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TRANSMITTAL LETTER FOR MODIFIED SECTIONS TO DRAFT CLOSEOUT REPORT FOR SITE 7 ABL ROCKET CENTER WV
6/1/1999
OHM REMEDIATION SERVICES CORP.

2:01 6/1/99 479

OHM Remediation Services Corp.
A Subsidiary of OHM Corporation

June 1, 1999

Ms. Dawn Hayes
Atlantic Division, NAVFACENGCOM CODE 1823
1510 Gilbert Street
Norfolk, Virginia 23511-2699

RE: Draft Closeout Report-Site 7 Beryllium Landfill, Allegany Ballistics Laboratory, Rocket Center, West Virginia

Dear Ms. Hayes:

Enclosed please find one copy of the modified sections to the Draftl Closeout Report. These sections include the following:

- Table of contents (page ii)
- Section 4.0
- Section 11.0

Instructions for inserting these sections into the draft document in order to produce the final document have been included.

If you have any questions concerning this final report, please call me at (609) 588-6397.

Respectfully yours,

David E. Fulton, P.G.
Senior Project Manager

DEF/tmg

CC: John Aubert-NAVSEA SYSCOM
Tom Bass-WVDEP
Bruce Beach-USEPA
Brett Doerr-CH2MHILL
Dave Leadenham-OHM (Trenton)
Richard Matthews-ROICC
Dave McBride-Alliant Techsystems
Lou Williams-NAVSEA TECHREP
Project File

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INSTRUCTIONS FOR DRAFT CLOSEOUT REPORT

The following instructions are for replacing and inserting pages into the existing Draft Closeout Report for Site 7, Beryllium Landfill.

To assemble the report:

1) Replace Table of Contents page ii
2) Replace section 4.0 with the new section 4.0
3) Insert new section 11.0

TABLE OF CONTENTS (CONTINUATION)

4.0 SAMPLING AND ANALYSIS

All samples were collected following accepted USEPA methodologies. Analytical methods performed were from USEPA SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, July, 1994. All analytical results were reviewed and found to be acceptable.

4.1 1994 CHARACTERIZATION

Samples were collected from the walls and floor of the excavation in June 1994, and were analyzed for full Toxic Compound List (TCL) and Toxic Analyte List (TAL) analytes, as well as Toxic Characteristic Leaching Procedure (TCLP) analytes. The TCL/TAL analyses were performed on five post-excavation soil and one aqueous sample. The TCLP analyses were performed on two soil samples collected from excavated soils, plus one duplicate sample. The results of these analyses are found in Table 4.1 and 4.2 and are briefly summarized below. The original sample results can be found in Appendix A.

4.1.1 TCL/TAL (Table 4.1)

One sample was collected from each wall and the floor of the excavation. Each sample was a composite for all of the analyses except volatiles, which was submitted to the laboratory as a grab sample. Sample numbers N001, E002, S003 and W004 represent samples collected from the north, east, south and west walls, respectively, and B005 identifies the sample collected from the floor of the excavation.

1) Volatile Organic Compounds – All samples had acetone detected, although acetone was also detected in the laboratory blank analysis for the soil samples. Methylene chloride was detected in 2/5 of the soil samples and the aqueous sample. Xylenes were detected in the aqueous sample. Each of these analytes was present at concentrations less than 10 µg/kg (ppb, soil) or 10 µg/L (ppb, aqueous).

2) Semivolatile Organic Compounds – All samples had bis(2-ethylhexyl)phthalate detected at concentrations to 2820 µg/kg in soil and 9 µg/L in the aqueous sample.

3) Pesticides/PCBs – Alpha- and/or gamma-chlordane were detected in 2/5 soil samples and the aqueous sample at concentrations to 2.25 µg/kg and 0.22 µg/L, respectively. However, these compounds were also detected in the laboratory blank analysis.

4) Metals/Cyanide – No cyanide was detected in any sample. The soil samples did not contain the following metals: cadmium, selenium, silver and thallium. Four of five samples did not contain antimony and 1/5 did not contain arsenic. The aqueous sample did not contain the previous five metals, as well as chromium, copper and nickel.

The aqueous sample was numbered WW001. It was found to contain concentrations less than 10 µg/L of acetone, methylene chloride, xylenes and bis(2-ethylhexyl)phthalate. The aqueous sample did not contain antimony, arsenic, cadmium, chromium, copper, nickel, selenium, silver and thallium.

4.1.2 TCLP (Table 4.2)

Samples for disposal characterization analyses were collected from the clean rolloff (DA-001) and both contaminated rolloffs (DA-002). Sample Q-001 was a duplicate of DA-001. Chlorobenzene, chloroform, lindane, heptachlor, barium, lead and mercury were detected in at least one of the disposal samples. All TCLP target analytes concentrations were below the respective TCLP Limits for each of the three samples analyzed.

