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west virginia department of environmental protection

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13 October 2010

William G. Fraser, P.E.
Remedial Project Manager
NAVFAC MIDLANT, Code OPHE3
9742 Maryland Ave., Bldg. N-26
Norfolk, VA 23511-3095

Re: *Draft Site 1 Soil Feasibility Study, Allegany Ballistics Laboratory, Rocket Center, West Virginia*

Dear Mr. Fraser:

The West Virginia Department of Environmental Protection/Division of Land Restoration (WVDEP/DLR) has completed a review of the *Draft Site 1 Soil Feasibility Study, Allegany Ballistics Laboratory, Rocket Center, West Virginia,* and provides the following comment(s).

General Comment:

The alternatives presented in the above reference document do not take into consideration impacts to or modifications of the RCRA subpart B and X permits and/or the National Pollutant Discharge Elimination System (NPDES) permit at Allegany Ballistics Laboratory. Such modifications are likely to increase the cost of the indicated remedial actions.

Please see attached memorandum from Pete Costello dated 7 October 2010 regarding comments on the SSRG model.

During the review of Table 4-1(General Response Action Table), it could not be determined what rationale was utilized to screen out possible alternatives. The reviewer could find no reference to ARARs or remedial action objectives. In addition, the containment technologies fail to discuss the seasonal flooding or account for potential repairs. Finally, as identified in specific comments, there are screening comments and implementation discussions that provide conflicting rationale between technologies.

Specific Comments:

1. Page 2-3, Section 2.2.1 Active Burning Grounds: The discussion fails to clarify the distinction of burning pan configuration historic vs present. Over the years of operation, burning pad configurations have been shifted based on explosive arcs. Therefore, the configuration identified in figure 2-2 only represents current operations. Please clarify.

2. Page 2-3, Section 2.2.1 Active Burning Grounds: The second paragraph on page 2-3 identifies a "treatment plant air emissions permit . . ."(Emphasis added). It is unclear if this air discussion is in reference to the RCRA subpart X permit or the substantive requirement permit for the CERCLA groundwater treatment plant. Please clarify.

3. Page 3-4, Section 3.4 Site Remediation Goals: Remediation goals fail to consider impacts to ecological receptors based on the assumption that the area is "inhospitable for use as a habitat by macroinvertebrates and higher organisms". While general habitat degradation due to regional effects unrelated to specific site activities (e.g. urbanization of a potential high quality habitat) may be permissible, it is not clear that this would be applicable at the present site. Given the rural setting, restoration of impacted habitat to a sufficient degree, such that a more natural ecosystem may become established does not seem implausible, particularly with regard to soil macroinvertebrates and some higher organisms such as birds, reptiles and mammals. For this reason, WVDEP requests that consideration of ecological receptors be retained during development of protective site remediation goals.

4. Appendix C, table C-1: The identification of 47 CSR 57 – 4.2 as an ARAR is in error. Moreover, the comment section of the document fails to adequately present the facts. First, the *Record of Decision Site 1 Operable Unit 3, Groundwater, Surface Water, and Sediment at the Allegany Ballistics Laboratory, West Virginia* does not provide variance or compliance with State regulation. A quick review of the Record of Decision under the declaration states "Operable Unit Four (OU 4), defined as the contaminated surface and subsurface soils at Site 1, will undergo further evaluation and separate remediation alternatives will be studied.". Further, the Statutory Determinations (see section 1.4) states a waiver for the selected remedy OU 3 cleanup of the DNAPL – zone under the Safe Drinking Water Act may be justified. Note the distinguishing differences OU3 groundwater, surface water, sediments vs OU 4 soil. WVDEP did not "authorize" (as used in 47 CSR § 57.4.2) or even contemplate the notion that soils would not be cleaned up when it signed the Site 1, OU 3 ROD. Remove 47 CSR 57-4.2 from the ARARs table.

5. Appendix C: Please include RCRA closure requirement 40 CFR 265 or 264.228 as an ARAR at the site 1 solvent disposal impoundments.

6. Appendix C, Table C-1: Include **§22-12-4. West Virginia GroundWater Protection Act and Applicable.**

   "Where the concentration of a certain constituent exceeds such standard due to human-induced contamination, no further contamination by that constituent is allowed and every reasonable effort shall be made to identify, remove or mitigate the source of such

contamination and to strive where practical to reduce the level of contamination over time to support drinking water use."

