage Shed B334		NR		n	n	n							
PAC	400	400-803	Misc Dumping, Building 460 Storm Drain		NR		n	n	n							

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PAC	400	400-804	Road North of Building 460		NR		n	n	n							
PAC	400	400-807	Sandblasting Area		NR		n	n	n							
PAC	400	400-810	Beryllium Fire - Bldg 444		NR		n	n	n							
PAC	400	400-813	RCRA Tank Leak in Bldg 460		NR		n	n	n							
PAC	400	400-815	RCRA Tank Leak in Bldg 460		NR		n	n	n							
PAC	500	500-906	Asphalt Surface Near Bldg 559		NR		n	n	n							
PAC	500	500-907	Tanker Truck Release of hazardous Waste From Tank 231B		NR		n	n	n							
PAC	600	600-1001	Temp. Waste Stor B663		NR		n	n	n							
PAC	600	600-1004	Central Avenue Ditch (formerly identified as 400-820)		NR		n	n	n							
PAC	600	600-1005	Former Pesticide Storage Area		NR		n	n	n							
PAC	700	700-1100	French Drain North of Bldg 776/777		NR		n	n	n							
PAC	700	700-1101	Laundry Tank Overflow - Bldg 732		NR		n	n	n							
PAC	700	700-1106	Process Waste Spill - Portal 1		NR		n	n	n							
PAC	700	700-1115	Identification of Diesel Fuel in Subsurface Soils		NR		n	n	n							

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PAC	700	700-1116	Transformer Leak South of Bldg 776		NR		n	n	n							
PAC	800	800-1200	Valve Vault 2		NR		n	n	n							
PAC	800	800-1201	Radioactive Site south of Bldg 883		NR		n	n	n							
PAC	800	800-1204	Bldg 866 Spills		NR		n	n	n							
PAC	800	800-1205	Bldg 881, East Dock		NR		n	n	n							
PAC	800	800-1212	Building 866 Sump Spill		NR		n	n	n							
PAC	900	900-1301	Bldg 991 Enclosed Area		NR		n	n	n							
PAC	900	900-1307	Explosive Bonding Pit		NR		n	n	n							
PAC	900	900-1308	Gasoline Spill Outside of Bldg 980		NR		n	n	n							
PAC	900	900-1310	ITS Water Spill (formerly 000-502)		NR		n	n	n							
PAC	NE	NE-1404	Diesel Spill at Pond B-2 Spillway		NR		n	n	n							
PAC	NE	NE-1407	OU2 Treatment Facility		NR		n	n	n							
PAC	NE	NE-1412	Trench T-12 Located @ OU2 East Trenches		NR		n	n	n							
PAC	NE	NE-1413	Trench T-13 Located @ OU2 East Trenches		NR		n	n	n							
PAC	NW	NW-1505	North Firing Range													

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PAC	SE	SE-1602	East Firing Range		NR		n	n	n							
UBC	100	B122	B122 UBC		NR		n	n	n							
UBC	100	B125	B125 UBC		NR		n	n	n							
UBC	300	B331	B331 UBC		NR		n	n	n							
UBC	300	B371	B371 UBC		NR		n	n	n							
UBC	300	B374	B374 UBC		NR		n	n	n							
UBC	400	B439	B439 UBC		NR		n	n	n							
UBC	400	B441	B441 UBC		NR		n	n	n							
UBC	400	B442	B442 UBC		NR		n	n	n							
UBC	400	B447	B447 UBC		NR		n	n	n							
UBC	500	B528	B528 UBC		NR		n	n	n							
UBC	500	B559	B559 UBC		NR		n	n	n							
UBC	700	B701	B701 UBC		NR		n	n	n							
UBC	700	B731	B731 UBC		NR		n	n	n							
UBC	700	B770	B770 UBC		NR		n	n	n							
UBC	700	B771	B771 UBC		NR		n	n	n							

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UBC	700	B776	B776 UBC		NR		n	n	n							
UBC	700	B777	B777 UBC		NR		n	n	n							
UBC	700	B778	B778 UBC		NR		n	n	n							
UBC	800	B865	B865 UBC		NR		n	n	n							
UBC	800	B883	B883 UBC		NR		n	n	n							
UBC	800	B886	B886 UBC		NR		n	<1	n	0	1	1	1	1	0	no
UBC	800	B887	B887 UBC		NR		n	n	n							
UBC	800	B889	B889 UBC		NR		n	n	n							
UBC	900	B991	B991 UBC		NR		n	n	n							
TNK	100	T01	Tank 1 - OPWL		NR	n	n	n	n							
TNK	400	T02	Tank 2 - OPWL		NR	n	n	n	n							
TNK	400	T03	Tank 3 - OPWL		NR	n	n	n	n							
TNK	400	T04	Tank 4 - OPWL		NR	n	n	n	n							
TNK	400	T05	Tank 5 - OPWL		NR	n	n	n	n							
TNK	400	T06	Tank 6 - OPWL		NR	n	n	n	n							
TNK	500	T07	Tank 7 - OPWL		NR	n	n	n	n							

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TNK	700	T08	Tank 8 - OPWL		NR	n	n	n	n							
TNK	700	T09	Tank 9 - OPWL		NR	n	n	n	n							
TNK	700	T10	Tank 10 - OPWL		NR	n	n	n	n							
TNK	700	T11	Tank 11 - OPWL		NR	n	n	n	n							
TNK	700	T13	Tank 13 - OPWL		NR	n	n	n	n							
TNK	700	T14	Tank 14 - OPWL		NR	n	n	n	n							
TNK	700	T15	Tank 15 - OPWL		NR	n	n	n	n							
TNK	700	T16	Tank 16 - OPWL		NR	n	n	n	n							
TNK	700	T17	Tank 17 - OPWL		NR	n	n	n	n							
TNK	700	T18	Tank 18 - OPWL		NR	n	n	n	n							
TNK	700	T19	Tank 19 - OPWL		NR	n	n	n	n							
TNK	700	T20	Tank 20 - OPWL		NR	n	n	n	n							
TNK	800	T21	Tank 21 - OPWL		NR	n	n	n	n							
TNK	800	T22	Tank 22 - OPWL		NR	n	n	n	n							
TNK	800	T23	Tank 23 - OPWL		NR	n	n	n	n							
TNK	800	T24	Tank 24 - OPWL		NR	n	n	n	n							

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TNK	800	T25	Tank 25 - OPWL		NR	n	n	n	n							
TNK	800	T26	Tank 26 - OPWL		NR	n	n	n	n							
TNK	700	T30	Tank 30 - OPWL		NR	n	n	n	n							
TNK	800	T32	Tank 32 - OPWL		NR	n	n	n	n							
TNK	700	T36	Tank 36 - OPWL		NR	n	n	n	n							
TNK	700	T37	Tank 37 - OPWL		NR	n	n	n	n							
TNK	700	T38	Tank 38 - OPWL		NR	n	n	n	n							
TNK	800	T39	Tank 39 - OPWL		NR	n	n	n	n							
IHSS	300	206	Inactive D-836 HW TK	PNFA			n	n	<1	0	0	1	1	1	0	no
IHSS	600	189	Nitric Acid Tanks	PNFA			<1	<1	<1	0	0	1	1	0.5	0	no
IHSS	NE	166.1	Landfill Trench A	PNFA			<1	<1	n	0	0	1	1	0.5	0	no
IHSS	NE	166.2	Landfill Trench B	PNFA			<1	<1	n	0	0	1	1	0.5	0	no
IHSS	NE	166.3	Landfill Trench C	PNFA			<1	<1	n	0	0	1	1	0.5	0	no
IHSS	NE	167.2	Landfill Pond Spray Area	PNFA			n	<1	<1	0	0	1	1	0.5	0	no
IHSS	NE	167.3	Landfill Pond Spray Area	PNFA			n	n	<1	0	0	1	1	0.5	0	no
IHSS	NE	216.1	East Spray Field-North Area	PNFA			n	<1	<1	0	0	1	1	0.5	0	no

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IHSS	SW	133.1	Ash Pit 1	PNFA			44	2	<1	46	2	1	1	1	2	no
IHSS	SW	133.2	Ash Pit 2	PNFA			44	2	<1	46	2	1	1	1	2	no
IHSS	SW	133.3	Ash Pit 3	PNFA			44	<1	<1	44	2	1	1	1	2	no
IHSS	SW	133.4	Ash Pit 4	PNFA			44	<1	2	46	2	1	1	1	2	no
IHSS	SW	133.5	Incinerator	PNFA			n	<1	<1	0	0	1	1	0.5	0	
IHSS	SW	133.6	Concrete Wash Pad	PNFA			n	<1	<1	0	0	1	1	0.5	0	
PAC	100	100-603	Building 123 Bioassay Waste Spill	PNFA			n	n	<1	<1	0	1	1	0.5	0	no
PAC	300	300-708	Transformer N of B371	PNFA												
PAC	300	300-709	Transformer Leak 334-1	PNFA												
PAC	300	300-711	Ni-Cad Battery Spil Outside Bldg 373	PNFA												
PAC	300	300-712	1/2 g Antifreeze Spill Outside Bldg 373	PNFA												
PAC	300	300-713	Caustic Spill N of Bldg 331	PNFA												
PAC	300	300-714	Laundry Waste Water Spill N of Bldg 374	PNFA												
PAC	400	400-812	Tank T-2 Spill I Building 460	PNFA			n	n	<1	0	0	1	1	0.5	0	no
PAC	400	400-814	A/C Compressor Release, Bldg 444 Roof	PNFA												
PAC	500	500-900	Transformer Leak 515/516	PNFA			0	<1	0	0	0	1	1	0.5	0	no

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PAC	500	500-901	Transformer Leak 555/558	PNFA			0	1	0	1	1	1	1	0.5	0.5	no
PAC	500	500-902	Transformer Leak 559	PNFA			0	<1	0	0	1	1	1	0.5	0.5	no
PAC	500	500-904	Transformer Leak 223-1/223-2	PNFA			0	n	19	19	1	1	1	0.5	0.5	no
PAC	500	500-905	Transformer Leak 558-1	PNFA												
PAC	500	500-909	Spent Photo Fixer Solution Release (IHSS 158)	PNFA												
PAC	600	600-1000	Transformer Storage B662	PNFA												
PAC	600	600-1002	Transformer Storage W B666	PNFA			0	n	<1	0	0	1	1	0.5	0	no
PAC	600	600-1003	Transformers N & S 661/675	PNFA			0	<1	0	0	0	1	1	0.5	0	no
PAC	700	700-1102	Transformer Leak - 776-4	PNFA			0	25	0	25	1	1	1	0.5	0.5	no
PAC	700	700-1103	Transformer Leak B707	PNFA												
PAC	700	700-1104	Transformer Leak B708	PNFA												
PAC	700	700-1111	Transformer Leak B750	PNFA			0	<1	0	0	0	1	1	0.5	0	no
PAC	700	700-1112	Transformer Leak B776-5	PNFA												
PAC	700	700-1113	IHSS 101	PNFA												
PAC	700	700-1114a	Release During Liquid Transfer Oper Bldg	PNFA												

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			774													
PAC	700	700-1114b	Release During Liquid Transfer Oper Bldg 774	PNFA												
PAC	800	800-1207	Transformer Leak 883-4	PNFA		0	0	2	2	2	1	1	1	1	1	no
PAC	800	800-1208	Transformer Leak 881-4	PNFA			0	6	6	2	1	1	1	1	1	no
PAC	800	800-1209	Transformer Leak 800 area	PNFA		0	0	9	9	2	1	1	1	1	1	no
PAC	800	800-1210	Transformers 865-1 & 865-2	PNFA		0	0	2	2	2	1	1	1	1	1	no
PAC	900	900-1306	Transformers 991-1 & 991-2	PNFA												
PAC	900	900-1314	Solar Evaporation Pond 207B Sludge Release	PNFA												
PAC	900	900-1315	Tanker Trk Release on E Patrol Rd, N of Spuce	PNFA												
PAC	900	900-1316	Elevated Chromium Identified During Geotechnical Drilling	PNFA												
PAC	900	900-1317	Soil from crate in 964 Laydown Yard	PNFA												
PAC	NE	NE-1410	Diesel fuel Spill at field Treatability Unit	PNFA												
PAC	NE	NE-1411	Diesel Fuel Overflowed from Tanker @ OU2	PNFA												

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PAC	NW	NW-1502	Disposal of Diesel Contaminated Material at Landfill (formerly NW-177)	PNFA												
PAC	NW	NW-1503	Disposal of Fuel Contaminated Material at Landfill	PNFA												
PAC	NW	NW-1504	Disposal of Thorosilane Contaminated Material at Landfill	PNFA												
PAC	SW	SW-1701	Recently Identified Ash Pit	PNFA			n	n	n							
PAC	SW	SW-1702	Recently Identified Ash Pit	PNFA			n	n	n							
IHSS	300	135	B373 CT Blowdown	NFA			n	n	<1	0	0	1	1	1	0	no
IHSS	300	151	Fuel Oil Leak Tk. 262	NFA			n	n	<1	0	0	1	1	1	0	no
IHSS	300	156.1	Rad Site	NFA			n	n	<1	0	0	1	1	1	0	no
IHSS	300	181	B334 Cargo Container Area	NFA			n	n	<1	0	0	1	1	1	0	no
IHSS	300	188	Acid Leak (SE of B374)	NFA			n	n	<1	0	0	1	1	1	0	no
IHSS	400	191	Hydrogen Perox. Leak	NFA			<1	<1	<1	0	0	1	1	1	0	no
IHSS	600	117.3	S. Chem. Storage Site	NFA			n	n	<1	0	0	1	1	1	0	no
IHSS	600	152	Fuel Oil Tank B452	NFA			n	n	n	0	0	1	1	1	0	no

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IHSS	600	164.1	Rad Site #2 800 Area	NFA			2	n	<1	2	1	1	1	0.5	0.5	no
IHSS	700	123.1	Valve Vault 7	NFA			n	n	<1	0	0	1	1	1	0	no
IHSS	700	150.5	Rad Site W B707 - (DUPLICATE OF 123.2)	NFA			na	na	na	na	na	1	1	1	0	
IHSS	800	147.2	B881 Conversion Act.	NFA			n	n	<1	0	0	1	1	1	0	no
IHSS	900	141	Sludge Disposal Area	NFA			<1	n	<1	0	0	1	1	0.5	0	no
IHSS	900	183	Gas Detox Area	NFA			n	n	n	0	0	1	1	0.5	0	
IHSS	900	210	B980 Cargo Cont.	NFA			n	n	<1	0	0	1	1	1	0	no
IHSS	000	172	Central Ave. Spill	NFA			n	n	<1	0	0	1	1	1	0	no
IHSS	NE	156.2	Soil Disposal Area	NFA			<1	<1	<1	0	0	1	1	1	0	no
IHSS	NE	167.1	Landfill Pond Spray Area	NFA			<1	<1	<1	0	0	1	1	0.5	0	no
IHSS	NW	203	Inactive HW Stor.	NFA			n	n	<1	0	0	1	1	0.5	0	no
IHSS	NW	174b	PU&D Yard - Dumpster Storage	NFA			n	n	12	12	1	1	1	0.5	0.5	no
IHSS	SE	209	Surface Disturbance	NFA			<1	<1	<1	0	0	1	1	0.5	0	no
PAC	100	100-600	Mercury Spill - Valve Vault 124-B B124	NFA												
PAC	100	100-601	Building 123 Phosphoric Acid Spill	NFA												
PAC	100	100-604	T-130 Complex Sewer Line Leaks	NFA												

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
PAC	100	100-605	Building 115 Hydraulic Oil Spill	NFA												
PAC	100	100-606	Building 125 TCE Spill	NFA												
PAC	100	100-607	Building 111 Transformer PCB Leak	NFA			n	n	n							
PAC	100	100-608	Building 131 Transformer Leak	NFA												
PAC	100	100-610	Asbestos Release - Building 123	NFA												
PAC	100	100-612	Battery Solution Spill - Building 119	NFA												
PAC	300	300-700	Scrap Roofing Disposal	NFA												
PAC	300	300-701	Sulfuric Acid Spill, Bldg 371	NFA												
PAC	300	300-703	Building 331 North Area	NFA												
PAC	300	300-704	Roof Fire, Bldg 381	NFA												
PAC	300	300-705	Potassium Hydroxide Spill N. of Bldg 374	NFA												
PAC	300	300-706	Evaporator Tanks N. of Bldg 374	NFA												
PAC	300	300-707	Sanitizer Spill	NFA												
PAC	300	300-710	Gasoline Spill North of Building 331	NFA												
PAC	300	300-715	Battery Acid Spill	NFA												

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
PAC	400	400-800	Transformer 443-1	NFA			0	1	0	1	1	1	1	0.5	0.5	no
PAC	400	400-805	Building 43 Tank #9 Leak	NFA												
PAC	400	400-806	Catalyst Spill, Building 440	NFA												
PAC	400	400-808	Vacuum Pump Leak, Building 442	NFA												
PAC	400	400-809	Oil Leak - 446 Guard Post	NFA												
PAC	400	400-811	Transformer 443-2, Bldg 443	NFA		0	0	<1	0	0	0	1	1	0.5	0	no
PAC	500	500-903	RCRA Storage Unit #1	NFA												
PAC	500	500-908	IHSS 156.1, 186	NFA												
PAC	600	600-1001(a)	Spills of Unknown Oil in PAC 600-1001 (SIR #318)	NFA												
PAC	700	700-1107	Compressor Waste Oil Spill - Building 776	NFA												
PAC	700	700-1109	Uranium Incident - Bldg 778	NFA												
PAC	700	700-1110	Nickel Carbonyl Burial West of Bldg 771	NFA												
PAC	700	700-1117	Bldg. 701 Water Line Soil Put-back	NFA												
PAC	800	800-1202	Sulfuric Acid Spill, Bldg 883	NFA												
PAC	800	800-1203	Sanitary Sewer Line Brk Btwn Bldg 865/866	NFA												

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
PAC	800	800-1206	Fire, Bldg 883	NFA												
PAC	800	800-1211	Capacitor Leak, Bldg 883	NFA												
PAC	900	900-1300	RO Plant Sludge Drying beds	NFA												
PAC	900	900-1302	Gasoline Spill	NFA												
PAC	900	900-1303	Natural Gas Leak	NFA												
PAC	900	900-1304	Chromic Acid Spill - Bldg 991	NFA												
PAC	900	900-1305	Building 991 Roof	NFA												
PAC	900	900-1309	OU 2 Field Treatability Unit Spill	NFA												
PAC	900	900-1311	Septic Tanks East of Building 991	NFA												
PAC	900	900-1312	OU 2 Water Spill	NFA												
PAC	900	900-1313	Seep Area Near OU2 Influent	NFA												
PAC	900	900-1318	Release of F001 Listed Waste to Soil	NFA												
PAC	000	000-501	Roadway Spraying	NFA												
PAC	NE	NE-1400	Tear gas Powder Release	NFA												
PAC	NE	NE-1401	NE Buffer Zone Gas Line Break	NFA												

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
PAC	NE	NE-1402	East Inner Gate PCB Spill	NFA												
PAC	NE	NE-1403	Gasoline Spill - Building 920 Guard Post	NFA												
PAC	NE	NE-1405	Diesel Spill at Field Treatability Unit	NFA												
PAC	NE	NE-1406	771 Hillside Sludge Release	NFA												
PAC	NE	NE-1408	OU2 Test Well (formerly NE-1406)	NFA												
PAC	NE	NE-1409	Modular Tanks and 910 Treatment Sys Spill (formerly 000-503)	NFA												
PAC	NW	NW-1500	Diesel Spill @ PU&D Yard (formerly NW-175)	NFA												
PAC	NW	NW-1501	Asbestos Release @ PU&D Yard (formerly NW-176)	NFA												
PAC	SE	SE-1600	Pond 7 - Steam Condensate Releases	NFA												
PAC	SE	SE-1601	Pond 8 - Colling Tower Discharge Releases	NFA												
PAC	SW	SW-1700	Fuel Spill into Woman Creek Drainage	NFA												
IHSS	000	192	Antifreeze Discharge	C-94			3	n	n	3	1	1	1	0.5	0.5	no
IHSS	700	185	Solvent Spill	C-94			n	n	n	0	0	1	1	0.5	0	no

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
IHSS	400	193	Steam Condensate Leak	C-94			n	n	1	1	0	1	1	0.5	0	no
IHSS	700	194	Steam Condensate Leak	C-94			n	n	n	0	0	1	1	0.5	0	no
IHSS	NW	195	Nickel Carbonyl Disposal	C-94			n	n	n	0	0	1	1	0.5	0	no
IHSS	SW	168	West Spray Field	C-95			190	<1	<1	190	4	1	1	0.5	2	no
IHSS	800	178	B 881 Drum Storage	C-95			n	n	n	0	0	1	1	0.5	0	no
IHSS	800	211	B881 Drum Storage	C-95			n	n	n	0	0	1	1	0.5	0	no
IHSS	800	217	B881 Cyanide Trt.	C-95			n	n	n	0	0	1	1	0.5	0	no
IHSS	800	179	B865 Drum Storage	C-95			n	n	n	0	0	1	1	0.5	0	no
IHSS	800	180	B883 Drum Storage	C-95			n	n	n	0	0	1	1	0.5	0	no
IHSS	400	204	Uranium Chip Roaster	C-95			n	n	n	0	0	1	1	0.5	0	no
IHSS	900	109	Ryan's Pit (Trench 2)	C-96	1		33679	2	<1	33681	10	2	3	1	60	yes
IHSS	NE	110	Trench T-3	C-96	2		26101	1612	<1	27713	10	2	3	1	60	yes
IHSS	NE	111.1	Trench T-4	C-96	3		26101	78	n	26179	10	2	3	1	60	yes
IHSS	900	113	Mound Area	C-97	5		19064	6	1	19071	9	3	2	1	54	yes
IHSS		199	Offsite Land Surface	C-97			n	<1	<1	0	0	1	1	0.5	0	no
IHSS		200	Great Western Res.	C-97			<1	<1	<1	0	0	1	1	0.5	0	no
IHSS		201	Standley Lake	C-97			<1	<1	<1	0	0	1	1	0.5	0	no

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
IHSS		202	Mower Reservoir	C-97			<1	<1	<1	0	0	1	1	0.5	0	no
IHSS	IZ	130	Rad Site - 800 Area	C-97			<1	34	<1	34	2	2	1	0.5	2	no
IHSS	800	104	Liquid Dumping	C-97			<1	10	<1	10	1	2	1	0.5	1	no
IHSS	900	119.2	E. Scrap Metal Storage	C-97			9	<1	<1	9	1	2	1	0.5	1	no
IHSS	800	102	Oil Sludge Pit	C-97			<1	<1	<1	<1	0	2	1	0.5	0	no
IHSS	800	103	Chemical Burial	C-97			<1	<1	<1	0	0	2	1	0.5	0	no
IHSS	800	105.1	West Out-of-Service Tank	C-97			<1	<1	<1	0	0	2	1	0.5	0	no
IHSS	800	105.2	East Out-of-Service Tank	C-97			<1	<1	<1	0	0	2	1	0.5	0	no
IHSS	800	106	106 Outfall	C-97			<1	<1	<1	0	0	2	1	0.5	0	no
IHSS	800	107	107 Hillside Oil Leak	C-97			<1	<1	<1	0	0	2	1	0.5	0	no
IHSS	800	145	Sanitary Waste Leak	C-97			<1	<1	<1	0	0	2	1	0.5	0	no
IHSS	900	108	Trench T-1	C-99	4		11	11080	<1	11091	9	1	3	2	54	yes
PLM		ETPLM	East Trenches Plume	IAC-99	7		26105	n	n	26105	10	3	1	1	30	yes
PLM		MNDPLM	Mound Plume	IAC-98	9		19067	n	n	19067	9	3	1	1	27	yes
TNK	800	T40	Tank 40-OPWL	IAC-96	10	3570	n	n	<1	3570	7	1	3	1	21	yes
IHSS	700	124.1	Rad Liq. Waste Tk. 66	IAC-96	11	1453	<1	<1	n	1453	7	1	3	1	21	yes
IHSS	700	124.2	Rad Liq. Waste Tk. 67	IAC-	11	1453	<1	<1	n	1453	7	1	3	1	21	yes

TYPE	Area	ID	Description	Status	Rank1	Total Tank Contents	Total Ground Water	Total Subsurface Soil	Total Surface Soil	Total Chemical Score	ALF Score	SW Impact Score Multiplier	Potential for Further Release Multiplier	Professional Judgement Multiplier	Total Priority Score	Exceeds Tier I AL
				96												
IHSS	700	125	Holding Tk. 66	IAC-96	11	1453	<1	<1	n	1453	7	1	3	1	21	yes
IHSS	400	122	Underground Conc. Tks.	IAC-96	12	751	270	<1	29	1050	7	1	3	1	21	yes
IHSS	700	124.3	Rad Liq. Waste Tk. 68	IAC-96	13	1000	<1	<1	n	1000	6	1	3	1	18	yes
PLM		SPPLM	Nitrate (Solar Pond) Plume	IAC-99	15		2403	n	n	2403	10	2	1	1	20	yes
IHSS	400	129	Oil Leak E of B443	IAC-96	31	<1	n	n	2	2	1	1	2	1	2	no

ATTACHMENT 5

ACTION LEVEL FRAMEWORK

Electronic Copy

Rocky Flats Environmental Technology Site Action Levels and Standards Framework for Surface Water, Ground Water, and Soils

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Action Level Framework

1.0 GENERAL BACKGROUND

1.1 Goal of Action Levels and Standards Framework

During negotiations that resulted in the Final Rocky Flats Cleanup Agreement (RFCA), a working group consisting of the Department of Energy (DOE), the Environmental Protection Agency (EPA), the Colorado Department of Public Health and Environment (CDPHE), and Kaiser-Hill teams was formed to develop a consensus proposal for the appropriate cleanup standards for surface water and action levels for all media that should apply to the Rocky Flats Environmental Technology Site (RFETS or Site). The working group developed this Action Levels and Standards Framework for Surface Water, Ground Water, and Soil (ALF) as its final recommendation in 1996 and several modifications were subsequently proposed, approved and incorporated into ALF. ALF was developed in a manner generally consistent with the Rocky Flats Vision (Vision) and Rocky Flats Cleanup Agreement (RFCA) Preamble Objectives. In some cases, the working group found it necessary to more precisely define aspects of the objectives so that applicability of action levels and required mitigating actions could be completely defined.

The goal of the ALF is to:

- provide a basis for future decision-making;
- define the common expectations of all parties; and
- incorporate land- and water-use controls into Site cleanup.

The Parties have determined that a National Wildlife Refuge is the reasonably anticipated future land use for the purpose of making cleanup decisions. This determination is based upon the assumption that a National Wildlife Refuge will be established in accordance with the Rocky Flats National Wildlife Refuge Act of 2001 (Refuge Act). This determination is also consistent with the RFCA Preamble and RFCA Vision land use assumptions. As a National Wildlife Refuge, the Parties assume that the Site will remain in federal ownership, and the surface will be managed as a Refuge where possible. Residential use is not recognized as a reasonably anticipated future land use. However, the rural resident exposure scenario was evaluated for the purposes of establishing risk-based surface soil action levels for plutonium, americium and uranium. A rural resident exposure scenario was also used to calculate the annual radiation dose under unrestricted land use conditions in order to demonstrate that the risk-based action levels meet assumed relevant and appropriate radiation control standards.

This ALF establishes action levels for groundwater and soil, action levels and cleanup standards for surface water and put-back levels for soil. Action levels are numeric levels that, when exceeded, trigger an action determination evaluation in

accordance with ALF Sections 2-5 and an appropriate accelerated response action. In some cases, concentrations of contaminants below action levels may also trigger an accelerated action (e.g., cleanup of soils contamination that is below soil action levels, but that may impact surface water quality).

A standard is an enforceable narrative and/or numeric restriction established by regulation and applied so as to protect one or more existing or potential future uses. Within this framework, standards are associated with surface water use classifications and applied at points of compliance (POCs). Surface water standards are not being directly applied to ground water or soils; instead, contaminated soils and groundwater are evaluated to determine whether they may adversely impact surface water quality.

Put-back levels apply to soils that contain contaminants at levels that do not trigger an accelerated action, but that are excavated incidental to the conduct of accelerated actions. Put-back levels also apply to soils that have been treated to remove contaminants to below action levels as provided in an accelerated action decision document. DOE is allowed to replace these soils back into the ground if the contaminant concentration does not exceed the action levels listed in Table 3. Soils may be replaced into the ground only in the same Operable Unit (OU) in which they originated. OUs are designated in Attachment 1-*Operable Unit Consolidation Plan.* DOE may, with LRA approval after appropriate consultation, replace excavated soils with contaminant concentrations greater than the put-back levels. In such cases decision factors to be considered include remedy effectiveness and protectiveness, reasonably anticipated future land uses, contaminant levels in surrounding soils, potential for contaminants to affect surface water quality, and costs. Decisions resulting in soil put-back will be recorded in the appropriate closeout report.

Action levels are risk-based and risk is considered additive when multiple contaminants are present. Radiological and non-radiological effects will be assessed independently on a project-specific basis using methodology that is protective of human health and the environment. The cumulative radiological and non-radiological effects will be assessed on a project-specific basis if the concentrations are near their respective action levels.

Following implementation of accelerated actions, final remedial/corrective action decisions, including final cleanup levels will be determined in a Corrective Action Decision/Record of Decision (CAD/ROD). The final remedial/corrective actions specified in a CAD/ROD may require additional work based on the final cleanup levels to ensure an adequate remedy.