4.2 1996 CHARACTERIZATION

Contaminated, excavated soil, contained in two rolloffs left on site, was segregated into waste streams, as described in Section 3.0. Thirty-six soil and one aqueous sample were collected in September, 1996 and analyzed for full TCL/TAL, explosives and herbicides, and eight composite soil samples were collected and analyzed for mercury using TCLP extraction. A trip blank was also analyzed for TCL volatiles. The results of these analyses are found in Table 4.3 and Table 4.4 and are briefly summarized below.

4.2.1 TCL/TAL (Table 4.3)

1) Volatile Organic Compounds – Seven soil samples, the labwaste sample, and the aqueous sample contained acetone, although this was also found in the laboratory blank. Methylene chloride was detected in six samples and the trip blank at less than 10 µg/kg and 13 µg/kg in the labwaste sample. Chloroform, 2-butanone and 2-hexane were detected in the aqueous sample at concentrations of 60, 30 and 2 µg/L, respectively. The labwaste sample was found to also contain 52µg/kg of 2-butanone.

2) Semivolatile Organic Compounds – Seventeen soil samples, the lab waste sample and the aqueous sample had bis(2-ethylhexyl)phthalate detected at concentrations between 418 µg/kg and 3180 µg/kg in soil, 14300 µg/kg in the labwaste sample and 290 µg/L in the aqueous sample. The aqueous sample was also found to contain di-n-octyl phthalate (76 µg/L).

3) Pesticides/PCBs – No pesticides or PCBs were detected in any of the samples.

4) Herbicides – No herbicides were detected in any of the samples.

5) Explosives – HMX was detected in three soil samples at concentrations between 593 µg/kg and 625 µg/kg.

6) Metals/Cyanide – Cyanide was detected in 14 samples at less than 1 mg/kg in soil, 2.29 mg/kg in the lab waste sample and 14 mg/L in the aqueous sample. The soil samples did not contain selenium or sodium. Thallium was detected in one soil sample, antimony in two samples, and cadmium was detected in four soil samples. all other metals were detected in at least 2/3 of the soil samples. The aqueous smaple contained aluminum, barium, beryllium, cadmium, calcium, cobalt, copper, iron, lead, manganese, mercury, nickel, potassium and zinc.

4.2.2 TCLP Mercury (Table 4.4)

Eight composite soil samples were extracted using EPA method 1311 (TCLP extraction) and then analyzed for mercury using EPA method 7470. Mercury was determined at concentrations between 6 and 26 µg/L and averaged 15.75 µg/L, well below the 200 µg/L concentration needed to label the sample hazardous for mercury.

TABLE 4.1
Detected TCL/TAL Compounds in Soils Excavated June 1994

Sample I.D.	B005	E002	N001	S003	W004	WW001
TCL VOCs	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/L
Acetone	4.93 BJ	9.40 B	8.80 B	8.84 B	9.59 B	3.88 J
Methylene chloride	2.29 J	ND	ND	ND	2.12 J	5.29
Xylenes (Total)	ND	ND	ND	ND	ND	0.854 J
TCL SVOCs	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/L
Bis(2-ethylhexyl)phthalate	96.7 J	1040	828	1530	2820	9 J
TCL Pest/PCBs	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/L
Alpha-Chlordane	ND	ND	ND	1.96 BJ	ND	0.22
Gamma-Chlordane	ND	1.53 BJ	ND	2.25 BJ	ND	ND
TAL Metals	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/L
Aluminum	8390	1250	7590	7390	7140	2190
Antimony	ND	ND	1.9 B	ND	ND	ND
Arsenic	2.66	ND	2.38 B	2.58	2.98 B	ND
Barium	61.8	99.6	68.2	78.5	85.5	80.8
Beryllium	60.27	1.19	1.4 B	1.06	0.962	1.24 B
Calcium	7390	3720	2470	2360	2140	18400
Chromium	12	14.9	16.6	9.82	13.5	ND
Cobalt	10.2	15.2	14	8.08	12.8	4.22 B
Copper	10.7	14	11.6	7.14	6.49	ND
Iron	25400	30700	27500	17800	19500	3850
Lead	17.2	20.1	19.7	18.4	22.2	5.02
Magnesium	544	837	623	374	344	5970
Manganese	471	415	873	671	1160	116
Mercury	35.2	0.163	0.288	0.363	0.068	4.84
Nickel	9.39	16	13.9	5.85	5.5	ND
Potassium	688	844	608	520	498	1650 B
Sodium	12.5	18.5	13.9	14.8	14.7	2750 B
Vanadium	20.1	22.2	19.3	17.3	20.6	7.07
Zinc	23.9	26.7	24.4	17.2	15.4	41