7. Appendix C, Table C-2: Should also include 33 CSR 1-3.2.b2 through 3.2.c., as follows:

3.2.b.2. The construction and operation of the SWLF must not:

3.2.b.2.A. Cause or contribute to violations of any applicable state water quality standard;

3.2.b.2.B. Violate any applicable West Virginia Water Pollution Control Act and/or other toxic effluent standard or prohibition under section 307 of the CWA;

3.2.b.2.C. Jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of a critical habitat protected under the Endangered Species Act of 1973; and

3.2.b.2.D. Violate any requirement under the Marine Protection, Research, and Sanctuaries Act of 1972 for the protection of a marine sanctuary.

3.2.b.3. The SWLF must not cause or contribute to significant degradation of natural wetlands, and the permittee must also demonstrate the integrity of the SWLF and its ability to protect ecological resources by addressing the following factors:

3.2.b.3.A. Erosion, stability, and migration potential of native wetland soils, muds, and deposits used to support the SWLF;

3.2.b.3.B. Erosion, stability, and migration potential of dredged and fill materials used to support the SWLF;

3.2.b.3.C. The volume and chemical nature of the waste managed in the SWLF;

3.2.b.3.D. Impacts upon fish, wildlife, and other aquatic resources and their habitat from any release of the solid waste or the leachate thereof;

3.2.b.3.E. The potential effects of catastrophic releases of waste or the leachate thereof to the natural wetlands and the resulting impacts on the environment; and

3.2.b.3.F. Any additional factors, as necessary, to demonstrate that ecological resources in the wetland are sufficiently protected.

3.2.b.3.G. To the extent required under section 404 of the CWA or applicable State natural wetlands laws in the West Virginia Water Pollution Control Act, steps must have been taken to attempt to achieve no net loss of natural wetlands (as defined by acreage and function) by first avoiding impacts to natural wetlands to the maximum extent practicable, as required by subdivision 3.2.b of this rule, then minimizing unavoidable impacts to the maximum extent practicable, and finally offsetting remaining unavoidable wetland impacts through all

appropriate and practicable compensatory mitigation actions (e.g., restoration of existing degraded natural wetlands or creation of manmade natural wetlands).

3.2.c. Perennial Stream Location Standards -- No SWLF may be located within the watercourse of a perennial stream;

3.2.d. Location Standards for Floodplains.

3.2.d.1. Permittees of new SWLFs, existing SWLFs and lateral expansions located in 100-year floodplains must demonstrate that the SWLF does not and will not:

3.2.d.1.A. Restrict the flow of the 100-year flood, reduce the temporary water storage capacity of the floodplain, or

3.2.d.1.B. Result in a washout of solid waste so as to pose a hazard to human health and/or the environment.

8. Page 2 of 7, Table 4 -1: The screening comments for In-Situ Treatment\Thermal Treatment should be further clarified. The comment states "In-situ heating is a potentially unsafe technology due to the reactivity of nitroglycerin and perchlorate at the site.", "In addition, the steep grade of the OABG towards the river makes it challenging to implement in situ heating technologies.", and "Finally, areas containing high concentrations of VOCs, which are the primary targets of this technology, will be removed during the re-grading of the site." Unfortunately these comments appear to contradict several of the following arguments intended as rationale for not recommending this remedial alternative. The relevant arguments include:

   a. First, the facility utilizes the materials identified in their production process and properly manages these materials. To date there has been no reported sample collected within the area of proposed remediation that would react during thermal treatment.

   b. Second, approximately 5 percent of the area has a slope while the rest of the site is relatively flat. The sloped areas area manageable.

   c. Finally, the final statement is inconsistent. In the event the soils containing waste are removed prior to treatment the soils containing waste would require appropriate characterization and disposal.

   For this reason, it appears that this technology has not been adequately evaluated. Please re-evaluate the potential response action.

9. Page 3 of 7, Table 4 -1: The screening comments for In-Situ Treatment Soil flushing "Site characteristics indicate that this technology is not feasible since the contaminated soils are mainly composed of silts and clays. The buried waste will prevent adequate distribution of

surfactants/reagents. Furthermore, this technology is not feasible because the currently operating groundwater treatment plant is not designed to treat inorganic contaminants. Therefore, modification of the existing groundwater treatment system will be required due to additional loading of these constituents resulting from soil flushing of the vadose zone. ." As in the previous comment, these statements fail to provide adequate information for evaluation. Clearly the treatment system could be upgraded if necessary however, there has been no evaluation to determine if, in fact, there will be inorganic loading or if the short and long term reductions in mass would warrant an upgrade of the current system. Please re-evaluate.

