



N00158.AR.000164
NAS WILLOW GROVE
5090.3a

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

July 2, 2002

Mr. James Colter
EFA Northeast
Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop #82
Lester, PA 19113-2090

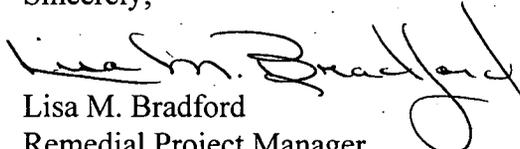
Dear Mr. Colter:

The purpose of this letter is to forward to you, three sets of comments from the Environmental Protection Agency (EPA) on the Draft Feasability Study (FS) Report for Site 5-Fire Training Area Groundwater (OU-2), for NASJRB Willow Grove. The enclosed comments are based upon a toxicological, hydrological and legal review of the report. Also enclosed are comments from Linda Watson, on the final RI for the site.

Should you have any questions regarding the enclosed comments or if you would like to meet to discuss the comment, please feel free to contact me at (215) 814-3363, (410) 532-1856 on Fridays or bradford.lisa@epa.gov. I would be happy to accommodate your request.

Thank you for the extension on the review time, as well as the consideration of our comments.

Sincerely,



Lisa M. Bradford
Remedial Project Manager

- Enclosure A - Legal comments
- B - Hydrological comments
- C - Toxicological comments
- D - Hydrological comments

cc: April Flipse (PADEP)
Mary Gemmill (RAB)



ENCLOSURE A

The following comments are offered by Lisa M. Bradford and Brian Nishitani.

EXECUTIVE SUMMARY

General Comment:

Remedial Action Objectives (RAOs):

RAO's should be developed to address contaminated environmental media (groundwater and soils). At a minimum ICs for soils, but you should look at other alternatives for comparison purposes as well. This is per DOD and/or Navy guidance, in addition to EPA guidance.

Specific Comments:

Site 5 Remedial Alternatives:

1. Alternative 2: Monitored Natural Attenuation, Institutional Controls, and Long Term Monitoring
Please add, "to prevent exposure to contaminated groundwater until cleanup goals are achieved" to the end of the second sentence.
2. Alternative 3A: Pump-and-Treat System, Air Stripping, Institutional Controls, and Long-Term Monitoring - Entire Plume
Please add, "and to prevent interference with remedy (physical components as well as effectiveness of groundwater network)" to the end of the fifth sentence.
3. Alternative 3B: Pump-and-Treat System, Air Stripping, Institutional Controls, and Long-Term Monitoring - Plume Source Zone
Please add, "and to prevent interference with remedy (physical components as well as effectiveness of groundwater network)" to the end of the fifth sentence.

Table ES-1 Site 5 Comparative Analysis of Remedial Action Alternatives: Compliance With ARARS:

4. Chemical Specific ARARS:
Please remove the second comment for each alternative.

Long-Term Effectiveness and Permanence:

5. Alternative 2: Natural Attenuation.
Adequacy and Reliability of Controls.
Does this apply to on-base, off-base or both?
6. Alternative 3A: Pump-and-Treat Entire Plume.
Adequacy and Reliability of Controls.
Does this apply to on-base, off-base or both?
7. Alternative 3B: Pump-and-Treat Plume Source Zone.
Adequacy and Reliability of Controls.
Does this apply to on-base, off-base or both?
8. Alternative 2: Natural Attenuation.
Need for 5-Year Review.
Please add, "monitored and enforced" to the end of the sentence.
9. Alternative 3A: Pump-and-Treat Entire Plume.
Need for 5-Year Review.
Please add, "monitored and enforced" to the end of the sentence.
10. Alternative 3B: Pump-and-Treat Plume Source Zone.
Need for 5-Year Review.
Please add, "monitored and enforced" to the end of the sentence.

Implementability:

11. Alternative 2: Natural Attenuation.
Ease of Doing More Action if Needed.
You must decide what IC mechanisms you want to consider, and how to implement, monitor and enforce them. Then evaluate the processes.
12. Alternative 3A: Pump-and-Treat Entire Plume.
Ease of Doing More Action if Needed.
You must decide what IC mechanisms you want to consider, and how to implement, monitor and enforce them. Then evaluate the processes.
13. Alternative 3B: Pump-and-Treat Plume Source Zone.
Ease of Doing More Action if Needed.
You must decide what IC mechanisms you want to consider, and how to implement, monitor and enforce them. Then evaluate the processes.