TABLE 4.2
Detected TCLP Compounds in Soils Excavated June 1994

Sample I.D.	TCLP Limit	DA-001	DA-002	Q-001
TCLP VOCs	µg/L	µg/L	µg/L	µg/L
Chlorobenzene	100000	ND	ND	13.5
Chloroform	6000	ND	21.2	23.0
TCLP Pesticides				
gamma-BHC (Lindane)	400	ND	2.28	ND
Heptachlor	8	ND	3.09	ND
TCLP Metals				
Barium	100000	1030	529	418
Lead	5000	2.12	3.0	ND
Mercury	200	ND	19.3	1.61

TABLE 4.3
Detected TCL/TAL Compounds in Wrangler Boxes Sampled September, 1996

Sample I.D.	W01	W02	W03	W04	W05	W06	W07	W08	W09	W10A	W10B	W11	W12
TCL VOCs (µg/kg)													
Acetone	31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	8	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	16	ND	ND	ND	ND	17	ND	ND	ND	ND	ND	ND
Xylenes (Total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TCL SVOCs (µg/kg)													
Bis(2-ethylhexyl)phthalate	ND	ND	*429*	ND	ND	507	418	806	ND	ND	ND	ND	ND
TAL Metals (mg/kg)													
Aluminum	8320	10200	9700	9300	8470	4460	4680	4970	5330	4900	4390	5140	4650
Antimony	ND	ND	ND	ND	6.95	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	6.66	6.98	7.88	6.54	6.94	6.07	5.04	5.34	7.08	5.79	6.46	4.69	5.04
Barium	66.7	86.6	71.2	62.5	66.9	38.3	33.8	34.9	44.5	37.9	53.8	40.4	32.7
Beryllium	36.9	50.1	74.2	44.8	45.6	27.6	25.7	18.4	27.0	33.2	22.8	71	24.6
Calcium	2380	2690	2660	2430	3270	1760	1550	1360	1490	1960	1270	1530	1400
Chromium	19.7	17.8	18.1	19.5	16.6	11.4	10.1	8.94	10.8	9.99	8.73	10.6	11.2
Cobalt	16.5	18.8	15.8	11.8	15.6	8.37	7.46	7.16	9.88	8.47	10.0	7.1	6.69
Copper	16	18.4	14.5	18.4	16.5	7.55	11.2	7.11	8.77	8.59	6.74	6.99	6.75
Iron	31100	33300	31300	29700	29200	18000	16100	17100	19400	18300	17000	16800	17300
Lead	39.2	54.9	71.5	66.9	57.8	37.7	56.9	28.9	67.8	32.0	36.1	24.9	44.5
Magnesium	671	806	821	836	713	371	399	419	436	403	351	438	415
Manganese	817	1120	821	568	726	467	350	371	554	435	718	409	336
Mercury	105	272	260	161	401	123	217	116	141	113	198	77.5	143
[illegible]	13.2	16.5	15.1	14.2	13.6	7.06	11.4	7.11	8.36	7.77	6.96	7.49	7.51
[illegible]ium	898	1060	1030	983	887	446	505	450	573	494	460	544	49
[illegible]	2.24	3.02	ND	1.24	3.67	ND	ND	ND	ND	ND	1.33	ND	ND
Vanadium	25.3	25.8	23.9	24.1	24.2	13.9	12.6	12.6	13.9	13.0	12.7	12.3	12.6
Zinc	43	46.2	47.2	44.8	40.8	21.6	30.4	22.1	26.1	27.2	24.6	38.2	27.5