1.2 Programmatic Assumptions

The working group developed this framework using the following inter-related programmatic or Site-Wide assumptions:

- The framework must be consistent with the Vision and RFCA Preamble;
- Implementation of the framework must protect human health and the environment; and
- Implementation of the framework must protect surface water uses and quality.

Institutional controls will be part of the final remedy as appropriate to ensure protection of human health and the environment. The need for, and extent of, specific institutional controls and other long-term stewardship activities will be analyzed in the RCRA Facility Investigation-Remedial Investigation/Corrective Measures Study-Feasibility Study. These other long-term stewardship activities include such things as monitoring, maintenance, information management, and remedy review. Appropriate requirements for institutional controls and other long-term stewardship activities will be described as part of the preferred alternative in the Proposed Plan. Subject to modification agreed upon following the public comment period for this plan, such requirements will also be contained in all final CAD/ROD(s) and in any modified RFCA agreement, consistent with RFCA Paragraph 286. As of May 2003, DOE and CDPHE have not reached agreement as to whether a post-closure permit (or, alternatively, an enforceable document as defined in 6 CCR 1007-3, § 100.10(d)) will be required for Rocky Flats, and if so, whether that permit (or enforceable document) will also contain appropriate requirements for institutional controls and other long-term stewardship activities. The Parties will endeavor to resolve this matter. Failing an agreed-upon resolution, each Party reserves its rights as provided in RFCA Part 18.

While the selection of individual institutional controls is dependent upon the final remedy selected, and therefore cannot be known at this time, the following institutional controls will be used as appropriate to protect human health and the environment:

- prohibition of construction and use of buildings in contaminated areas;
- prohibition on drilling wells for water use into contaminated groundwater, the use of contaminated groundwater and/or pumping groundwater that could adversely affect the remedy;
- restrictions on excavation in areas above subsurface contamination or intrusion into subsurface contamination;
- restrictions on activities that cause soil disturbance in areas with surface soil contamination; and
- other restrictions to protect engineered controls (such as covers, groundwater barriers and treatment cells) and monitoring systems.

The anticipated extent of areas with institutional controls at closure is shown in Figure 1. The anticipated boundary of areas that will be subject to institutional controls depicted in Figure 1 is subject to modification based upon characterization, future response actions, the results of the comprehensive risk assessment, and the final remedial/corrective action decision in the final CAD/ROD. The Parties additionally presume that there will be no residential development at Rocky Flats.

Section 25-15-320, C.R.S., requires an environmental covenant under certain conditions. As of April 2003, the Parties have not reached agreement on the applicability of this statute to the federal government. Failing an agreed-upon resolution, each Party reserves its rights as provided in RFCA Part 18.

1.3 Action Prioritization and Implementation

Accelerated actions will be supportive of the Intermediate and Long-Term Site Conditions as discussed in the RFCA Preamble and to the extent practicable, will contribute to the efficient performance of any anticipated long-term remedial actions. Protection of all surface water uses with respect to fulfillment of the Intermediate and Long-Term Site Conditions will be the basis for making soil and ground water accelerated action decisions. Accelerated actions will also be designed to prevent adverse impacts to ecological resources and ground water consistent with the ALF. Because the ALF does not address the inherent value of ground water, any residual effects on ground water not addressed through this Framework will be addressed under a Natural Resources Damage Assessment (NRDA).

Response action decisions may be implemented by means of an accelerated action (Proposed Action Memorandum [PAM], Interim Measure/ Interim Remedial Action [IM/IRA], or RFCA Standard Operating Protocol [RSOP]) or addressed as necessary in the CAD/ROD for the affected area. Actions will be developed in an integrated manner with other actions being taken and will be consistent with best management practices.

2.0 SURFACE WATER

2.1 Basis for Standards and Action Levels

Protection of surface water will be a basis for making soil and groundwater accelerated response action decisions pursuant to ALF Sections 3-5, so that at the completion of all cleanup activities, surface water leaving RFETS should be of sufficient quality to support all uses. The surface water standards this framework is designed to protect are found in the WQCC Regulation No. 31: Basic Standards and Methodologies for Surface Water (5 CCR 1002-3l) ("Basic Standards") and the site-specific water quality standards in the WQCC Regulation No. 38 (5 CCR 1002-38) ("Site-Specific Standards").

The Colorado Water Quality Control Commission (WQCC) determines water quality standards throughout Colorado. Local municipalities, including Westminster, Broomfield, Thornton, and Northglenn, have been and will be involved and consulted in surface water decisions, including recommendations to the WQCC.

Surface water exists in creeks and ponds on RFETS as well as immediately offsite. These surface waters are part of Segments 4a/4b and 5 of Big Dry Creek as follows:

- Segment 4a – Mainstem and all tributaries to Woman Creek and Walnut Creeks from the sources to Standley Lake and Great Western Reservoir, except for specific listings in Segments 4b and 5;
- Segment 4b – North and South Walnut Creek and Walnut Creek, from the outlet of Pond A-4 and B-5 to Indiana Street;
- Segment 5 – Mainstems of North and South Walnut Creek, including all tributaries, lakes, and reservoirs, from their sources to the outlets of Ponds A-4 and B-5, on Walnut Creek, and Pond C-2 on Woman Creek.

  See Figure 2, *Sketch of Stream Segments 4a, 4b, and 5.*

2.2 Numeric Levels During Active Remediation (Near-Term Site Condition)

During the period of active remediation, the Table 1 values will apply as standards in Segment 4a/4b of Big Dry Creek and as action levels in Segment 5.

A. Non-radionuclides

1. The numeric values that will apply throughout both stream segments are based on Colorado surface water use classifications consistent with the uses described in the RFCA Preamble:
   - Water Supply;
   - Aquatic Life - Warm 2;
   - Recreation 2; and
   - Agricultural.

2. Numeric values will be derived from the following:
   a. For metals, the site-specific standards or the basic standards apply, except where temporary modifications apply. If the basic and site-specific standards differ for a particular metal, the site-specific standard applies.
   b. For inorganics, the site-specific standards apply or the basic standards apply, except where temporary modifications apply. If the basic or site-specific standards differ for a particular inorganic, the site-specific standard applies.
   c. For organic chemicals, the more stringent of the basic standards or the site-specific standards applies, except where temporary modifications apply.

3. Effective March 2, 1997, maximum contaminant levels (MCLs) were adopted as temporary modifications for six organic compounds in Segment 5. These temporary modifications of surface water standards were granted through the year 2009 by the WQCC and must be re-examined every three years. Other temporary modifications to the numeric values during active remediation may be developed through subsequent working group efforts.

   a. The basis for proposing the temporary modifications may include one or more of the following:
      - A determination of ambient conditions in a manner consistent with the Basic Standards (5 CCR 1002-3 1);
      - A mass-balance equation that calculates maximum influent concentrations in Segment 5 that will be protective of numeric values at Segment 4a/4b POCs without allowing treatment within waters of the State; and
      - Some other methodology agreed to by all Parties.

   b. These temporary modifications should be developed together with other stakeholders (i.e., the local municipalities that are impacted by surface water from the RFETS).

4. Any contamination in surface water resulting from releases from a unit at RFETS subject to RCRA interim status requirements will be addressed through this ALF and through remedial actions rather than through RCRA closure (see Attachment 10 to RFCA, RCRA Closure for Interim Status Units). This would include surface water containing nitrates that has been impacted by the Solar Ponds ground water plume. Addressing the nitrates through this framework will allow these waters to be managed in a more cost-effective and flexible manner. The Parties recognize that changes in the management of nitrates may cause the surface water to more routinely approach the current 10 mg/L standard at the POC.

5. Due to detention and batch release operations of Pond A-4 and Pond B-5 waters, exceedance of the numerical pH of 9.00 occurs. Both the wastewater treatment plant effluent and storm water inflows to the ponds have pH values within the numerical range of 6.5 to 9.00 prior to detention in Pond B-5 and A-4; however, the nutrient loading to the ponds promotes algae growth which can shift carbonate equilibria. These conditions cause pH exceedance above 9.00 (with a calculated 85th percentile value of 9.10). All parties agree that aquatic use is likely not impacted by pH exceedances; however, the DOE will strive to control pH in the pond waters through prudent pond water management.

B. Radionuclides

1. Numeric values for plutonium and americium for Segments 4a/4b and 5 are risk-based ($1x10^{-6}$ lifetime excess cancer risk from direct exposure including consumption). These values are the statewide basic standards, effective March 2, 1997, as set by the WQCC.

2. Both radionuclides will be analyzed separately, and compared to the numeric value below:
   a. 0.15 pCi/L for plutonium and
   b. 0.15 pCi/L for americium.
   There is no total pCi/L limit.

3. The Parties agree that in the event that the plutonium and americium numerical standards are exceeded, the DOE will make every effort to

   identify the source of the exceedance. This will include documenting: hydrologic characteristics; preventive actions, terminal pond operational parameters; and any abnormal conditions and occurrences. Further, specific decisions regarding the terminal pond operations and the release of water will be guided by the Pond Operations Plan. This plan includes specific responses for identified circumstances and preserves dam safety. DOE shall have the burden to demonstrate prudent pond water management and strive to maintain the lowest detained volume practicable in the terminal ponds.

6. In Segments 4a/4b and 5, numeric values for gross alpha, gross beta, tritium and uranium will be the site-specific standards found in Table 2 of 5 CCR 1002-8-38. Numeric values for radium and strontium are based on the statewide Basic Standards (5 CCR 1002-31.11). The Parties will re-examine these values based upon conditions in the basins and will propose alternative values if appropriate.

C. POCs/Points of Evaluation (POEs)

1. In Segment 4a/4b, POCs will be placed at the existing sampling locations for the outfalls of the terminal ponds (Ponds A-4, B-5, and C-2) in both Walnut Creek and Woman Creek. Additional POCs for plutonium and americium will be established near where Indiana Street crosses Walnut and Woman Creeks. In the event that exceedances simultaneously occur for either plutonium or americium at both the Indiana Street POC and the associated Terminal Pond POC, then this occurrence will be treated as a single enforcement action. As conditions at the RFETS change, the locations of the POCs may need to change. Such changes can be made by agreement of the Parties pursuant to Part 9 of RFCA.

2. In Segment 5, exceedance of action levels will be measured at POEs upstream in the main stream channel at existing gauging/sampling stations or at additional sampling locations in the main stream channel as necessary. POEs will be identified in the Integrated Monitoring Plan. A POE in Segment 5 will be established below the v-notch weir following the Sewage Treatment Plant disinfection process. At the POE below the v-notch weir, plutonium, americium and uranium will be monitored. When Sewage Treatment Plant operations cease, this POE will be eliminated.

3. Compliance will be measured using a 30-day moving average for those contaminants for which this is appropriate. When necessary to protect a particular use, acute and chronic levels will be measured differently as described in the current Integrated Monitoring Plan.

4. Compliance will be measured for plutonium and americium using an annual average at the existing POCs at the outfalls of the terminal ponds (Ponds A-4, B-5, and C-2) in both Walnut Creek and Woman Creek contingent upon WQCC adoption of an annual average period. CDPHE will take action to obtain WQCC adoption of the annual average period. During active remediation, compliance will continue to be measured for plutonium and americium using a 30-day moving average at the existing POCs near where Indiana Street crosses Walnut and Woman Creeks.

5. Performance monitoring points are Segments 4a/4b and 5 in-stream locations identified in any accelerated action decision document and/or in any CAD/ROD where surface water is sampled to determine whether the concentration of any contaminant identified for sampling in the response action meets specified water quality objectives. Such performance monitoring may be incorporated into the Integrated Monitoring Plan after the response action is implemented.

2.3 Numeric Levels After Active Remediation (Intermediate and Long-Term Site Conditions)

When the Intermediate Site Condition is achieved following completion of active remediation, the surface water must be of sufficient quality to support any surface water use classification in both Segments 4a/4b and 5. All final remedies must be designed to protect surface water for any use as measured at the nearest and/or most directly impacted surface water in Segments 4a/4b and 5. Interim remedies will be consistent with this as a goal. Any temporary modifications will be removed. POCs will be at the outfalls of the terminal ponds and near where Indiana Street crosses both Walnut and Woman Creeks. Compliance will be measured for plutonium and americium using an annual average at the existing POCs at the outfalls of the terminal ponds (Ponds A-4, B-5, and C-2) in both Walnut Creek and Woman Creek. However, compliance will be measured for plutonium and americium using a 30-day moving average at the existing POCs near where Indiana Street crosses Walnut and Woman Creeks. If the terminal ponds are removed, new monitoring and compliance points will be designated and will consider ground water in stream alluvium. The need for and location of POEs and performance monitoring points will be addressed as necessary in the CAD/ROD.

2.4 Action Determinations

A. When contaminant concentrations exceed the Table 1 standards at a POC, source evaluation and mitigating action will be required. Specific remedial actions will be determined on a case-by-case basis, but must be designed such that surface water will meet applicable standards at the POCs. If standards are exceeded at a POC, DOE will inform the CDPHE and EPA of such exceedances within 15 days of gaining knowledge of the exceedances. In addition, DOE will, within 30 days of gaining knowledge of the exceedances,

   submit to CDPHE and EPA a plan and schedule for source evaluation for the exceedance, including a preliminary plan and schedule for mitigating action. Final plans and schedules for mitigating actions will be developed and implemented by DOE, in consultation with CDPHE and EPA, following completion of the source evaluation. Nothing in this paragraph, however, shall preclude DOE from undertaking timely mitigation once a source has been identified. Once an initial notification, source evaluation, and mitigating action have been triggered for a particular exceedance, additional exceedances from the same source would not require separate notifications or additional source evaluations or mitigation. The Standley Lake Protection Project (SLPP) Operations Agreement addresses conditions and timing of storage and releases of waters in the Woman Creek Reservoir. Consistent with the SLPP Operations Agreement, it is the intent of the Parties that waters which. meet the standards at the Indiana Street POC are acceptable for any use.

B. During active remediation, when contaminant concentrations in Segment 5 exceed the Table 1 action levels, source evaluation will be required. If mitigating action is appropriate, the specific actions will be determined on a case-by-case basis, but must be designed such that surface water will meet applicable standards at the POCs. In the case of action level exceedances in Segment 5, DOE will inform the CDPHE and EPA of such exceedances within 15 days of gaining knowledge of the exceedances. In addition, DOE will, within 30 days of gaining knowledge of the exceedances, submit to CDPHE and EPA a plan and schedule for source evaluation for the exceedance, including a preliminary plan and schedule for mitigating action. Final plans and schedules for mitigating actions will be developed and implemented by DOE, in consultation with CDPHE and EPA, following completion of the source evaluation. Nothing in this paragraph, however, shall preclude DOE from undertaking timely mitigation once a source has been identified. Once an initial notification, source evaluation, and mitigating action (if appropriate) have been triggered for a particular exceedance, additional exceedances from the same source would not require separate notifications or additional source evaluations or mitigation.

C. Exceedances of water quality standards at a POC may be subject to civil penalties under sections 109 and 310(c) of CERCLA. In addition, failure of DOE to notify CDPHE and EPA of such exceedances, or to undertake source evaluations or mitigating actions as described in paragraph 2.4.A, above, shall be enforceable consistent with the terms of Part 16 of the RFCA.

D. Exceedances of action levels in Segment 5 shall not be subject to civil penalties. However, failure of DOE to notify CDPHE and EPA of such exceedances, or to undertake source evaluations or mitigating actions (if appropriate) as described in paragraph 2.4.B above, shall be enforceable consistent with the terms of Part 16 of the RFCA.

2.5 Surface Water Monitoring Network

A. Surface water monitoring will continue as currently established unless subsequent changes are agreed to by all Parties. Surface water monitoring will be consistent with the Integrated Monitoring Plan which will be reviewed and revised on an annual basis.

B. All parties will receive quarterly surface water monitoring reports which will highlight any exceedances of surface water standards or action levels and any significant changes to surface water flow conditions.

3.0 GROUND WATER

3.1 Basis of Action Levels

At the time RFCA was signed, three ground water classifications applied at RFETS: Domestic Use Quality, Agricultural Use Quality, and Surface Water Protection. Effective March 2, 1997, the WQCC removed the domestic use and agricultural use classifications since direct use of ground water will be prevented at the Site through institutional controls. Surface water protection was retained as the only use classification for ground water at RFETS. During the period of active remediation; ground water action levels will apply and must be protective of surface water standards and quality as well as of ecological resources. Since no other human exposure to on-site ground water is foreseen, ground water action levels are based on surface water and ecological protection. This framework for ground water action levels assumes that all contaminated ground water emerges to surface water before leaving the RFETS.

3.2 Action Level Strategy

The strategy for ground water is intended to prevent contamination of surface water by applying MCLs as ground water action levels. MCLs have been established by EPA for many chemical contaminants and represent the maximum permissible level of a contaminant in drinking water. MCLs are listed at 40 CFR 141.61 and 141.62. Where an MCL for a particular contaminant is lacking, the residential ground water ingestion-based Preliminary Remediation Goal (PRG) value will apply. Ground water action levels are based on a two-tier approach. Tier I action levels consist of near-source action levels for accelerated cleanups, and Tier II are action levels that are protective of surface water.

A. Tier I
   1. Action levels consist of 100 x MCLs (see Table 2).
   2. Designed to identify high concentration ground water “sources” that should be addressed through accelerated actions.

B. Tier II
   1. Action levels consist of MCLs (see Table 2).
   2. Designed to prevent surface water from exceeding surface water standards/action levels by triggering ground water management actions when necessary.
   3. Situations where ground water is contaminating or could contaminate surface water at levels above surface water standards/action levels will trigger a Tier II action.
   4. Tier II Action Levels are to be measured in designated wells as identified in the Integrated Monitoring Plan.

      a. Tier II wells are either currently uncontaminated or contaminated at levels less than MCLs. In general, Tier II wells are located between the down gradient edge of each plume and the surface water towards which the plume is most directly migrating.

b. If the proposed new wells are shown to be contaminated or if additional plume information dictates, new or alternate wells will need to be chosen.

3.3 Action Determinations

A. Tier I

1. If Tier I action levels are exceeded, an evaluation is required to determine if remedial or management action is necessary to prevent surface water from exceeding standards. If this evaluation determines that action is necessary, the type and location of the action will be delineated and implemented as an accelerated action. This evaluation may include a trend analysis based on existing data. Accelerated action priority will be given to plumes showing no significant decreasing trend in ground water contaminant concentrations over 2 years.

2. Additional ground water that does not exceed the Tier I action levels may still need to be remediated or managed through accelerated actions or CAD/RODs to protect surface water quality or ecological resources and/or prevent action level exceedances at Tier II wells (e.g., lower-level, but fast-moving contamination). The plume areas to be remediated and the cleanup levels or management techniques utilized will be determined on a case-by-case basis.

B. Tier II

1. If concentrations in a Tier II well exceed MCLs during a regular sampling event, as specified in the Integrated Monitoring Plan, monthly sampling in that well will be required. Three consecutive monthly samples showing contaminant concentrations greater than MCLs will trigger an evaluation. This will require a ground water remedial action, if modeling, which considers mass balancing and flux calculations and multiple source contributions, predicts that surface water action levels will be exceeded in surface water. These actions will be determined on a case-by-case basis and will be designed to treat, contain, manage, or mitigate the contaminant plume.

2. Ground water contaminated at levels above ground water action levels currently exists at several locations. Each of these situations will be addressed according to appropriate decision documents.

3. Any contamination in ground water resulting from releases from a unit at RFETS subject to RCRA interim status requirements will be addressed through this ALF and through remedial actions rather than through RCRA closure (see Attachment 10 to RFCA, RCRA Closure for Interim Status Units). This would include ground water containing nitrates from the Solar Ponds plume. Addressing the nitrates through this framework will

allow these waters to be managed in a more cost-effective and flexible manner.

C. Other Considerations

1. Efficient, cost-effective, and feasible actions that are taken to remediate or manage contaminated ground water may not necessarily be taken at the leading edge of plumes; but rather at a location within the plume. Factors contributing to this situation could include technical impracticability at the plume edge, topographical or ecological problems at the plume edge, etc. This situation may result in a portion of a plume that will not be remediated or managed. This plume portion may cause exceedance of MCLs at Tier II wells or exceedance of surface water standards/action levels. When an up-gradient ground water action is taken that results in this situation, DOE and its subcontractor may request relief from the ground water and/or surface water standards. CDPHE and EPA will evaluate the request and may grant temporary relief or a change to the standards/action levels for a specific area. Soil or subsurface soil source removals will not be considered as the sole justification for the changed standard/action levels. In addition, such changes will be determined such that surface water use classifications are not jeopardized and surface water quality does not exceed standards at POCs.

2. Ground water plumes that can be shown to be stationary and do not therefore present a risk to surface water, regardless of their contaminant levels, will not require remediation or management. They will require continued monitoring to demonstrate that they remain stationary.

3. Where background levels exceed action levels, more frequent sampling and remedial actions will not be triggered. For those constituents where high background levels exist, a modified action level considering background will be developed.

3.4 Ground Water Monitoring Network

A. Ground water monitoring will be consistent with the Integrated Monitoring Plan, which will be reviewed on an annual basis.

B. All ground water monitoring data as well as changes in hydrologic conditions and exceedances of ground water action levels will be reported quarterly and summarized annually to all parties.

C. If quarterly reporting shows that previously uncontaminated wells are contaminated above ground water action levels, the sampling frequency will be increased to monthly. Three consecutive monthly samples showing exceedances will trigger an evaluation to determine if a remedial or management action is necessary. If three consecutive monthly samples then

show no exceedances, the sampling frequency will revert back to the frequency specified in the Integrated Monitoring Plan.

D. All ground water plumes that exceed ground water action levels must continue to be monitored until the need for institutional controls is mitigated.

E. All ground water remedies, as well as some soil remedies, will require ground water performance monitoring. The amount, frequency, and location of any performance monitoring will be based on the type of remedy implemented and will be determined on a case-by-case basis within decision documents. The remedy should also consider that surface water quality will be acceptable for all uses after active remediation.

4.0 SOILS CONTAMINATED WITH NON-RADIOACTIVE MATERIALS

4.1 Action Levels and Basis

A. Action levels are the concentrations in soils of non-radioactive contaminants and uranium for its toxicity, listed in Table 3, Soil Action Levels.

B. Action levels have been calculated to be protective of:

1. A wildlife refuge worker:

   a. Based on a lifetime excess cancer risk of $1x10^{-5}$ to a wildlife refuge worker; and

   b. Based on a Hazard Index (HI) of 1 for a wildlife refuge worker; and

2. Ecological resources.

4.2 Action Determinations

The Site will undergo characterization in accordance with the Industrial Area Sampling and Analysis Plan (IA SAP) or the Buffer Zone SAP (BZ SAP). Non-radionuclide soil contamination will be evaluated for Action Determinations as described in A-H, below. Actions will be determined on a case-by-case basis and may include any or a combination of removal, treatment, institutional controls, or engineering controls. For volatile organic compounds, where VOC contamination levels approach free product concentrations, such as at IHSS 118.1, a combination of contaminated soil source removal and groundwater treatment may be selected as the appropriate accelerated action. Where characterization data indicate that soil contamination exceeds action levels within the top 6 inches, DOE will propose to remove the contamination, unless this is not appropriate considering Sections 4.2.G and H.

A. Where soil contamination is identified below 6 inches in depth, the Soil Risk Screen (Figure 3) will be used to evaluate the potential risk of exposure and the need for further accelerated action.

B. Additional soil contamination may need to be remediated or managed to protect surface water quality in accordance with Section 2.0.

C. Where soil contamination exceeds the ecological action levels in Table 3, *Soil Action Levels*, DOE will consider the target species and the exposure unit for that species, and the location, areal extent, and concentration of contamination in evaluating and determining appropriate accelerated actions necessary to protect ecological resources. Accelerated actions to protect ecological resources may include the use of biota barriers, soil removal or target species management actions.

D. Following accelerated actions soils with residual contamination will be evaluated in the RFI/RI-CMS/FS and an appropriate response action will be documented in the CAD/ROD. It is anticipated that institutional controls or a combination of institutional controls and engineered controls will generally be used to manage these lower risk sites.

E. Where asphalt, concrete or other man-made material at existing surface grade covers the soil surface, the basis for action will be determined as if the material had been removed.

F. Soils beneath "below-grade" structures, e.g., basements, valve vaults, pits, etc., will be addressed through the application of the Subsurface Soil Risk Screen in Figure 3.

G. Factors to be considered for all Action Determinations:
   1. Actions will be developed in an integrated manner with other actions being taken;

   2. Actions will be consistent with best management practices; and

   3. Actions may be accomplished by means of an interim or final action; and

   4. Remediation and/or management actions will be implemented to protect ecological resources where those actions can be implemented without damaging other ecological resources.

H. Isolated Data Points
   1. Single geographically isolated data points of contamination greater than action levels will be evaluated using the data aggregation and "hot spot" methodology outlined in the IA SAP and the BZ SAP, and action will be taken as warranted.

   2. These single data points will not trigger a source removal, remedial, or management action, in the absence of the source evaluation.

I. No Further Accelerated Action Determinations
   1. Any determination that No Further Accelerated Action is required by this section will be made in accordance with the decision criteria found in this section.

   2. If an action is required to be taken based on a determination made in accordance with this section, the action will be taken and be documented in a Closeout Report. The LRA's approval of the Closeout Report is the determination that No Further Accelerated Action is required by this section.

3. If no action is required to be taken based on a determination made in accordance with this section, the determination will be documented for LRA review and approval. The LRA's approval of the Data Summary Report is the determination that No Further Accelerated Action is required by this section.

5.0 SOILS CONTAMINATED WITH RADIOACTIVE MATERIALS

5.1 Basis for Action Levels:

A. Action levels are the concentrations of radioactive materials contamination in soils that have been selected from levels provided in *Results of the Interagency Review of Radionuclide Soil Action Levels,* September 30, 2002.

B. Action level concentrations result in a calculated annual radiation dose, under conditions of unrestricted land use, that does not exceed the annual dose limits in the Colorado Radiation Control Regulations, *Radiological Criteria for License Termination*, 6 CCR 1007-1 RH 4.61 (results in a radiation dose of less than 25 mrem/year to either a wildlife refuge worker or a rural resident), which is a potentially relevant and appropriate requirement for any final remedy.

C. Action levels have been calculated to be protective of:
   1. a wildlife refuge worker; a rural resident, in the event the land use is not restricted to a Wildlife Refuge; and

   2. ecological resources (action levels for radioactive contamination that are protective of human health are lower than concentrations of radioactive contamination that are protective of ecological resources).

5.2 Action Levels

A. Radioactive soil contamination exceeding action levels in Table 3, Soil Action Levels, will be evaluated for Action Determinations as described in 5.3, below. These action levels result in a lifetime excess cancer risk of $1x10^{-5}$ to a wildlife refuge worker. For plutonium and americium, these action levels also equate to an excess lifetime cancer risk to a hypothetical rural resident of less than $1x10^{-4}$.

B. The total risk from multiple radionuclides will be accounted for by the sum-of-ratios method.

5.3 Action Determinations

The Site will undergo characterization in accordance with the Industrial Area Sampling and Analysis Plan (IA SAP) or the Buffer Zone SAP (BZ SAP). Actions will be determined on a case-by-case basis and may include any or a combination of removal, treatment, institutional controls, or engineering-controls consistent with A–K, below.

A. Where characterization data show that plutonium-239/240 and americium-241 soil contamination exceeds the action level, DOE will remove sufficient

radionuclide contamination to at least meet the action level within the top 3 feet. If plutonium-239/240 and/or americium-241 soil contamination greater than the action level extends below 3 feet in depth, the Subsurface Soil Risk Screen, Figure 3, will be used to evaluate the potential risk of exposure and the need for further accelerated action.

B. Where characterization data show that uranium soil contamination originating at the surface exceeds the action level, DOE will remove sufficient contamination to at least meet the action level within the top 6 inches. If uranium soil contamination greater than the action level extends below 6 inches in depth, the Subsurface Soil Risk Screen, Figure 3, will be used to evaluate the potential risk of exposure and the need for further accelerated action.

C. Plutonium-239/240 and americium-241 soil contamination found in the 3-6 foot depth interval will be addressed as follows:

1. If during characterization of soils between three and six feet total plutonium-239/240 and americium-241 contamination is found at an activity concentration of greater than 3nCi/g, "step out" sampling will be performed to determine the areal extent of contamination.
2. Based upon the results of the "step out" sampling, a removal action may be triggered depending on the areal or volumetric extent of the contamination. If plutonium-239/240 and americium-241 soil contamination is found in the 3-6 foot depth interval that exceeds 3 nCi/g, and the areal extent of the contamination is found to be greater than 80m^2, it will be removed to an activity concentration less than 1 nCi/g.
3. If plutonium-239/240 and americium-241 soil contamination is found in the 3-6 foot depth interval at activity concentrations greater than 7 nCi/g, it will be removed to an activity concentration less than 1 nCi/g without additional sampling to determine the areal extent. For contamination between 3 and 7 nCi/g, the areal or volumetric extent of contamination will determine if an action is required. The contaminant levels and areal or volumetric triggers are listed below.

Contamination Level (nCi/g)	Areal Extent Limit (m^2)	Volume Extent Limit (m^3)
7	0	0
6	40	25
5	50	31
4	60	37
3	80	50

4. Once excavation is initiated, the principle of ALARA will be applied by removing all soil contamination to less than 1 nCi/g.

5. If contamination between 1 and 3 nCi/g is found at multiple sampling points for any IHSS or group of IHSSs in close proximity, the DOE and LRA will evaluate the potential for risk of exposure and consult with the community regarding the need for further action.

D. Original Process Waste Lines (OPWLs) and associated radionuclide contaminated soils are addressed through the OPWL characterization approach described in Attachment 14.

E. Additional soil contamination may need to be remediated or managed to protect surface water quality in accordance with Section 2.0.

