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MEMORANDUM RISK SUMMARY FOR SITE 7 FORMER BERYLLIUM LANDFILL ABL
ROCKET CENTER WV
7/21/2000
CH2MHILL

Risk Summary for Site 7 (Former Beryllium Landfill)

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DATE: July 21, 2000

Introduction and Purpose

This memorandum has been prepared to evaluate the potential risks to human health and the environment from soil and groundwater beneath Site 7 (the Former Beryllium Landfill).

The analytical results for soil and groundwater from previous investigations and confirmatory samples from a removal action conducted at Site 7 were compared to regulatory screening levels (as shown in Tables 1 and 2, respectively). The following is a presentation of the constituents detected above regulatory screening levels in site media, potential ecological and human receptors that have been identified, any existing exposure pathways to the receptors, and potential risks to the receptors.

Site Background

Site 7, the Former Beryllium Landfill, is reported to be a small pit formerly used to dispose of beryllium dust and waste laboratory chemicals. Potential contaminants in site soil and groundwater prior to the removal of landfill contents in 1995 were inorganic compounds (specifically beryllium), volatile organic compounds (VOCs), and semi-volatile organic compounds (SVOCs). The location of the former landfill is southwest of Plant 1, and east of Site 5 on the western flank of Knobly Mountain. It is situated directly south of the main administration building, Building 300, and adjacent to State Route 956, as shown in Figure 1.

Nature and Extent of Contamination

Soil

During the soil removal at Site 7, five confirmatory soil samples were collected from the bottom and sides of the excavation to determine when sufficient soil had been removed. Soil samples were analyzed for Target Compound List (TCL) VOCs, SVOCs, pesticides/polychlorinated biphenyls (PCBs), and Target Analyte List (TAL) metals. The analytical results for detected constituents were compared to the U. S. Environmental Protection Agency (USEPA), Region III residential and industrial Risk-based Concentration (RBC) screening criteria and soil screening levels (SSLs), flora and fauna Biological Technical Assistance Group (BTAG) screening criteria for soil, and inorganic background concentrations. The results of this comparison are presented in Table 1.

No pesticides or PCBs were detected in the soil. Two VOCs (i.e., acetone and methylene chloride) and one SVOC (i.e., bis(2-ethylhexyl)phthalate) were detected in soil below all applicable regulatory screening levels.

Nineteen inorganics were detected in the soil samples. As shown in Table 1, 11 inorganic constituents were detected above one or more human health or ecological screening criteria. These are aluminum, arsenic, beryllium, chromium, iron, lead, manganese, mercury, nickel, vanadium, and zinc. Of these, four constituents (i.e., arsenic, beryllium, iron, and mercury) exceeded residential RBC screening levels. No inorganic constituents were detected above industrial RBC screening levels.

The concentrations of arsenic detected at the site were consistent with background soil concentrations at the facility and were within the background concentration range for the facility and State of West Virginia (from WV 60 CSR 1). In addition, arsenic was detected below BTAG screening criteria for both flora and fauna.

Mercury and beryllium were detected at concentrations above the residential RBC and background only in the soil sample collected from the bottom of the excavation. Beryllium concentrations detected in the samples collected from the walls of the excavation were consistent with background concentrations for the facility and State of West Virginia. Mercury concentrations detected in the samples collected from the walls of the excavation were slightly higher than the facility background concentration for mercury; however, they were within the background concentration range excepted by the State of West Virginia (from WV 60 CSR 1). Mercury was detected above BTAG screening criteria for flora and fauna in all samples collected. Beryllium was detected above the BTAG screening criteria for fauna in all samples.

Iron was detected in three of the five soil samples collected above the residential RBC screening criterion. Iron also was detected above BTAG screening criteria for flora and fauna in all samples collected. The concentrations of iron detected in all confirmatory samples were consistent with inorganic background concentrations for the facility and State of West Virginia (from WV 60 CSR 1).