Sample I.D.	W13	W14	W15	W16	W17	W18	W19	W21A	W21B	W22	W23	W24	W25
TCL VOCs (µg/kg)													
Acetone	ND	ND	ND	ND	14	23	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (Total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TCL SVOCs (µg/kg)													
Bis(2-ethylhexyl)phthalate	503	3180	ND	481	ND	ND	ND	236	914	532	2890	ND	424
Explosives (µg/kg)													
HMX	ND	ND	ND	593	ND	ND	ND	ND	ND	ND	ND	625	ND
Cyanide (mg/kg)	ND	ND	ND	ND	ND	ND	ND	0.694	0.606	0.731	0.622	0.592	0.693
TAL Metals (mg/kg)													
Aluminum	5280	5070	*11500*	9170	8550	7970	8730	8460	9220	8150	10200	8360	9500
Arsenic	5.73	5.12	*8.33*	7.43	6.9	7.8	8.81	6.27	7.05	9.24	9.33	6.86	8.96
Barium	37.5	35.3	75.9	90.7	72.0	77	74.7	78.2	71.3	65.9	80.3	83.7	82.0
Beryllium	*22.1*	*34.5*	*119*	8.39	112	50.3	133	30.4	39.7	29.1	50.3	46.3	30.1
Calcium	2120	1280	4370	3050	4990	3090	3130	2850	2940	3990	3800	2980	6890
Chromium	12.3	12.5	*22.0*	23.2	19.4	17.8	16.8	20.3	18.2	17.2	19.9	19.7	20.2
[illegible]balt	*7.38*	*5.37*	*15.8*	19.4	17.2	17.6	14.0	16.2	15.2	12.7	17.7	15.3	14.1
[illegible]r	8.62	7.69	*18.4*	20.4	19.7	15.1	15.8	15.2	17.8	13.9	18.0	16.9	17.0
[illegible]	19800	18000	34000	34100	32400	33400	30700	32900	30900	30300	34600	34500	35100

TABLE 4.3
Detected TCL/TAL Compounds in Wrangler Boxes Sampled September, 1996

ple I.D.	W13	W14	W15	W16	W17	W18	W19	W21A	W21B	W22	W23	W24	W25
[illegible]	38.2	17.3	*40.9*	56.6	55.4	30.7	30.5	51.1	32.8	29.5	36.4	32.3	30.0
Magnesium	445	421	1020	76.2	687	727	700	682	745	623	854	650	776
Manganese	384	289	770	1010	803	966	804	1030	752	658	945	847	855
Mercury	246	199	*240*	520	309	229	177	204	171	82.0	159	82.5	86.0
Nickel	8.51	7.03	*17.6*	15.1	14.7	15.1	14.4	14.6	14.5	13.9	16.8	15.3	14.8
Potassium	*573*	*571*	*1140*	1040	922	996	1070	982	1050	867	1200	1030	1030
Silver	ND	ND	*2.30*	3.95	2.00	2.80	2.93	2.90	1.89	2.10	2.87	4.57	2.54
Vanadium	14.7	13.6	*27.1*	2.83	26.5	25.4	25.0	27.3	25.0	24.6	27.5	27.3	27.7
Zinc	27.6	23.0	54.5	72.4	54.6	49.2	62.4	76.3	54.6	40.8	56.0	46.9	50.6

Sample I.D.	W26	W27	W28	W29	W30	W32A	W32B	W33	DWC1	TB	LABWASTE
TCL VOCs (µg/kg)											
Acetone	ND	*15*	ND	ND	ND	14	ND	12	19	ND	244
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	30	ND	52
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	60	ND	ND
Methylene chloride	ND	ND	*7*	6	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes (Total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TCL SVOCs (µg/kg)											
Bis(2-ethylhexyl)phthalate	*420*	ND	ND	745	ND	911	1390	1590	286	NA	14300
Di-n-octylphthalate	ND	ND	ND	ND	ND	ND	ND	ND	76	NA	ND
Explosives (µg/kg)											
HMX	ND	ND	ND	ND	ND	ND	ND	607	ND	NA	ND
Cyanide (mg/kg)	0.626	0.607	ND	ND	0.702	0.685	0.726	0.706	0.014	NA	2.29
[illegible] Metals (mg/kg)											
[illegible]um	9730	12300	12900	13800	14100	10000	11100	8180	6450	NA	1360
[illegible]ony	ND	ND	ND	ND	ND	ND	ND	7.64	ND	NA	ND
Arsenic	8.76	9.24	*7.95*	7.55	7.78	8.60	8.02	9.80	ND	NA	ND
Barium	86.0	101	85.3	93.6	86.0	82.8	81.8	99.3	ND	NA	104
Beryllium	*24.7*	*15.8*	*20.2*	23.3	8.44	23.4	15.8	30.5	51.0	NA	2440
Cadmium	*0.742*	0.874	ND	1.60	ND	ND	ND	3.02	6.00	NA	1.53
Calcium	7190	3210	2900	3160	2600	2640	2850	3310	71.1	NA	1030
Chromium	19.2	23.4	*21.9*	24.5	23.4	19.5	21.8	38.6	14.0	NA	18.1
Cobalt	*18.4*	*17.6*	*15.7*	16.1	17.0	16.6	15.2	17.0	ND	NA	65.3
Copper	17.6	21.6	*17.6*	20.1	16.8	18.8	17.8	28.8	61.0	NA	15.3
Iron	35300	39900	35400	38300	35200	32800	36300	43300	29800	NA	12140
Lead	35.8	34.1	*39.9*	46.0	36.9	35.8	37.6	39.6	63.0	NA	174
Magnesium	782	1020	1030	1200	1170	750	862	698	19300	NA	ND
Manganese	1160	1070	939	838	1030	1090	896	893	348	NA	40.2
Mercury	95.5	94.7	*69.8*	67.0	17.2	54.0	72.0	179	54.0	NA	59.5
Nickel	15.7	19.9	*18.2*	21.4	18.0	15.3	16.7	20.2	ND	NA	38.2
Potassium	*1040*	*1200*	*944*	1320	1420	971	1120	901	ND	NA	9430
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND
Silver	*3.70*	*3.24*	*2.00*	2.56	3.11	3.32	2.96	4.21	ND	NA	ND
Sodium	ND	ND	ND	ND	ND	ND	ND	ND	47500	NA	ND
Thallium	ND	ND	ND	ND	ND	ND	ND	2.12	ND	NA	ND
Vanadium	27.3	30.4	*28.2*	29.8	30.5	27.4	28.7	27.0	ND	NA	ND
Zinc	57.0	51.0	66.7	57.6	44.8	52.6	60.0	58.2	394	NA	1150

