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NASJRB WILLOW GROVE  
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LETTER AND COMMENTS FROM U S EPA REGION III REGARDING DRAFT REMEDIAL  
INVESTIGATION REPORT FOR SITE 3 NASJRB WILLOW GROVE PA  
03/25/2011  
U S EPA REGION III

03/25/2011

**RESPONSE TO EPA COMMENTS  
DRAFT SITE 3 REMEDIAL INVESTIGATION REPORT**

**FROM:** Linda Watson, Toxicologist  
Technical Support Branch (3HS41)

**TO:** Lisa Cunningham, RPM  
Federal Facilities Section (3HS13)

**DATE:** March 2, 2011

I have reviewed the Willow Grove, Draft RI - Site 3 Ninth Street Landfill and have the following comments to offer:

1. Section 2.0 is not included in the report.

**RESPONSE:** Concur. A complete copy of the full report and Appendices will be supplied to the EPA toxicologist as an interim document for discussion purposes and acceptance before the Draft Final Site 3 RI Report document is prepared after all EPA comments are resolved.

2. Section 6.1.3., Test Pit and Landfill Delineation Investigations, page 6-4, third paragraphs. The report states, "The RSL for trivalent chromium was used for COPC selection for groundwater because speciation data (i.e., total chromium versus hexavalent) were analyzed for 8 groundwater samples collected in March 2008 and demonstrated that no hexavalent chromium was present." The report should include this supporting documentation to confirm these findings otherwise hexavalent chromium should be used for screening.

**RESPONSE:** Concur. A complete copy of the analytic data for the hexavalent chromium groundwater analysis is included in Appendix A (See "Miscellaneous Parameters, Hexavalent Chromium").

3. Section 6.6.1.1, Selection of Locations and Numbers of Samples, page 6-42, 2<sup>nd</sup> paragraphs. the sentence reads, "Two surface soil samples analyzed for dioxin (03SS04 and 03SS08) were collected from the baseball diamond during the Phase II Investigations in 1997." According to Figure 2-2, sample 03SS04 is NOT located near the baseball field but instead is located west on Unknown Anomaly 2.

**RESPONSE:** Concur. An error was made based on confusion of sample nomenclature. In the September 1991 Phase I RI, 16 surface soil locations (numbered S-1 through S-16) were sampled on the baseball field. In the 1997 Phase II RI, 12 surface soil locations (numbered 03SS01 through 03SS12) were sampled across the surface of the suspected landfill area. To match data base conventions adopted in 1997, the 16 surface soil sample ID's from 1991 Phase I RI were renamed 03SS01,1991 through 03SS16,1991. The similar sample ID designations caused

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confusion that has now been corrected in the text and figures. There was no corresponding confusion in the HHRA prepared using these results.

Corrections have been made to Figure 2-2 and other related figures where appropriate, as well as the corresponding text throughout the document.

4. Figure 2-2. Please explain why surface soil samples were not collected in the Playground Area, Volleyball Area, and the Picnic Table Area? These areas would have a higher degree of receptor frequency and thus should be considered in the investigation

RESPONSE: This comment was discussed as Item 5 in the Navy's reply to comments dated October 19, 2011, as follows:

"Previous investigations, including the PA, the SI and Phase I RI investigations, performed in the late 1980's through 1997, including results of the SI EM survey, indicated that Site 3 landfill and recycling activities did not extend to the area of the picnic grove, volleyball court and child playground. The results of the 2008 EM survey, which included the playground/volleyball/picnic areas, showed one small, isolated anomaly that could not be attributed to cultural interference. This anomaly, located between the volleyball court and the playground, was investigated with a test pit excavation (03TP29) in 2008. The test pit encountered sparse debris consisting of scrap metal from 3 to 4 feet below grade. The sample collected from this test pit, 03TP29-0304-01, did not show significant contamination, confirming previous results. The Team decision for field sampling was reflected in the November 2008 Site 3 Landfill Delineation SAP that was implemented in early 2009. In addition, groundwater sampling and analysis that has been ongoing for decades, supports the Site Conceptual Model of no source or evidence of disposal activities in the Picnic Grove Area."

It is believed that EPA has accepted this discussion. Is that response sufficient? Future land use is not known.

#### **RAGS D Tables**

5. Table 2.04. One surface soil sample for the Hanger Area is not sufficient enough to adequately characterize site conditions. A minimum of 5 samples are need to provide any level of statistical confidence regarding site conditions. How large (acres) is the Hanger Area?