F. Following accelerated actions soils with residual contamination will be evaluated in the RFI/RI-CMS/FS and an appropriate response action will be documented in the CAD/ROD. It is anticipated that institutional controls or a combination of institutional controls and engineered controls will generally be used to manage these lower risk sites.

G. Where asphalt, concrete or other man-made material at existing surface grade covers the soil surface, the basis for action will be determined as if the material had been removed.

H. Soils beneath "below-grade" structures, e.g., basements, valve vaults, pits, etc., will be addressed through the application of the Subsurface Soil Risk Screen in Figure 3.

I. Factors to be considered for all Action Determinations:

1. Actions will be developed in an integrated manner with other actions being taken;

2. Actions will be consistent with best management practices;

3. Actions may be accomplished by means of an interim or final action; and

4. Remediation and/or management actions will be implemented to protect ecological resources where those actions can be implemented without significantly damaging other ecological resources.

J. Isolated Data Points:

1. Single geographically isolated data points of contamination greater than the action levels will be evaluated using the data aggregation and "hot

spot" methodology outlined in the IA SAP and the BZ SAP, and action will be taken as warranted.

2. These single data points will not trigger a source removal, remedial, or management action, in the absence of the source evaluation.

K. No Further Accelerated Action Determinations

1. Any determination that No Further Accelerated Action is required by this section will be made in accordance with the decision criteria found in this section.

2. If an action is required to be taken based on a determination made in accordance with this section, the action will be taken and be documented in a Closeout Report. The LRA's approval of the Closeout Report is the determination that No Further Accelerated Action is required by this section.

3. If no action is required to be taken based on a determination made in accordance with this section, the determination will be documented for LRA review and approval. The LRA's approval of the Data Summary Report is the determination that No Further Accelerated Action is required by this section.

Table 1 - Surface Water Action Levels & Standards

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
Acenaphthene	83-32-9	4.20E-01	W+F, WS		1.00E-02
Acenaphthylene	208-96-8	2.80E-06	W+F		1.00E-02
Acetone	67-64-1	3.65E+00	PRG		
Acrolein	107-02-8	2.10E-02	AL		1.00E-02
Acrylonitrile	107-13-1	5.90E-05	W+F		5.00E-03
Alachlor	15972-60-8	1.20E-03	W+F		2.00E-03
Aldicarb	116-06-3	7.00E-03	WS		1.00E-02
Aldicarb sulfone	1646-88-4	7.00E-03	WS		3.00E-03
Aldicarb sulfoxide	1646-87-3	7.00E-03	WS		3.00E-03
Aldrin	309-00-2	1.30E-07	W+F		1.00E-04
Aluminum, dissolved	7429-90-5	8.70E-02	AL		
Ammonia, un-ionized	7664-41-7	[e]	[e]		
Anthracene	120-12-7	2.10E+00	W+F, WS		1.00E-02
Antimony, total recoverable	7440-36-0	6.00E-03	W+F, WS		1.00E-02
Arsenic, total recoverable	7440-38-2	1.80E-05	W+F		
Atrazine	1912-24-9	3.00E-03	WS		1.00E-03
Barium, total recoverable	7440-39-3	4.90E-01	WS		
Benzene	71-43-2	1.20E-03	W+F, WS	5.00E-03	1.00E-03
Benzidine	92-87-5	1.20E-07	W+F		1.00E-02
alpha-BHC	319-84-6	3.90E-06	W+F		5.00E-05
beta-BHC	319-85-7	1.40E-05	W+F		5.00E-05
gamma-BHC [Lindane]	58-89-9	8.00E-05	AL		5.00E-05
Benzo(a)anthracene	56-55-3	4.40E-06	W+F		1.00E-02
Benzo(a)pyrene	50-32-8	4.40E-06	W+F		2.00E-04
Benzo(b)fluoranthene	205-99-2	4.40E-06	W+F		1.00E-02
Benzo(g,h,i)perylene	191-24-2	4.40E-06	W+F		1.00E-02
Benzo(k)fluoranthene	207-08-9	4.40E-06	W+F		1.00E-02
Beryllium	7440-41-7	4.00E-03	SS, WS		5.00E-03
Boron, total	7440-42-8	7.50E-01	AG, SS		
Bromodichloromethane	75-27-4	5.60E-04	W+F [f]		1.00E-03
Bromoform [Tribromomethane]	75-25-2	4.30E-03	W+F [f]		1.00E-03
Bromomethane [Methyl Bromide]	74-83-9	4.80E-02	W+F		1.00E-03
2-Butanone [Methylethyl Ketone]	78-93-3	2.19E+01	PRG		
Butylbenzylphthalate	85-68-7	1.40E+00	W+F, WS		1.00E-02
Cadmium, dissolved	7440-43-9	1.50E-03	TVS [g]		5.00E-03
Carbofuran	1563-66-2	4.00E-02	WS		7.00E-03
Carbon disulfide	75-15-0	3.65E+00	PRG		
Carbon tetrachloride	56-23-5	2.50E-04	W+F	5.00E-03	1.00E-03
Chlordane	5103-71-9	2.10E-06	W+F		1.00E-03
Chlorobenzene	108-90-7	1.00E-01	W+F, WS		5.00E-03
Chloroethane	75-00-3	2.94E-02	PRG		
bis(2-Chloroethyl)ether	111-44-4	3.10E-05	W+F		1.00E-02
Chloroform [Trichloromethane]	67-66-3	5.70E-03	W+F [f]		1.00E-03
bis(2-Chloroisopropyl)ether	39638-32-9	2.80E-01	W+F, WS		1.00E-02
Chloromethane [Methyl Chloride]	74-87-3	5.70E-03	W+F		1.00E-03
4-Chloro-3-methylphenol	59-50-7	3.00E-02	AL		5.00E-02
2-Chloronaphthalene	91-58-7	5.60E-01	W+F, WS		

Table 1 - Surface Water Action Levels & Standards

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
2-Chlorophenol	95-57-8	3.50E-02	W+F, WS		5.00E-02
Chloropyrifos	2921-88-2	4.10E-05	AL		1.00E-04
Chromium III, Total Recoverable	16065-83-1	5.00E-02	SS, WS		
Chromium VI, dissolved	18540-29-9	1.10E-02	TVS [g]		
Chrysene	218-01-9	4.40E-06	W+F		1.00E-02
Copper, dissolved	7440-50-8	1.60E-02	TVS [g]		
Cyanide	57-12-5	5.00E-03	SS		
4,4-DDD	72-54-8	8.30E-07	W+F		1.00E-04
4,4-DDE	72-55-9	5.90E-07	W+F		1.00E-04
4,4-DDT	50-29-3	5.90E-07	W+F		1.00E-04
Dalapon	75-99-0	2.00E-01	WS		1.30E-02
Demeton	8065-48-3	1.00E-04	AL		1.00E-03
Dibenzo(a,h)anthracene	53-70-3	4.40E-06	W+F		1.00E-02
Dibromochloromethane	124-48-1	8.00E-02	WS [f]		1.00E-03
1,2-Dibromo-3-chloropropane	96-12-8	2.00E-04	WS		1.00E-03
Di-n-butylphthalate	84-74-2	3.65E+00	PRG		1.00E-02
1,2-Dichlorobenzene	95-50-1	6.00E-01	W+F, WS		1.00E-02
1,3-Dichlorobenzene	541-73-1	4.00E-01	W+F		1.00E-02
1,4-Dichlorobenzene	106-46-7	7.50E-02	W+F, WS		1.00E-02
3,3-Dichlorobenzidine	91-94-1	3.90E-05	W+F		1.00E-02
1,1-Dichloroethane	75-34-3	3.65E+00	PRG		1.00E-03
1,2-Dichloroethane	107-06-2	3.80E-04	W+F, WS	5.00E-03	1.00E-03
1,1-Dichloroethene	75-35-4	7.00E-03	W+F, WS	7.00E-03	1.00E-03
1,2-Dichloroethene (cis)	156-59-2	7.00E-02	WS		5.00E-03
1,2-Dichloroethene (trans)	156-60-5	1.00E-01	W+F, WS		5.00E-03
2,4-Dichlorophenol	120-83-2	2.10E-02	W+F, WS		5.00E-02
Dichlorophenoxyacetic acid [2,4-D]	94-75-7	7.00E-02	WS		1.00E-03
1,2-Dichloropropane	78-87-5	5.20E-04	W+F, WS		1.00E-03
1,3-Dichloropropylene	542-75-6	1.00E-02	W+F		1.00E-03
Dieldrin	60-57-1	1.40E-07	W+F		1.00E-04
Di(2-ethylhexyl)adipate	103-23-1	4.00E-01	WS		6.00E-03
Diethylphthalate	84-66-2	5.60E+00	W+F, WS		1.00E-02
Diisopropyl methyl phosphonate	1445-75-6	8.00E-03	WS		1.00E-03
2,4-Dimethylphenol	105-67-9	1.40E-01	W+F, WS		5.00E-02
Dimethylphthalate	131-11-3	3.13E+02	W+F		1.00E-02
4,6-Dinitro-2-methylphenol	534-52-1	2.70E-03	W+F, WS		5.00E-02
2,4-Dinitrophenol	51-28-5	1.40E-02	W+F, WS		5.00E-02
2,4-Dinitrotoluene	121-14-2	1.10E-04	W+F, WS		1.00E-02
2,6-Dinitrotoluene	606-20-2	2.30E-01	AL		1.00E-02
Dinoseb	88-85-7	7.00E-03	WS		2.00E-03
Dioxin (2,3,7,8 TCDD)	1746-01-6	1.30E-11	W+F		
1,2-Diphenylhydrazine	122-66-7	4.00E-05	W+F		
Diquat	65-00-7	2.00E-02	WS		4.00E-03
Endosulfan	115-29-7	5.60E-05	AL		1.00E-04
Endosulfan, alpha	95-99-88	5.60E-05	AL		1.00E-04
Endosulfan, beta	3321-36-59	5.60E-05	AL		1.00E-04
Endosulfan sulfate	1031-07-8	5.60E-05	AL		1.00E-04

Table 1 - Surface Water Action Levels & Standards

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
Endothall	145-73-3	1.00E-01	WS		9.00E-02
Endrin (technical)	72-20-8	3.60E-05	AL		1.00E-04
Endrin aldehyde	7421-93-4	7.60E-04	W+F		1.00E-04
Ethylbenzene	100-41-4	7.00E-01	W+F,WS		1.00E-02
Ethylene dibromide [1,2-Dibromomethane]	106-93-4	5.00E-05	WS		
bis(2-Ethylhexyl)phthalate	117-81-7	1.80E-03	W+F		1.00E-02
Fluoranthene	206-44-0	2.80E-01	W+F, WS		1.00E-02
Fluorene	86-73-7	2.80E-01	WS		1.00E-02
Fluoride	7782-41-4	2.00E+00	WS		
Glyphosate	1071-83-6	7.00E-01	WS		6.00E-02
Guthion	86-50-0	1.00E-05	AL		1.50E-03
Heptachlor	76-44-8	2.10E-07	W+F		5.00E-05
Heptachlor epoxide	1024-57-3	1.00E-07	W+F		5.00E-05
Hexachlorobenzene	118-74-1	7.50E-07	W+F		1.00E-02
Hexachlorobutadiene	87-68-3	9.30E-03	AL		1.00E-02
Hexachlorocyclohexane, Technical	608-73-1	1.20E-05	W+F		2.00E-04
Hexachlorocyclopentadiene	77-47-4	5.00E-03	AL		1.00E-02
Hexachloroethane	67-72-1	7.00E-03	W+F, WS		1.00E-02
Indeno(1,2,3-cd)pyrene	193-39-5	4.40E-06	W+F		1.00E-02
Isophorone	78-59-1	3.60E-02	W+F		1.00E-02
Lead, dissolved	7439-92-1	6.50E-03	TVS [g]		1.00E-02
Malathion	121-75-4	1.00E-04	AL		2.00E-04
Mercury, total	7439-97-6	1.00E-05	SS		1.00E-03
Methoxychlor	72-43-5	3.00E-05	AL		5.00E-04
Methylene chloride [Dichloromethane]	75-09-2	4.70E-03	W+F, WS		1.00E-03
4-Methyl-2-pentanone [Isopropoacetone]	108-10-1	2.92E+00	PRG		
2-Methylphenol [o-Cresol]	95-48-7	1.83E+00	PRG		
Mirex	2385-85-5	1.00E-06	AL		1.00E-04
Naphthalene	91-20-3	2.80E-02	W+F, WS		1.00E-02
Nickel, dissolved	7440-02-0	1.23E-01	TVS [g]		
Nitrate	14797-55-8	1.00E+01	AG	100 [h]	
Nitrite	14797-65-0	5.00E-01	AL [i]	4.5 [h]	
Nitrobenzene	98-95-3	3.50E-03	W+F, WS		1.00E-02
Nitrophenol 4	100-02-7	5.60E-02	WS, W+F		
Nitrosodibutylamine N	924-16-3	6.40E-06	W+F		1.00E-02
Nitrosodiethylamine N	55-18-5	8.00E-07	W+F		1.00E-02
Nitrosodimethylamine N	62-75-9	6.90E-07	W+F		1.00E-02
n-Nitrosodiphenylamine	86-30-6	5.00E-03	W+F		1.00E-02
n-Nitrosodipropylamine	621-64-7	5.00E-06	W+F		1.00E-02
Nitrosopyrrolidine N	930-55-2	1.60E-05	W+F		1.00E-02
Oxamyl(vydate)	23135-22-0	2.00E-01	WS		2.00E-02
PCBs	1336-36-3	1.70E-04	W+F [j]		1.00E-02
Parathion	56-38-2	1.30E-05	AL		
Pentachlorobenzene	608-93-5	3.50E-03	W+F		1.00E-02
Pentachlorophenol	87-86-5	2.80E-04	W+F		5.00E-02
Phenanthrene	85-01-8	2.80E-06	W+F		1.00E-02
Phenol	108-95-2	2.56E+00	AL		5.00E-02

Table 1 - Surface Water Action Levels & Standards

Analyte	CAS Reference Number	Standards and Action Levels [a] (mg/L)	Basis [b]	Temporary Modifications [c] (mg/L)	PQLs [d] (mg/L)
Picloram	1918-02-1	5.00E-01	WS		1.00E-03
Pyrene	129-00-0	2.10E-01	W+F, WS		1.00E-02
Selenium	7782-49-2	4.60E-03	AL		1.00E-02
Silver, dissolved	7440-22-4	6.00E-04	TVS [g]		5.00E-03
Simazine	122-34-9	4.00E-03	WS		7.00E-04
Sulfide	18496-25-8	2.00E-03	SS		
Styrene	100-42-5	1.00E-01	WS		5.00E-03
1,2,4,5-Tetrachlorobenzene	95-94-3	2.10E-03	WS		1.00E-02
1,1,2,2-Tetrachloroethane	79-34-5	1.70E-04	W+F		1.00E-03
Tetrachloroethene	127-18-4	8.00E-04	W+F	5.00E-03	1.00E-03
Thallium	7440-28-0	5.00E-04	W+F, WS		1.20E-02
Toluene	108-88-3	1.00E+00	W+F, WS		5.00E-03
Toxaphene	8001-35-2	2.00E-07	AL		3.00E-03
1,2,4-Trichlorobenzene	120-82-1	5.00E-02	AL		1.00E-02
1,1,1-Trichloroethane	71-55-6	2.00E-01	W+F, WS		5.00E-03
1,1,2-Trichloroethane	79-00-5	3.00E-03	W+F, WS		1.00E-03
Trichloroethene	79-01-6	2.70E-03	W+F	5.00E-03	1.00E-03
2,4,6-Trichlorophenol	88-06-2	2.10E-03	W+F		5.00E-02
Trichlorophenoxyproprionic acid	93-72-1	1.00E-02	W+F		5.00E-03
Vinyl chloride	75-01-4	2.00E-03	W+F, WS		2.00E-03
Xylene (total)	1330-20-7	1.00E+01	WS		5.00E-03
Zinc, dissolved	7440-66-6	1.41E-01	TVS [g]		
PHYSICAL PARAMETERS:					
Dissolved oxygen (minimum)		5.0 mg/L	SS		
pH		6.5-9.0	SS		
RADIONUCLIDES:		pCi/L			
Americium 241	14596-10-2	0.15	BS		
Plutonium 239/240	10-12-8	0.15	BS		
Radium 226/228		5 [k]	BS		
Strontium 89/90	11-10-9	8	BS		
Tritium	10028-17-8	500	SS		
Uranium, total	7440-61-1	11(10) [l]	SS		
Gross alpha, total	14127-62-9	7(11) [l]	SS		
Gross beta, total	12587-47-2	8(19) [l]	SS		

NOTES:

[a] The values in this table reflect the classifications and standards approved by the Colorado WQCC effective October 30, 2001. Values apply as standards in Segments 4a and 4b and as action levels in Segment 5. Values based on PRGs are applied only as action levels and are not enforceable standards. Standards for chloride, dissolved iron, dissolved manganese, and sulfate are Secondary Drinking Water Standards, which are based on aesthetic considerations. They have been removed as site-specific standards since Segments 4a, 4b, and 5 waters will not be used for drinking water supply.

[b] Acronyms: AG = Agriculture; AL = Aquatic Life; BS = Basic Standard; PRG = Preliminary Remediation Goal for residential groundwater ingestion; SS = Site Specific Standard; TVS = Table Value Standard; WS = Water Supply; W+F = Water plus Fish

[c] Temporary modifications affect Segment 5 only and apply until December 31, 2009.

[d] Whenever the practical quantitation level (PQL) for a pollutant is higher (less stringent) than a standard/action level or temporary modification, "less than" the PQL will be used as the compliance threshold. These less stringent PQLs are

shaded.

[e] There is no un-ionized ammonia standard for Segment 5 or Segment 4b. A standard of 0.1 mg/L applies to Segment 4a, which begins in Walnut Creek downstream of Indiana Street.
[f] Per the Basic Standards, the Total Trihalomethane (TTHM) standard applies to the sum of the four TTHM compounds. For dibromochloromethane the TTHM value for water supply, 80 parts per billion, was applied.
[g] Table value standards for metals are based on a toxicity equation which uses a hardness value of 143 mg/L.

[h] The temporary modifications for nitrate and nitrite apply to the Walnut Creek drainage only.

[i] The listed nitrite value is the chronic aquatic life standard based on chloride levels in excess of 22 mg/L in Segment 4.

[j] The total PCB standard in the Basic Standards is based on the sum of the Araclor analytes.

[k] Per the basic standard, this value applies to the sum of the two radium isotopes.

[l] Radiological parameters are distinguished by drainage basin in Table 2 of 5 CCR 1002-38. The first value is the standard for Woman Creek and the paranthetical value is the standard for Walnut Creek.

The scientific notation used in this table indicates the power of ten by which the two-decimal-place number is multiplied (e.g., 2.52E-02 = 2.52 X 10^{-2} = .0252).

Table 2 - Ground Water Action Levels

Analyte	CAS Reference Number	Tier I [a] (mg/L)	Tier II (mg/L)	Basis [b]	PQLs [c] (mg/L)
Acenaphthene	83-32-9	2.19E+02	2.19E+00	[2]	1.00E-02
Acetone [c]	67-64-1	3.65E+02	3.65E+00	[2]	
Aldrin	309-00-2	5.01E-04	5.01E-06	[2]	1.00E-04
Aluminum	7429-90-5	3.65E+03	3.65E+01	[2]	
Ammonium (as Ammonia)	7664-41-7	3.54E+03	3.54E+01	[2]	
Anthracene	120-12-7	1.10E+03	1.10E+01	[2]	1.00E-02
Antimony	7440-36-0	6.00E-01	6.00E-03	[1]	1.00E-02
Aroclor-1016	12674-11-2	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1221	11104-28-2	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1232	11141-16-5	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1242	53469-21-9	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1248	12672-29-6	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1254	11097-69-1	5.00E-02	5.00E-04	[1]	1.00E-03
Aroclor-1260	11096-82-5	5.00E-02	5.00E-04	[1]	1.00E-03
Arsenic	7440-38-2	5.00E+00	5.00E-02	[1]	
Barium	7440-39-3	2.00E+02	2.00E+00	[1]	
Benzene	71-43-2	5.00E-01	5.00E-03	[1]	1.00E-03
alpha-BHC	319-84-6	1.35E-03	1.35E-05	[2]	5.00E-05
beta-BHC	319-85-7	4.73E-03	4.73E-05	[2]	5.00E-05
gamma-BHC [Lindane]	58-89-9	2.00E-02	2.00E-04	[1]	5.00E-05
Benzo(a)anthracene	56-55-3	1.17E-02	1.17E-04	[2]	1.00E-02
Benzo(a)pyrene	50-32-8	2.00E-02	2.00E-04	[1]	2.00E-04
Benzo(b)fluoranthene	205-99-2	1.17E-02	1.17E-04	[2]	1.00E-02
Benzo(k)fluoranthene	207-08-9	1.17E-01	1.17E-03	[2]	1.00E-02
Benzoic Acid	65-85-0	1.46E+04	1.46E+02	[2]	
Benzyl Alcohol	100-51-6	1.10E+03	1.10E+01	[2]	
Beryllium	7440-41-7	4.00E-01	4.00E-03	[1]	5.00E-03
Bromodichloromethane	75-27-4	1.00E+01	1.00E-01	[1]	1.00E-03
Bromoform [Tribromomethane]	75-25-2	1.00E+01	1.00E-01	[1]	1.00E-03
Bromomethane [Methyl bromide]	74-83-9	5.11E+00	5.11E-02	[2]	1.00E-03
2-Butanone [Methylethyl ketone]	78-93-3	2.19E+03	2.19E+01	[2]	
Butylbenzylphthalate	85-68-7	7.30E+02	7.30E+00	[2]	1.00E-02
Cadmium	7440-43-9	5.00E-01	5.00E-03	[1]	5.00E-03
Carbon disulfide	75-15-0	3.65E+02	3.65E+00	[2]	
Carbon tetrachloride	56-23-5	5.00E-01	5.00E-03	[1]	1.00E-03
alpha-Chlordane	5103-71-9	2.00E-01	2.00E-03	[1]	1.00E-03
beta-Chlordane	5103-74-2	2.00E-01	2.00E-03	[1]	1.00E-03
gamma-Chlordane	12789-03-6	2.00E-01	2.00E-03	[1]	1.00E-03
4-Chloroaniline	106-47-8	1.46E+01	1.46E-01	[2]	
Chlorobenzene	108-90-7	1.00E+01	1.00E-01	[1]	5.00E-03
Chloroethane	75-00-3	2.94E+00	2.94E-02	[2]	
bis(2-Chloroethyl)ether	111-44-4	7.74E-03	7.74E-05	[2]	1.00E-02
Chloroform [Trichloromethane]	67-66-3	1.00E+01	1.00E-01	[1]	1.00E-03
bis(2-Chloroisopropyl)ether	39638-32-9	1.22E-01	1.22E-03	[2]	1.00E-02
Chloromethane [Methyl chloride]	74-87-3	6.55E-01	6.55E-03	[2]	1.00E-03
2-Chloronaphthalene	91-58-7	2.92E+02	2.92E+00	[2]	
2-Chlorophenol	95-57-8	1.83E+01	1.83E-01	[2]	5.00E-02
Chromium (total)	7440-47-3	1.00E+01	1.00E-01	[1]	
Chrysene	218-01-9	1.17E+00	1.17E-02	[2]	1.00E-02
Cobalt	7440-48-4	2.19E+02	2.19E+00	[1]	
Copper	7440-50-8	1.30E+02	1.30E+00	[3]	

Table 2 - Ground Water Action Levels

Analyte	CAS Reference Number	Tier I [a] (mg/L)	Tier II (mg/L)	Basis [b]	PQLs [c] (mg/L)
Cyanide	57-12-5	2.00E+01	2.00E-01	[1]	
4,4-DDD	72-54-8	3.55E-02	3.55E-04	[2]	1.00E-04
4,4-DDE	72-55-9	2.50E-02	2.50E-04	[2]	1.00E-04
4,4-DDT	50-29-3	2.50E-02	2.50E-04	[2]	1.00E-04
Dalapon	75-99-0	2.00E+01	2.00E-01	[1]	1.30E-02
Dibenzo(a,h)anthracene	53-70-3	1.17E-03	1.17E-05	[2]	1.00E-02
Dibenzofuran	132-64-9	1.46E+01	1.46E-01	[2]	
Dibromochloromethane	124-48-1	1.01E-01	1.01E-03	[2]	1.00E-03
1,2-Dibromo-3-chloropropane	96-12-8	2.00E-02	2.00E-04	[1]	1.00E-03
Di-n-butylphthalate	84-74-2	3.65E+02	3.65E+00	[2]	1.00E-02
1,2-Dichlorobenzene	95-50-1	6.00E+01	6.00E-01	[1]	1.00E-02
1,3-Dichlorobenzene	541-73-1	6.00E+01	6.00E-01	[1]	1.00E-02
1,4-Dichlorobenzene	106-46-7	7.50E+00	7.50E-02	[1]	1.00E-02
3,3-Dichlorobenzidine	91-94-1	1.89E-02	1.89E-04	[2]	1.00E-02
1,1-Dichloroethane	75-34-3	3.65E+02	3.65E+00	[2]	1.00E-03
1,2-Dichloroethane	107-06-2	5.00E-01	5.00E-03	[1]	1.00E-03
1,1-Dichloroethene	75-35-4	7.00E-01	7.00E-03	[1]	1.00E-03
1,2-Dichloroethene (total)	75-35-4	7.00E+00	7.00E-02	[1]	5.00E-03
2,4-Dichlorophenol	120-83-2	1.10E+01	1.10E-01	[2]	5.00E-02
2,4-Dichlorophenoxyacetic acid (2,4-D)	94-75-7	7.00E+00	7.00E-02	[1]	1.00E-03
1,2-Dichloropropane	78-87-5	5.00E-01	5.00E-03	[1]	1.00E-03
cis-1,3-Dichloropropene	10061-01-5	4.73E-02	4.73E-04	[2]	1.00E-03
trans-1,3-Dichloropropene	10061-02-6	4.73E-02	4.73E-04	[2]	1.00E-03
Dieldrin	60-57-1	5.32E-04	5.32E-06	[2]	1.00E-04
Diethylphthalate	84-66-2	2.92E+03	2.92E+01	[2]	1.00E-02
2,4-Dimethylphenol	105-67-9	7.30E+01	7.30E-01	[2]	5.00E-02
Dimethylphthalate	131-11-3	3.65E+04	3.65E+02	[2]	1.00E-02
4,6-Dinitro-2-methylphenol	534-52-1	3.65E-01	3.65E-03	[2]	
2,4-Dinitrophenol	51-28-5	7.30E+00	7.30E-02	[2]	5.00E-02
2,4-Dinitrotoluene	121-14-2	1.25E-02	1.25E-04	[2]	1.00E-02
2,6-Dinitrotoluene	606-20-2	1.25E-02	1.25E-04	[2]	1.00E-02
Di-n-octylphthalate	117-84-0	7.30E+01	7.30E-01	[2]	
Endosulfan I	959-98-8	2.19E+01	2.19E-01	[2]	1.00E-04
Endosulfan II	33213-65-9	2.19E+01	2.19E-01	[2]	1.00E-04
Endosulfan sulfate	1031-07-8	2.19E+01	2.19E-01	[2]	1.00E-04
Endosulfan (technical)	115-29-7	2.19E+01	2.19E-01	[2]	1.00E-04
Endrin (technical)	72-20-8	2.00E-01	2.00E-03	[1]	1.00E-04
Ethylbenzene	100-41-4	7.00E+01	7.00E-01	[1]	1.00E-02
bis(2-Ethylhexyl)phthalate	117-81-7	6.00E-01	6.00E-03	[1]	1.00E-02
Fluoranthene	206-44-0	1.46E+02	1.46E+00	[2]	1.00E-02
Fluorene	86-73-7	1.46E+02	1.46E+00	[2]	1.00E-02
Fluoride	7782-41-4	4.00E+02	4.00E+00	[1]	
Glyphosate	1071-83-6	7.00E+01	7.00E-01	[1]	6.00E-02
Heptachlor	76-44-8	4.00E-02	4.00E-04	[1]	5.00E-05
Heptachlor epoxide	1024-57-3	2.00E-02	2.00E-04	[1]	5.00E-05
Hexachlorobenzene	118-74-1	1.00E-01	1.00E-03	[1]	1.00E-02
Hexachlorobutadiene	87-68-3	1.09E-01	1.09E-03	[2]	1.00E-02
Hexachlorocyclopentadiene	77-47-4	5.00E+00	5.00E-02	[1]	1.00E-02
Hexachloroethane	67-72-1	6.08E-01	6.08E-03	[2]	1.00E-02
Indeno(1,2,3-cd)pyrene	193-39-5	1.17E-02	1.17E-04	[2]	1.00E-02
Isophorone	78-59-1	8.96E+00	8.96E-02	[2]	1.00E-02