10. Page 4 of 7, Table 4 -1, Chemical/Physical Treatment Chemical Reduction with Zero-Valent Iron (ZVI): The implementability discussion does not provide a clear understanding of the process. The discussion appears to imply that the areas to be treated will first be excavated and zero-valent iron blended with the resulting soil/waste. The resultant mixture will then be redistributed at the site. Once generated some of the soil/waste may be hazardous. For this reason, the ZVI soil/waste mixture should be properly characterized and appropriately managed. Please provide additional detail and/or re-evaluate.

11. Page 4 of 7, Table 4 -1, Chemical/Physical Treatment Incineration: Due to the extent of the reported impacts at the site, any proposed remedy will have a short term effect on ecological habitat or require a permit. For this reason, the implementability discussion for this alternative (as well as several others), appears tenuous. Habitat has been and continues to be impacted by onsite activities. Since the action has been designated as an NPL action under CERCLA, only the substantive requirements of a permit are required. Please re-evaluate.

12. Page 5 of 7, Table 4 -1: Ex-Situ Treatment, Chemical Oxidation/Reduction: It is unclear why this technology is retained as an optional remedy, given the following observations:

a. Groundwater extraction would prohibit the interface with the moisture necessary for the chemical reaction.

b. It is unclear if the ZVI could be adequately blended with the tight silt and clay formation.

c. Potential elevation of inorganic levels based on this treatment or other technologies is discussed; however, this option fails to address them.

Please re-evaluate and explain.

13. Page 6 of 7, Table 4 -1: Containment, Installation of a Soil Cover: This alternative will not comply with ARARs.

14. Page 7 of 7, Table 4 -1: Containment, Installation of a Vegetative Cover: This alternative will not comply with ARARs.

If you need clarification I can be reached at Thomas.L.Bass@wv.gov or (304) 926-0499 extension 1274.

Sincerely,

Thomas L. Bass
Environmental Resource Specialist
Office of Environmental Remediation
Superfund Group

cc: Don Martin – WVDEP (provided electronically)
Pete Costello – WVDEP (provided electronically)
Larry Sirinek – WVDEP (provided electronically)
John Aubert – NAVSEA (provided electronically)
Lou Williams – NAVSEA (provided electronically)
Yi.Ji-Sun – USEPA (provided electronically)
Bruce Beach – EPA (provided electronically)
Steven Glennie – CH2MHill (provided electronically)

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MEMORANDUM

To: Tom Bass
From: P. Costello
Date: October 7, 2010

Subject: Review of the SSRG Model Application; Draft *Site 1 Soil Feasibility Study,* Allegany Ballistics Laboratory, July 2010

General Comment

Neither the text in Volume 1 nor Appendix A of Volume 2 included input parameters or presented a discussion of input parameters. Only the calculated results for the various contaminants of concern are presented.

Subsequently, the EPA RPM forwarded WVDEP a copy of the SSRG workbook as completed by CH2MHILL. Without knowledge of the parameter inputs, adequate evaluation of the model application would have been impossible.

In general, WVDEP will accept the use of peer reviewed default parameters in a model application. When input parameters differ from the default, supporting documentation must adequately defend the values, or range of values, incorporated. No explanation, rationale or discussion of inputs has been provided.

Relatedly, when incorporating non-default values, a sensitivity analysis based on a range of reasonably anticipated values for each parameter should be performed and documented. No discussion of this type of analysis is presented.

Specific Comments

Comment 1. Fraction of Organic Parameters

CH2MHILL employed a fraction of organic value of 0.026 (2.6%) in the saturated zone. This value is in contrast to the value of 0.0073 (0.76%) associated with the vadose foc parameter. Typically, organic carbon concentrations would be expected to decrease with depth.

Tables 4-4 through 4-8 of the July 2006 *Focused Remedial Investigation for Site 1 Soils, Operable unit 4* present the results for Total Organic Carbon from approximately 20 locations. Samples submitted for TOC analysis from location AS01-SB60, SB61 and SB62 were taken from the 1-3, 3-5, 5-7 and 7-8 foot intervals. Results reflect the expected decreasing trend with depth.

Interval	1-3'	3-5'	5-7'	7-8'
Min	6500	5200	4200	2300
Max	14000	7600	5000	3700
Avg.	9450	6733.333	4533.333	2833.333

The only other locations noted in review with samples collected at depth for TOC analysis were AS01-SB70 from the 2.5-3 foot interval and AS-01-SB72 and SB-74, both from the 4.5 to 5 foot interval. Apparently intervals above and below those given were not collected. AS-01-SB72 exhibited the highest result at 28,000 mg/kg (foc=0.028) whereas nearby AS-01-SB74 exhibited 2800 mg/kg (foc=0.0028). All other locations with TOC results reported were from samples collected from the 0-1 or 1-2 foot intervals averaging approximately 9,000 mg/kg. In its review, WVDEP could not locate any site specific data to justify or verify attributing a site wide foc value of 0.026 to the saturated zone. Without supporting information, an foc value for the saturated aquifer values outside the 0.002 to 0.005 range become suspect. Model results are moderately to highly sensitive to this parameter. Changing the CH2MHILL employed value to 0.005 reduces the acceptable residual TCE SSRG determined concentration from 0.691 mg/kg to 0.199 mg/kg.