Table 4.4
TCLP Mercury Concentrations in Wrangler Box Composites

Sample ID	WC1	WC2	WC3	WC4	WC5	WC6	WC7	WC8
TCLP Mercury (µg/L)	18	14	26	25	6.0	10	21	6.0

11.0 REQUEST FOR CLOSURE DOCUMENTATION

11.1 STATEMENT OF BASIS AND PURPOSE

This section presents the results and rationale for closure of the Site 7, Beryllium Landfill, at the ABL facility, located in Rocket Center, West Virginia.

The selected remedial action was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The remedial action was based on the administrative Record of Decision (ROD) for this site signed by the Navy, the State of West Virginia and the United States Environmental Protection Agency. Subsequently, a non-time-critical removal action as defined in 40 CFR Section 300.415(b)(4) was deemed appropriate for Site 7 to prevent and minimize the threat of a release and to assess the threat of hazardous substances released. Completion of the remedial action has met the Remedial Action Objectives established for the site, thus providing the justification for closure. In addition, the removal action attained, to the extent practicable, Applicable or Relevant and Appropriate Requirements (ARARs) under federal and state environmental laws, as described in 40 CFR 300.415(i).

11.2 SITE HISTORY AND ENFORCEMENT ACTIVITIES

ABL is a government-owned, contractor-operated research, development, and production facility located in Mineral County, West Virginia. Since 1943, the facility has been used primarily for research, development, and testing of solid propellants and motors for ammunition, rockets, and armaments. The facility lies between the North Branch Potomac River on the north and west and Knobly Mountain on the south and east. Site 7 is located directly south of the main administration building, Building 300, and adjacent to State Route 956.

In the early 1960s, ABL requested and obtained a permit from the State of West Virginia (permit 3324) to establish a landfill for waste disposal, specifically beryllium. ABL was conducting research on propellants containing beryllium and needed to dispose of both beryllium-containing propellants and beryllium. A small (10-feet by 15-feet by 6-feet deep) earthen pit was created, and was used intermittently in the 1960s to dispose of beryllium-contaminated waste. The work with beryllium at ABL ceased in the late 1960s.

Records documenting the material disposed of at Site 7 were not kept and identification of material disposed of in the landfill was based on conversations with personnel who were involved at the time the site was active. The following information was gathered from the personnel:

1. No beryllium-containing propellant was landfilled.

2. Beryllium-containing wastes included wiping tissues, gloves, emptied containers, and respirator cartridges which might be contaminated with metallic beryllium or beryllium oxide.

3. The total quantity of waste disposed of in the landfill was "small". The landfill was approximately 150 square feet in area and 6 feet deep. Waste was placed in the pit and covered with a few shovels of dirt.

4. A small quantity of laboratory chemicals was also placed in the landfill, however no one was able to provide information as to specific chemicals or chemical types.

The site was inspected in January 1979 and officially closed on June 28, 1979. In June 1980, the landfill was again inspected by the State of West Virginia and the facility was directed to remove the landfilled waste. The activities that followed this request are detailed below.