RESPONSE: The Hangar Area is approximately 1 to 1.5 acres. This comment was discussed as Item 12 in the Navy's reply to comments dated October 19, 2011, as follows:

"The intent of the investigation of the Hangar Area was to look for potential alternative sources of groundwater contamination, as this location was not considered the primary soil area of investigation. The goal of this supplemental investigation was satisfied by taking mainly

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subsurface soil samples, since contamination to groundwater would flow in a vertical direction.”

It is believed that EPA has accepted that discussion. Is that response sufficient?

6. Table 2.06, Table 3.06, and Appendix A (pages 1-31). The Landfill Area Surface Soil EPC's can not be confirmed since all listed surface soil samples in Table 2.07 can not be located in Appendix A. Specifically, Appendix A only accounts for 56 samples and the list indicates a total of 68 samples. Samples 03SS31 through 03SS42 can not be located? **In addition, several of the samples listed in Table 2.07 are prefixed with "SB" which typically indicates subsurface soil samples. Why are subsurface soil samples being used to assess risk for surface soil?**

RESPONSE: The current version of the surface soil data summary includes 68 locations plus 9 field duplicates. Samples 03SS31 through 03SS42 are included in the 68. The designation of the sample IDs from 1991 is potentially confusing. However, the samples are indeed from surface soil even though "SB" usually stands for "soil boring." The Navy has prepared a detailed explanation of the history of these surface soil samples obtained in 1991 (from two distinct sampling intervals – from zero to .six inches and from 1.5 to 2 feet) for inclusion into Section 2.1.2.1.

The following additional text is proposed:

“During Phase I activities, surface soil samples were obtained from 16 locations, S-1 through S-16 (also referred to as 03SS01 through 03SS16), at a depth interval of 0 to 6 inches, and from 14 locations, S-1, S-3, and S-5 through S-16, at a depth interval of 1.5 to 2 feet. The samples were collected over a 90-foot-by-90-foot grid on the baseball field, in response to the detection of PAHs in this area during the SI. The samples were analyzed for full TAL metals and TCL organic parameters. These soil samples, originally designated S-1 through S-16 (including one duplicate of S-16), were obtained on September 5, 1991. Later, due to data base constraints, these soil samples were redesignated 03SS01 through 03SS16 with the sample date of 9/5/1991 to differentiate them from soil samples 03SS01 through 03SS12 obtained in 1997 from different locations.”

Marked-up proposed revisions for Section 2.1.2.1 have been added to each revised draft RI Report.

7. Table 2.06, Surface Soil, page 1 of 2. Please increase the font size of this table. The results cannot be seen.

RESPONSE: Concur. Font size will be increased to improve readability.

8. Table 2.07, Surface Soil. This table appears to be a duplicate of Table 2.06.

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RESPONSE: This Table is not a duplicate of Table 2.06. It presents the results of comparison to background concentrations.

9. Table 2.08, Table 3.06, and Appendix A (pages 1-37). The Landfill Area Soil (surface and subsurface) EPC's can not be confirmed because the Sample Identification number provided in the summary table can not be matched with samples listed in Table 2.08. In addition, the following samples (listed in Table 2.08) are not included in Appendix A Summary tables; 03SB01\_19910906, 03SB03\_19910906, 03SB05\_19910906, 03TP-0102-03-20070504, 03TP16-0102-01-20070507, 03TP16-0102-01-20070507-D.

RESPONSE: Concur: The sample data summary has been corrected. A copy of the data summary that includes these samples is attached. To assist all parties in matching the calculation of EPCs, an example of the data set for manganese in Landfill Area Soil has been attached. This data set is obtained from the list of samples on Table 2.08 (also attached). The re-run of ProUCL using this data set that matches the corresponding UCL reported in the RI report is also attached for ease of comparison.

10. Table 2.08, page 4 of 4. The listed Landfill Areas Samples include 03SB02 and 03SB04 however, these samples are not located in the Appendix A, Data Summary of Analytical Results.

RESPONSE: Concur: These two samples can now be found on the landfill subsurface soil data summary.

11. Table 2.10, Soil/Air. The reported soil concentrations should first be converted using the appropriate PEF for inorganics and VF for organics and then compared to the Residential Air RSLs. One sample is not sufficient to adequately characterize site conditions.