Table 2 - Ground Water Action Levels

Analyte	CAS Reference Number	Tier I [a] (mg/L)	Tier II (mg/L)	Basis [b]	PQLs [c] (mg/L)
Lead (dissolved)	7439-96-5	1.50E+00	1.50E-02	[3]	1.00E-02
Lithium	7439-93-2	7.30E+01	7.30E-01	[2]	
Manganese	7439-96-5	1.72E+02	1.72E+00	[2]	
Mercury	7439-97-6	2.00E-01	2.00E-03	[1]	1.00E-03
Methoxychlor	72-43-5	4.00E+00	4.00E-02	[1]	5.00E-04
Methylene chloride [Dichloromethane]	75-09-2	5.00E-01	5.00E-03	[1]	1.00E-03
2-Methylnaphthalene	91-57-6	1.46E+02	1.46E+00	[2]	
4-Methyl-2-pentanone	108-10-1	2.92E+02	2.92E+00	[2]	
2-Methylphenol	95-48-7	1.83E+02	1.83E+00	[2]	
4-Methylphenol	106-44-5	1.83E+01	1.83E-01	[2]	
Molybdenum	7439-98-7	1.83E+01	1.83E-01	[2]	
Naphthalene	91-20-3	1.46E+02	1.46E+00	[2]	1.00E-02
Nickel	7440-02-0	1.40E+01	1.40E-01	[1]	
Nitrate (MCL as N)	14797-55-8	1.00E+03	1.00E+01	[1]	
Nitrite (MCL as N)	14797-65-0	1.00E+02	1.00E+00	[1]	
2-Nitroaniline	88-74-4	2.19E-01	2.19E-03	[2]	
Nitrobenzene	98-95-3	1.83E+00	1.83E-02	[2]	1.00E-02
4-Nitrophenol	100-02-7	2.92E+01	2.92E-01	[2]	
n-Nitrosodiphenylamine	86-30-6	1.74E+00	1.74E-02	[2]	1.00E-02
n-Nitrosodipropylamine	621-64-7	1.22E-03	1.22E-05	[2]	1.00E-02
Pentachlorophenol	87-86-5	1.00E-01	1.00E-03	[1]	5.00E-02
Phenol	108-95-2	2.19E+03	2.19E+01	[2]	5.00E-02
Pyrene	129-00-0	1.10E+02	1.10E+00	[2]	1.00E-02
Selenium	7782-49-2	5.00E+00	5.00E-02	[1]	1.00E-02
Silver	7440-22-4	1.83E+01	1.83E-01	[2]	5.00E-03
Strontium	7440-24-6	2.19E+03	2.19E+01	[2]	
Styrene	100-42-5	1.00E+01	1.00E-01	[1]	5.00E-03
Sulfate	14808-79-8	5.00E+04	5.00E+02	[4]	
1,1,2,2-Tetrachloroethane	79-34-5	4.26E-02	4.26E-04	[2]	1.00E-03
Tetrachloroethene	127-18-4	5.00E-01	5.00E-03	[1]	1.00E-03
Thallium	7440-28-0	2.00E-01	2.00E-03	[1]	1.20E-02
Tin	7440-31-5	2.19E+03	2.19E+01	[2]	
Toluene	108-88-3	1.00E+02	1.00E+00	[1]	5.00E-03
Toxaphene	8001-35-2	3.00E-01	3.00E-03	[1]	3.00E-03
1,2,4-Trichlorobenzene	120-82-1	7.00E+00	7.00E-02	[1]	1.00E-02
1,1,1-Trichloroethane	71-55-6	2.00E+01	2.00E-01	[1]	5.00E-03
1,1,2-Trichloroethane	79-00-5	5.00E-01	5.00E-03	[1]	1.00E-03
Trichloroethene	79-01-6	5.00E-01	5.00E-03	[1]	1.00E-03
2,4,5-Trichlorophenol	95-95-4	5.00E+00	5.00E-02	[1]	
2,4,6-Trichlorophenol	88-06-2	7.74E-01	7.74E-03	[2]	5.00E-02
Vanadium	7440-62-2	2.56E+01	2.56E-01	[2]	
Vinyl acetate	108-05-4	3.65E+03	3.65E+01	[2]	
Vinyl chloride	75-01-4	2.00E-01	2.00E-03	[1]	2.00E-03
Xylene (total)	1330-20-7	1.00E+03	1.00E+01	[1]	5.00E-03
Zinc	7440-66-6	1.10E+03	1.10E+01	[2]	
RADIONUCLIDES:		pCi/L	pCi/L		
Americium-241	14596-10-2	14.5	0.145	[2]	
Cesium-137+D	10045-97-3	151	1.51	[2]	
Plutonium-239/240	10-12-8	15.1	0.151	[2]	
Radium-226/228+D		2000 [d]	20 [d]	[1]	

Table 2 - Ground Water Action Levels

Analyte	CAS Reference Number	Tier I [a] (mg/L)	Tier II (mg/L)	Basis [b]	PQLs [c] (mg/L)
RADIONUCLIDES: (continued)		pCi/L	pCi/L		
Strontium-89/90	11-10-9	85.2	0.852	[2]	
Tritium	10028-17-8	2,000,000	20,000	[1]	
Uranium-233/234	11-08-5	106	1.06	[2]	
Uranium-235	15117-96-1	101	1.01	[2]	
Uranium-238	7440-61-1	76.8	0.768	[2]	

NOTES:

[a] Tier I action levels are 100 times the corresponding Tier II value.

[b] Basis for Tier II action level:

[1] Maximum Concentration Level (MCL)

[2] Residential groundwater ingestion Preliminary Remediation Goal (PRG)

[3] EPA Action Level based on the Lead and Copper Rule (40 CFR 141.2)

[4] Proposed MCL

[c] If the practical quantitation level (PQL) for a pollutant is higher (less stringent) than an action level, "less than" the PQL will be used as the compliance threshold. These less stringent PQLs are shaded.

[d] This value applies to the sum of the two radium isotopes.

D = Daughters (Indicates that cancer risk estimates for these radionuclides include the contributions from their short-lived decay products, assuming secular equalibrium with the principal nuclide in the environment. Sample analyses for these radionuclides will not include any activity contribution from daughter products.

The scientific notation used in this table indicates the power of ten by which the two-decimal-place number is multiplied (e.g., 2.52E-02 = 2.52 X 10^{-2} = .0252).

Table 3 - Soil Action Levels

Analyte	CAS Reference Number	Wildlife Refuge Worker [a]	Ecological Receptor [b]	Units
ORGANIC ANALYTES				
Acenaphthene	83-32-9	4.08E+07*		µg/kg
Acetone[d]	67-64-1	1.02E+08*	2.11E+05 (PD)	µg/kg
Aldrin	309-00-2	1.62E+03		µg/kg
Ammonium (as Ammonia)	7664-41-7	> 1E+09*[d]		µg/kg
Anthracene	120-12-7	2.04E+08*		µg/kg
Aroclor 1016	12674-11-2	4.64E+04*		µg/kg
Aroclor 1221	11104-28-2	1.24E+04		µg/kg
Aroclor 1232	11141-16-5	1.24E+04		µg/kg
Aroclor 1242	53469-21-9	1.24E+04		µg/kg
Aroclor 1248	12672-29-6	1.24E+04		µg/kg
Aroclor 1254	11097-69-1	1.24E+04	3.71E+05 (PD)	µg/kg
Aroclor 1260	11096-82-5	1.24E+04		µg/kg
Benzene	71-43-2	2.05E+05		µg/kg
alpha-BHC	319-84-6	5.24E+03		µg/kg
beta-BHC	319-85-7	1.84E+04		µg/kg
gamma-BHC (Lindane)	58-89-9	2.55E+04		µg/kg
Benzo(a)anthracene	56-55-3	3.49E+04	8.00E+05 (PD)	µg/kg
Benzo(a)pyrene	50-32-8	3.49E+03	2.57E+04 (I)	µg/kg
Benzo(b)fluoranthene	205-99-2	3.49E+04	1.01E+06 (PD)	µg/kg
Benzo(k)fluoranthene	207-08-9	3.49E+05	1.01E+06 (PD)	µg/kg
Benzoic Acid (at pH 7)	65-85-0	> 1E+09*		µg/kg
Benzyl Alcohol	100-51-6	3.07E+08*		µg/kg
Bromodichloromethane	75-27-4	6.17E+05		µg/kg
Bromoform	75-25-2	3.73E+06		µg/kg
Bromomethane (methyl bromide)	74-83-9	1.93E+05*		µg/kg
2-Butanone (methyl ethyl ketone)	78-93-3	1.92E+08*	4.33E+05 (PD)	µg/kg
Butylbenzylphthalate	85-68-7	1.47E+08*		µg/kg
Carbon disulfide	75-15-0	1.51E+07*		µg/kg
Carbon tetrachloride[c]	56-23-5	8.15E+04*	8.32E+04 (PM)	µg/kg
alpha-Chlordane	5103-71-9	9.44E+04		µg/kg
beta-Chlordane	5103-74-2	9.44E+04		µg/kg
gamma-Chlordane	12789-03-6	9.44E+04		µg/kg
4-Chloroaniline	106-47-8	2.95E+06*		µg/kg
Chlorobenzene	108-90-7	6.09E+06*		µg/kg
Chloroethane (ethyl chloride)	75-00-3	1.32E+07		µg/kg
bis(2-chloroethyl)ether	111-44-4	3.48E+04		µg/kg
Chloroform[c]	67-66-3	1.92E+04*	1.01E+05 (PD)	µg/kg
bis(2-chloroisopropyl)ether	39638-32-9	5.47E+05		µg/kg
Chloromethane (methyl chloride)	74-87-3	3.71E+05		µg/kg
2-Chloronaphthalene	91-58-7	8.18E+07*		µg/kg
2-Chlorophenol	95-57-8	5.11E+06*		µg/kg
Chrysene	218-01-9	3.49E+06		µg/kg
4,4-DDD	72-54-8	1.43E+05		µg/kg
4,4-DDE	72-55-9	1.01E+05		µg/kg
4,4-DDT	50-29-3	1.00E+05		µg/kg

Table 3 - Soil Action Levels

Analyte	CAS Reference Number	Wildlife Refuge Worker [a]	Ecological Receptor [b]	Units
Dibenz(a,h)anthracene	53-70-3	3.49E+03		µg/kg
Dibenzofuran	132-64-9	2.95E+06*		µg/kg
Dibromochloromethane	124-48-1	3.29E+05		µg/kg
Di-n-butylphthalate	84-74-2	7.37E+07*		µg/kg
1,2-Dichlorobenzene (o-)	95-50-1	3.12E+07*		µg/kg
1,4-Dichlorobenzene (p-)	106-46-7	8.40E+05		µg/kg
3,3-Dichlorobenzidine	91-94-1	6.13E+04		µg/kg
1,1-Dichloroethane	75-34-3	2.25E+07*		µg/kg
1,2-Dichloroethane	107-06-2	1.06E+05		µg/kg
1,1-Dichloroethene	75-35-4	1.70E+04		µg/kg
1,2-Dichloroethene (total)	540-59-0	9.20E+06*		µg/kg
2,4-Dichlorophenol (at pH 6.8)	120-83-2	3.07E+06*		µg/kg
1,2-Dichloropropane	78-87-5	3.45E+05*		µg/kg
cis-1,3-Dichloropropene	10061-01-5	6.57E+03		µg/kg
trans-1,3-Dichloropropene	10061-02-6	6.57E+03		µg/kg
Dieldrin	60-57-1	1.72E+03		µg/kg
Diethylphthalate	84-66-2	5.90E+08*		µg/kg
2,4-Dimethylphenol	105-67-9	2.04E+07*		µg/kg
Dimethylphthalate	131-11-3	> 1E+09*		µg/kg
4,6-Dinitro-2-methylphenol (4,6-dinitro-o-cresol)	534-52-1	1.02E+06*		µg/kg
2,4-Dinitrophenol	51-28-5	2.04E+06*		µg/kg
2,4-Dinitrotoluene	121-14-2	5.63E+04		µg/kg
2,6-Dinitrotoluene	606-20-2	5.63E+04		µg/kg
Di-n-octylphthalate	117-84-0	1.47E+07		µg/kg
Endosulfan I	959-98-8	4.42E+06*		µg/kg
Endosulfan II	33213-65-9	4.42E+06*		µg/kg
Endosulfan sulfate	1031-07-8	4.42E+06*		µg/kg
Endosulfan (technical)	115-29-7	4.42E+06*		µg/kg
Endrin (technical)	72-20-8	2.21E+05*		µg/kg
Ethylbenzene	100-41-4	4.25E+06		µg/kg
bis(2-ethylhexyl)phthalate	117-81-7	1.97E+06		µg/kg
Fluoranthene	206-44-0	2.72E+07*		µg/kg
Fluorene	86-73-7	4.08E+07*		µg/kg
Fluoride (as fluorine)	7782-41-4	6.13E+07*		µg/kg
Heptachlor	76-44-8	6.12E+03		µg/kg
Heptachlor epoxide	1024-57-3	3.03E+03		µg/kg
Hexachlorobenzene	118-74-1	1.72E+04		µg/kg
Hexachlorobutadiene	87-68-3	1.47E+05*		µg/kg
Hexachlorocyclopentadiene	77-47-4	3.50E+06*		µg/kg
Hexachloroethane	67-72-1	7.37E+05*	1.99E+06 (PD)	µg/kg
Indeno(1,2,3-cd)pyrene	193-39-5	3.49E+04		µg/kg
Isophorone	78-59-1	2.91E+07		µg/kg
Methoxychlor	72-43-5	5.11E+06*		µg/kg
Methylene chloride (dichloromethane)[c]	75-09-2	2.53E+06	3.95E+04 (PD)	µg/kg
2-Methylnaphthalene	91-57-6	2.04E+07*		µg/kg
4-Methyl-2-pentanone (methyl isobutyl ketone)	108-10-1	1.64E+07*		µg/kg

Table 3 - Soil Action Levels

Analyte	CAS Reference Number	Wildlife Refuge Worker [a]	Ecological Receptor [b]	Units
2-Methylphenol (o-cresol)	95-48-7	3.69E+07*		µg/kg
4-Methylphenol (p-cresol)	106-44-5	3.69E+06*		µg/kg
Naphthalene	91-20-3	3.09E+06*		µg/kg
2-Nitroaniline	88-74-4	1.67E+07*		µg/kg
Nitrobenzene	98-95-3	3.32E+05*		µg/kg
4-Nitrophenol	100-02-7	8.18E+06*		µg/kg
n-Nitrosodiphenylamine	86-30-6	7.81E+06		µg/kg
n-Nitrosodipropylamine	621-64-7	5.47E+03		µg/kg
Pentachlorophenol	87-86-5	1.62E+05		µg/kg
Phenol	108-95-2	6.13E+08*		µg/kg
Pyrene	129-00-0	2.21E+07*		µg/kg
Styrene	100-42-5	1.23E+08*		µg/kg
1,1,2,2-Tetrachloroethane	79-34-5	1.00E+05		µg/kg
Tetrachloroethene[c]	127-18-4	6.15E+05	3.75E+04 (PM)	µg/kg
Toluene	108-88-3	3.13E+07*	1.28E+05 (PM)	µg/kg
Toxaphene	8001-35-2	2.50E+04		µg/kg
1,2,4-Trichlorobenzene	120-82-1	9.23E+06*		µg/kg
1,1,1-Trichloroethane	71-55-6	7.97E+07*		µg/kg
1,1,2-Trichloroethane	79-00-5	2.36E+05		µg/kg
Trichloroethene[c]	79-01-6	1.96E+04	5.09E+05 (PD)	µg/kg
2,4,5-Trichlorophenol	95-95-4	1.02E+08*		µg/kg
2,4,6-Trichlorophenol	88-06-2	3.47E+06*		µg/kg
Vinyl acetate	108-05-4	9.63E+08*		µg/kg
Vinyl chloride[c]	75-01-4	4.12E+04	1.66E+02 (PM)	µg/kg
Xylene (total)	1330-20-7	2.04E+06		µg/kg
INORGANIC ANALYTES				
Aluminum	7429-90-5	2.28E+05*		mg/kg
Antimony	7440-36-0	4.09E+02*		mg/kg
Arsenic[c]	7440-38-2	2.22E+01	2.16E+01 (PD)	mg/kg
Barium	7440-39-3	2.64E+04*		mg/kg
Beryllium[c]	7440-41-7	9.21E+02*	2.15E+00 (PD)**	mg/kg
Cadmium (food)[c]	7440-43-9	9.62E+02*		mg/kg
Chromium III	16065-83-1	> 1E+06*		mg/kg
Chromium VI	18540-29-9	2.68E+02		mg/kg
Cobalt	7440-48-4	1.55E+03*		mg/kg
Copper	7440-50-8	4.09E+04*		mg/kg
Cyanide	57-12-5	2.04E+04*		mg/kg
Iron	7439-89-6	3.07E+05*		mg/kg
Lead[c]	7439-92-1	1.00E+03[e]	2.56E+01 (K)**	mg/kg
Lithium	7439-93-2	2.04E+04*		mg/kg
Manganese	7439-96-5	3.48E+03*		mg/kg
Mercury (elemental)	7439-97-6	2.52E+04*		mg/kg
Molybdenum	7439-98-7	5.11E+03*		mg/kg
Nickel (soluble)	7440-02-0	2.04E+04*		mg/kg

Table 3 - Soil Action Levels

Analyte	CAS Reference Number	Wildlife Refuge Worker [a]	Ecological Receptor [b]	Units
Nitrate	14797-55-8	> 1E+06*		mg/kg
Nitrite	14797-65-0	1.02E+05*		mg/kg
Selenium	7782-49-2	5.11E+03*		mg/kg
Silver	7440-22-4	5.11E+03*		mg/kg
Strontium	7440-24-6	6.13E+05*		mg/kg
Tin	7440-31-5	6.13E+05*		mg/kg
Uranium (Total)		2.75E+03*[f]	6.78E+01 (PD)	mg/kg
Vanadium	7440-62-2	7.15E+03*	4.33E+02 (K)	mg/kg
Zinc	7440-66-6	3.07E+05*		mg/kg
RADIONUCLIDES [g]				
Americium-241[c]	14596-10-2	7.60E+01	1.90E+03	pCi/g
Plutonium-239/240[c]	10-12-8	5.00E+01/ 1.16E+02 [**h**]	3.80E+03	pCi/g
Uranium-234[c]	11-08-5	3.00E+02	1.80E+03	pCi/g
Uranium-235[c]	15117-96-1	8.00E+00	1.90E+03	pCi/g
Uranium-238[c]	7440-61-1	3.51E+02	1.60E+03	pCi/g
TO BE DETERMINED [i]				
Acenaphthylene	208-96-8	TBD		
Benzo(g,h,i)perylene	191-24-2	TBD		
4-Bromophenyl phenyl ether	101-55-3	TBD		
Dioxin	1746-01-6	TBD		
Furan	110-00-9	TBD		
Hexachlorocyclohexane, gamma	58-89-9	TBD		
Pendimethalin	40487-42-1	TBD		
Pentachlorobenzene	608-93-5	TBD		
Pentachloronitrobenzene	82-68-8	TBD		
Phenanthrene	85-01-8	TBD		
1,2,4,5-Tetrachlorobenzene	95-94-3	TBD		
Trifluralin	1582-09-8	TBD		

Notes:

[a] Values are based on PRG calculations for a wildlife refuge worker (see RFCA Appendix 3, Implementation Guidance Document Appendix N). Values represent either a 1 x 10^{-5} lifetime excess cancer risk or a HQ=1 for non-cancer toxicity. An "*" indicates that the value for the wildlife refuge worker is based on HQ=1 for non-cancer toxicity. All toxicity factors used in the calculations are from IRIS, from HEAST, or are approved by the NCEA.

[b] Listed values are based on PRG calculations for ecological receptors (see RFCA Appendix 3, Implementation Guidance Document Appendix N) and are based on Lowest-Observed-Adverse-Effects Level (LOAEL) end points. The action level listed is the lowest action level that was calculated for each of the five selected wildlife receptors: Preble's meadow jumping mouse and black tailed prairie dog (fossorial (burrowing) small mammals), mourning dove (small ground-feeding bird), terrestrial invertebrate (multiple species), and American kestrel (avian predator). The acronym in parentheses is the ecological receptor that is the basis for the Action Level shown: (PM) – Preble's Meadow Jumping Mouse; (PD) - Prairie Dog; (MD) Mourning Dove; (I) - Invertebrate; and (K) - Kestrel.

A "**" indicates that the action level is less than the mean plus 2 standard deviations of the Site background concentration. In these cases, the ecological action levels will default to background levels.

Inferential statistics are recommended to demonstrate cleanup to background levels.

[The Ecological Risk Working Group is evaluating all analytes listed in Table 3 to determine if the analyte is an ecological potential contaminant of concern (PCOC). PRGs will be calculated for analytes determined to be ecological PCOCs. Table 3 will be modified, as appropriate, based on this evaluation.]

[c] Sitewide human health analytes that will be analyzed during characterization at a minimum.
[d] > 1E+09 or >1E+06 indicates the action level has a calculated value greater than 1.00E+09 mg/kg (1,000,000,000 ug/kg) or 1.00 + 06 mg/kg

(1,000,000 mg/kg) respectively.

[e] U.S. Environmental Protection Agency (EPA). 1994. Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities. Office of Solid Waste and Emergency Response. Washington, D.C. Directive 9355.4-12

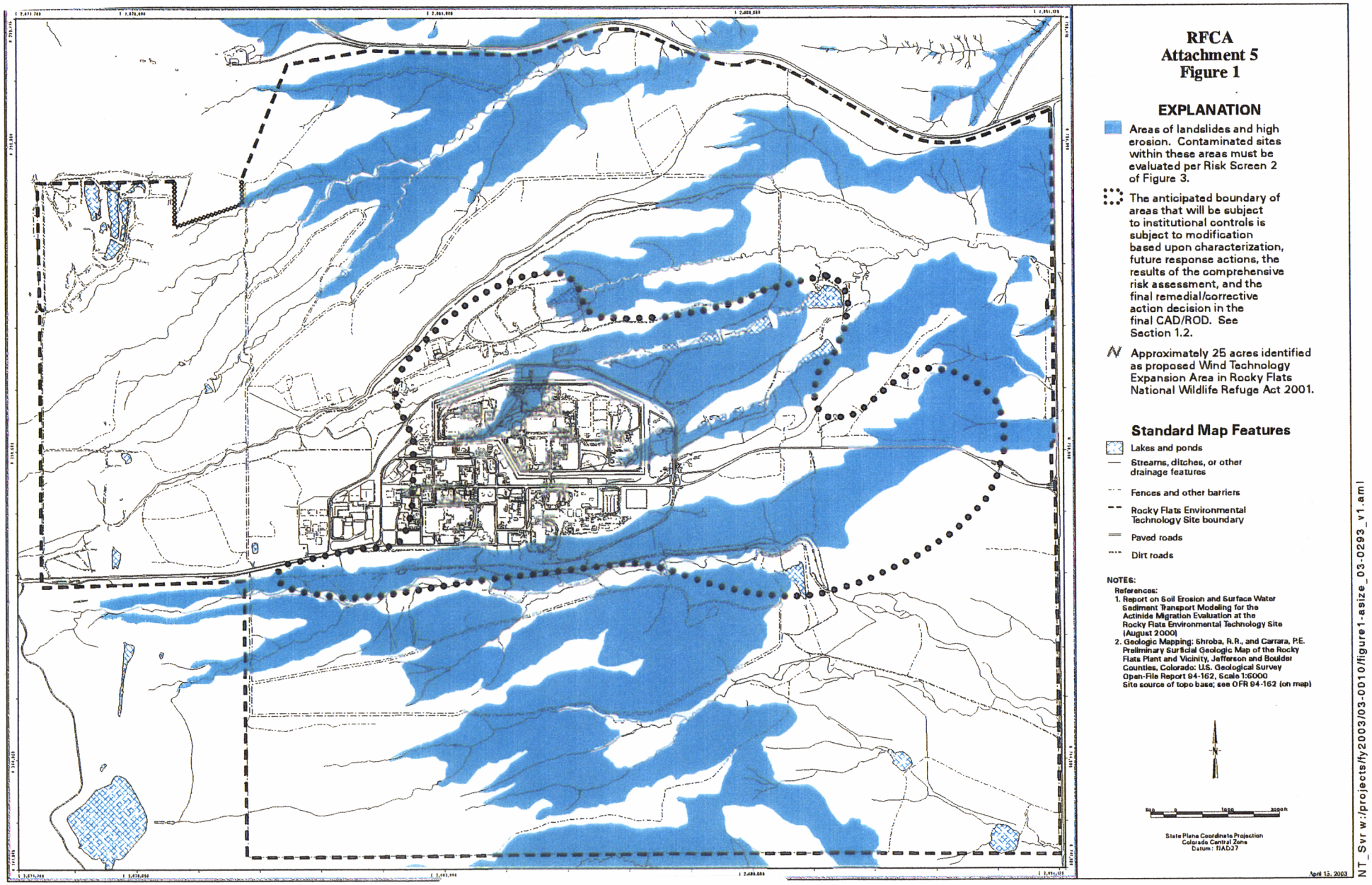
[f] The action level for total uranium in units of mg/kg accounts for the non-cancer risk. If uranium contamination reported in pCi/g is collocated with plutonium and/or americium contamination, the radiological action levels for uranium isotopes will be included in sum-of-ratios calculations. If uranium concentrations exceeds either action level, an action determination in accordance with ALF Section 5.3 is triggered.

[g] Wildlife refuge worker values for radionuclides are from the Task 3 Report and Appendices: Calculation of Surface Radionuclide Soil Action Levels for Plutonium, Americium, and Uranium (September 30, 2002). The values are for individual radionuclides and are based on a 1 x 10^{-5} excess cancer risk and the 5th percentile of the RSAL distribution. In order to account for the total dose from the multiple radionuclides, sum-of-ratios calculations will be applied to all radionuclides which are present above background. Actual values that trigger actions will therefore likely be lower than the values listed in this table. Action levels for other radionuclides will be determined as necessary and in the same manner used to calculate the values listed in this table.

[h] Although the Pu-239 calculated value at 1 X 10^{-5} risk is 116 pCi/g, the RFCA parties have agreed that accelerated actions are required for soil with Pu activity levels above 50 pCi/g.

[i] Analytes with the note "TBD" are being reviewed to determine if the analyte was used or could have been used at RFETS. If it is determined that the analyte was used or could have been used at RFETS, then a wildlife refuge worker action level will be determined in the same manner used to calculate the wildlife refuge worker values listed in this table.