Initial Assessment Study

Prior to initiation of the Installation Restoration Program (IRP) at ABL, environmental investigations were conducted under the Navy Assessment and Control of Installation Pollutants (NACIP) program. The NACIP program called for two primary phases, the Initial Assessment Study (IAS), and the Confirmation Study. The Navy completed an IAS (NEESA, 1983) in 1983 to identify areas where hazardous substances, pollutants, or contaminants may exist as a result of the facilities past hazardous material storage, handling, and waste disposal operations. The IAS identified the beryllium landfill as an area where hazardous substances may exist, and reported that a maximum of 2 pounds of beryllium, which was used experimentally in the production of propellant, was buried in the pit. In addition, the IAS reported that less than 100 pounds of miscellaneous unidentified overage laboratory chemicals were disposed of in the pit in an isolated event. Soil from a nearby area was used as cover material for the pit, and 3 to 4 feet of soil cover the buried waste (NEESA, 1983).

The IAS concluded that the extent of potential groundwater contamination resulting from leaching and downward migration of beryllium and other potentially hazardous compounds is likely to be minor because of the small amounts of waste, which were disposed of in the landfill. (NEESA, 1983)

Coordination efforts with the State of West Virginia Department of Natural Resources (DNR) regarding final disposition of the material in the landfill were on going during the IAS. The IAS recommended no further action in the Confirmation Study, which was the next step in the NACIP Program.

Interim Remedial Investigation

In 1984 the Navy decided that additional information was required to assess the environmental risks posed by Site 7. The Navy conducted a Confirmation Study under the NACIP program. In 1986, the NACIP program was changed to the Navy's Installation Restoration Program (IRP) to comply with the requirements of CERCLA as amended by SARA. SARA required Federal Agencies to institute a program that followed the requirements of CERCLA along with standard Superfund policies and procedures. As a result, the Confirmation Study was re-titled to be consistent with CERCLA terminology as an Interim Remedial Investigation (Interim RI).

During the Interim RI, three test pits were excavated at Site 7. Composite samples were collected from each test pit at 0-3 feet, and from one test pit at 3-6 feet. All of the samples were analyzed for volatile organic compounds; semi-volatile organic compounds, pesticides, PCBs, metals, cyanide, phenols and EP toxicity. (Figure 2-1) The Interim RI concluded that beryllium was not a concern at the concentrations detected at Site 7. Mercury and silver were the only inorganics detected at concentrations above background levels, but the EP Toxicity test results for mercury and silver were below regulatory levels.

Remedial Investigation

In July 1992 a groundwater monitoring well was installed 15 feet downgradient of Site 7. Well 7GW1 is screened from about 10 feet to 80 feet below ground surface. Well 7GW1 was sampled on October 29, 1992 and the sample was analyzed for volatile organics, explosives, and total metals. No volatile organics or explosives were detected in the groundwater sample.

Construction Investigation

The Navy initiated an investigation to excavate and characterize the waste from Site 7 for disposal under a Removal Action. In June 1994, the material from Site 7 was excavated and placed into steel storage containers. The results from the Interim RI were used to initially characterize the material as non-hazardous.

The excavation of the Site 7 landfill was completed June 30, 1994. Excavation began at the southern end of Site 7. The soil first excavated from the site was visibly clean and contained no debris. This soil was placed into the first 20 cubic yard (yd^3) container. As the excavation proceeded north, it was visually apparent where material had been placed into the ground. The material excavated from the remainder of the site that was visibly mixed with debris was placed into two remaining 20-yd^3 containers. Small vials (2 to 3 oz.) which were partially filled with a gray-white solid substance and a dark gray solid substance were observed within the debris. Various sized laboratory bottles were also mixed within the debris. During excavation, the material was visually screened to remove a representative number of containers for further characterization of the material.

The excavation continued until the remaining soil was visibly free of containers and debris. When the excavation was complete, soil samples were collected from each of the sidewalls and the bottom of the excavation. The samples were analyzed for Contract Laboratory Program (CLP) Full Target Compound List (TCL) organics and Target Analyte List (TAL) inorganics. The analytical results of these samples are presented in Section 2.3. Analytical results from the samples were compared to USEPA Region III Risk Based Concentration (RBC) Table. This table provides chemical concentrations within a media that correspond to a fixed risk level of 10^{-6} or a hazard level of 1.0. The values in the table were used as a guideline to determine whether the excavation was complete.

Following excavation, the material in the vials was characterized as beryllium (Be) and beryllium oxide based on conversations with plant personnel. The solid gray-white material in the vials was identified as a beryllium-oxide and the solid dark gray material was identified as beryllium-powder (the marking "Be-Metal" was observed on one of the vials that was approximately 3 oz. and 1/2 full). From the two roll-off containers that contained the visibly contaminated soil, the Navy collected sufficient material to fill four (4) each one-quart containers and one (1) each 16-ounce container. This material was then shipped via overnight courier to Brush Wellman in Elmore, OH, a RCRA treatment facility for Be, to evaluate treatment options. The facility rejected the sample because it contained both a small vial containing metallic mercury (Hg) and an unidentifiable cylindrical polymer object.