RESPONSE: This comment was discussed as Item 15 in the Navy's reply to comments dated October 19, 2011, as follows:

The soil-to-air pathway screening levels were obtained from the DOE/ORNL website's online calculator. The ORNL website continually updates criteria and they also update the Region 3 RSL screening tables. Therefore, use of these online screening reference values in the risk assessment should have produced an identical list of COPCs equivalent to using the procedure recommended in the above comments. The outcome would be the same whether data are compared to screening levels using soil concentrations units for both the sample data and the screening criteria, or if the soil concentrations are first converted to air units using a manually-calculated PEF or VF and then compared to screening RSLs listed in air concentration units. Chemical-specific PEF and VF parameters are used in the ORNL online calculator to internally back-convert RSL air criteria to soil equivalent concentrations, thus streamlining the effort involved in producing the RAGS D Table 2.09. A footnote to this table explains how the screening values were obtained: "The EPA soil to air screening level calculator for residential

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use was used. The noncarcinogenic values (annotated "N") are divided by 10 to correspond to a target hazard quotient of 0.1, or an incremental cancer risk of 1.0E-06 for carcinogens (annotated "C") ( URL: <http://rais.ornl.gov/cgi-bin/epa/ssl1.cgi>.)”

It is believed that EPA has accepted this discussion. Is that response sufficient?

12. Table 3.03, Surface Soil, Hanger Area Surface Soil. One sample is not sufficient enough to adequately characterize surface soil site conditions for the Hanger Area.

RESPONSE: This comment was discussed as Item 12 in the Navy’s reply to comments dated October 19, 2011, as follows:

“The intent of the investigation of the Hangar Area was to look for potential alternative sources of groundwater contamination, as this location was not considered the primary soil area of investigation. The goal of this supplemental investigation was satisfied by taking mainly subsurface soil samples, since contamination to groundwater would flow in a vertical direction.”

It is believed that EPA has accepted that discussion. Is that response sufficient?

13. Table 3.06, Surface Soil. The maximum concentrations for the following contaminants do not agree with the maximum value reported in Table 2.06; aluminum, chromium, iron, benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, and phenanthracene.

RESPONSE: This comment was discussed as Item 20 in the Navy’s reply to comments dated October 19, 2011, as follows:

“Field duplicates are averaged before computing UCLs and the mean and maximum statistics shown on Table 3s, which is done because the duplicate pairs are spatially co-located and therefore not statistically independent for the purposes of evaluating the population of concentration values applied to estimate and evaluate EPCs. On the other hand, field duplicate pairs are treated separately for evaluating the maximum detected concentrations on Table 2s, which ensures that the data are screened for candidate COPCs in the most conservative manner possible.

EPA Region 3 has for several years now recommended/required the maximum of all discrete samples (individual duplicate values) to be considered in the COPC screening Table 2. On the Table 3, the selection of an EPC is supposed to be representative of the upper range of exposure but not necessarily worst case, so EPA strongly recommends that whenever possible statistical 95% UCLs should be used instead of the maximum detected value. However, when very few (e.g., only a couple) samples exist, EPA generally accepts the use of the maximum as the EPC. While not explicitly directed by any guidance, in such cases duplicates have been historically averaged before adopting the maximum as the EPC because the goal is to identify an upper range value that is plausible but not worst case, and spatially co-located points can generally be able to

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be averaged to provide a more realistic estimate of exposure.

In this instance, no changes are necessary since the disagreement in values cited above occurred in cases where the maximum values occurred in field duplicate pairs: aluminum (03SS41 and 03SS41-D); chromium (03SS35 and 03SS35-D); iron (03SS35 and 03SS35-D); and benz(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, and phenanthrene (all of the maximum values for these PAHs were found in the same field duplicate pair (03SB06-19910906 and 03SB06-19910906-D).”

It is believed that EPA has accepted that discussion. Is that response sufficient?

14. Table 3.08, Soil. The maximum concentrations for the following contaminants do not agree with the maximum value reported in Table 2.08; antimony, arsenic, cobalt, copper, iron, lead, vanadium, zinc, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene.

RESPONSE: This comment was discussed as Item 22 in the Navy’s reply to comments dated October 19, 2011, as follows:

“For the reasons explained in comment no. 20, the maximum concentrations do not agree because field duplicates are not averaged before computing the maximum in Table 2s, but duplicate pairs are averaged before computing UCLs or maximum and mean statistics on Table 3s. The cited maximum values occurred in field duplicate pairs: antimony (03TP27-0304-01 and 03TP27-0304-01-D); arsenic (03TP27-0304-01 and 03TP27-0304-01-D); cobalt (03TP27-0304-01 and 03TP27-0304-01-D); copper (03TP25-0607-02 and 03TP25-0607-02-D); iron (03TP27-0304-01 and 03TP27-0304-01-D); lead (03TP05-0910-02-20070430 and 03TP05-0910-02-20070430-D); vanadium (03TP27-0304-01 and 03TP27-0304-01-D); zinc (03TP27-0304-01 and 03TP27-0304-01-D); and the PAHs benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and chrysene (all of the maximum values for these PAHs were found in the same field duplicate pair (03SB06-19910906 and 03SB06-19910906-D).”