The scientific notation used in this table indicates the power of ten by which the two-decimal place number is multiplied (e.g., 2.52E-02 = 2.52 x 10^{-2} = 0.0252)


RFCA
Attachment 5
Figure 1
EXPLANATION
Areas of landslides and high erosion. Contaminated sites within these areas must be evaluated per Risk Screen 2 of Figure 3.
The anticipated boundary of areas that will be subject to institutional controls is subject to modification based upon characterization, future response actions, the results of the comprehensive risk assessment, and the final remedial/corrective action decision in the final CAD/ROD. See Section 1.2.
Approximately 25 acres identified as proposed Wind Technology Expansion Area in Rocky Flats National Wildlife Refuge Act 2001.
Standard Map Features
Lakes and ponds
Streams, ditches, or other drainage features
Fences and other barriers
Rocky Flats Environmental Technology Site boundary
Paved roads
Dirt roads
NOTES:
References:
1. Report on Soil Erosion and Surface Water Sediment Transport Modeling for the Actinide Migration Evaluation at the Rocky Flats Environmental Technology Site (August 2000)
2. Geologic Mapping: Shroba, R.R., and Carrara, P.E. Preliminary Surficial Geologic Map of the Rocky Flats Plant and Vicinity, Jefferson and Boulder Counties, Colorado: U.S. Geological Survey Open-File Report 94-162, Scale 1:6000
Site source of topo base; see OFR 94-162 (on map)
State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27
April 15, 2003
NT_Svr w:/projects/fy2003/03-0010/figure1-asize_03-0293_v1.aml

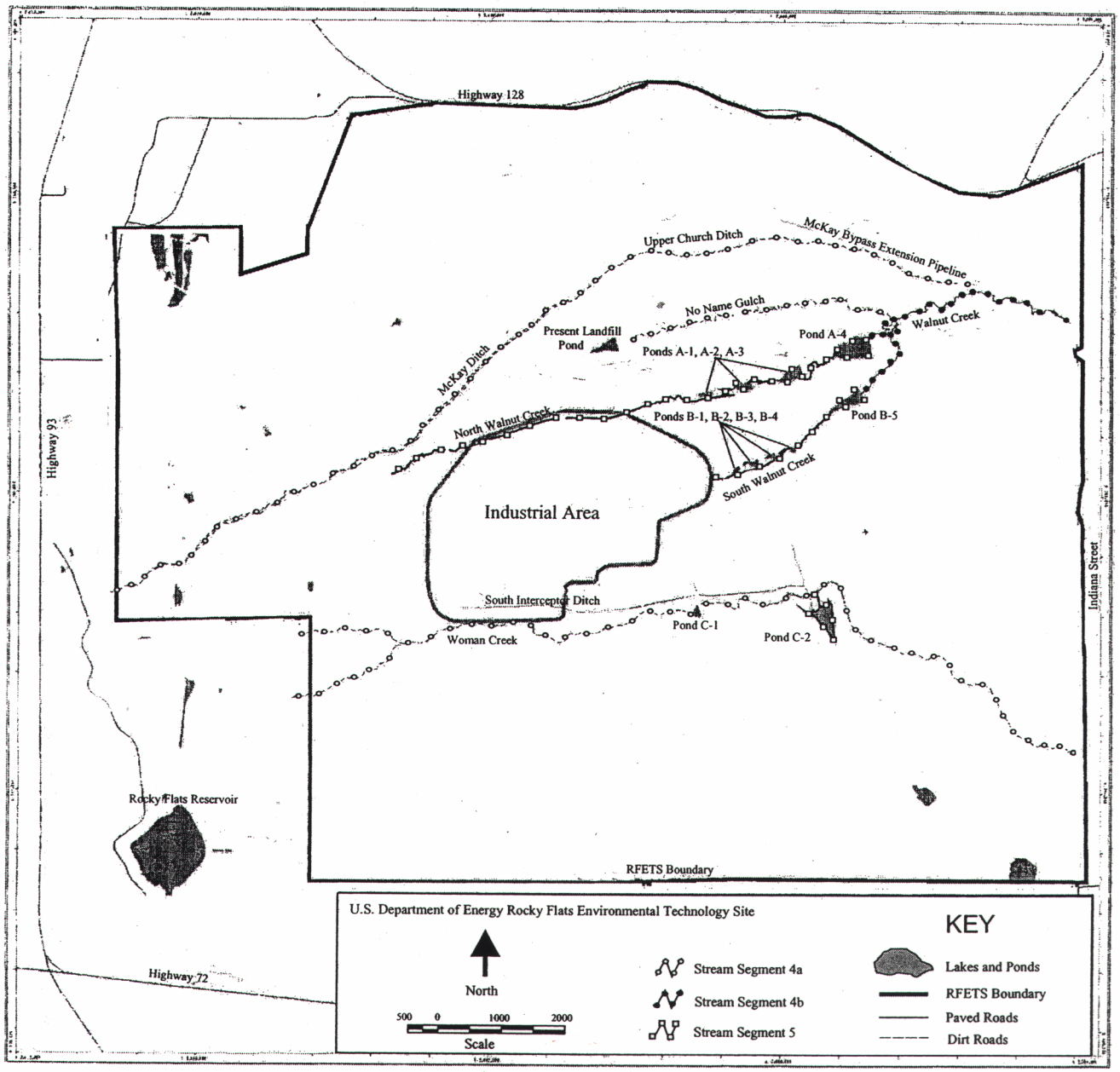
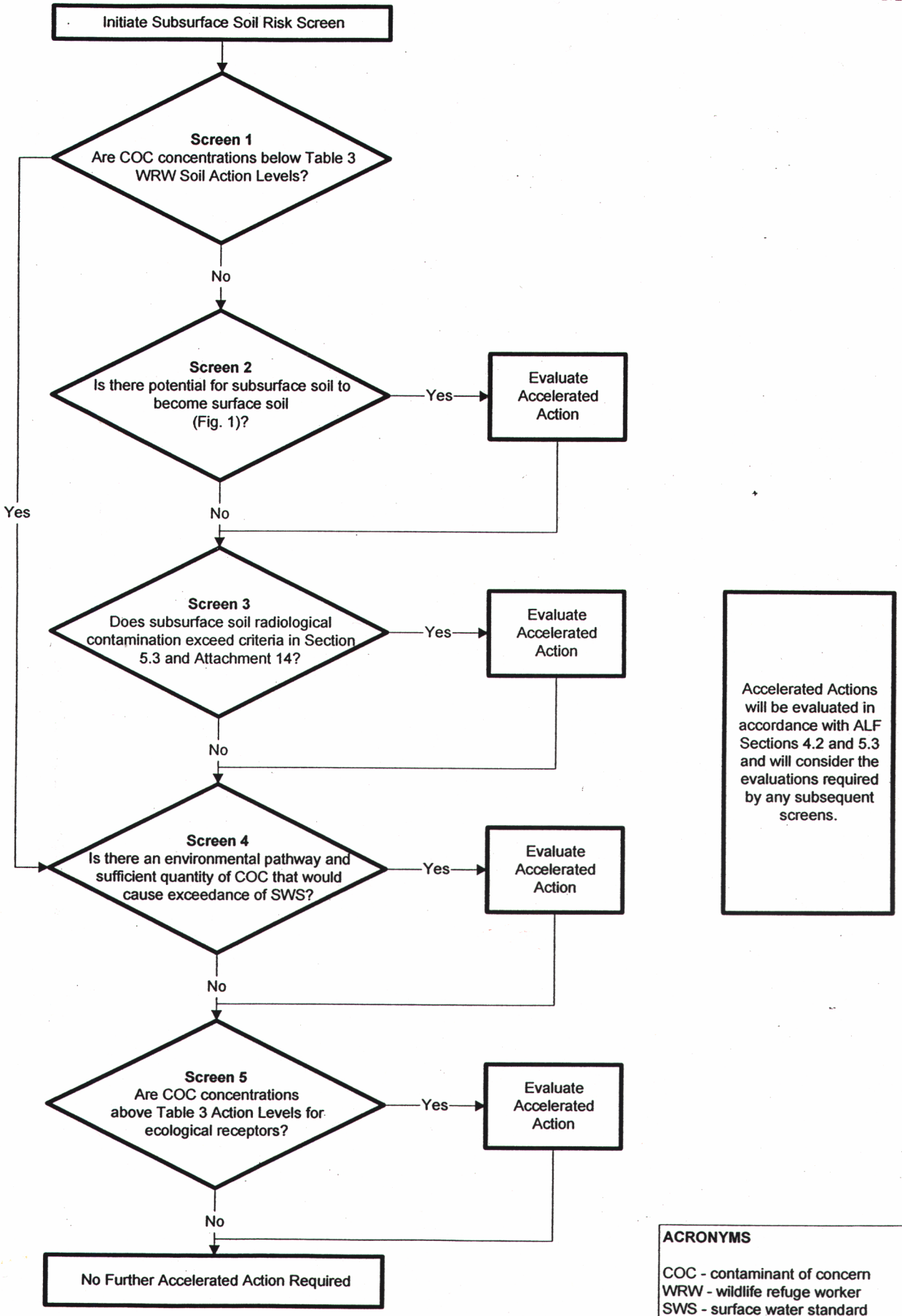


Figure 2
Sketch of Stream Segments
4a,4b and 5

RFCA Attachment 5
Figure 3: Subsurface Soil Risk Screen



ACRONYMS

COC - contaminant of concern
WRW - wildlife refuge worker
SWS - surface water standard
ALF - action level framework

ATTACHMENT 6

NO ACTION/NO FURTHER ACTION/NO FURTHER REMEDIAL ACTION
(NFA)
DECISION CRITERIA FOR
ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

ELECTRONIC COPY

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TABLE

Table 1 Generalized Information Requirements for NFA Justification Documentation 25

LIST OF ACRONYMS AND INITIALISMS

AOC	Area of Concern
ARAR	Applicable or Relevant and Appropriate Requirement
BRA	Baseline Risk Assessment
CAD/ROD	Corrective Action Decision/Record of Decision
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CHWA	Colorado Hazardous Waste Act
CHWR	Colorado Hazardous Waste Regulation
COC	Chemical of Concern
DOE	Department of Energy
ECOC	Ecological Chemical of Concern
EPA	Environmental Protection Agency
ERA	Ecological Risk Assessment
ERAM	Ecological Risk Assessment Methodology
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
HRR	Historical Release Report
IAG	Interagency Agreement
IHSS	Individual Hazardous Substance Site
IM/IRA	Interim Measure/ Interim Remedial Action
NCP	National Contingency Plan
NFA	No Action/No Further Action/No Further Remedial Action
OU	Operable Unit
PCOC	Potential Chemical of Concern
RAGS	Risk Assessment Guidance for Superfund
RBCs	Risk-Based Concentrations
RCRA	Resource Conservation and Recovery Act
RFETS	Rocky Flats Environmental Technology Site
RFI/RI	RCRA Facility Investigation/Remedial Investigation
RME	Reasonable Maximum Exposure
SA	Source Area
SWMU	Solid Waste Management Unit
TM	Technical Memorandum
UTL	Upper Tolerance Limit

EXECUTIVE SUMMARY

Presented in this document are No Action/No Further Action/No Further Remedial Action (NFA) decision criteria and NFA decision documentation requirements to be used as guidance for determining which geographic areas as defined by the NFA Working Group (e.g., Individual Hazardous Substance Sites [IHSSs], Source Areas [SAs], Operable Units [OUs], Areas of Concern [AOC]) at the Rocky Flats Environmental Technology Site (RFETS), Golden, Colorado may become candidates for an NFA decision.

The NFA decision process presented within this document meets the substantive requirements to support a No Action or No Further Action (as defined by CERCLA) remedy selection for a Corrective Action Decision/Record of Decision (CAD/ROD). In addition, administrative requirements for coordination of NFA decisions with the CAD/ROD process and with RCRA closures at RFETS are discussed in this document. Various processes are consolidated in this document to provide decision criteria for establishing those geographic areas at RFETS that do not require further study or remediation as part of the CERCLA process, including planned land use decisions. The steps, in order of performance, can be summarized as follows:

1. Conduct source evaluation (with available data/information). If a review of historical release information/defensible data reveals that no current or potential threat can be found, the exposure pathway is incomplete and the IHSS can be recommended for No Action.

2. Conduct a background comparison. If a review of historical release information/ defensible data indicates that a current or potential threat may be present, an IHSS, usually as part of an OU, will undergo a background comparison. A background comparison is performed to distinguish between constituents that are associated with site activities and those associated with background conditions. If medium-specific environmental data collected from an IHSS are shown to be at or below background levels for inorganic chemicals, and no organic chemicals are detected in that medium, that IHSS may become a candidate for No Action.

3. Conduct a CDPHE conservative screen. The purpose of conducting a CDPHE conservative screen is to reduce the number of IHSSs that are required to undergo a CERCLA baseline risk assessment. Certain geographical areas have already been screened using the CDPHE conservative screen to evaluate human health risks. Ecological risks are screened using Tier 2 of the Ecological Risk Assessment (ERA)

process. If an IHSS or source area passes both the human health and ecological risk-based screens, then that IHSS becomes a candidate for No Action.

4. Perform a Baseline Risk Assessment (BRA). The BRA consists of a human health risk assessment (conducted on an exposure area) and an ecological risk assessment (conducted by drainage area). A BRA includes an evaluation of baseline conditions as if no action, including implementing institutional controls, were taken. Risks assuming residential exposures can be compared to risks associated with other exposure scenarios to estimate the risk consequences of alternate land uses. If the results of the BRA estimate that the risks to human health and the environment are within acceptable levels, the IHSS becomes a candidate for No Further Action or No Further Remedial Action with institutional controls, depending on the specific receptors considered by the BRA.

The remedy selection process must be documented to support a NFA decision. For those sites not evaluated as part of an RFI/RI, a document justifying the NFA decision must be prepared to present an evaluation of existing information and data to support a scientifically and legally defensible NFA decision. For those sites evaluated within an RFI/RI Report or a Letter Report (i.e., a report generated as part of the CDPHE conservative screen), additional documentation justifying the NFA decision is not necessary; the RFI/RI Report or Letter Report serves as the documentation. Rationale for an NFA decision will be summarized in an update to the Historical Release Report (HRR), and appropriate supportive documentation will be appended, as necessary. The HRR update for an NFA is intended to be a place keeper for documentation that the substantive requirements for an NFA decision have been met.

Geographic areas that can only achieve No Further Remedial Action status if an institutional control is in place will be recognized as such. An institutional control and a recommendation for No Further Remedial Action will likely be part of the final CAD/ROD for the geographic area. If the circumstances, e.g., land use or risk evaluation, change between a recommendation for an NFA and the CAD/ROD incorporating the geographic area, the documentation supporting the NFA recommendation, and the NFA recommendation itself, will be reevaluated.

If cumulative risks for an OU or the entire site are between 10^{-4} and 10^{-6}, risk management decisions must be made and may include NFA, remedial action, or risk controls such as land use designations and restrictions. DOE, in consultation with the NFA Working Group, may decide to place further remedial studies and/or closure activities on hold for a geographic area

where DOE believes there is a high likelihood that no remedial action will be required. Such geographic areas may not be recommended for No Further Remedial Action until the cumulative risks are evaluated as part of the final CAD/ROD for the geographic area.

1.0 INTRODUCTION

1.1 Objectives

The purpose of this document is to present decision criteria for determining those geographic areas (e.g., Individual Hazardous Substance Sites [IHSSs], Source Areas [SAs], Operable Units [OUs], Areas of Concern [AOCs]) at the Rocky Flats Environmental Technology Site (RFETS), Golden, Colorado which may become a candidate for a No Action/No Further Action/No Further Remedial Action (NFA) decision. Various processes that meet the substantive requirements in support of NFA remedy selection are consolidated in this document to provide decision criteria for establishing those geographic areas at RFETS that do not require further remediation as part of the CERCLA process, considering planned future land uses.

Presented in this document are NFA decision criteria and requirements for NFA decision documentation that ultimately can be used in the preparation of a CAD/ROD or in a RCRA closure. Administrative requirements for coordination of NFA closures at RFETS are discussed briefly in the Section 3.0 on NFA decision documentation. The primary benefits for having a preapproved NFA decision process include the following:

- Accelerate IHSS decision making and closures by not having to redevelop the NFA process for each closure.

- Track the status of successful closures at RFETS on an IHSS-by-IHSS basis.

- Eliminate negative cost and schedule impacts. Once an area has been accepted for an NFA decision, any work that is scheduled to occur within that area (e.g., routine monitoring or maintenance) should not require all the paperwork (e.g., Soil Disturbance Permit, waste determinations) or the personal protective equipment that would be needed in a contaminated (real or suspected) area. This would save time and money, and reduce the amount of waste generated.

- Limit the number and length of documents to be produced, thus reducing review time and cost of document production.

- Accelerate cleanup at RFETS by allowing resources to be directed to high priority sites.

An NFA Strategy Working Group, comprised of members from each agency and the Kaiser-Hill Team, will be established. The primary goals for this NFA working group will be to define the geographic areas (i.e., IHSS, SA, AOC, or OU) that will be considered for the NFA determination process. If a geographic area is located where an institutional control is expected to ensure a future land use, the working group will identify the area as such and the future land use will be considered in the NFA recommendation. Geographic areas that can only achieve No Further Remedial Action status if an institutional control is in place will be recognized as such. An institutional control and a recommendation for No Further Remedial Action will likely be part of the final CAD/ROD for the geographic area. If the circumstances, e.g., land use or risk evaluation, change between a recommendation for an NFA and the CAD/ROD incorporating the geographic area, the documentation supporting the NFA recommendation, and the NFA recommendation itself, will be reevaluated.

If cumulative risks for an OU or the entire site are between 10^{-4} and 10^{-6}, risk management decisions must be made and may include NFA, remedial action, or risk controls such as land use designations and restrictions. DOE, in consultation with the NFA Working Group, may decide to place further remedial studies and/or closure activities on hold for a geographic area where DOE believes there is a high likelihood that no remedial action will be required. Such geographic areas may not be recommended for No Further Remedial Action until the cumulative risks are evaluated as part of the final CAD/ROD for the geographic area.

1.2 Regulatory Basis for NFA Decisions

On January 22, 1991, the DOE, the CDPHE, and the EPA entered into a tri-party agreement (Interagency Agreement [IAG]), as directed by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the corrective action section of the Resource Conservation and Recovery Act (RCRA), for the management of Rocky Flats Facility cleanup. This agreement was made to ensure that: (1) environmental impacts associated with past and present activities at the Rocky Flats Site would continue to be thoroughly investigated; (2) appropriate response actions would be taken; and (3) response actions would be completed as necessary to protect human health, welfare, and the environment. This framework identified the necessity of joint environmental regulatory processes to fulfill the requirements of RCRA and CERCLA. The IAG identified the required methodology for remedial actions, permit modifications, closures, and corrective actions for cleanup at Rocky Flats.

This NFA decision criteria document expands on the site-specific methodology for making NFA decisions at RFETS, using the regulatory guidance provided by CERCLA and RCRA.

1.2.1 CERCLA Guidance

Section 117 of CERCLA, as amended by SARA of 1986, requires the issuance of decision documents for remedial actions taken pursuant to sections 104, 106, 120, and 122. In response to these regulations, the EPA developed *Guidance on Preparing Superfund Decision Documents, Preliminary Draft* (EPA, 1992) and a Quick Reference Fact Sheet titled *Guide to Developing Superfund No Action, Interim Action, and Contingency Remedy RODs* (EPA, 1991a). EPA has also produced a *Record of Decision Checklist for No Action* (EPA, undated) to aid in the development of NFA decision documents and in the process of obtaining an NFA decision. EPA OSWER Directive 9355.0-30 (EPA, 1991b) was written to clarify the role of the baseline risk assessment in developing Superfund remedial alternatives and supporting risk management decisions. These documents are the basis upon which this current NFA decision criteria document for RFETS is built.

Using the NFA Quick Reference Fact Sheet (EPA, 1991a) as a basis, an NFA decision may be warranted at RFETS under three general sets of circumstances:

1. When the Site or area of the site (e.g., an OU or an IHSS) poses no current or potential threat to human health or the environment (a no action decision); or

2. When a previous response eliminated the need for further remedial response (a no further action decision); or

3. When risk calculations based on specific exposure scenarios indicate that institutional controls alone will constitute acceptable risk management (a no further remedial action decision).

EPA (EPA, 1992) defines no action as "no treatment, engineering controls, or institutional controls." Remedial alternatives that include solely institutional controls are not considered "no action." An alternative may include monitoring and still be considered "no action."

OSWER Directive 9355.0-30 (EPA, 1991b) states that: "If the baseline risk assessment and the comparison of exposure concentrations to chemical-specific standards indicates that there is no unacceptable risk to human health or the environment and that no remedial action is warranted, then the CERCLA Section 121 cleanup standards for selection of a Superfund remedy, including the requirements to meet applicable or relevant and appropriate requirements (ARARs), are not triggered."

An ARARs analysis will not be triggered for risk less than 10^{-6} for the appropriate receptor, but CERCLA does not preclude independent application of State standards by CDPHE.

1.2.2 RCRA Guidance

A RCRA corrective action is used to clean up hazardous waste or hazardous waste constituents released from any solid waste management unit (SWMU) at a permitted facility, as codified in 42 USC 6924 section 3004(u).

The State of Colorado was authorized, by the EPA, to manage hazardous waste requirements within its boundaries through the Colorado Hazardous Waste Act (CHWA). CDPHE, through its Hazardous Material and Waste Management Division, promulgated regulation in 6 CCR 1007-3 for the proper handling of hazardous waste and constituents. The Corrective Action Program for any SWMU is defined in section 264.101 of those regulations.

On November 16, 1993, CDPHE provided additional guidance for closure requirements, corrective action requirements, and other program requirements. This guidance identified the risk assessment methodology and the use thereof in making corrective action decisions for hazardous waste generator facilities that are regulated by the CHWA and its implementing regulations (Colorado Hazardous Waste Regulations [CHWR]). The methodology identifies a three-step screen approach for evaluating corrective action at a SWMU.

The first screen is a comparison to background and/or detection limits. Exceeding the detection limits or background levels (both defined in this guidance) would require screening steps two and three of the CDPHE screening process. SWMU or release sites that meet the levels prescribed in the criteria identified are considered "clean" and corrective action would not be necessary.

In addition, the July 27, 1990, Federal Register proposes 40 CFR §264.514, which presents a mechanism by which a permittee may request a permit modification to effectively terminate further requirements at a RCRA facility where no further action is justified.

For IHSSs that have interim status under RCRA, substantive requirements should be included as part of an Interim Measure/Interim Remedial Action (IM/IRA) for public comment. However, for NFAs, an IM/IRA should not be required and a Proposed Plan will suffice. In this situation, modification of the CHWA Permit for Rocky Flats will proceed as a separate

process after the CAD/ROD is adopted. For interim status units (e.g., IHSSs), RCRA Clean Closure Certification by an independent engineer is a requirement for NFA.

1.3 Exposure Pathway—Generic Site Conceptual Model

The key criterion in proposing an NFA decision is the determination of whether any actual or potential risk to human health or the environment exists. In order for a public health or environmental threat to exist, a complete pathway for exposure must exist between a site and a receptor. Individual components of an exposure pathway from the generic site conceptual model for the *No Further Action Justification Document for Rocky Flats Plant Low-Priority Sites (Operable Unit 16)* (DOE, 1993) are shown in Figure 1.

An exposure pathway is defined as "a unique mechanism by which a population may be exposed to chemicals at or originating from the site" (EPA, 1989a). As shown in Figure 1, a credible exposure pathway must include a contaminant source, a release mechanism, a transport medium, an exposure route, and a receptor. These individual components of an exposure pathway are defined as follows:

- Contaminant Source: A contaminant source includes contaminants and/or contaminated environmental media associated with historical operations/occurrences at each IHSS

- Release Mechanisms: Release mechanisms are physical and chemical processes by which contaminants are released from the source. A conceptual model identifies primary release mechanisms, which release contaminants directly from the IHSSs, and secondary release mechanisms, which release contaminants from environmental media.

- Retention or Transport Medium: A retention or transport medium is one into which contaminants are released from the source and from which contaminants may be released to a receptor (or to another medium by a secondary release mechanism). Primary transport media include air, soil, surface water, ground water, and biota.

- Exposure Route: An exposure route is an avenue through which contaminants are physiologically incorporated by a receptor and include inhalation, ingestion, dermal contact, and external irradiation.

- Receptor: A receptor is a population affected by contamination released from a site. Potential human receptors for contaminants in IHSSs at RFETS include workers and

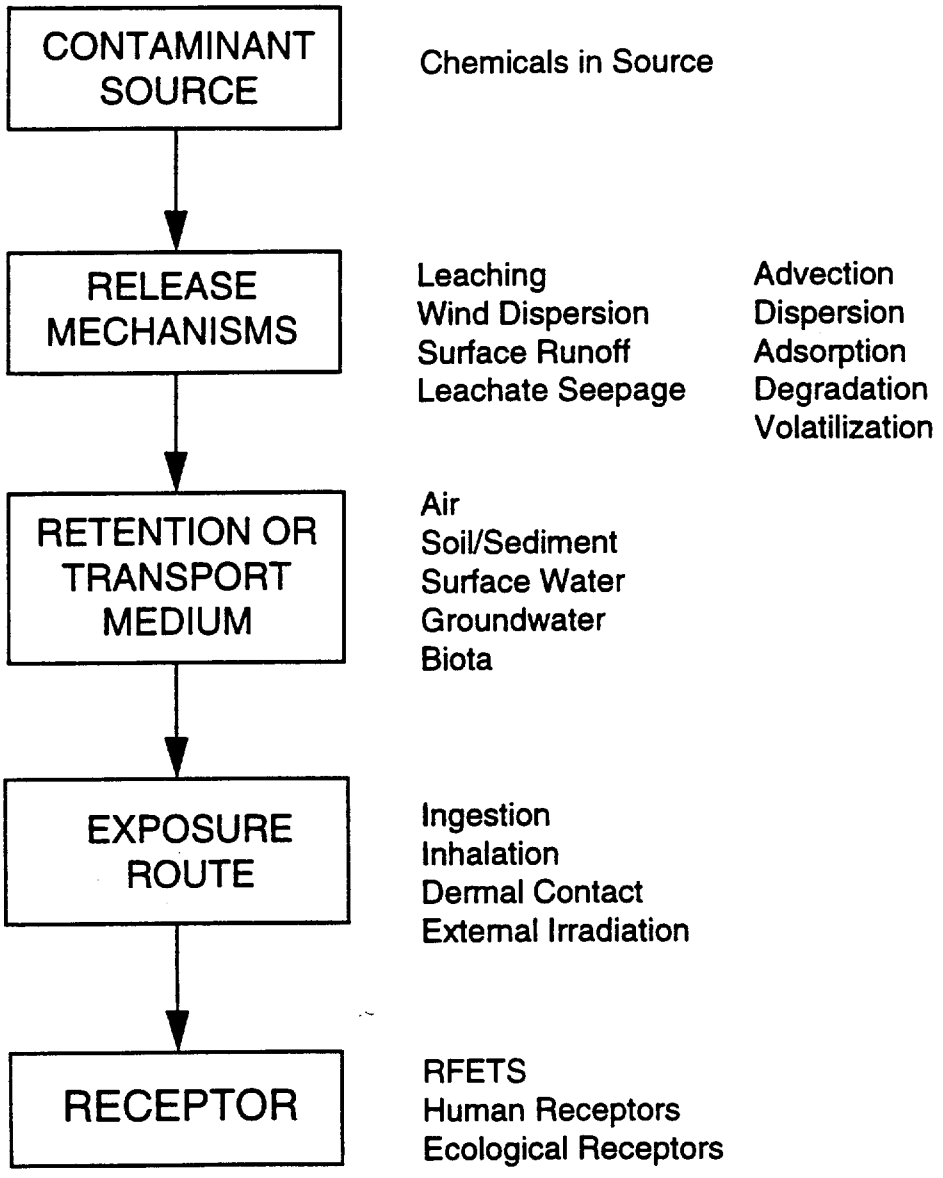


Figure 1. Exposure Pathway--Generic Site Conceptual Model

visitors. Environmental receptors include flora and fauna. Offsite receptors could include residents or agricultural workers.

If an exposure pathway lacks any of these components, it is not complete, there is no risk, and No Action is warranted. However, if an exposure pathway is complete, an NFA can be considered if the potential risk present is within acceptable limits as determined by the CDPHE conservative screen or the BRA. If a geographic area is located where an institutional control is expected to ensure a future land use, the working group will identify the area as such and the future land use will be considered in the NFA recommendation. Geographic areas that can only achieve No Further Remedial Action status if an institutional control is in place will be recognized as such. An institutional control and a recommendation for No Further Remedial Action will likely be part of the final CAD/ROD for the geographic area. If circumstances, e.g., land use or risk evaluation, change between a recommendation for an NFA and the CAD/ROD incorporating the geographic area, the documentation supporting the NFA recommendation, and the NFA recommendation itself, will be reevaluated.

If cumulative risks for an OU or the entire site are between 10^{-4} and 10^{-6}, risk management decisions must be made and may include NFA, remedial action, or risk controls such as land use designations and restrictions. DOE, in consultation with the NFA Working Group, may decide to place further remedial studies and/or closure activities on hold for a geographic area where DOE believes there is a high likelihood that no remedial action will be required. Such geographic areas may not be recommended for No Further Remedial Action until the cumulative risks are evaluated as part of the final CAD/ROD for the geographic area.

The criteria for NFA decisions presented in Section 2.0 address both incomplete and complete exposure pathways. Section 3.0 describes the documentation requirements for making an NFA recommendation.

2.0 CRITERIA FOR NFA DECISIONS

The regulatory process for dispositioning a site suspected of contamination can be long and complex. However, there are several points in this process at which a geographic area (an IHSS, SA, AOC, or OU) can be recommended for NFA. Criteria have been developed for each decision point to determine whether or not sufficient information is available to protect human health and the environment. Figure 2 shows these NFA decision points. The remainder of this section, which is organized according to Figure 2, describes the criteria to be met at each decision point.

2.1 Source Evaluation

The first step in evaluating a geographic area is to determine what sources of contamination, if any, remain in the geographic area. If no existing source can be found, the exposure pathway is incomplete and the geographic area can be recommended for No Action. The remaining components of an exposure pathway (release mechanisms, retention or transport medium, exposure route, and receptor) are all evaluated during the risk assessment process.

The NFA criteria for demonstrating that no current or potential threat exists are site specific. Historical information must be reviewed to determine whether or not an NFA decision may be appropriate at an early stage of a site investigation. NFA justification can be accomplished using minimal investigation and characterization resources if adequate historical release information and defensible data are available; additional environmental sampling may not always be necessary. If it appears that an existing contaminant source is lacking in an IHSS, an NFA determination may be made without the need to collect additional environmental samples (Decision Point 1).

As seen in Figure 2, No Action recommendation at Decision Point 1 may be made under at least three circumstances, where a lack of contaminant source is indicated. These circumstances have already resulted in successful NFA determinations for IHSSs at RFETS. The final *No Further Action Justification Document for OU16* (DOE, 1993) describes these circumstances, which are demonstrated in the following examples:

1. In IHSS 185, a 1986 4-gal solvent spill was cleaned up immediately, using a commercial absorbent. This solvent was not detected in subsequent ground water sampling. Based on this evidence and additional physicochemical rationale, no action was warranted for this IHSS.