The unidentifiable object was returned to ABL where it was subjected to a series of tests. Initial analytical results concluded that the object was composed of approximately 50% nitroglycerin. The remaining 50% of the material was unknown but suspected of being a type of polymer coating. A hazard analysis was completed by ABL to determine the potential hazards associated with this material. Sensitivity testing indicated that the object was reactive. Positive reactions were obtained in both the ABL friction and impact tests at relatively low testing levels. However, no reactions occurred when a 25 LB weight was dropped on the sample from a height of six feet, and the sample burned only moderately when exposed to a kerosene soaked sawdust fire. Based on the results of the tests, ignition of similar items is considered unlikely with prudent handling of the soil, and if ignited in an unconfined state, the most likely response is a moderate burning reaction.

Two composite samples of the excavated material were collected from the steel intermodal containers (one from the container with visibly clean soils and one from the two remaining containers) and analyzed for Toxicity Characteristic Leaching Procedure (TCLP). The results were negative, indicating that the waste was not a characteristic waste. The container that contained the visibly clean soils was determined to be non-hazardous and disposed of in the Arden Landfill in Washington, Pennsylvania.

11.3 SUMMARY OF SITE CHARACTERIZATION

This section summarizes available data on the physical and demographic characteristics of the site. The site characterization includes a description of the site, and the geology, hydrogeology, topography, hydrology, climate, and surrounding land use of the site. A summary of previous investigations is also included.

Geology

ABL is located in the Valley and Ridge Physiographic Province, near its western boundary with the Allegheny Plateau Province. The Valley and Ridge Physiographic Province is underlain by sedimentary rock folded and faulted during the late Paleozoic Era. More-resistant sandstones underlie ridges, and less-resistant shales and soluble limestones underlie the lowlands. Shale, limestones, and sandstones of Silurian and Devonian age underlie ABL.

Test pits excavated during the Interim Remedial Investigation indicate that Site 7 is underlain by several feet of clay. The surficial material encountered during installation of monitoring well 7GW1 (located 15 feet downgradient of Site 7), is a clayey gravel. Beneath the clay is relatively dense limestone, as indicated in drilling logs for 7GW1. Bedrock was encountered within approximately 1.5 feet of the surface during drilling.

Hydrogeology

The drilling logs from 7GW1, a 64 foot-deep groundwater monitoring well installed approximately 15 feet north of Site 7 in the Fall of 1992, indicate that limestone was encountered throughout the entire well. Bedrock was encountered within approximately 1.5 feet of the surface. During drilling, no apparent water-bearing fractures were encountered. After a number of weeks, it was discovered that water had accumulated in the borehole to a depth of approximately 30 feet from the ground surface. The groundwater flow within the limestone is confined to fractures and solution channels. The direction and rates of groundwater flow in fractured bedrock are controlled by the size, frequency, and orientation of fractures and by the hydraulic gradient. Solution-widened fractures in limestone can facilitate rapid migration of groundwater. The most likely groundwater flow direction at Site 7 is towards the North Branch Potomac River.

Topography

The most significant physiographic feature in the vicinity of ABL is Knobly Mountain. Site 7 is located on the side of Knobly Mountain at an approximate elevation of 920 feet mean sea level (msl) (USGS 7.5-minute Cresaptown, WV-MD quadrangle map). Site 7 is relatively level, and the topography surrounding the site is gently sloped to the north at approximately an 8% grade. The area immediately north of the site has a slightly greater topographic relief.

Hydrology

The predominant hydrologic feature in the vicinity of ABL is the North Branch Potomac River, which borders the western and northern sides of the facility. The elevation of the river ranges from about 655 feet msl, in the vicinity of Site 5, to about 645 feet msl at the eastern end of the facility.

Surface water from Site 7 flows northward down Knobly Mountain towards the North Branch Potomac River, which is approximately 2,000 feet downgradient of the site.

Climate

Northeastern West Virginia has a semi-humid continental climate characterized by warm summers and cold winters and an even distribution of precipitation. At Cumberland, Maryland, the closest official recording station to ABL, the average annual temperature is 53.0 degrees Fahrenheit, with an average annual precipitation of 35 inches. However, annual precipitation averages about 50 inches along the divide in western Mineral County where ABL is located. Annual evaporation averages approximately 33 inches in the vicinity of ABL. Temperature, total precipitation, and snowfall are all somewhat variable within the region due to the mountainous topography.