14. Alternative 2: Natural Attenuation.
Ability to Monitor Effectiveness.
You must decide what IC mechanisms you want to consider, and how to implement, monitor and enforce them. Then evaluate the processes.
15. Alternative 3A: Pump-and-Treat Entire Plume.
Ability to Monitor Effectiveness.
You must decide what IC mechanisms you want to consider, and how to implement, monitor and enforce them. Then evaluate the processes.
16. Alternative 3B: Pump-and-Treat Plume Source Zone.
Ability to Monitor Effectiveness.
You must decide what IC mechanisms you want to consider, and how to implement, monitor and enforce them. Then evaluate the processes.
17. Alternative 2: Natural Attenuation.
Ability to Obtain Approvals and Coordinate with Other Agencies.
You must decide what IC mechanisms you want to consider, and how to implement, monitor and enforce them. Then evaluate the processes.
18. Alternative 3A: Pump-and-Treat Entire Plume.
Ability to Obtain Approvals and Coordinate with Other Agencies.
You must decide what IC mechanisms you want to consider and how to implement, monitor and enforce them. Then evaluate the processes.
19. Alternative 3B: Pump-and-Treat Plume Source Zone.
Ability to Obtain Approvals and Coordinate with Other Agencies.
You must decide what IC mechanisms you want to consider and how to implement, monitor and enforce them. Then evaluate the processes.

Cost:

20. Alternative 2: Natural Attenuation.
Capital Cost.
This must include ICs.
21. Alternative 3A: Pump-and-Treat Entire Plume.
Capital Cost.
This must include ICs.
22. Alternative 3B: Pump-and-Treat Plume Source Zone.
Capital Cost.
This must include ICs.

23. Alternative 2: Natural Attenuation.
First-Year Annual O&M Capital Cost.
This must include ICs.
24. Alternative 3A: Pump-and-Treat Entire Plume.
First-Year Annual O&M Capital Cost.
This must include ICs.
25. Alternative 3B: Pump-and-Treat Plume Source Zone.
First-Year Annual O&M Capital Cost.
This must include ICs.
26. Alternative 2: Natural Attenuation.
Five Year Reviews.
This must include ICs.
27. Alternative 3A: Pump-and-Treat Entire Plume.
Five Year Reviews.
This must include ICs.
28. Alternative 3B: Pump-and-Treat Plume Source Zone.
Five Year Reviews.
This must include ICs.
29. Alternative 2: Natural Attenuation.
Present Worth Cost.
This must include ICs.
30. Alternative 3A: Pump-and-Treat Entire Plume.
Present Worth Cost.
This must include ICs.
31. Alternative 3B: Pump-and-Treat Plume Source Zone.
Present Worth Cost.
This must include ICs.

2.0 IDENTIFICATION AND SCREENING OF TECHNOLOGIES

Table 2-6 Preliminary Screening of Technologies and Process Options for Contaminated Groundwater:

32. Process Options.
If the plume has not gone off-base, "deed restrictions and notices" cannot be used. See "Process Options" and "Screening Comment."

33. Screening Comment.

If the plume has not gone off-base, "deed restrictions and notices" cannot be used. See "Process Options" and "Screening Comment."

3.0 DEVELOPMENT AND SCREENING OF REMEDIAL ACTION ALTERNATIVES

Site 5 - Development and Screening of Alternatives:

34. Alternative 2: Monitored Natural Attenuation Institutional Controls.

Please discuss what this entails.

35. Alternative 3A: Pump and Treat Entire Plume. Institutional Controls.

Please discuss what this entails.

36. Alternative 3B: Pump and Treat Source Zone. Institutional Controls

Please discuss what this entails.

4.0 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES.

Alternative 2: Monitored Natural Attenuation:

37. Long-Term Effectiveness and Permanence.

Please include discussion of ICs.

38. Implementability.

Please include discussion of ICs.

Alternative 3A: Pump and Treat Systems, Air Striping, Institutional Controls, and Long-Term Monitoring - Entire Plume:

39. Long-Term Effectiveness and Permanence.

Insufficient thought given to ICs in the 4th paragraph, 3rd sentence.