Seven inorganic constituents (i.e., aluminum, chromium, lead, manganese, nickel, vanadium, and zinc) were detected above one or more ecological screening level only. All seven of these constituents were detected below inorganic background concentrations for the facility.

Groundwater

One groundwater monitoring well (i.e., 7GW1), screened within the bedrock aquifer, exists at the site. The well was sampled once on October 18, 1992 for VOCs, explosives, and total inorganics during the Remedial Investigation (RI). The analytical results of detected constituents were compared to RBC screening criteria for tap water and U. S. Environmental Protection Agency (USEPA) MCLs. The results of this comparison are presented in Table 2. No VOCs or explosives were detected in the groundwater. Fifteen inorganic compounds were detected in groundwater. Three inorganic compounds (i.e., aluminum, antimony, and iron) were detected at concentrations exceeding USEPA MCLs. Antimony was the only constituent detected above the RBC screening criteria for tap water. The concentration of antimony detected is flagged with a "J", indicating that the result is estimated because it was detected below the instrument quantitation limit. The detected concentrations of aluminum, antimony, and iron are consistent with expected background concentrations for groundwater

at the site and are well below their respective RBC screening levels for tap water. The concentration of beryllium detected in the 7GW1 (i.e., 0.54 $\mu\text{g}/\text{l}$) is below both RBC screening criteria for tap water (i.e., 73 $\mu\text{g}/\text{l}$) and the USEPA MCL (i.e., 4.0 $\mu\text{g}/\text{l}$). In addition, the beryllium concentration is one order of magnitude lower than the BTAG ecological screening level in fresh surface water (i.e., 5.3 $\mu\text{g}/\text{l}$).

RISK SUMMARY

The threat to human health and the environment from existing constituents in Site 7 media is considered very low because of the landfill removal activities conducted in 1994. Described below are the potential risks associated with the remaining constituent concentrations and the long-term reliability for continued protection.

Potential exposure to remaining risks: The contents of the Site 7 landfill were excavated until the soil was visibly free of containers (vials) and debris. The results of confirmatory soil sampling of the walls and bottom of the excavation were compared to industrial RBC screening criteria (USEPA, April 1995) and used to determine when the RA was sufficient. The excavation was then backfilled with clean fill soil. The TCL/TAL constituents remaining in the soil are below current USEPA industrial RBC screening levels. The potential for migration and exposure through the groundwater pathway was significantly reduced with the removal of landfilled materials.

Four inorganic constituents (i.e., arsenic, beryllium, mercury, and iron) were detected at concentrations exceeding residential RBC screening criteria (see Table 1). Arsenic and iron are considered "essential human nutrients" and the concentrations detected are consistent with background soil concentrations at the facility and with the background concentration range for State of West Virginia (from WV 60 CSR 1). Therefore, the concentrations detected in soil do not pose a significant risk to human health and the environment.

Beryllium and mercury were detected at concentrations that exceeded the residential RBC from a single soil sample collected from the bottom of the excavation (depth of six feet). These detections are an isolated occurrence that when considered collectively with the site soil would result in a human health risk that is within acceptable levels.

In terms of ecological risk at the site, a site conceptual model was evaluated to identify potential ecological receptors and pathways at the site. Based upon this evaluation, no aquatic habitats were found to occur in the vicinity of Site 7 and no complete exposure pathways currently exist at the site. The area of soil contamination was small and isolated, the waste has been removed, and there is no evidence of surface transport pathways to surrounding habitats. Transport of constituents to groundwater also is unlikely based upon the small amount of waste disposed of in the landfill, the geology at the site, and available groundwater data.

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

In summary, the threat to human health and the environment from the former beryllium landfill is very low as a result of the removal action conducted at the site.