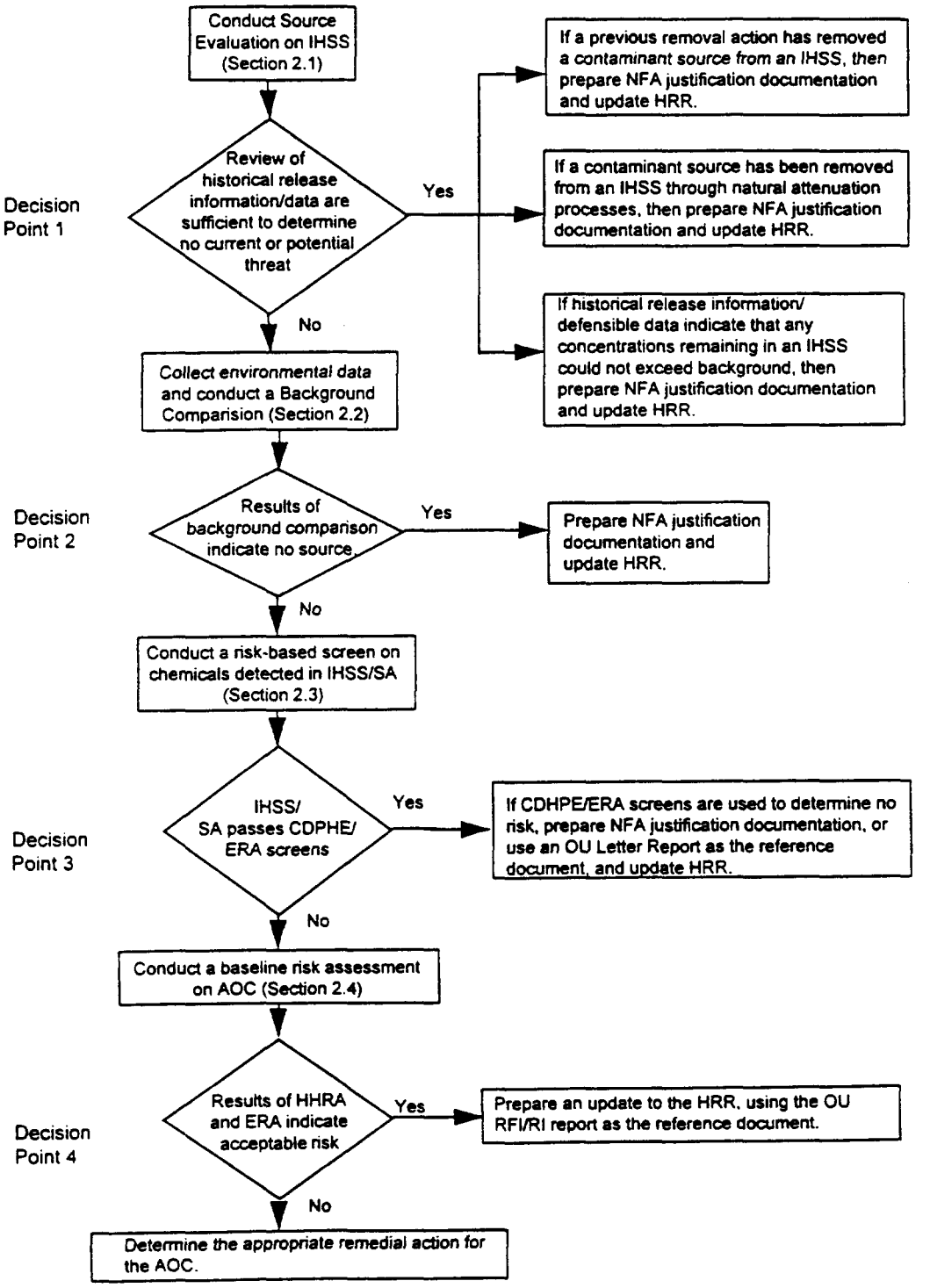


Figure 2. Decision Points for NFA Recommendations

2. In early 1980, 155 gallons of antifreeze, containing 25 percent ethylene glycol, were released from Building 708 through a buried culvert (IHSS 192) into Walnut Creek. A fate and transport degradation model run using the physicochemical characteristics of ethylene glycol indicated that it was completely degraded through natural attenuation, resulting in an NFA decision for this IHSS.

3. A 1979 break in a steam condensate line discharged steam condensate water containing low levels of tritium onto a paved area (IHSS 194). Tritium levels in steam condensate water samples were within background activity levels; considering the half life of tritium and the time since the discharge, no action was warranted.

As with the IHSSs in OU16, this type of NFA determination may be useful for evaluating geographic areas in the Industrial Area at RFETS. However, if adequate historical release information and current environmental data are not available to make an NFA determination, the geographic area would progress to the next step in the process, which could include scoping the site investigation to obtain additional data.

2.2 Background Comparisons

If a review of historical release information/data indicates that a contaminant source may be present, the geographic area will undergo a background comparison. A background comparison is performed to distinguish between constituents that are associated with site activities and those associated with background conditions. If sufficient data are available, a statistical methodology is used to conduct the background comparison (i.e., potential chemicals of concern [PCOC] identification) for nonanthropogenic compounds. A five-phase methodology (Figure 3), used to determine if an inorganic constituent exceeds background levels, was developed and approved by DOE, EPA Region VIII, and CDPHE. This methodology is detailed in the *Human Health Risk Assessment Methodology for RFETS* (DOE, 1995a) and EG&G Interoffice Correspondence (EG&G, 1995). In addition, examples of the application of background comparison at RFETS can be found in the site-specific letter reports for OU5 (DOE, 1994a) and OU6 (DOE, 1994b).

In a statistical background comparison, PCOCs are determined on an OU-wide basis for each environmental medium. Organic chemicals are assumed to be man-made and are not compared to background. Professional judgement, using spatial, temporal, or pattern-recognition concepts, must be applied to ensure the background data set is appropriate for comparison to the OU data set (for example, geologic conditions should be considered). If

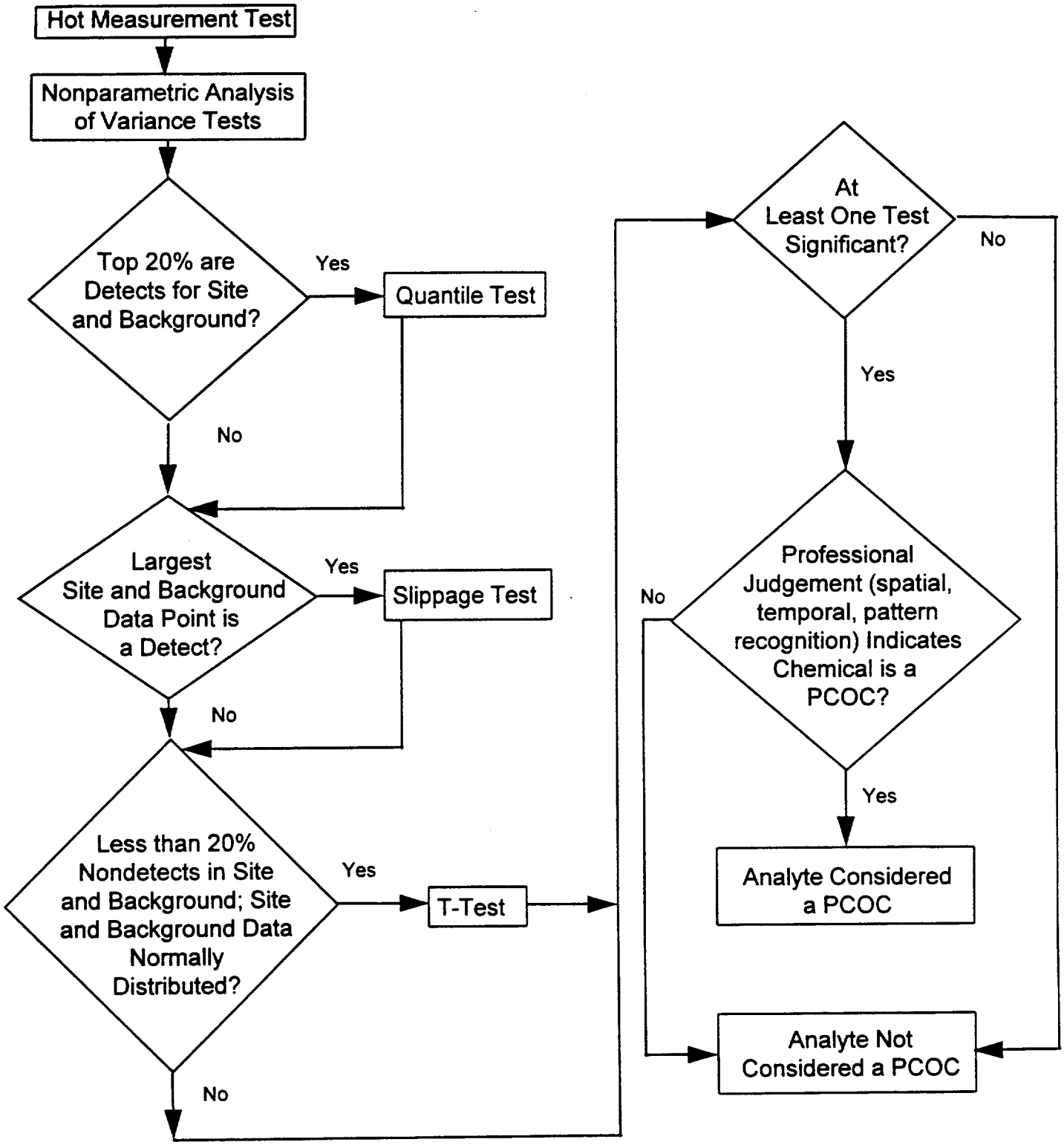


Figure 3. Background Comparison/PCOC Selection

appropriate background data sets are not available (such as with OU3 lake sediments), a weight-of-evidence approach may be used to provide background benchmark values. Professional judgment must also be used to identify IHSSs or OUs where analyte- or medium-specific data are insufficient to run statistical background comparisons (e.g., in data sets with limited sample size or greater than 80% nondetects). In these cases, it may be more appropriate to use only the Hot Measurement Test (i.e., the maximum detected concentration of an analyte is compared to the background 99% upper tolerance limit [$UTL_{99/99}$] for that analyte) as a background comparison.

If medium-specific environmental data collected from an IHSS are shown to be at or below background levels for inorganic chemicals, and no organic chemicals are detected in that medium (Decision Point 2), that IHSS may become a candidate for No Action. If PCOCs are identified for an IHSS, the data must be analyzed using the CDPHE conservative screen described in Section 2.3.

2.3 Risk-based Screening of Chemicals

An IHSS having PCOCs (inorganic and/or organic), as indicated through a background comparison described in Section 2.2, must undergo a risk-based screening of chemicals before it can be recommended for no action. The purpose of conducting a risk-based screen is to reduce the number of IHSSs that are required to undergo a CERCLA baseline risk assessment. Human health risks are evaluated using the CDPHE conservative screen (Section 2.3.1); ecological risks are screened using Tier 2 of the ecological risk assessment (ERA) process (Section 2.3.2).

2.3.1 CDPHE Conservative Screen

The CDPHE conservative screen was developed by the State of Colorado to ensure that the requirements of RCRA are met. The CDPHE conservative screen was incorporated by DOE, EPA, and CDPHE into the data aggregation process used in human health risk assessment (HHRA) for RFETS. This screen is one method used by DOE, EPA, and CDPHE to make decisions regarding no action, voluntary corrective action, or further analysis through an HHRA. A CDPHE conservative screen is conducted in accordance with the guidance provided in the *Human Health Risk Assessment Methodology for RFETS* (DOE, 1995a) and shown in Figure 4.

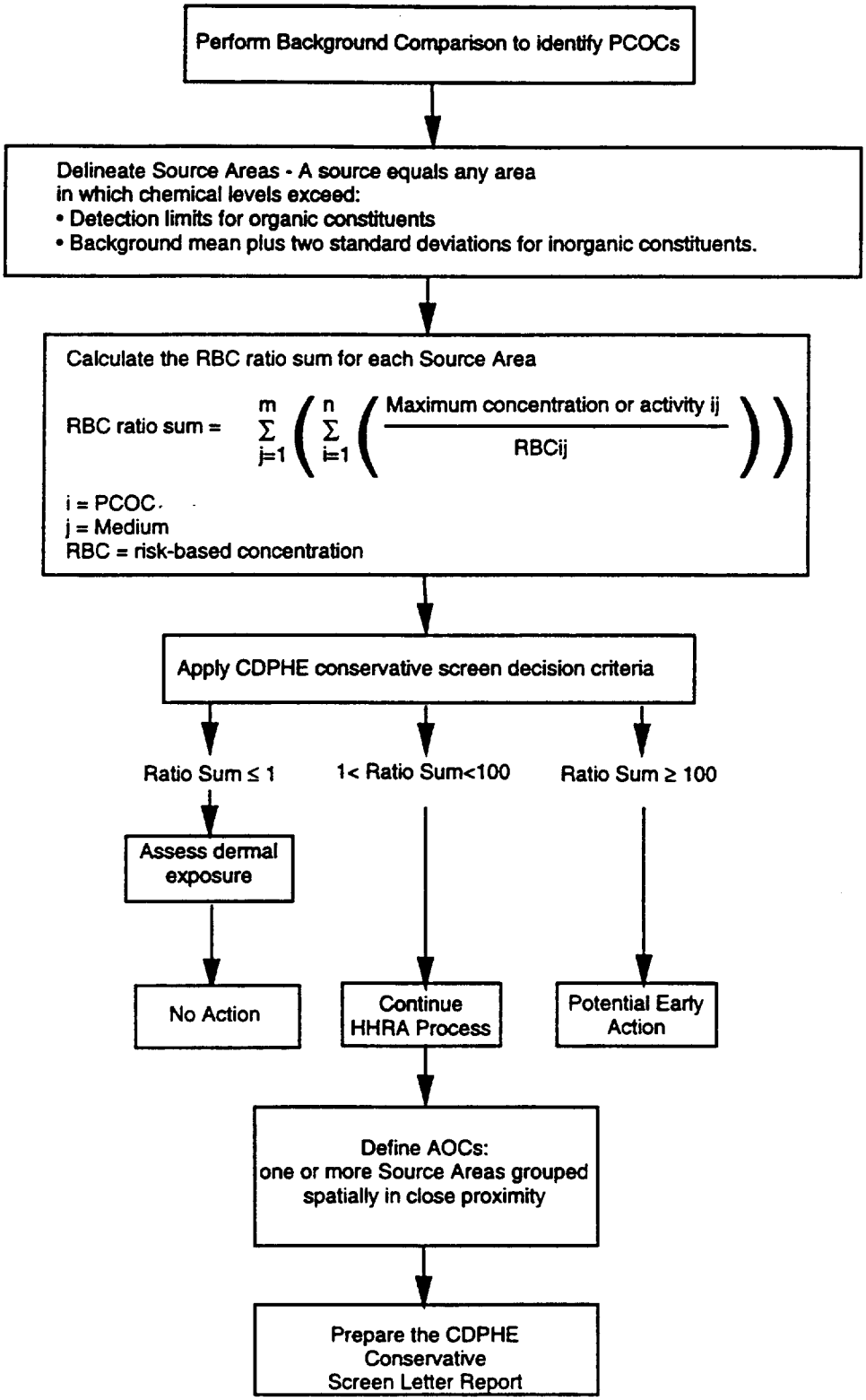


Figure 4. CDPHE Conservative Screen

In the CDPHE conservative screen, source areas (SAs) are delineated that contain organic PCOCs above reporting limits and/or inorganic PCOCs at concentrations above the arithmetic mean plus two standard deviations of the background data. An SA consists of one or more IHSSs that are grouped together based on historical use, site characterization, PCOC types and concentrations, affected media, and rates of migration.

The CDPHE conservative screen is considered conservative based on the following requirements of the process:

- The risk-based concentrations (RBCs) ratio sum for each SA is calculated using the maximum detected concentration for an analyte, rather than the 95% upper confidence limit used in CERCLA risk assessments.

- The chemical- and medium-specific RBC is calculated assuming direct residential exposure, rather than an exposure scenario more appropriate to the site. Land use recommendations made by the Rocky Flats Future Site Working Group (1995) primarily include open space use for the buffer zone and environmental technology (industrial/
office) use for the industrial area; future onsite residential land use was not recommended.

- The RBC is calculated using a carcinogenic risk of 10^{-6} and a noncarcinogenic hazard quotient of 1.0, rather than using the 10^{-4} to 10^{-6} risk range used in CERCLA risk assessments.

- The residential scenario is based on exposure assumptions and standard default factors provided for the reasonably maximum exposed (RME) residential receptor; CERCLA risk assessments also provide risk estimates for central tendency (average) receptors.

- The CDPHE conservative screen includes data for soil samples collected to a depth of 12 feet in the surface soil calculations, rather than soil from the 0- to 2-foot interval, which is more typical of CERCLA HHRAs.

The chemical-specific ratios are summed for each medium, with carcinogenic ratios summed separately from those analytes causing noncarcinogenic effects. The ratio sums for each medium are then added to get a total sum ratio for an SA. The ratios are compared to the CDPHE conservative screen decision criteria used to designate source areas as candidates for

no action, for further evaluation in the HHRA, or for possible early action (Decision Point 3). Source areas with ratio sums less than 1 may become candidates for No Action pending an evaluation of the risk associated with potential dermal contact. For source areas with ratio sums between 1 and 100, and greater than 100, DOE may evaluate the source area further in the HHRA and/or pursue a voluntary early action alternative in accordance with the Environmental Priorities List, respectively. A CDPHE conservative screen letter report is prepared to summarize the results of this screen and is used as a reference document to justify an NFA decision.

Those IHSSs or SAs within an OU that do not pass the CDPHE conservative screen are grouped into areas of concern (AOCs) for further evaluation in an HHRA. AOCs are defined as one or more SAs grouped spatially in close proximity that have historically similar waste streams (i.e., similar PCOCs).

2.3.2 Ecological Risk Assessment Tier 2 Screen

After an IHSS or source area passes the CDPHE conservative screen, it must then pass a screening-level ERA before it can become a candidate for an NFA decision. This screening process is performed according to the EPA's eight-step guidance (draft) on conducting ERAs at Superfund sites (EPA, 1994). A site-wide ecological risk assessment methodology (ERAM) was developed that is consistent with this eight-step guidance. The screening portion of this site-specific guidance is shown in Figure 5 and described in the following documents:

- *ERAM Technical Memorandum, Site-wide Conceptual Model* (DOE, 1995b) helps identify environmental stressors and the potentially complete exposure pathways that will become the focus of the ERA (DOE, 1995b).

- *ERAM Technical Memorandum, Ecological Chemicals of Concern Screening Methodology* (DOE, 1995c) describes a tiered screening process for identifying chemicals at potentially ecotoxic concentrations.

The purpose of a screening-level ERA is to detect whether a significant ecological threat exists in a geological area. After PCOCs have been determined for a geographic area, risks are estimated by comparing maximum analyte concentrations with screening-level ecotoxicity benchmarks, with the subsequent generation of hazard quotient (HQ) values. The HQ is the result of the exposure estimate divided by the benchmark. This step, which is also part of

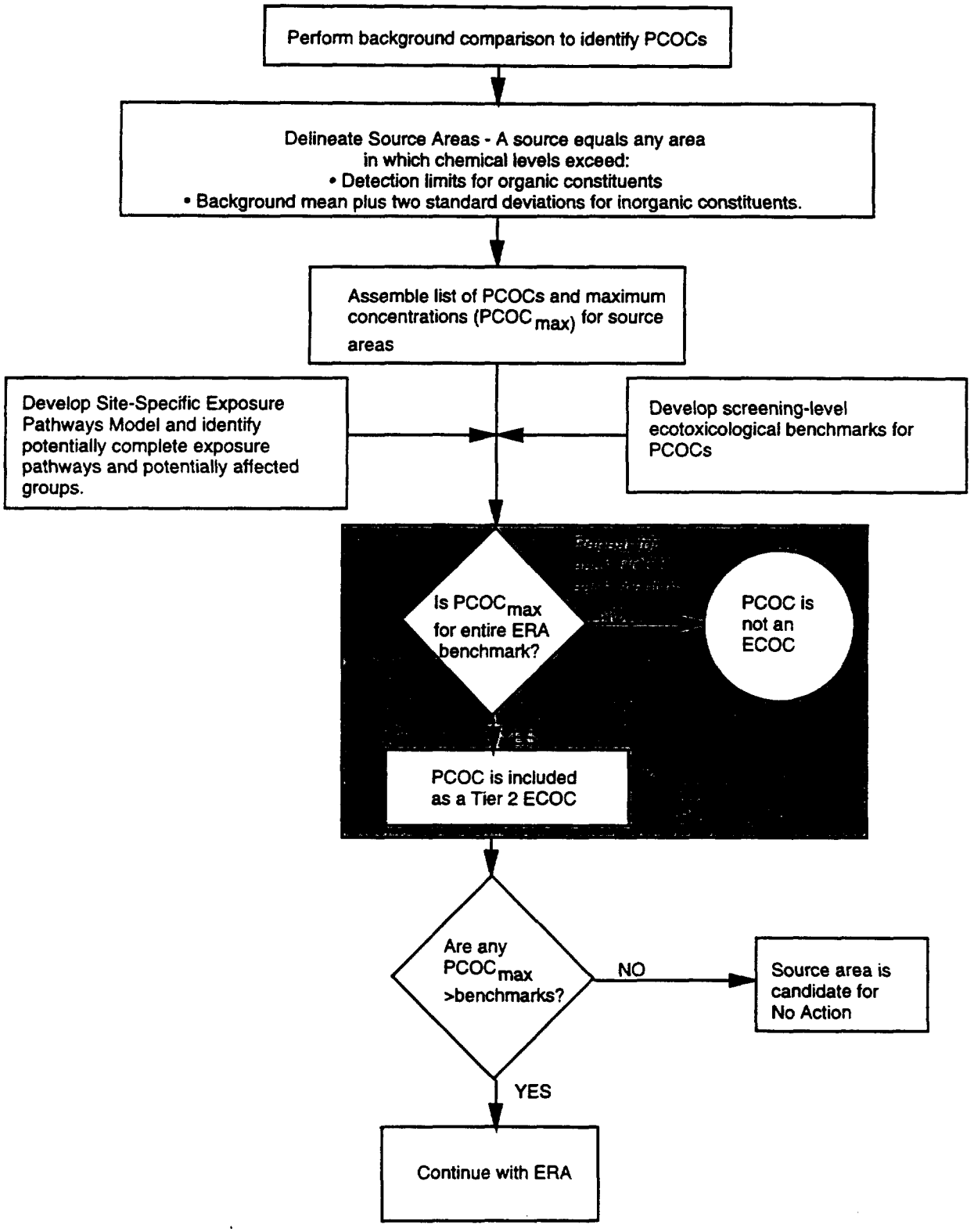


Figure 5. Screening-Level ERA

Decision Point 3 shown in Figure 2, is used to evaluate whether the site preliminary screening is adequate to determine the presence of an ecological threat (EPA, 1994).

If none of the PCOCs are present at ecotoxic concentrations, the site is considered to present a negligible or *de minimis* risk and a more detailed quantitative risk assessment is not warranted (EPA, 1994). If the HQ for a PCOC is greater than 1, then that analyte is identified as a potential ecological chemical of concern (ECOC) and is subject to further analysis. However, if HQs for each of the PCOCs for a source area are 1or below, the screen indicates that none of the PCOCs are present at potenially ecotoxic concentrations and should not be subjected to further analysis.

In summary, an IHSS or SA that fails to pass any of the screening criteria described in this section will be grouped with similar IHSSs or SAs into an AOC and will undergo a CERCLA baseline risk assessment (HHRA and/or ERA), as described in Section 2.4.

2.4 CERCLA Baseline Risk Assessment

CERCLA, as implemented by the NCP, establishes the overall approach for determining appropriate remedial actions at Superfund sites. The overall mandate of the Superfund program is to protect human health and the environment from current and potential threats posed by uncontrolled hazardous substance releases. To support this mandate, EPA developed the *Risk Assessment Guidance for Superfund* (RAGS) (EPA, 1989a and 1989b), which addresses both the human health and ecological risk assessments in Volumes I and II, respectively. Within remedial investigation reports, baseline risk assessments provide an evaluation of the potential threat to human health and the environment in the absence of any remedial action. The baseline risk assessment (BRA) therefore consists of an HHRA and an ERA.

The risk assessment methodology used at RFETS has been adapted to this site jointly by DOE, EPA, CDPHE, and EG&G from EPA guidance. RFETS guidance to the HHRA process is provided in the *Human Health Risk Assessment Methodology for RFETS* (EG&G, 1995). The methodology for conducting an RFETS ERA is based on the *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments* (EPA, 1994). Site-specific guidance for conducting ERAs is provided in *Ecological Risk Assessment Methodology for Rocky Flats Environmental Technology Site* (Vertucci *et al.*, 1995).

2.4.1 Human Health Risk Assessment Methodology

As established in Section 2.3, an AOC must undergo a BRA if it does not pass through the risk-based screen. Figure 6 briefly outlines the steps taken in conducting an HHRA, which consist of the following elements:

- Identifying chemicals of concern (COCs)
- Developing exposure scenarios
- Describing fate and transport models
- Calculating intake factors
- Conducting a toxicity assessment
- Conducting a risk characterization
- Analyzing uncertainty in the HHRA
- Documenting human health risks in the BRA.

An RFI/RI report includes both a summary of risks for a site and a list of recommendations. However, the final decisions on whether or not a site will be recommended for NFA or if a remedial action is warranted is made by the risk managers from DOE, EPA, and CDPHE, with input from the stakeholders. The following are a few guidelines in making these risk-management decisions.

1. An IHSS, AOC, or OU is a candidate for an NA or NFA decision if the carcinogenic risk estimated using the exposure factors for a residential receptor is 10^{-6} or below and the noncarcinogenic hazard index (HI) is 1 or below.

2. In terms of risk-based decision making for an IHSS, AOC, or OU, a 10^{-6} excess lifetime cancer risk level is the point of departure and remedial design goal. These areas are candidates for No Further Remedial Action decision with institutional controls if the carcinogenic risk estimated using the reasonable maximum exposure factors for the appropriate receptor (e.g., open-space recreational user, office worker, construction worker) is 10^{-6} or below and the noncarcinogenic hazard index (HI) is 1 or below. An institutional control will be required to ensure the anticipated appropriate future land use.

3. Areas clearly require remedial action where the cumulative excess lifetime cancer risks exceed 10^{-4} using appropriate receptors. If cumulative risks for an OU or the entire site are between 10^{-4} and 10^{-6}, risk management decisions must be made and may

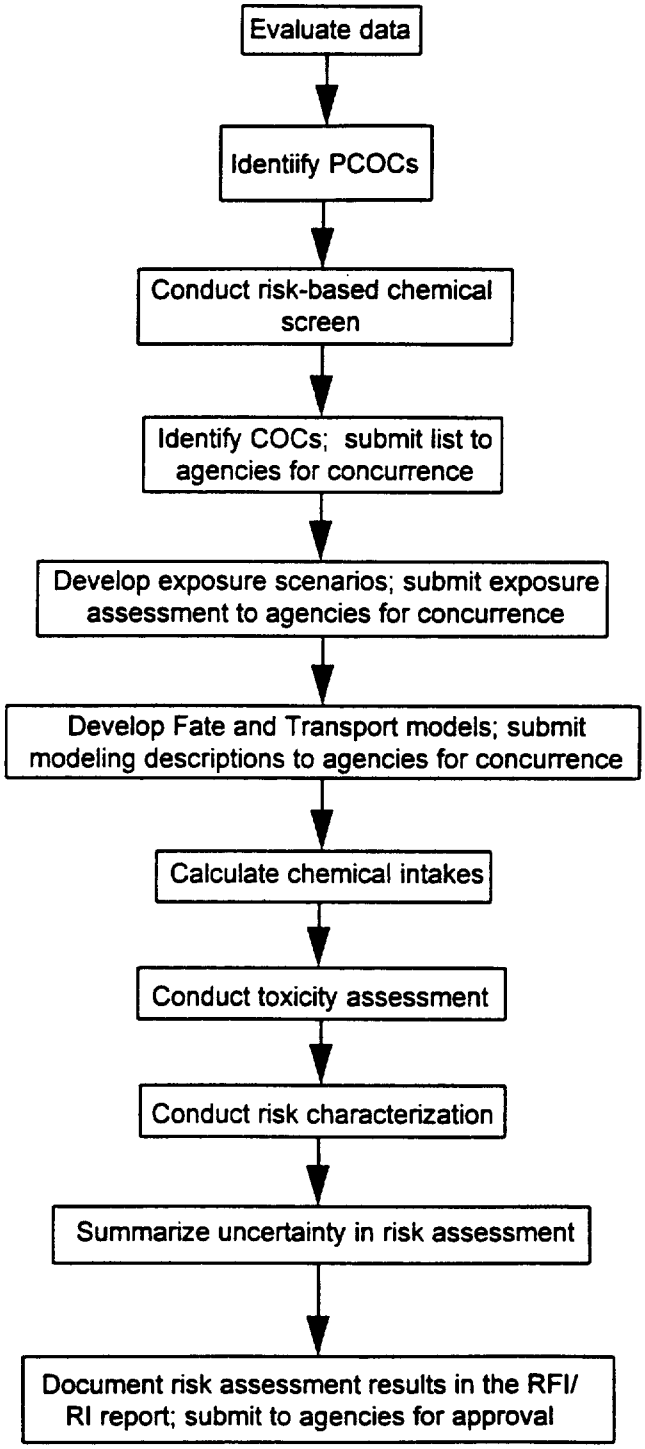


Figure 6. Human Health Risk Assessment Process

include NFA, remedial action, or risk controls such as land use designations and restrictions. DOE, in consultation with the NFA Working Group, may decide to place further remedial studies and/or closure activities on hold for a geographic area where DOE believes there is a high likelihood that no remedial action will be required. Such geographic areas may not be recommended for No Further Remedial Action until the cumulative risks are evaluated as part of the final CAD/ROD for the geographic area. No Further Remedial Action with institutional controls may be considered when the estimated carcinogenic risks are in the low end of the risk range, when the cumulative noncarcinogenic HI is less than 10 (depending on the particular toxic effects of the chemicals involved), and when neither risk managers nor stakeholders can provide nonrisk-based justification that action is warranted.

OSWER Directive 9355.0-30 (EPA, 1991b) provides guidance to support the above criteria:

> "Generally, where the baseline risk assessment indicates that a cumulative site risk to an individual using reasonable maximum exposure assumptions for either current or future land use exceeds the 10^{-4} lifetime excess cancer risk end of the risk range, action under CERCLA is generally warranted at the site. For sites where the cumulative site risk to an individual based on reasonable maximum exposure for both current and future land use is less than 10^{-4}, action generally is not warranted, but may be warranted if a chemical specific standard that defines acceptable risk is violated or unless there are noncarcinogenic effects or an adverse environmental impact that warrants action. A risk manager may also decide that a lower level of risk to human health is unacceptable and that remedial action is warranted, for example, there are uncertainties in the risk assessment results. Records of Decision for remedial actions taken at sites posing risk within the 10^{-4} to 10^{-6} risk range must explain why remedial action is warranted."

Future land use evaluations will be consistent with the Vision.