It is believed that EPA has accepted that discussion. Is that response sufficient?

15. Table 5.01. The May 2010 RSL table was used to verify the toxicity values and the following RfD’s should be updated; cadmium (1E-03 for diet and 5.4E-4 for water) and chromium (3E-03).

RESPONSE: Concur. The cadmium comment was previously addressed by the Navy’s October 19, 2011 response to comment no. 26, as follows:

“The current RfD used for cadmium was 1E-3, which was correctly applied only to soil exposure. A different RfD cited in the comment (5E-4) applies to water exposure, but chromium was not a COPC for water media.”

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The cited RfD for cadmium (1E-3) is correctly listed in Table 5.01 and correctly applied only to soil exposure. The other cadmium RfD cited in the comment (5E-4) applies to water exposure, but cadmium was not selected as a COPC for water media.

The chromium RfD value (3E-03) cited matches the value listed in Table 5.01.

16. Table 6.01. The May 2010 RSL table was used to verify the toxicity values and the following CSF's should be updated; tetrachloroethene (5.4E-01) and trichloroethene (5.9E-03).

RESPONSE: Concur. As a concession to EPA, the Navy used both the Cal-EPA and the NCEA disputed CSFs to evaluate risk for this HHRA. Section 6.6.4 discusses the comparative results. Either way, the disputed slope factors do not change the selection of risk drivers for Site 3 groundwater.

17. Table 6.02. The May 2010 RSL table was used to verify the toxicity values and the following iCSF's should be updated; chromium (8.4E-02), aroclor-1254 (5.7E-04), tetrachloroethene (5.9E-06), trichloroethene (2E-06).

RESPONSE: Table 6.02 will be edited to show the aroclor-1254 IUR of 5.7E-4, which matches the RSL table. Since PCBs were not selected as a COPC for the inhalation pathway, this change will not affect calculated risks.

The current chromium IUR published on IRIS is 1.2E-2 is the value used in the risk assessment. The IRIS IUR is based on a study which assumed a 1:6 ratio of hexavalent to trivalent chromium. The Region 3 RSL table cites an IUR for hexavalent chromium of 0.084 which incorporates a 7-fold multiplier based on assuming that 100 percent of chromium inhaled is hexavalent instead of the IRIS assumption of a 1:6 ratio. If this assumption were used, inhalation risks for soil would still be orders of magnitude below levels of concern, so rather than revise the risk assessment tables, the issue will be discussed in the uncertainty section.

As explained in the response to item 16 above, Section 6.6.4 will discuss the comparative results from applying the disputed TCE and PCE CSFs.

18. Appendix A, Analytical Results. The report continues to omit the subsurface soil samples in the analytical results.

RESPONSE: The analytical data within Appendix A now contains one data summary for Landfill Area surface soil and another data summary for Landfill Area subsurface soil as well corresponding surface soil and subsurface soil data summaries for the Army Reserve Hangar Area. Data summaries in Appendix A summary tables will be reordered in a logical succession to avoid potential confusion.