TABLE 1
Excavation Delineation Soil Sample Analytical Results

Chemical	Screening Criteria					Sample Results					Background Levels	
	Residential RBC for Soil	Industrial RBC for Soil	SSL for transfer to groundwater	BTAG Soil Flora	BTAG Soil Fauna	B005	E002	N001	S003	W004	Facility Inorganic Background UTL ^a	State Background Concentration Range ^b
Volatile Organic Compounds (ug/kg)												
Acetone	7.8 x 10 ⁵	2 x 10 ⁷	2.5 x 10 ³	---	---	4.93 BJ	9.4 B	8.8 B	8.84 B	9.59 B	---	---
Methylene Chloride	8.5 x 10 ⁴	7.6 x 10 ⁵	19	200	200	2.29 J	ND	ND	ND	2.12 J	---	---
Semivolatile Organic Compounds (ug/kg)												
Bis(2-ethylhexyl)phalate	4.6 x 10 ⁴	4.1 x 10 ⁵	2.9 x 10 ⁶	5,008	5,008	96.7 J	1,040	828	1,530	2,820	---	---
Inorganic Compounds (mg/kg)												
Aluminum	7.8 x 10 ³	2 x 10 ⁵	---	---	1	8,390	1,250	7,590	7,390	7,140	27,976	50,000 – 100,000
Antimony	3.1	82	13	---	0.48	ND	ND	1.9 B	ND	ND	5.7	< 1 – 8.8
Arsenic	0.43	3.8	0.026	---	328	2.66	ND	2.38 B	2.58	2.98 B	15	5.9 – 13
Barium	5.5 x 10 ²	1.4 x 10 ⁴	2.1 x 10 ³	440	440	61.8	99.6	68.2	78.5	85.5	407	300 – 500
Beryllium	16	4.1 x 10 ²	1.2 x 10 ³	---	0.02	60.27	1.19	1.4 B	1.06	0.962	1.5	ND – 2
Calcium	---	---	---	---	---	7,390	3,720	2,470	2,360	2,140	67,000	400 – 2,500
Chromium ^c	23	610	42	0.0075	0.02	12	14.9	16.6	9.82	13.5	29	30 – 70
Cobalt	4.7 x 10 ²	1.2 x 10 ⁴	---	200	100	10.2	15.2	14	8.08	12.8	24	7 – 20
Copper	3.1 x 10 ²	8.2 x 10 ³	1.1 x 10 ⁴	---	15	10.7	14	11.6	7.14	6.49	37	15 – 30
Iron	2.3 x 10 ³	6.1 x 10 ⁴	---	12	3,260	25,400	30,700	27,500	17,800	19,500	46,212	15,000 – 70,000
Lead	400*	---	---	0.01	2	17.2	20.1	19.7	18.4	22.2	29	10 – 20
Magnesium	---	---	---	4,400	4,400	544	837	623	374	344	2,730	2,000 – 5,000
Manganese	1.6 x 10 ³	4.1 x 10 ⁴	9.5 x 10 ²	330	330	471	415	873	671	1,160	5,124	300 – 1,500
Mercury ^d	2.3	61	---	0.058	0.058	35.2	0.163	0.288	0.363	0.068	0.06	0.02 – 0.44
Nickel	160	4.1 x 10 ³	---	2	2	9.39	16	13.9	5.85	5.5	30	15 – 30
Potassium	---	---	---	---	---	688	844	608	520	498	1,880	8,100 – 18,700
Sodium	---	---	---	---	---	12.5	18.5	13.9	14.8	14.7	87	1,500 – 7,000
Vanadium	55	1.4 x 10 ³	5.1 x 10 ³	58	0.5	20.1	22.2	19.3	17.3	20.6	43	30 – 100
Zinc	2.3 x 10 ³	6.1 x 10 ⁴	1.4 x 10 ⁴	---	10	23.9	26.7	24.4	17.2	15.4	149	40 – 98

RBC = EPA Region III Risk-Based Concentration (4/13/00), noncarcinogenic compounds were screened using a HQ = 0.1

SSL = USEPA Soil Screening Levels, April 13, 2000 – soil migration to groundwater with a dilution-attenuation factor of 20.