2.4.2 Ecological Risk Assessment Methodology

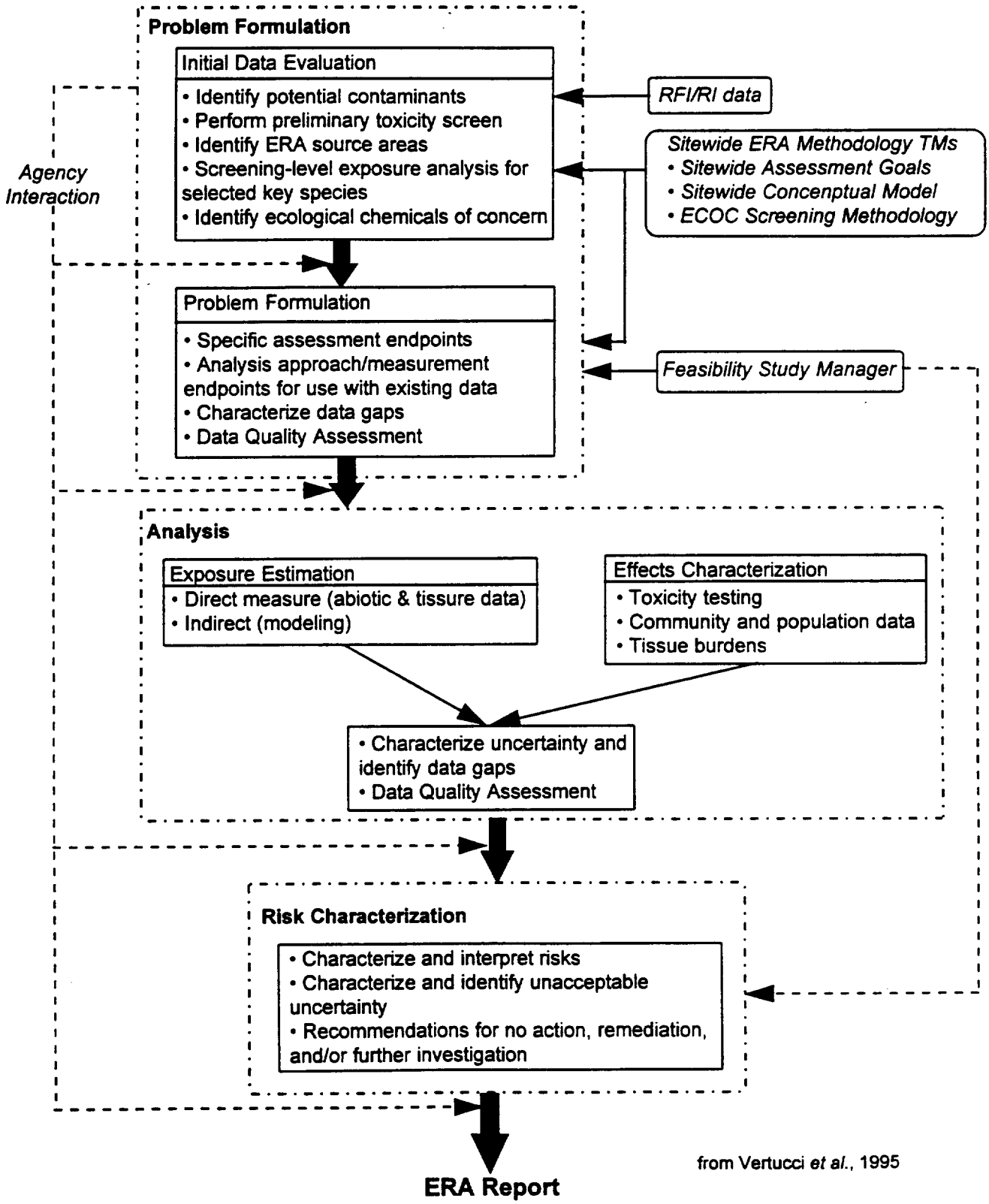
If data from a given IHSS or source fail to pass a Tier 2 ecological evaluation (HQ > 1 for any analyte), the data are evaluated using a Tier 3 ERA screen, which is basically equivalent to the concentration/toxicity screening conducted during the HHRA. A Tier 3 ERA is a much more comprehensive evaluation of exposure pathways and a more accurate method for estimating

exposure than a Tier 2 screening-level ERA. The Tier 3 exposure estimation includes methods that account for factors which modify the frequency, duration, and intensity of contact between a receptor and the contaminated media. Tier 3 evaluation results in a list of chemicals that are subjected to more detailed analysis in the ecological risk characterization.

ERA risk characterization integrates the exposure assessment and the effects assessment. It includes a description of risk in terms of the assessment endpoints, a discussion of the ecological significance of the effects, a summary of the overall confidence in the ERA, and a discussion of possible risk management strategies. Figure 7 presents the ERA process used at RFETS.

Risk characterization for each ERA study area involves quantifying exposure by using site-specific data and exposure models and comparing this exposure to dose-response information from the scientific literature. Risk characterization also involves interpretation of biological tests (e.g., toxicity tests, benthic macroinvertebrate studies) to determine any measurable ecological effects of the chemical stressors.

Risk characterization requires that different types of data be evaluated together. Balancing and interpreting the different types of data can be a major task and frequent communication between scientists from DOE, EPA, and CDPHE is essential to defensible risk characterization. Because no solid criteria exist for determining ecological risk, professional judgment will be used at this step in the NFA process. There should be agreement on the interpretation of site-specific data, the exposure assessment, the results of ecological effects studies, and the strength of the evidence linking dose-response, measured effects, and site COCs.



from Vertucci *et al.*, 1995

Figure 7. Ecological Risk Assessment Process at RFETS

3.0 NFA DECISION DOCUMENTATION

The purpose of NFA decision documentation is to provide the basis for a defined geographic area's final CAD/ROD. If circumstances, e.g., land use or risk evaluation, change between a recommendation for an NFA and the CAD/ROD incorporating the geographic area, the documentation supporting the NFA recommendation, and the NFA recommendation itself, will be reevaluated. In addition, an NFA status will have a significant impact on activities at a specific job site conducted prior to a CAD/ROD. Therefore, an efficient mechanism for implementing NFA decisions will provide both long- and short-term benefits. The process was selected for communicating NFA decisions is through updates to the HRR. It is anticipated that the HRR will be maintained as part of the Rocky Flats Cleanup Agreement.

Among other purposes, these updates serve as a basis for issuing soil disturbance permits, obtaining waste determinations, and determining the appropriate level of personal protection equipment for work in an IHSS. Therefore, the HRR updates were selected for recommendations on NFA decisions, tracking IHSS status, and communicating IHSS information (e.g., information for waste determinations required by EPA and CDPHE). The HRR update format includes a description of the release event, complete physical and chemical descriptions of the constituents released, responses to the events, fate of the constituents released, and a reference section. Additionally, signature lines for DOE, EPA, and CDPHE concurrence are provided in the HRR updates. The process for updating the HRR has been developed through negotiations and document reviews from DOE, EPA, and CDPHE.

A recommendation for an NFA decision for a geographic area is presented to DOE, EPA, and CDPHE as an update to the HRR. Documentation justifying the NFA decision must accompany an NFA recommendation to support the HRR update, and ultimately, a CAD/ROD determination. Characterization of sites, including the evaluation of data to determine risk, is usually included within RFI/RI reports. For those sites evaluated within an RFI/RI Report or a Letter Report (i.e., for those IHSSs that pass the CDPHE conservative screen), additional NFA justification documentation is not necessary and the supporting documentation will be incorporated into the HRR update by reference, or appended, as necessary. For those sites not evaluated as part of an RFI/RI, NFA justification must be prepared to present an evaluation of existing information and data to support a scientifically and legally defensible NFA recommendation. This supporting documentation, which may include a CDHPE conservative screen will be included in the HRR update as an attachment or appendix.

NFA justification documentation is prepared to support NFA recommendations on IHSSs for which a (1) source evaluation has determined no current or potential threat exists, (2) background comparison has indicated no current or potential threat of a contaminant source, and (3) future screening-level risk evaluation has indicated no risk, or risk within acceptable levels, is present. Depending upon the IHSS being evaluated, supporting documentation will vary in the type, quantity, and quality of information and data. The NFA working group must determine whether or not available data are necessary and sufficient to perform a given process evaluation that must be made for each site. Appropriate guidance (e.g., EPA/CERCLA, CDPHE/CHWA) is available to help determine if necessary and sufficient data are available to perform background comparisons and/or a risk-based screening of chemicals. An evaluation of data quality should be performed prior to using data and the results of that evaluation should be included as part of the documentation to ensure that the data quality objective process (generally presented in the OU work plan or sampling and analysis plan) is used during the investigation and documented properly.

An example of the types of information to be included as backup information is presented in Table 1. This sample table of contents can be modified, as necessary, to meet site-specific needs. It is also intended that all justification documentation be as brief as possible, including only the necessary and sufficient information required to support a scientifically and legally defensible recommendation.

The NFA decisions recommended in the HRR updates are intended to be "place keepers". An IHSS can be placed on hold until the NFA working group agrees, or another appropriate body, that initiating the administrative process (Proposed Plan, Closure Plan, CAD/ROD, RCRA Permit Modification, etc.) for IHSS closure is beneficial. Geographic areas placed on hold by DOE, in consultation with the NFA Working Group, may be recommended for No Further Remedial Action after the cumulative risks are evaluated for the final CAD/ROD for a geographic area for which the estimated carcinogenic risks are in the low end of the risk range, the cumulative noncarcinogenic effects are less than 10 (depending on the particular toxic effects of the chemicals involved), and neither risk managers nor stakeholders can provide nonrisk-based justification that action is warranted.

The administrative process under CERCLA would be initiated with the preparation of a Proposed Plan, which may recommend closure of several IHSSs in one CAD/ROD. Proposed

Table 1
Generalized Information Requirements for NFA Justification Documentation

1.0 INTRODUCTION
- 1.1 Purpose of Document
- 1.2 Background Information

2.0 FIELD INVESTIGATION
- 2.1 Site Investigation Objectives, including data quality objectives
- 2.2 Site History and Available Data
- 2.3 Investigation Activities
- 2.4 Data Quality and Usability

3.0 PHYSICAL CHARACTERISTICS
- 3.1 Surface Features
- 3.2 Geology
- 3.3 Hydrogeology
- 3.4 Ecology

4.0 NATURE AND EXTENT OF CONTAMINATION
- 4.1 Source Evaluation
- 4.2 Site Conceptual Model
- 4.3 Background Comparison
- 4.4 Nature and Extent of Contamination

5.0 EVALUATION OF RISKS
- 5.1 Risk-based Screening of Chemicals
- 5.2 Summary of Baseline Risk Assessment

6.0 NFA JUSTIFICATION

7.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

8.0 REFERENCES

LIST OF TABLES
LIST OF FIGURES
LIST OF APPENDICES

Plans can be developed for individual sites, groups of sites, OUs and unrelated sites, depending upon the timing or benefit of any given closure or closures being pursued.

For IHSSs that have interim status under RCRA, substantive requirements should be included as part of an IM/IRA for public comment. However, for NFAs, an IM/IRA should not be required and a Proposed Plan will suffice. In this situation, modification of the CHWA Permit for Rocky Flats will proceed as a separate process after the CAD/ROD is adopted. For interim status units (e.g., IHSSs), RCRA Clean Closure Certification by an independent engineer is a requirement for NFA.

It is noted that in cases where IHSSs overlap, both IHSSs must meet the NFA criteria in order for closure of their respective geographical area to be pursued via the administrative process described above. The NFA status of an overlapping IHSS may still be documented with an HRR update, but the IHSS must be identified within the HRR update as overlapping with another IHSS which has or has not been accepted as having NFA status. This process will ensure that the area of IHSS overlap is still considered when the HRR is utilized for soil disturbance permits, waste determinations, personal protective equipment, and so forth. In addition, HRR updates can continue as required by the IAG and geographical areas may ultimately be closed.

4.0 REFERENCES

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Rocky Flats Future Site Working Group, 1995. *Rocky Flats Future Site Working Group Recommendations for Rocky Flats Environmental Technology Site.* Prepared for Rocky Flats Local Impacts Initiative, DOE RFFO, CDPHE, and EPA. (July)

U. S. Department of Energy (DOE), 1993. *Final No Further Action Justification Document for Rocky Flats Plant Low-Priority Sites (Operable Unit 16).* Prepared for DOE Rocky Flats Field Office by EG&G Rocky Flats, Inc., Golden, CO. (October)

DOE, 1994a. *Letter Report on the Colorado Department of Public Health and Environment Source Area Delineation and Risk-based Conservative Screen and the Environmental Protection Agency Areas of Concern Delineation for the Human Health Risk Assessment for Woman Creek Priority Drainage Area (Operable Unit No. 5), Rocky Flats Environmental Technology Site.* Rocky Flats Environmental Technology Site, Golden, CO. (November 28)

DOE, 1994b. *Letter Report on the Colorado Department of Public Health and Environment Source Area Delineation and Risk-based Conservative Screen and the Environmental Protection Agency Areas of Concern Delineation for the Human Health Risk Assessment for Walnut Creek Priority Drainage Area (Operable Unit No. 6), Rocky Flats Environmental Technology Site.* Rocky Flats Environmental Technology Site, Golden, CO. (October)

DOE, 1995a. *Human Health Risk Assessment Methodology for RFETS (Draft).* Prepared for DOE Rocky Flats Field Office by EG&G Rocky Flats, Inc., RF/ER-95-0088, Golden, CO.

DOE, 1995b. *Ecological Risk Assessment Methodology Technical Memorandum No. 2, Site-wide Conceptual Model (Draft Final).* Prepared for DOE Rocky Flats Field Office by EG&G Rocky Flats, Inc., Golden, CO. (March)

DOE, 1995c. *Ecological Risk Assessment Methodology Technical Memorandum No. 3, Ecological Chemicals of Concern (ECOCs) (Draft Final).* Prepared for DOE Rocky Flats Field Office by EG&G Rocky Flats, Inc., Golden, CO. (April)

U.S. Environmental Protection Agency (EPA), 1989a. *Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A) (Interim Final).* Office of Emergency and Remedial Response, EPA/540/1-89/002, Washington D.C. (December)

EPA, 1989b. *Risk Assessment Guidance for Superfund, Volume II: Environmental Evaluation Manual (Interim Final)*. Office of Emergency and Remedial Response, EPA/540/1-89/001, Washington D.C. (March)

EPA, 1991a. *Guide to Developing Superfund No Action, Interim Action, and Contingency Remedy RODs*. Office of Emergency and Remedial Response, Quick Reference Fact Sheet 9355.3-02FS-3, Washington D.C. (April)

EPA, 1991b. *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*. OSWER Directive 9355.0-30, Washington, D.C. (April 22)

EPA, 1992. *Guidance on Preparing Superfund Decision Documents (Preliminary Draft)*. Office of Emergency and Remedial Response, Directive 9335.3-02, Washington D.C. (January)

EPA, 1994. *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments (Review Draft)*. Environmental Response Team, Edison, NJ. (September 26)

EPA, Undated. *Record of Decision Checklist for No Action.*

Vertucci, F.A., Lavelle, B., Lewis, M., Love, J., and Wickstrom, M., 1995. *Ecological Risk Assessment Methodology for Rocky Flats Environmental Technology Site.* IN: Proceedings for ER '95, Denver, CO. (August 13-17)

ATTACHMENT 7

LIST OF REPOSITORIES

List of Repositories

Rocky Flats Reading Room
Front Range Community College Library
3645 W. 112th Avenue
Westminster, Colorado 80030
(303) 469-4435

Colorado Department of Public Health and Environment
Rocky Flats Reading Room
c/o RFCA Project Coordinator
Hazardous Materials & Waste Management Division
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530
(303) 692-3367
(800) 886-7689

U.S. Environmental Protection Agency, Region VIII
Superfund Records Center
999 18th Street
Denver, Colorado 80202-2466
(303) 312-6473

ATTACHMENT 8

REGULATORY MILESTONES

RECEIVED

2003 DEC 18 P 2:00

CORRESPONDENCE CONTROL

Colorado Department of Public Health and Environment

December 11, 2003

Mr. Joseph A. Legare
Assistant Manager for Environment and Stewardship
U.S. Department of Energy, Rocky Flats Field Office
10808 Highway 93, Unit A
Golden, Colorado 80403-8200

Dear Mr. Legare:

Given the dramatic and successful progress that is being made at Rocky Flats towards meeting the December 2006 closure date, the Colorado Department of Public Health and Environment and the U.S. Environmental Protection Agency believe that updating rolling Earned Value milestones to cover FY2004, FY2005, and FY2006 is an exercise that has become dated. With the site ahead of schedule relative to the Closure Baseline established in 2000, most of the FY2004 Earned Value milestones that were established in our letter dated September 23, 2002 were met before the start of the current fiscal year. Therefore, the agencies are choosing to forego establishment of rolling Earned Value milestones this year. If the current trend of closure progress is dramatically disrupted, reestablishment of Earned Value milestones will be reconsidered next fall.

The agencies are retaining the Outyear Tier One milestones that were established in previous years for completion of key remedial and decommissioning activities. A list of these milestones is attached.

Sincerely,

Steven H. Gunderson
Colorado Department of Public Health and Environment

Mark Aguilar
Environmental Protection Agency

Cc: Dave Shelton, KH
Howard Roitman, CDPHE/HMWMD
John Swartout, Governor's Office
RF Citizens Advisory Board
RF Coalition of Local Governments
Administrative Record, T130 G
Colorado Department of Public Health and Environment
Environmental Protection Agency

Tier I Milestones for Rocky Flats
December 2003

FY05	Complete the remedial action identified in the 903 Pad IM/IRA decision document, including disposition of remedial waste by September 30, 2005.
FY 06	Complete the demolition of Bldg. 776 by October 31, 2006.
FY 07	Complete D&D of Building 371 by October 31, 2007.
FY07	Complete shipments of all TRU waste from Rocky Flats by December 15, 2007.
FY07	Complete all Individual Hazardous Substance Sites remedial actions, not including operations and maintenance, by December 15, 2007.

ATTACHMENT 9

BUILDING DISPOSITION

ELECTRONIC COPY

BUILDING DISPOSITION

PURPOSE

The purpose of this attachment is to define the process for building disposition, the standards for final building disposition, and process for waste management for waste generated for building disposition.

DEFINITION

Building disposition is defined as the sequence of activities required to take a building/facility from its existing condition to final disposition. In this attachment, the term "building disposition" is used to describe the entire process, and to avoid confusion with the preexisting meanings of Deactivation and Decommissioning terms in Department of Energy and Nuclear Regulatory Commission parlance. As used in this Attachment, "building" may refer to entire buildings, to portions of buildings, or only to structures, systems, or components within buildings.

BUILDING DISPOSITION APPROACH

CHARACTERIZATION PROGRAM. A reconnaissance level characterization will be made to establish a preliminary estimate of the type of contamination or safety hazard present. All buildings and facilities at RFETS will have this preliminary characterization. The type and tractability of radiation and hazardous substances contamination, and physical hazards will be evaluated. Additional surveys to characterize contamination, as well as physical safety hazards, will be conducted throughout the disposition process.

SITE BUILDING DISPOSITION BASELINE. The characterization program provides the planning data base needed for estimating and scheduling the work required for disposition. A multi-year building disposition baseline will be developed, including estimates of resource needs. The building disposition baseline will be included in the Site-Wide Integrated Baseline.

OVERALL APPROACH. Unless building specific conditions otherwise warrant, the activities denoted below will be performed in each building:

a) containerized waste and material removed;
b) liquid waste and processing systems drained;
c) RCRA units closed or have a closure plan integrated with building disposition plan;
d) all TRU waste, defined as materials in excess of 100 nanocuries per gram, removed;

e) equipment, piping, ducts, gloveboxes, and major electrical components removed (i.e. strip out);
f) radioactive hot spots and hazardous substances removed; and
g) easily removed contamination removed.

As part of the building disposition process, consideration will be given to maximizing reuse and recycling of salvageable material, when economically feasible. Different areas within a single building can be at different phases in the disposition approach, e.g., one room can be undergoing deactivation, while the rest of the building is in post-deactivation. For those buildings where SNM activities never took place, the disposition process will begin with post-deactivation.

GENERAL PROCEDURES. General procedures are being developed for the entire site that will describe actions for building disposition and will include RFCA standard operating protocols (RSOPs). The building disposition process will define decision making criteria and how RSOPs will be applied. The RSOPs will provide a detailed description of each work activity. Buildings determined at the time of the reconnaissance level characterization to have significant contamination or hazards will need building-specific disposition plans. For buildings determined at the time of the reconnaissance level characterization to be free of significant contamination or hazards, decontamination will be conducted under the general procedures codified in the Decommissioning Program Plan. When the Final Survey Report is accepted, the building will be available for reuse or dismantlement. Any building determined at the time of the reconnaissance level characterization to be free of contamination will go directly to reuse or dismantlement.

DECOMMISSIONING OPERATIONS PLANS. A Decommissioning Operations Plan will be developed for any building found as a result of its characterization to have significant contamination or hazards. The Decommissioning Operations Plan will present an activity- based program to decontaminate the locations identified in that building's preliminary characterization study as contaminated or presenting a physical hazard. Any proposals for cleanup of a building will include a risk, economic, and engineering assessment.

STANDARDS FOR BUILDING DISPOSITION

NEW REGULATIONS PROPOSED. The federal agencies (DOE, EPA and NRC) involved in radiation protection of the public and the environment have been developing new regulations for decommissioning. The three agencies recognize the need for consistency in the regulations that they are developing. A joint working group has been in existence for several years. In public discussion and in written status reports, the agencies continue to promise this consistency.

BUILDING RADIATION CLOSURE STANDARDS. It is DOE's intention to follow

EPA's preliminary regulation that calls for an effective dose equivalent (EDE) of 15/75[1] mrem from the site in any single year above background. This means: (1) Conduct remediation so that, after completion of the remedial action, radioactive material in excess of background radiation levels shall not exceed concentrations that could cause any reasonably maximally exposed member of the public to receive, through all potential exposure pathways, an EDE of 15 mrem from RFETS in any single year. The 15 mrem will be calculated using exposure scenarios that are consistent with the land uses contemplated in the Rocky Flats Vision; and (2) Determine that the remediation provides a reasonable expectation that, for 1000 years after completion of the remedial action in the event of failure of the active control measures, radioactive material in excess of background radiation levels shall not exceed concentrations that could cause any reasonably maximally exposed member of the public to receive, through all potential exposure pathways, an EDE of 75 mrem[1] from RFETS in any single year. Once this EPA Site Remediation Regulation is promulgated as final, RFFO will modify its programs if necessary to comply with the requirements of the final regulation.

For a building to be released for unrestricted use, it would need to meet the 15 mrem annual dose equivalent to the maximally exposed member of the public as estimated using appropriate analysis techniques; or have control measures providing that level of protection in place consistent with its use. The Parties have agreed to follow the procedures defined in DOE Order 5400.5 for free release of equipment. (These are the same procedures contained in the proposed 10 CFR 834 for release of equipment.) They are consistent with commercial nuclear power industry practice.

AREAS OF RADIOACTIVE CONTAMINATION. The parties agree to work together to establish measurement procedures to determine what areas of radioactive contamination will be decontaminated after strip out of a building is complete. The goal will be two fold: to reduce the residual radiation and to do so by an approach that minimizes the amount of waste generated. All building disposition practices will minimize the risk potentially associated with radiological exposure and all radiological exposures are to be balanced against economic and social factors producing a positive net benefit to the worker, general public, and the environment. The parties have agreed that all TRU waste will be isolated and removed from the buildings. TRU waste is a material having activity greater than 100 nCi/gm based on average bulk volume.

After strip out, further characterization of radioactive areas will be undertaken, where necessary. An evaluation will be made of technically applicable decontamination methods. As part of this evaluation, the type of waste expected to be generated and the cost of its treatment, storage and/or disposal will be estimated as well as the cost of required

[1] EPA has revised the 75 mrem to 85 mrem dose limit in its preliminary rule at 40 CFR 196. This attachment will be modified when the rule is final.

engineering and personal protective systems.

HAZARDOUS AND TOXIC SUBSTANCE CONTAMINATION. Measurement techniques will be selected for estimation of residual hazardous substances after strip out. The thrust will be to identify areas of fixed contamination which will need to be segregated during demolition in order to minimize waste generation volume and management cost for treatment and/or disposal. The techniques to remove identified areas of hazardous contamination will be included in building specific disposition plans. In buildings where the decision is made to forego the preparation of building specific disposition plans, hazardous contamination will be dealt with on a task order basis, with application of known well-tested technology.

WASTE MANAGEMENT

WASTE ACTIVITIES. When the disposition process is carried out in an individual building, the waste generated will be segregated by type: radioactive, mixed, hazardous, or sanitary. If the particular type of waste is planned to be disposed of off site in the near term, then the waste should be packaged to meet the waste acceptance criteria of the off site facility. The determination of whether a generated waste is TRU, will be made by assaying the container after packaging and establishing its activity on a weight basis. The waste determination for low level waste will be made based on the presence of radiation in the material before its removal. Attention will be given to waste minimization, in this case, the effort will be to remove the areas of radiation contamination, while segregating the contamination from the bulk (uncontaminated) material.

Should the decision be made to store the waste on site in an interim storage facility, the waste acceptance criteria would again be set based on the planned interim storage. If the waste is to packaged (containerized) at the point of origin for later shipment, the procedure for waste packaging will be established to conform to that requirement

Reuse or solid waste designations will be made for equipment that passes the free-release criteria and meets government surplus requirements. Hazardous waste determinations will be made based on applicable RCRA requirements.

ATTACHMENT 10

RCRA/CHWA CLOSURE FOR INTERIM STATUS UNITS

ELECTRONIC COPY

RCRA/CHWA Closure for Interim Status Units

I. For closure of the Solar Evaporation Ponds (IHSS 101) and the Present Landfill (IHSS 114), which are both subject to RCRA/CHWA interim status requirements, and which will be closed in-place, DOE must, at a minimum:

A. Place a cap/cover over the unit using two design criteria:
   1. "design concentration limits (DCLs)" calculated to be protective of the most directly impacted surface water using the water quality standards listed in Table 1 of Attachment 5.
      - DCLs would be calculated on a unit-specific basis for ground water passing the downgradient unit boundary. Since closure remedies must last beyond the period of active remediation, DCLs would be back-calculated from the surface water quality standards listed in Table 1 of Attachment 5.
      - DCLs assume an ongoing release from the unit, but at levels that are protective of human health and the environment, consistent with the RFETS Vision.
      - DCLs, as a cap/cover design criteria for closure, will be presented within the appropriate decision documents.
   2. For units with existing ground water contamination, the cap/cover must be designed to control any remaining source to the extent that further contaminant contribution to the plume from the unit is not capable of enlarging the plume or increasing contaminant concentrations within the plume. The parties recognize that existing plumes may continue to migrate or expand independent of continued source contamination loading. As a design criteria for a cap/cover, the unit/source must have its rate of continuing release controlled to the extent necessary to prevent enlarging the plume or increasing contaminant concentrations.

B. After the cap/cover has been installed, points of compliance (POCs) for each unit will be determined. The POCs will generally be at the unit boundaries, but may:
   1. utilize existing monitoring wells to the greatest extent possible, and
   2. utilize "waste management areas" (see CHWR, Section 264.95(b)(2)). For the Solar Ponds, the waste management area would be the area prescribed by a line circumscribing all five surface impoundments, including the area covered by the outermost berms of each. For the Present Landfill, the waste management area would be the entire area in which waste has been placed. If waste management areas are used, POCs may be chosen at the downgradient limit of the area rather than the downgradient limit of each individual unit.

C. At the POCs, compliance would be based on:
   1. non-exceedance of "alternate concentration limits (ACLs)" at units/areas with either no ground water contamination or levels of contamination less than the ACLs.
   2. Generally declining contamination levels for units/areas with pre-existing ground water contamination levels greater than the ACLs (this assumes placement of a DCL cap/cover is in place).
   3. As with DCLs, ACLs would be calculated on a unit/area specific basis for ground water passing the POCs. Since closure remedies must last beyond the period of active remediation, ACLs would be back-calculated from the surface water quality standards listed in Table 1 of
   4. Attachment 5 so as to be protective of the most directly impacted surface water. To the extent that points of compliance are unit boundaries, the ACLs should equal the DCLs for those units. ACLs may be different from the DCLs when several units have been consolidated within a waste management area.

5. The POCs and ACLs will be designated within the appropriate decision document and approved by the regulators when the decision document is approved after appropriate public review and comment.

D. Closure requirements will not extend to remediation or management of existing ground water contamination from these units except as delineated in B.2 above. Existing ground water contamination will be addressed through coordinated RCRA corrective action/CERCLA remedial action, as described in RFCA.

E. Other large-scale remedial actions taken at RFETS may enhance the ability to comply with closure requirements. For instance, units that can benefit from large-scale dewatering or ground water diversion projects may be able to demonstrate ACL compliance with a minimal non-standard cover/cap.

F. Any materials generated during implementation of a closure action that are also generated as part of a corrective action will be considered "remediation wastes" for the purpose of CAMU utilization.

G. All post-closure requirements, including monitoring, maintenance, access control, and security requirements, will be delineated in the Closure Plan, IM/IRA, or CAD/ROD decision document for the unit or waste management area.

II. To meet the RCRA/CHWA closure requirements for all other IHSSs subject to interim status requirements (portions of the former OU 9, OU 10 and OU 13 consisting of tanks, ancillary equipment, and storage pads -–See Attachment 3), DOE must, at a minimum:

A. Remove all wastes from the units.

B. If the units have not had a release, close the units and associated ancillary equipment. For the tanks and storage areas that make up this universe of units at RFETS, this should be able to be accomplished via:
   1. decontamination of the unit and any ancillary equipment, and/or

   2. removal and appropriate disposition/disposal of the unit and any ancillary equipment.

   Closure via 1. or 2. above should result in "clean" closure (i.e., no ongoing responsibility for post-closure care) and DOE may obtain complete closure certification.