Surrounding Land Use

The land surrounding ABL consists of undeveloped woodland, cropland, and a limestone quarry. The property approximately 3/4 of a mile west of Site 7, on the Maryland side of the North Branch Potomac River, is primarily bottomland and is used for growing crops. A limestone quarry is approximately 3/4 of a mile south of Site 7 adjacent to State Route 956. The land east of Site 7, off of Plant 1, is divided by a mountain ridge and is undeveloped woodlands and croplands.

There are currently about 550 employees at ABL. The majority of the employees work at Plant 1, which is one-half mile from Site 7. There are no known residents within one-half mile radius of Site 7, and it is estimated that less than 50 residents live within a one mile radius. Residents on the other side of the North Branch Potomac River use groundwater as their water supply. The North Branch Potomac River is not used as a water supply in the vicinity of ABL, but may be used for recreational activities such as boating, fishing, and swimming.

Terrestrial Flora and Fauna

Terrestrial flora at ABL is predominantly woodland species. The predominant tree stand is oak-hickory-pine forest. This area was probably originally dominated by oak-chestnut forest, but cutting of large oaks and elimination of chestnut by blight has allowed hickory and pine to become established. Site 7 and the area immediately adjacent is a small open area surrounded by oak-hickory-pine forest.

The undeveloped areas within the facility support a variety of indigenous wildlife species such as white-tailed deer, woodchuck, gray fox, opossum, squirrel, raccoon, and rabbit, as well as game birds such as wild turkey and quail. The area also has a rich herpetofauna (reptiles), which include both northern and southern species at the limits of their range.

11.4 DESCRIPTION OF THE SELECTED REMEDY AND RATIONALE FOR CLOSURE

Alternative 1 was selected from the Engineering Evaluation and Cost Analysis (EE/CA), dated May 1996, and involved the screening, segregating, and sampling of approximately 36 cubic yards of material excavated in June 1994 and contained within three steel intermodal containers. The material consisted of soil and debris mixed with beryllium, mercury, and PEP (propellant, explosives, and pyrotechnics).

The goal of the non-time critical removal action was to prevent hazardous contaminants, pollutants and/or constituents from being released to or from the shallow subsurface soil media and prevent the release of hazardous contaminants, pollutants and/or constituents from the bulk storage containers. This goal corresponds to 40 CFR Section 300.415(b)(2)(iii). The specific objectives developed for this site included:

(1) Excavation of the material
(2) Restricting access to the material

(3) Characterization of the material
(4) Removal, treatment, and disposal of the material from the site.

Excavation of the material (Objective #1) was performed in June 1994. Site 7 is characterized as a small pit measuring 10 feet by 15 feet by 6 feet deep. Post excavation samples were collected from the four walls and floor and analyzed for full Toxic Compound List (TCL), Toxic Analyte List (TAL), and Toxic Characteristic Leaching Procedure (TCLP) analytes. The results (presented in Table 4.1 of the Final Report, dated June 27, 1997) indicates the concentration levels were below the industrial limits established by the EPA Region III Risk-based Criteria, dated April 15, 1998.

Objectives #2 through #4 were achieved via the implementation of soil segregation, analysis, and disposal activities described in the Final Report, dated June 27, 1997. On October 14, 1994, one roll-off containing overburden soils was disposed of at a municipal landfill. Materials in the two remaining roll-offs contained small vials of beryllium dust (Hazardous waste code P015), small vials of mercury (hazardous waste code U151), and a small piece of potentially explosive material composed of approximately 40% nitroglycerin. These two roll-offs were move to a secure location adjacent to Site 5 to evaluate segregation and disposal options. After characterization, hazardous waste streams were appropriately packaged and sent to permitted hazardous waste facilities as described in Section 5.3 of the above referenced report. The request for a closure is based on these analytical results and the limited risk to public health, welfare, and the environment of any hazardous contaminants, pollutants, and/or constituents detected at Site 7.

11.5 SUMMARY OF SITE RISKS

Described below are the risks associated with any remaining potential exposure and the long-term reliability for continued protection.

Potential exposure to remaining risks: The material from Site 7 was excavated until the soil was visibly free of containers (vials) and debris. Confirmation soil sampling of the walls and bottom of the excavation was performed and results are presented in Table 4.1 of the Final Report. The excavation was then backfilled with clean soil. The remaining TCL/TAL compounds remaining in the soil are below the EPA Region III Risk-Based Criteria for industrial limits. The potential for migration and exposure through the groundwater pathway has been significantly reduced by excavation of the material.

Long-term reliability for continued protection: Material excavation and proper disposal provided the most reliable long-term protection because the soils were removed from the facility.

In summary, the threat to human health and the environment from the Site 7 landfill has been reduced as a result of the remedial action.