BTAG = USEPA Region III Biological Technical Assistance Group screening levels (USEPA, 1995)

^a – Background concentrations derived from subsurface soil UTLs calculations (CH2M HILL, March 6, 2000).

^b – Background concentrations for the State of West Virginia based upon Shacklette & Boerngen (1984).

^c – The screening levels for Chromium IV were used to evaluate the risk for total chromium at the site.

^d – The USEPA soil screening criteria for mercuric chloride was used for mercury.

* = EPA residential lead soil action level (USEPA, December 1996).

--- = No screening criteria available

J = Estimated concentration below the quantitation limit

B = Compound detected in blank and quantity reported is not 5-10 times greater than that found in the blank

ND = Not Detected

Shading indicates that the compound was detected above the screening level but below the background level.

TABLE 2
Analytical Results of Detected Constituents in Groundwater

Constituent	7GW1 (10/92)	Tap Water RBC ^a	EPA MCL
Inorganic Constituents (mg/l)			
Aluminum ^b	0.731	3.7	0.05 – 0.2
Antimony	0.012 J	0.0015	0.006
Arsenic	ND	4.5 x 10 ⁻⁵	0.05
Barium	0.185 J	0.26	2.0
Beryllium	5.4 x 10 ⁻⁴ J	7.3 x 10 ⁻³	0.004
Calcium	126	---	---
Chromium ^{cd}	6.0 x 10 ⁻³ J	0.011	0.1
Cobalt	ND	0.22	---
Copper ^b	3.6 x 10 ⁻³ J	0.15	1.3
Iron ^b	0.52	1.1	0.3
Lead ^b	ND	---	0.015
Magnesium	11.1	---	---
Manganese ^b	0.039	0.073	0.05
Mercury ^b	9.0 x 10 ⁻⁵ J	1.1 x 10 ⁻³	0.002
Nickel	7.7 x 10 ⁻³ J	0.073	0.1
Potassium	2.91 J	---	---
Sodium	6.78	---	---
Vanadium	ND	0.026	---
Zinc	4.75 x 10 ⁻²	1.1	---

^a – Tap Water Risk-based Concentration Limits are from USEPA Region III Risk-Based Concentration Table (4/13/00), noncarcinogenic compounds were screened using a HQ = 0.1

^b – Secondary Maximum Contaminant Levels (MCLs) were used to evaluate risk for this compound.

^c – The MCL for total chromium was used to evaluate risk.

^d – The USEPA tap water RBC for chromium IV was used to evaluate risk.

--- = Screening criteria not available

Shaded areas indicate concentrations detected exceeded at least one screening value.

J – Concentration is estimated; response was below the lowest standard but greater than zero.

B – This compound was detected in an associated blank.

ND -This compound was not detected in the analysis

CECOS

Environmental Restoration FY01 Schedule¹

To enroll in any class, submit a CECOS Fax Quota Request Form to the CECOS Registrar via FAX (805)982-2918. The Quota Request Form, as well as confirmation of receipt, may be obtained by contacting the Registrar FON (805)982-2895. CECOS information and enrollment is also available on the CECOS web site listed above. Please submit registrations at least three weeks in advance to allow for adequate planning and to prevent course cancellation.

Advanced Environmental Restoration

01010 17-20 Apr 01 Port Hueneme, CA

Data Quality Objectives²

01010 23-25 Apr 01 Charleston, SC
01020 TBD San Antonio, TX

Ecological Risk Assessment

01010 05-07 Dec 00 Washington, DC
01020 13-15 Mar 01 San Diego, CA
01030 28-30 Aug 01 Charleston, SC

Environmental Geographic Information System (GIS)

01010 22-23 San Diego, CA 24-25
Jan 01 Jan 01
01020 18-19 Charleston, SC 20-21
Jun 01 Jun 01