C. If the units have had a release, DOE should proceed through the activities outlined II.B above. However, DOE must also remove all contaminated soil affected by the unit unless a demonstration can be made that the contaminated soil cannot practicably be removed (265.197(a)). If this demonstration can be made and soil contaminated by a release from any of these units is left in place, the unit must close as a landfill (265.197(b)). In addition, back-filling a tank and its ancillary equipment with material that effectively and permanently immobilizes any remaining contaminants would be an acceptable means of closure in place. If either contaminated soil or a back-filled tank is left in place, Section I of this attachment, including post-closure requirements, would apply. If the contaminated soils and the tank can be practicably removed and the requirements of II.B.1 or II.B.2

have been accomplished, the unit can be "clean" closed with no ongoing responsibility for post-closure care and DOE may obtain complete closure certification.

D. Closure requirements will not extend to remediation or management of existing ground water contamination from these units except as delineated in I.B.2 above. Existing ground water contamination will be addressed through coordinated RCRA corrective action/CERCLA remedial action, as described in RFCA.

E. After initially removing hazardous waste inventory from the units, all wastes generated during implementation of a closure action will be considered" remediation wastes" for the purpose of CAMU utilization.

F. All post-closure requirements, including monitoring, maintenance, access control, and security requirements, will be delineated in the Closure Plan, IM/IRA, or CAD/ROD decision document for the unit or waste management area.

III. CDPHE and DOE agree that past decisions regarding IHSSs (or portions thereof) at RFETS subject to closure requirements will be reviewed (See Attachment 3). Based upon this review, and in consideration of more complete information, it is the expectation of the CDPHE and DOE that several of these IHSSs may not be subject to interim status closure requirements.CDPHE and DOE have reviewed the information related to the Original Process Waste Lines (OPWL), IHSS 121 of former OU-9 and other IHSSs. The OPWL network originally consisted of approximately 35,000 feet of pipeline. Parts of the OPWL were converted to New Process Waste Lines, or other systems. The OPWL system now consists of approximately 29,000 feet of pipeline. A 1986 RCRA Compliance Order and CERCLA Agreement granted interim status to mixed waste units including the process waste lines that were in use at that time (NPWL) and did not include OPWL. That agreement is the reason that OPWL are not subject to interim status closure requirements.

IV. CDPHE agrees that tank system interim status units identified in Part II of this Attachment may qualify for closure in accordance with standards that are alternative to the requirements specified in Part II of this Attachment, as provided in revisions to the Colorado Hazardous Waste Regulations, 265.110 (d). CDPHE also agrees that IHSS 101 and/or IHSS 114 identified in Part I of this Attachment may qualify for closure in accordance with these alternative requirements, but more information is needed to make a determination. Because the alternative requirements in 265.110(d) will protect human health and the environment, such qualified interim status units are eligible to be closed in accordance with the performance standard in 265.111 (a) and (b) in lieu of the requirements specified in Parts I and II of this Attachment. Closure in accordance with these alternative requirements will meet the following :

A. Be protective of the wildlife refuge worker to a lifetime excess cancer risk of $1x10^{-5}$ and;

B. Provide that the concentration of contaminants do not result in a Hazard Index (HI) of greater than 1 for a wildlife refuge worker and;

C. Assure that contaminants that exceed the ecological action level for target species, listed in Table 3, Soil Action Levels, in Attachment 5 do not pose an unacceptable hazard considering the target species and the exposure unit for that species, and the location, areal extent, and concentration of contamination.

ATTACHMENT 11

LIST OF ADDRESSES

List of Addresses

Environmental Protection Agency. Region VIII
ATTN: Rocky Flats Project Manager, EPR-FF
18th Street, Suite 500
Denver, Colorado 80202-2466

RFCA Project Coordinator
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, Colorado 80246-1530

RFCA Project Coordinator
United States Department of Energy
Rocky Flats Field Office
10808 Highway 93, Unit A
Golden, Colorado 80403-8200

ATTACHMENT 12

RFCA DOCUMENTS INDEX

RFCA Documents Index

1. Site Quality Assurance Program (QAP), Rev. 1, Kaiser-Hill Company L.L.C., effective February 2, 1996; as updated.

2. U.S. Department of Energy, Historical Release Report for the Rocky Flats Plant, Volumes I and II, June 1992; as updated.

3. Existing ER Standard Operating Procedures.

4. U.S. Department of Energy, Rocky Flats Site-wide Integrated Public Involvement Plan, U.S. Department of Energy, March 1998; as updated.

5. Treatability Study Work plans listed in the Administrative Record.

6. Site Health and Safety Program Manual, EG&G Rocky Flats, Inc., (Adopted by Kaiser-Hill Company, L.L.C. in July 1995) September 30, 1995 (Or most current version).

7. U.S. Department of Energy, Final Plan for Prevention of Contaminant Dispersion, February 1992.

8. U.S. Department of Energy, Background Geochemical Characterization Report, Rocky Flats Plant, September 30, 1993.

9. Final Treatability Studies Plan, Volumes I and II, August 1991. Approved by EPA on October 22, 1991.

10. Final resolutions of previous disputes that are relevant to implementation of RFCA. The Administrative Record shall be reviewed for such resolutions, and this list will be updated accordingly.

11. U.S. Department of Energy, Rocky Flats Environmental Technology Site, Integrated Monitoring Plan FY98/FY99, October 1998; as updated.

12. U.S. Department of Energy, Decommissioning Program Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, October 8, 1998. Approved by CDPHE on November 4, 1998. Approved by EPA on November 12, 1998; as updated.

13. U.S. Department of Energy, Final Surface Water Remedial Action Objectives Technical Memorandum, August 20, 2002. Approved by CDPHE and EPA on September 17, 2002.

14. U.S. Department of Energy, Final Work Plan for the Development of the Remedial Investigation and Feasibility Study Report for the Rocky Flats Technology Site, March 11, 2002. Approved by CDPHE on March 19, 2002 and approved by EPA on March 25, 2002.

15. U.S. Department of Energy, Final 1997 Integrated Water Management Plan for the Rocky Flats Environmental Technology Site, A Working Group, February 1998 (RF/RMRS-97-078.UN).

16. U.S. Department of Energy, Rocky Flats Environmental Technology Site Natural Resource Management Policy, Rev. 0 September 30, 1998.

CAD/RODs

1. U.S. Department of Energy, Corrective Action Decision/Record of Decision, Operable Unit 1, Rocky Flats Environmental Technology Site, Golden, Colorado, February 1997. Approved March 1997.

2. U.S. Department of Energy, Final Major Modification to OU 1 881 Hillside Area CAD/ROD dated January 5, 2001. Approved February 2001.

3. U.S. Department of Energy, Corrective Action Decision/Record of Decision, Operable Unit 3, Rocky Flats Environmental Technology Site, Golden, Colorado, April 1997. Approved June 1997.

4. U.S. Department of Energy, Corrective Action Decision/Record of Decision, Operable Unit 11: West Spray Field, Rocky Flats Environmental Technology Site, Golden, Colorado, September 1995. Approved October 1995.

5. U.S. Department of Energy, Corrective Action Decision/Record of Decision, Operable Unit 15: Inside Building Closures, Rocky Flats Environmental Technology Site, Golden, Colorado, September 1995. Approved October 1995.

6. U.S. Department of Energy, Corrective Action Decision/Record of Decision, Operable Unit 16: Low Priorities Sites, Rocky Flats Environmental Technology Site, Golden, Colorado, August 1994. Approved October 1994.

Decontamination and Decommissioning (D&D)

1. U.S. Department of Energy, Building 123, Proposed Action Memorandum, Rocky Flats Environmental Technology Site, Golden, Colorado, August 1997. Approved by CDPHE on August 25, 1997.

2. U.S. Department of Energy, Final Close-out Report for Building 123 Decommissioning Project as Required by RFCA, Revision 0, September 1998. Revision 1, February 1999. Approved by CDPHE on March 10, 2000.

3. U.S. Department of Energy, B371/374 Closure Project Decommissioning Operations Plan (DOP), Rocky Flats Environmental Technology Site, Golden, Colorado, March 26, 2001. Approved by CDPHE on March 29, 2001.

4. U.S. Department of Energy, B707 Closure Project Decommissioning Operations Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, December 21, 2000. Approved by CDPHE on January 18, 2001.

5. U.S. Department of Energy, Building 771/774 Closure Project Decommissioning Operations Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, December 1998. Approved by CDPHE on January 11, 1999.

6. U.S. Department of Energy, Building 776/777 Closure Project Decommissioning Operations Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, November 3, 1999. Approved by CDPHE on November 5, 1999. The Demolition Plan for B776/777, a major modification to the DOP, was approved by CDPHE on July 1, 2003.

7. U.S. Department of Energy, Decommissioning Operations Plan for the 779 Cluster Interim Measure/Interim Remedial Action, Rocky Flats Environmental Technology Site, Golden, Colorado, February 1998. Approved by CDPHE on February 6, 1998.

8. U.S. Department of Energy, Decommissioning Closeout Report for the Building 779 Closure Project, April 1, 2000. Approved by CDPHE on January 26, 2001.

9. U.S. Department of Energy, Building 886 Cluster Closure Project Interim Measure/Interim Remedial Action, Rocky Flats Environmental Technology Site, Golden, Colorado, July 30, 1998. Approved by CDPHE on August 3, 1998.

10. U.S. Department of Energy, Closeout Report for the Building 980 Cluster, Revision 0 October 9, 1997.

11. U.S. Department of Energy, Sampling and Analysis Plan for the Decontamination & Decommissioning Monitoring of Buildings 991, 559, and 881. Approved by CDPHE on June 21, 2001.

12. U.S. Department of Energy, the Decontamination and Decommissioning (D&D) Characterization Protocol, November 20, 1998. Revision 3, April 23, 2001 approved by CDPHE on April 10, 2001.

    Note: Appendix D of this report is the Reconnaissance Level Characterization Plan, Revision 0, April 23, 2001. Approved by CDPHE on April 10, 2001.

13. U.S. Department of Energy, the Site-Wide Pre-Demolition Survey Plan, Revision 0, March 23, 2001. Approved by CDPHE on April 10, 2001.

14. U.S. Department of Energy, Proposed Action Memorandum (PAM) for Decommissioning Building Cluster 980 (B980), Revision 0, Rocky Flats Environmental Technology Site, Golden, Colorado, August 15, 1997. Approved by CDPHE on August 25, 1997.

D&D RSOPs

1. U.S. Department of Energy, RFCA Standard Operating Protocol (RSOP) for Recycling Concrete, Rocky Flats Environmental Technology Site, Golden, Colorado, September 28, 1999. Approved by CDPHE and EPA on October 18, 1999.

2. U.S. Department of Energy, RFCA Standard Operating Protocol for Facility Disposition, Rocky Flats Environmental Technology Site, August 14, 2000. Approved by EPA and CDPHE on October 5, 2000.

3. U.S. Department of Energy, RSOP for Facility Component Removal, Size Reduction, and Decontamination Activities, Rocky Flats Environmental Technology Site, Golden, Colorado, February 4, 2001. Approved by EPA and CDPHE on February 22, 2001.

ER IM/IRAs

1. U.S. Department of Energy, Final Interim Measures/Interim Remedial Action Decision Document for Rocky Flats Industrial Area, Rocky Flats Environmental Technology Site, Golden, Colorado, November 1994.

2. U.S. Department of Energy, Operable Unit 4 Solar Evaporation Ponds Interim Measures/Interim Remedial Action Decision Document, Rocky Flats Environmental Technology Site, Golden, Colorado, April 1, 1992. Approved by CDPHE and EPA on April 6, 1992.

3. U.S. Department of Energy, Interim Measures/Interim Remedial Action Plan and Decision Document, 881 Hillside Area, Operable Unit No. 1, Rocky Flats Plant, Golden, Colorado, January 1990.

4. U.S. Department of Energy, Final Surface Water Interim Measures/Interim Remedial Action Plan/Environmental Assessment and Decision Document South Walnut Creek Basin, Rocky Flats Plant, Golden, Colorado, March 1991. Approved by CDH on January 28, 1990.

   NOTE: The last two IM/IRA references (January 1990 IM/IRA for the 881 Hillside and the October 1994 IM/IRA for the South Walnut Creek Basin) were administratively combined in May 1995. CDPHE and EPA approved the consolidation of the treatment facilities in a letter dated September 14, 1995.

5. U.S. Department of Energy, Modification to the Final Surface Water Interim Remedial Action Plan Environmental Assessment and Decision Document South Walnut Creek Basin dated October 11, 1994. Approved by EPA on July 11, 1997.

6. U.S. Department of Energy, Termination of the Surface Water Interim Remedial Action Plan Environmental Assessment and Decision Document South Walnut Creek Basin dated October 1994. Approved July 28, 1998.

7. U.S. Department of Energy, Major Modification to the Interim Measures/Interim Remedial Action Plan and Decision Document, 881 Hillside Area Operable Unit No. 1, dated January 1990. Conditionally approved by EPA on August 27, 1997.

8. U.S. Department of Energy, Final Mound Site Plume Decision Document, Major Modification to the Final Surface Water Interim Measure/Interim Remedial Action Plan/Environmental Assessment and Decision Document for South Walnut Creek March 1991, Revised October 1994, Rocky Flats Environmental Technology Site, Golden, Colorado, September 30, 1997. Approved by EPA in September 1997.

9. U.S. Department of Energy, Interim Measure/Interim Remedial Action Decision Document, National Conversion Pilot Project, Stage II, Rocky Flats Field Office, Golden, Colorado, March 30, 1995.

   NOTE: Although this IM/IRA is regulated under RFCA, the IM/IRA provides that the activities conducted under the IM/IRA shall not become regulatory milestones. Further, the National Conversion Pilot Project work is funded in accordance with a Cooperative Assistance Agreement, and not though normal RFETS budget planning. The work being done under this IM/IRA ceased upon expiration of the funds provided under the Cooperative Assistance Agreement for Stage II. The IM/IRA work was not included in the Integrated Sitewide Baseline.

10. U.S. Department of Energy, Corrective Action Management Unit Interim Measure/Interim Remedial Action Decision Document and Application Support Document for Containerized Storage at the Rocky Flats Environmental Technology Site, Golden, Colorado, Final, August 1997. Approved by CDPHE on August 28, 1997.

11. U.S. Department of Energy, Corrective Action Management Unit Interim Measure/Interim Remedial Action Decision Document and Application Support Document for Bulk Storage at the Rocky Flats Environmental Technology Site, Golden, Colorado, Final, August 1997. Approved by CDPHE on August 28, 1997.

12. U.S. Department of Energy, Interim Measure/Interim Remedial Action for the Solar Ponds Plume Remediation Project, Rocky Flats Environmental Site, Golden, Colorado, June 11, 1999. Approved by CDPHE on June 11, 1999.

ER PAMs

1. U.S. Department of Energy, Proposed Action Memorandum Hotspot Removal Rocky Flats Plant Operable Unit 1, Rocky Flats Plant, Golden, Colorado, September 1994.

2. U.S. Department of Energy, Final Proposed Action Memorandum Remediation of Polychlorinated Biphenyls, Rocky Flats Environmental Technology Site, Golden, Colorado, May 1995. Approved by CDPHE on June 21, 1995.

3. U.S. Department of Energy, Proposed Action Memorandum Passive Seep Collection and Treatment System for Operable Unit 7, December 1994. Approved by CDPHE and EPA on December 8, 1994.

4. U.S. Department of Energy, Modified Proposed Action Memorandum Passive Seep Collection and Treatment System for Operable Unit 7, Rocky Flats Environmental Technology Site, Golden, Colorado, June 1995. Approved by CDPHE on June 26, 1995.

5. U.S. Department of Energy, Modified Proposed Action Memorandum Passive Seep Collection and Treatment System for Operable Unit 7, July 6, 1998. Approved by EPA on July 24, 1998.

6. U.S. Department of Energy, Final Proposed Action Memorandum for the Remediation of Individual Hazardous Substance Site 109, Ryan's Pit, Rocky Flats Environmental Technology Site, Golden, Colorado, August 24, 1995. Approved by CDPHE on August 9, 1995.

7. U.S. Department of Energy, Final Proposed Action Memorandum for the Remediation and Draft Modification of Colorado Hazardous Waste Corrective Action Section of the Operating Permit for Rocky Flats Environmental Technology Site, Golden, Colorado, October 1995. (Associated with storage and treatment of contaminated soil from expedited cleanup activities at IHSS 109, Ryan's Pit, OU 2). Revision 3, dated August 30, 2001.

8. U.S. Department of Energy, Proposed Action Memorandum Remediation for the Contaminant Stabilization of Underground Storage Tanks, Rocky Flats Environmental Technology Site, Golden, Colorado, April 6, 1996. Approved by CDPHE and EPA on May 15, 1996.

9. U.S. Department of Energy, Proposed Action Memorandum for the Source Removal at Trenches T-3 and T-4, IHSSs 110 and 111.1, Rocky Flats Environmental Technology Site, Golden, Colorado, August 24, 1995 and revised April 9, 1996. Approved by EPA on April 30, 1996.

10. U.S. Department of Energy, Final Proposed Action Memorandum for the Source Removal at the Mound Site, IHSS 113, Revision 0, Rocky Flats Environmental Technology Site, Golden, Colorado, February 3, 1997. Approved by EPA in February 1997.

11. U.S. Department of Energy, Final Proposed Action Memorandum for the Source Removal at Trench 1, IHSS 108, Rocky Flats Environmental Technology Site, Golden, Colorado, July 1997. Approved by EPA on August 27, 1997.

12. U.S. Department of Energy, Final Proposed Action Memorandum for the East Trenches Plume, Rocky Flats Environmental Technology Site, Golden, Colorado, February 4, 1999. Approved by EPA in February 1999.

13. U.S. Department of Energy, Proposed Action Memorandum for IHSS 101 and RCRA Closure of the Solar Evaporation Ponds, Rocky Flats Environmental Technology Site, Golden, Colorado, May 2003. Approved by CDPHE on May 22, 2003.

ER RSOPs

1. U.S. Department of Energy, RSOP for Soil and Asphalt Management, Rocky Flats Environmental Technology Site, Golden, Colorado, August 3, 2001. Approved by EPA and CDPHE on August 28, 2001.

2. U.S. Department of Energy, Environmental Restoration RFCA Standard Operating Protocol (ER RSOP) for Routine Soil Remediation, Rocky Flats Environmental Technology Site, January 2002.. Approved by CDPHE on January 11, 2002. Approved by EPA on March 15, 2002.

ER Sampling and Analysis Plans (SAPs)

1. U.S. Department of Energy, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June 2001. Approved by CDPHE on June 18, 2001.

2. U.S. Department of Energy, Buffer Zone Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June 2002. Approved by EPA on March 13, 2002.

ATTACHMENT 13

UST CLOSURE LETTER AGREEMENT

ELECTRONIC COPY

March 13, 1996

Mr. Mark Silverman
U. S. Department of Energy
Rocky Flats Office, Bldg 116
P.O. Box 928
Golden, Colorado 80402-0928

Dear Mr. Silverman,

The purpose of this letter is to describe how CDPHE and the Oil Inspection Section of the Colorado Department of Labor and Employment (OIS) will coordinate Rocky Flats Cleanup Agreement (RFCA) activities in the Industrial Area of RFETS that are regulated by the Colorado Petroleum Storage Tanks Act (Tanks Act).

OIS is the state agency responsible for implementation of the Tanks Act. However, pursuant to the Draft RFCA, Part 8, Regulatory Approach, CDPHE has been designated the Lead Regulatory Agency (LRA) for RFCA activities in the Industrial Area, including activities associated with implementation of the Tanks Act. Therefore, at RFETS, CDPHE will consult with OIS as described in this letter. To facilitate coordination among the parties, CDPHE, in its role as LRA, will assure that the substantive UST closure and remediation requirements are met.

All of the Underground Storage Tanks (USTs) on RFETS are owned by DOE, but are currently operated by a contractor or sub-contractor to DOE. Kaiser-Hill is overseeing the closure of 20 of the USTs, 18 of which have been and are currently being used to store diesel fuel and two of which have been and are currently being used to store gasoline.

Closure of the Tanks: Prior to closing 19 of the 20 USTs, an above-ground storage tank (AST) will be installed near the location of the USTs. Fuel in each UST will be transferred to the AST, each UST will be appropriately cleaned and then sealed with closed cell polyurethane foam. The remaining UST will be closed in place, but will not be replaced with an AST. OIS will be responsible for rendering permit decisions for any ASTs that require permits.

Assessment and Remediation of Any Tank Releases: Four of the 20 USTs are situated behind Building 331, the Site's garage (the Garage Tanks). Two of the Garage Tanks have been and are currently being used to store diesel fuel, and two have been and are currently being used to

store gasoline. An assessment of the Garage Tanks has already been conducted. The first assessment was done by CH2M Hill in 1992. This investigation was undertaken when stained soils were discovered around the fill pipes during the installation of spill and overfill prevention equipment. CH2M Hill concluded that the staining was caused by several spills that occurred prior to the area having been paved with asphalt. CH2M Hill prepared and submitted to the State a report describing those activities. Weston conducted a further assessment of the area during 1994 and 1995. Weston assessed the soil, installed four groundwater monitoring wells, twice sampled the groundwater, and prepared and submitted to the State a Site Characterization Report and Corrective Action Plan and Groundwater Monitoring Reports. The analytical results for the groundwater samples all tested non-detect for BTEX and TPH. OIS has already agreed, and CDPHE endorses, that the Garage Tanks may be closed in place without any further assessment of the soil or groundwater. This agreement includes the proper abandonment of the four groundwater monitoring wells near the Garage Tanks should DOE decide to do so.

RFCA and the RFETS Vision incorporate continuing restricted land use for the site (open space and industrial use only), and development of a Site-wide groundwater strategy. Using these aspects of RFCA and the fact that diesel constituents are not very mobile, CDPHE, DOE, and OIS agree that the following site assessment will be conducted for each of the remaining 16 tanks, all of which stored diesel fuel: One geoprobe sample will be taken on each side of each tank, as close to the tank as is possible and in the backfill, if possible. The geoprobe will be driven at least to the bottom of the original trench for each tank. A soil sample will be collected at the bottom of the fill, or at an equivalent depth if outside the backfill, or one foot above the ground water, if ground water is present above the bottom of the fill material. Each soil sample will be field tested for TPH. In addition, although there is no requirement to drive the geoprobe to groundwater, groundwater will be field tested for TPH if encountered. For any tank with sample results below 5,000 ppm of TPH, the tank may be closed in place without further remedial action.

Given the need to coordinate both the installation of the ASTs as well as the closure of each UST, CDPHE, DOE, OIS, and Kaiser-Hill agree that one closure report will be submitted to CDPHE and OIS for review when all of the USTs have been assessed that includes all tanks that meet the agreed upon 5000 ppm TPH standard. CDPHE will coordinate the review of the report with OIS, as well as any comments thereto, and will approve or disapprove the report as LRA pursuant to RFCA, Part 8, Paragraph 113(j), "Closeout Reports".

For any tank with sample results above 5,000 ppm of TPH, CDPHE, DOE, OIS, and Kaiser-Hill will meet to discuss further action to be taken, if any. On the basis of these discussions, one or more of the following actions will be taken:

1. a closure report will be submitted pursuant to the previous paragraph for each tank for which no further action is required;

2. the parties will initiate the process to revise, if necessary, the Site-wide ground water strategy;
3. a Proposed Action Memorandum (PAM) will be prepared covering all tanks for which corrective action is to be taken. This PAM will include the corrective action requirements for each tank and associated contamination, but will not need to identify utilities. CDPHE will coordinate the review of the PAM with OIS, as well as any comments thereto, and will approve or disapprove the PAM as LRA pursuant to RFCA, Part 8, Paragraph 113(k), "PAMs".

If you have any questions regarding these matters, please call CDPHE at the number below.

Sincerely,

/s/
Joe Schieffelin, Unit Leader
Federal Facilities Program
CDPHE
303-692-3356

/s/
Richard O. Piper
State Inspector of Oils
CDOLE

ATTACHMENT 14

ORIGINAL PROCESS WASTE LINES (OPWL) SUBSURFACE SOIL APPROACH

ORIGINAL PROCESS WASTE LINES (OPWL) SUBSURFACE SOIL APPROACH

The characterization and removal approach for the contaminated soil associated with reported or suspected OPWL leaks and associated valve vaults is defined below.

I. GENERAL

All OPWLs within 3 feet of the surface will be removed. Soil contaminated at concentrations above the soil action level for plutonium and americium by any leaks from OPWLs within 3 feet of the surface will be removed to a depth of 3 feet. To minimize the risk of mobilizing and transporting contaminants into subsurface soil, flushing of the OPWL lines is not anticipated or required.

A. All soils associated with OPWLs that are between 3 and 6 feet deep with reported leak locations will be directly sampled at the reported leak location to 8 feet below the surface. Approximately 27 initial sampling locations based on reported leaks between 3 and 6 feet have been identified. Sampling will consist of biased sampling directly into the soils surrounding the reported leak location. If initial sampling indicates contamination >3nCi/g plutonium, then subsequent step-out sampling will be performed. Step-out sampling will be approximately two meters on either side of the initial sampling location, perpendicular to the piping run, and between five and ten meters on either side of the initial sampling location in the direction of the piping as indicated in Table A14-1. Additional soil sampling will be designed to adequately characterize soil contamination to implement the soil risk screen in Attachment 5, "RFETS Action Levels and Standards Framework for Surface Water, Ground Water and Soils" (ALF), Figure 3, based on the initial and step-out sample results.

B. OPWL sections where leaks are suspected to have occurred between 3 and 6 feet below the surface but where specific leak locations are not identified will be characterized. Approximately 58 initial sampling locations based on suspected leaks between 3 and 6 feet have been identified. Sample locations are based on OPWL structures with higher leak potential and material of construction. The sampling strategy for Original Process Waste Line (OPWL) Leaks less than six feet deep with uncertain leak locations is based on the Operable Unit 9 Final Phase I RCRA Facility Investigation/ Remedial Investigation (RFI/RI) Work Plan Dated February 1992. Site walks and interviews were conducted under this work plan in 1994-1995. These identified sampling locations based on the rationale in the RFI/RI work plan. The same locations will be used for sampling sections of the pipeline where the exact location of the leak could not be ascertained. If initial sampling indicates contamination >3nCi/g plutonium, then subsequent step-out sampling will be performed. Step-out sampling will be approximately two meters on either side of the initial sampling location, perpendicular to the piping run, and between five and ten meters on either side of the initial sampling location in the direction of the piping as indicated in Table A14-1. Additional soil sampling will be designed to adequately characterize soil contamination to implement the soil risk screen in Attachment 5, "RFETS Action Levels and Standards Framework for Surface Water, Ground Water and Soils" (ALF), Figure 3, based on the initial and step-out sample results.

Characterization in accordance with this attachment and in accordance with the Industrial Area Sampling and Analysis Plan (IA SAP), of under building contamination (UBC), potential areas of concern (PACs), other Individual Hazardous Substance Sites (IHSSs), and areas between

C. IHSS's that are not yet characterized that overlie OPWLs will provide adequate characterization of soils for all other OPWLs. In addition, the RFETS groundwater monitoring network required by ALF Section 3.4 provides analytical data on the presence and mobility of subsurface soil column contaminants. Action determinations for groundwater contamination are made in accordance with ALF Section 3.3. Samples for OPWL will extend to 8 feet below the surface in order to quantify any remaining contamination.

If plutonium concentration is >3 nCi/g between 3 and 6 feet below the surface and the areal or volumetric extent of contamination exceeds the trigger values provided in Table A14-1,DOE shall remove radionuclide contamination to less than 1 nCi/g.

Table A14-1

Contamination Level (nCi/g)	Areal Extent Limit (m^2)	Volume Extent Limit (m^3)	Step-out Sample Locations
7	0	0	None
6	40	25	2m x 5m
5	50	31	2m x 6m
4	60	37	2m x 7.5m
3	80	50	2m x 10m

Areal or volumetric extent of contamination will be determined based on the "step-out" sampling approach described in Sections A & B and Table A14-1. An accelerated action would be triggered if plutonium contamination exceeds the values in Table A14-1 or if contamination from other contaminants of concern pose a lifetime excess cancer risk greater than $1x10^{-5}$or a Hazard Index >1.

D. An attempt will be made to perform plutonium speciation in the soil contaminated by OPWL leaks at each of 3 locations where known leaks have occurred. This will be done to determine the mobility profile of plutonium in the soil directly around the leaks.

E. DOE will remove valve vaults down to a minimum of 6 feet below the surface. Valve vaults deeper than 6 feet below the surface will be removed to the extent practicable giving due consideration to the safety of workers (there are approximately 30 total valve vaults). DOE will follow the ER RSOP Notification process for valve vault removal. Practicality is based on three aspects, listed in order of priority - safety, technical, and cost/benefit. These aspects are not necessarily independent. For example, while a condition may arise that makes removing a valve vault unsafe or not technically feasible using normal methods, safety or engineering measures could be implemented to complete the job safely. However, the cost may be prohibitive when weighed against the potential benefit to the refuge worker and the environment. Safety considerations are predominantly associated with confined spaces and working in deep excavations. Technical feasibility includes prohibitions of layback due to other structures and groundwater level. The practical approach includes the following:

1. Evaluate conditions for valve vaults deeper than 6 feet to determine if the potential benefit to the refuge worker and the environment justifies the cost. If costs do not justify complete removal, remove the valve vault to a depth of at least 6 feet.
2. Evaluate the need for grouting and back filling the remaining portion of the vault and any associated OPWLs.

F. Once an OPWL or associated valve vault is opened, and where safe and practical, the pipe will be grouted or foamed to minimize the possibility of mobilizing contamination inside the OPWL.