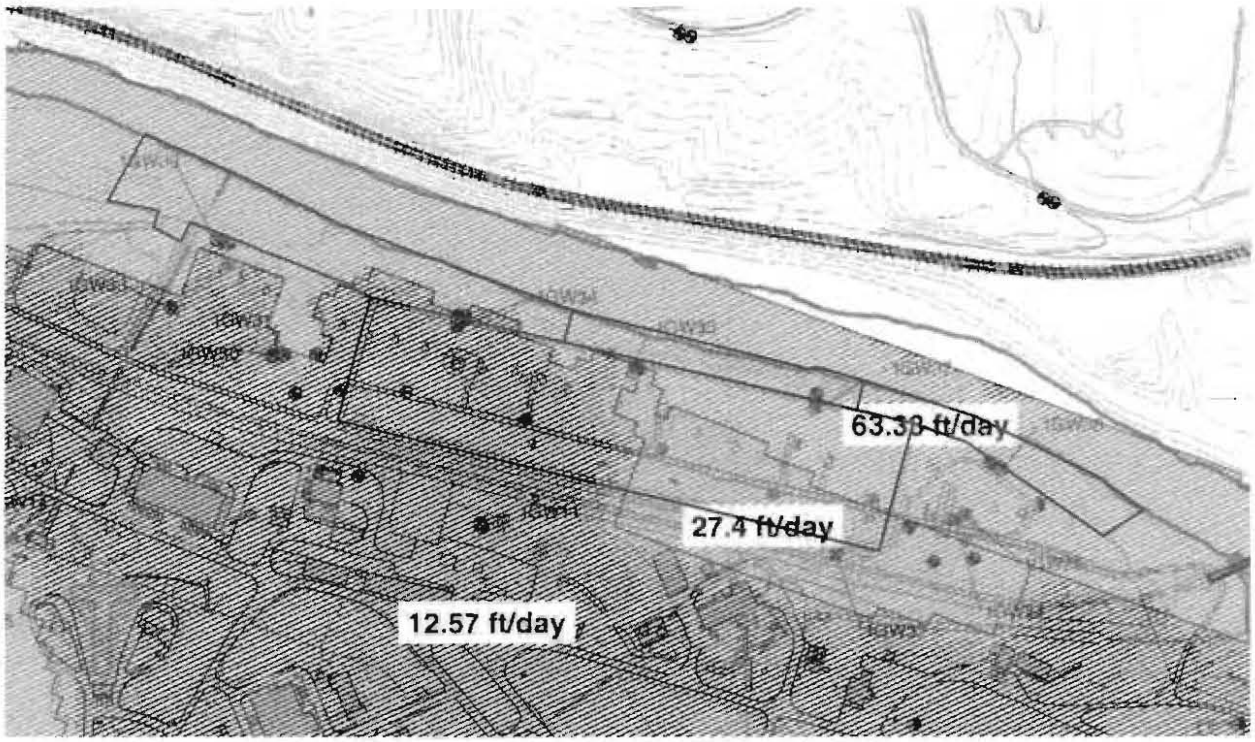
When considering an foc value applied to the unsaturated zone WVDEP generally accepts a default value of 0.006 for the upper portion and 0.002 to 0.003 for depths below 2 feet. If a site specific value is employed, WVDEP expects this value to be supported with a well documented site specific depth weighted average. The CH2MHILL application employed a value of 0.0073. SSRG results are not significantly affected by slight changes to this parameter.

Comment 2. Allocation of conductivity

The CH2MHILL application allocated a value of 7046 m/yr (63.3 ft/day) across the entire site area. Figure 5-3 of the Draft *Phase III Aquifer Testing at Site 1 and Ste 10-Allegany Ballistics Laboratory* reflects the ModFlow calibrated conductivity values assigned to the layer representing the alluvium. In its review WVDEP overlaid the approximate boundaries of the various Site 1 areas under evaluation on Figure 5-3.