Geostatistics

Environmental Negotiation Workshop

01010 14-16 Nov 00 Puerto Rico
01020 12 -14 Dec 00 San Diego, CA
01030 27-29 Mar 01 Charleston, SC
01040 24-26 Apr 01 San Antonio, TX
01050 31Jul -2 Aug 01 Guam
01060 TBD ISEERB

Environmental Risk Assessment and Management

01010 28-30 Nov 00 San Diego, CA
01020 10-12 Jul 01 Washington, DC
01030 TBD ISEERB Location

Health and Environmental Risk Communication

01010 30 Jan-1 Feb 01 Norfolk, VA
01020 10-12 Apr 01 Puerto Rico
01030 05-07 Jun 01 Jacksonville, FL
01040 24- 26 July 01 Guam
01050 14-16 Aug 01 San Diego, CA
01060 TBD ISEERB Location
01070 TBD ISEERB Location

Managing Environmental Quality Assurance

01010 26-27 Apr 01 Charleston, SC
01020 TBD San Antonio, TX

Remedy Selection and Closure

01010 28-30 Nov 00 Charleston, SC
01020 15-17 May 01 San Diego, CA
01030 05-07 Jun 01 Philadelphia, PA
01040 TBD ISEERB Location

HAZWOPER – Site Workers

01010 05-09 Mar 01 Washington, DC
01020 07-11 May 01 Honolulu, HI
01030 18-22 Jun 01 San Diego, CA

HAZWOPER – Refresher

01010 06 Feb 01 San Diego, CA
01020 01 Mar 01 Washington, DC
01030 02 Mar 01 Washington, DC
01040 02 Apr 01 Norfolk, VA
01050 03 Apr 01 TBD
01060 09 Apr 01 Philadelphia, PA
01070 17 Apr 01 Puerto Rico
01080 04 May 01 Lemoore, CA
01090 14 May 01 Honolulu, HI
01100 15 May 01 Honolulu, HI
01110 16 May 01 Honolulu, HI
01120 17 May 01 Honolulu, HI
01130 18 May 01 Silverdale, WA
01140 21 May 01 Philadelphia, PA
01150 23 May 01 Charleston, SC
01160 07 Jun 01 Charleston, SC
01170 13 Jun 01 Port Hueneme, CA
01180 14 Jun 01 San Diego, CA
01190 15 Jun 01 San Diego, CA
01200 18 Jul 01 Charleston, SC
01210 02 Aug 01 San Diego, CA
01220 03 Aug 01 San Diego, CA

¹ Updated 03 May 00.

² ISEERB course provided by the Air Force.

CRANEY ISLAND INTERNAL ASSESSMENT PLAN (IAP) DRAFT HAZARDOUS WASTE MANAGEMENT PLAN

I. PHILOSOPHY

The purpose of this document is to implement a comprehensive management plan for the Hazardous Waste Management Program at Craney Island compliant with all applicable local, state, and federal laws, and U.S. Navy orders and instructions. Where individual departments, contractors, and tenant commands at Craney Island have requirements in addition to those contained herein, these requirements must be at least as, or more stringent, and must not conflict with the program established for the Facility.

II. APPROACH TO CONDUCTING INTERNAL ASSESSMENTS

Internal assessments will be conducted as follows:

The Sewells Point Storefront Hazardous Waste Specialist will perform a weekly inspection of the Facility's hazardous waste satellite accumulation area at Building 453. Inspections will be performed in accordance with the guidelines specified in Appendix A. Weekly inspections will also include site visits to all other locations where it is either known or anticipated that hazardous waste may be generated to ensure that hazardous wastes are not being accumulated in those areas.

The CNRMA Hazardous Waste Media Manager will perform an inspection of the Facility's hazardous waste satellite accumulation area at Building 453 on a quarterly basis. The purpose of this inspection will not be to duplicate the efforts of the Storefront Specialist, but to confirm and support actions and recommendations resulting from those efforts. These inspections will also include all locations where it is either known or anticipated that hazardous waste may be generated.