19. Appendix A, Data Summary of Analytical Results for Groundwater and Table 2.01

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(Groundwater Samples included in COPC screening and risk assessment). All efforts were made to match the listed samples in Table 2.01 with the Groundwater Data Summary Analytical Results to determine the Exposure Point Concentrations for contaminants in Table 3.01. However, all sample identification numbers listed within the Table 2.01 are not included in the Groundwater Data Summary of Analytical Results. Specifically, the following samples; 03MW03I-Sampled 04/01/2009, 03MW01I-Sampled 06/25/1997, 03MW08D-Sampled 10/15/2008. In addition, many samples identified in the Groundwater Data Summary of Analytical Results are not located on Table 2.01. Specifically, the following samples; 03MW01I (9/23/1991), 03MW01I-F (9/23/1991), 03MW01SI-L (10/17/2008), 03MW01SI-L (10/17/2008), 03MW01SI-L-D (10/17/2008), 03MW01SI (9/20/1991), 03MW01SI-F (9/20/1991), 03MW01S (9/18/1991), 03MW01S-F (9/18/1991), 03MW01S-F-D (9/18/1991), 03MW02S (9/18/1991), 03MW02S-F (9/18/1991), 03MW03I1 (4/11/2009), 03MW03I (9/23/1991), 03MW03I-D (9/23/1991), 03MW03I-F (9/23/1991), 03MW03I-F-D (9/23/1991), 03MW03S-I (10/20/2008), 03MW03SI (9/20/1991), 03MW03SI-F (9/20/1991), 03MW03S (9/18/1991), 03MW03S-F (9/18/1991), 03MW04I (9/20/1991), 03MW04I-F (9/20/1991), 03MW04SI-L (10/14/2008), 03MW04SI (9/20/1991), 03MW04SI-F (9/20/1991), 03MW04S (9/18/1991), 03MW04SI-F (9/20/1991), 03MW04S (9/18/1991), 03MW04SI-F (9/18/1991), 03MW05S (9/20/1991), 03MW05S-F (9/20/1991), 03MW09S (2/17/10), 03MW09O (2/17/10). Please keep in mind, all results must be reproducible. Sample identification numbers used in the risk assessment should be readily identified and easy to match against the data reported in the

**RESPONSE:** The groundwater analytical data summary in Appendix A includes analytical results spanning 1991 to 2010. Generally, older analytical results from 1991 or 1997 were not considered to best represent current groundwater conditions. Table 2.01 lists the samples that were considered representative (generally the most recent data for each well) to include in the HHRA. This is explained in the HHRA in the Data Evaluation Section 6.1.1:

We have prepared a reproducibility example verification similar to the process that the EPA toxicologist would perform to check our work (see attachments). The groundwater PCE data set from the list of samples shown on Table 2.01 was re-run in the ProUCL model, resulting in agreement with the UCL reported in the revised RI report.

After the HHRA was completed, monitoring well pair 03MW09S and 03MW09O was installed downgradient of waste disposal areas "A" and "B" to determine potential groundwater impact from VOCs found in the disposal areas. Groundwater analytical PCE results from the well pair (03MW09O – 0.25ug/L and 03MW09S – 5.9 ug/L) were very similar to other nearby wells (such as 03MW03S – 3.1 ug/L and 03MW04S – 3.1 ug/L) generally downgradient of the Site 3 former landfill. Since there was minimal impact on the HHRA calculation of risk anticipated, and no substantive impact on the conclusions of the HHRA postulated, all parties agreed to present the data in the RI report for completeness, but not to rerun the HHRA to include the new (February 2010) data. Accordingly, the groundwater summary table in Appendix A includes results for 03MW09 wells but they are not included in the data set for the HHRA groundwater calculations. (see Section 4.6.2 and Figure 4-23 for more information)

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20. Data Summary of Analytical Results, Groundwater, page 34-61. Please explain why sample 03MW05S (3/12/2008) is reported as detection of "1 or 2" with no qualifier?

RESPONSE: Concur. In Appendix A we encountered several instances of improperly printed pages that lacked the corresponding qualifier column for the final data column. These have been corrected.

21. Data Summary of Analytical Results, Groundwater, page 39-61. Please explain why sample 03MW06SI (10/15/2008) is reported as detection of "1 or 2" with no qualifier?

RESPONSE: Concur. In Appendix A we encountered several instances of improperly printed pages that lacked the corresponding qualifier column for the final data column. These have been corrected.

22. Table 7.01 through 7.41. RME and CTE. Many of the cancer results can not be seen (copying failure) therefore, could not be verified.

RESPONSE: Concur. The current originals of these documents have some numbers depicted in colors (blue and green) that do not reproduce in photocopy well. All originals will be reprinted in black and white and the reproductions will be checked for readability before the next version of this document (Draft Final) is distributed.

23. Tables 7.20 - 7.20a through 7.22, 7.28, 7.29, 7.21, 7.21a, 7.22, 7.22a. RME and CTE. Please increase the font size. Many of the results cannot be seen.

RESPONSE: Concur. Font size increase and printing originals in black and white will be done as proposed in item 22 above.

24. Table 7.27RME, 7.28RME. Based on the most recent RSL table chromium is now identified as a mutagen and must be evaluated as such.

RESPONSE: Concur. The HHRA included application of receptor-specific age dependent adjustment factors (ADAFs) in Section 6.4.9 for chromium (as well as for PAHs). The intake was multiplied by the cancer slope and the weighted average ADAF to yield cancer risk (see corrected page 6-33 for revision/clarification).