Based on this overlay, the conductivity value of 7046 m/yr (63.3 ft/day) appears appropriate for the Eastern, Central and Western OABG areas. This does not appear to be the case for the Active Burning Ground Area, notably the western portion. Fifty percent of the total Active Burning Ground Area, the western portion, is underlain by material associated with a conductivity of 12.57 ft/day (±1400 m/yr). In the eastern portion, twenty-seven percent of the ABG Area is underlain by material with a conductivity of 27.4 ft/day (±3050 m/yr) and twenty-three percent is underlain by material with the 7046 m/yr (63.3 ft/day) conductivity value. As model results, notably the calculated dilution-attenuation factor, are highly sensitive to this

parameter, it may be more appropriate to evaluate the eastern and western portions of the Active Burning Ground Area as distinct entities (refer to figure on the following page).



Overlay of the areas of interest on Fig. 5-3

Comment 3. Aquifer thickness

CH2MHILL allocated a value of 6.1 meters to represent the aquifer thickness. Figures 2-4 and 2-5 from the Draft FS depict vertical cross sections A-A' and B-B' respectively. Cross section A-A' spans the site parallel to the river immediately down gradient of the Active Burning Grounds Area. Bedrock elevation varies from 636 feet to 640 feet with an approximate average of 638 feet. The water table elevation is shown at elevation 650 feet suggesting an average saturated thickness of 12 feet or 3.7 meters. Cross section B-B' runs through center of the Active Burning Grounds Area parallel to the river. Bedrock elevation along this cross section varies from 637 feet to 641 feet with an average elevation of approximately 638 feet. Water table elevation is shown at 650 feet suggesting a saturated thickness 12 to 13 feet. Prior to start up of the ground water extraction system, previous investigations interpreted pre-pumping water table elevations at approximately 654 feet in the vicinity of the Former Disposal Pits, 652 feet through the center of the Active Burning Ground Area along cross section B-B' and 650 feet along cross section A-A'.

Based on the above analysis, WVDEP considers an aquifer thickness of 4.0 to 4.6 meters to be more representative of site conditions. The SSRG calculated dilution-attenuation factor is highly sensitive to this parameter. A reduction in aquifer thickness from the CH2MHILL input of 6.1

meters to 4.4 meters reduces the calculated DAF from 46.1 to 33.6. A reduction of the DAF is reflected by a proportionally similar reduction in the calculated acceptable residual contaminant concentrations.

Comment 4. Infiltration Rate

In the SSRG User-Input screen CH2MHILL assigned a value of 0.0804 meters per year (3.17 inches per year) to represent the annual infiltration rate. Site 1 lies in a relatively flat, extensive, alluvial plain with a predominance of unpaved grassy areas conducive to infiltration.

The allocated infiltration rate is significantly less than the model calibrated recharge rate of 12 inches per year discussed in the 2001 *Phase III Aquifer Testing at Site 1 and Site 10 of Allegany Ballistics Laboratory Superfund Site.* The 2001 *Aquifer-Characteristics Data for West Virginia*, Water Investigations (USGS Report 01-4036) derived recharge rate estimates across the state using hydro-graph analysis from historically recorded stream flow data. The mean recharge rate derived for the Potomac River Basin is 9.4 inches per year. The study estimated a recharge rate of 7.3 inches per year for the region near Headsville, WV, approximately 12 miles south of the ABL facility.

Calculation of the dilution-attenuation factor is indirectly proportional to this parameter. Doubling the infiltration rate to 0.1608 meters per year roughly halves the DAF from 46.1 to 23.6.

Final Comment SSRG result for TCE with mean values of WVDEP recommended inputs

Parameter	CH2MHILLI	WVDEP	Units	Note
Infiltration	0.0804	0.1608	meters/yr	
L	122	100	meters	
K west	7046	1400	meters/yr	
K east	7046	4650	meters/yr	Weighted Avg.
Da	6.1	4.4	meters	
foc	0.026	0.003		

WVDEP ran the application for the eastern and western portions of the Active Grounds Area. Therefore the length input parameter was changed to 100 meters. The conductivity value applied to the eastern portion is a weighted average based upon the estimated areas as overlain on the map of conductivities. Inputs not noted in the table were left as provided in the EPA copy of the CH2MHILL workbook. With the above inputs, the SSRG permissible residual TCE results were 0.024 mg/kg for the western portion of the Active Burning Grounds Area and 0.038 mg/kg for the eastern portion.

Without further documentation, WVDEP must conclude that simulation as presented is a non-conservative application yielding, at least in the case of TCE, acceptable residual concentrations of contamination an order of magnitude higher than what will be required to return the aquifer to beneficial use within a reasonable time frame.