III. BUSINESS & MANAGEMENT PRACTICES TO BE ASSESSED

Compliance of the hazardous waste satellite accumulation area at Building 453 will be assessed in accordance with the requirements specified in Appendix A.

Work practices at all other locations where it is either known or anticipated that hazardous waste may be generated will be assessed to ensure that hazardous wastes are not being accumulated in those areas.

IV. LOCATIONS TO BE ASSESSED

The hazardous waste satellite accumulation area at Building 453 will be assessed as described in Section II above and as indicated in the Internal Assessment Plan Summary shown in Appendix **B**.

In addition, all other locations where it is either known or anticipated that hazardous waste may be generated will be assessed as described in Section II.

V. SEWELLS POINT STOREFRONT SPECIALIST TASKS

The Sewells Point Storefront Specialist will be responsible to execute the following tasks:

- Weekly inspections of the hazardous waste satellite accumulation area at Building 453 as described in Section II.
- Weekly inspections of all other locations where it is either known or anticipated that hazardous waste may be generated as described in Section II.

- Weekly inspections will be recorded for file in the form of completed checklists (see Appendix A) and applicable notes. Files will be maintained for 3 years.
- Issues requiring correction will be resolved promptly, at the lowest level possible, and will be followed up with appropriate training and subsequent inspections as needed.
- Report findings of all inspections to the CNRMA Hazardous Waste Media Manager on a weekly basis.
- Ensure personal hazardous waste training sufficient to perform assigned duties is kept current.

VI. CNRMA MEDIA MANAGER TASKS

The CNRMA Media Manager will be responsible to execute the following tasks:

- Quarterly inspections of the hazardous waste satellite accumulation area at Building 453 as described in Section II.
- Quarterly inspections of all other locations where it is either known or anticipated that hazardous waste may be generated as described in Section II.
- Quarterly inspections will be recorded for file in the form of completed checklists (see Appendix A) and applicable notes. Files will be maintained for 3 years.
- Review findings provided by the Sewells Point Storefront Specialist on a weekly basis to determine if intervention or support is needed.
- Prepare EPRs covering all aspects of the Hazardous Waste Program at Craney Island on an annual basis.
- Ensure personal hazardous waste training sufficient to perform assigned duties is kept current.
- Review this document on an annual basis for update as needed.
- Annually: review the HW generation records and discuss with the Pollution Prevention media manager to see if any pollution prevention actions might be worth investigating.
- Annually: review the entire HW management program and prepare the HW management portion of the EQA report and provide to the CNRMA EQA coordinator. This EQA report will include any recommended changes to the Internal Assessment Plan.

VII. REQUIRED INSPECTIONS

Compliance inspections as performed by the Sewells Point Storefront Specialist are required on a weekly basis.

Compliance inspections/evaluations as performed by the CNRMA Media Manager are required on a quarterly/annual basis.

VIII. INSPECTION PRIORITIES

The local priority assigned to these inspections is “low.”

IX. FREQUENCY OF INTERNAL ASSESSMENTS

Internal assessments will be performed on a quarterly basis as described in Sections II and VI and on a weekly basis as described in Section V.

X. PERSONNEL RESPONSIBLE FOR CONDUCTING INTERNAL ASSESSMENTS

The Sewells Point Storefront Specialist and the CNRMA Media Manager are responsible for conducting Internal Assessments. Individual tasks are described in Sections V and VI.

XI. SCHEDULE ASSESSMENTS

Quarterly assessments will be completed no later than the last day of March, June, September, and December.

XII. IMPLEMENTATION & MAINTENANCE OF THIS PLAN

The requirements set forth in this document will be implemented immediately.

This document will be reviewed and updated as needed on an annual basis.

**APPENDIX A:
HAZARDOUS WASTE SATELLITE ACCUMULATION AREA
INSPECTION CHECKLIST**

Carolyn, assuming you already have a SAA checklist, we'd insert that right here. If you don't have one that your folks are working from, then we can create one easily enough. Let me know if you need me to do that.