40. Short-Term Effectiveness.

Please elaborate on the last sentence, specifically the "land use restrictions."

ENCLOSURE B

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029**

SUBJECT: Willow Grove FS for Site 5 - Fire Training Area GW
OU-2

May 28, 2002

FROM: Kathy Davies, Hydrologist

TO: Lisa Bradford, RPM

I have reviewed the subject document and have the following comments:

Page ES-6. Alternative 2: MNA, ICs and LTM

The viability of this treatment alternative needs further discussion and supporting data.

Page 2-8. Potential chemical-Specific ARARs and TBCs

It is stated here that the aquifer underlying NASJRB Willow Grove is classified as Class IIA, a potential source of potable water under New Jersey regulations. This classification scheme is irrelevant for the site. Classification of the aquifer is based on EPA's Guidelines for Groundwater Classification under the EPA Groundwater Protection Strategy. Since the aquifer is a current source of drinking water, it is a Class IIA aquifer under EPA's system. Thus, it is expected that the groundwater is to be restored to drinking water quality and the ARARs for this action are MCLs and/or non-zero MCLGs (for multiple contaminants and/or multiple pathways).

Page 2-14. Method Used For Development of Remedial Action Objectives.

It should be noted here that it is EPA's expectation to return groundwater to its beneficial use and that the aquifer is a Class IIA aquifer (i.e. currently used source of drinking water), thus both current and future potential use scenarios include groundwater as a source of drinking water.

Table 2-6. The last screening comment.

It is stated here that natural attenuation appears to be functioning to limit growth of the plume. At some point, all plumes reach steady state. For NA to even be considered, the plume must have reached steady state or is shrinking. Steady state conditions alone are insufficient to be the basis of retaining this action.

Page 3-1. Rationale for Development of Alternatives.

It should be noted here that it is EPA's expectation to return groundwater to its beneficial use as a current and future potential source of drinking water.



Page 3-2.

It should be noted in all discussions that the extent of the downgradient contamination in the intermediate zone has not been delineated. Groundwater is used off-site as potable water source. The statement that there is currently no pathway for human exposure to VOC contaminated groundwater has not been well substantiated and should be qualified here.

Pages 3-4. Alternative 2:MNA

It has not been demonstrated that natural attenuation processes are sufficient to remediate the groundwater to MCLs or risk-based levels. The lack of cis-1,2-DCE or vinyl chloride (transformation products of TCE) is of concern. The ubiquitous presence of 1,1-DCE (an abiotic transformation product of 1,1,1-TCA) which was not discussed in the RI or FS in the evaluation of degradation is of concern, especially when this compound has been detected off-site. Finally, the plume itself has not been fully delineated either vertically or horizontally in the intermediate zone. Therefore, the evaluation of the potential success of this alternative in the FS appears to be overestimated.

Page 3-6 and Page 3-10. Groundwater Extraction.

It is stated here that the extraction system would be installed to a depth of approximately 30 to 150 feet in the overburden aquifer. On page 1-2 it is stated that the overburden thickness ranged from 9 to 18 feet. Please clarify this discrepancy.

Page 3-8. Groundwater Treatment System.

It should read Groundwater Quality Standards, not Quite Standards.

Page 4-8. Alternative 2: MNA

As described above, it is not clear that MNA is occurring such that it can be chosen as a reliable remedial option. This is especially true when the discussion is focused on TCE, yet it appears that 1,1-DCE is the primary risk driver.

Page 4-15.

It is stated here the extraction and treatment of contaminated groundwater would be from the concentrated center of the plume. Please provide the remedial technology to be used on the remaining dilute plume.

Page 4-17.

It says here that the groundwater system would be for containment (not restoration?) and would address the entire groundwater contaminant plume. This is not consistent with the description provided on page 4-15.

Page 4-29. Reduction of TMV through Treatment.

If MNA is chosen, it is EPA's preference to choose it based upon destruction (biotic or abiotic) and not dilution of the contaminants. If the NA mechanism were destruction, then it would seem that there would be a reduction of TMV through treatment.

ENCLOSURE C

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

SUBJECT: NASJRB Willow Grove
Feasibility Study for Site 5

FROM: Linda R. Watson, Toxicologist
Technical Support Section (3HS41)

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

DATE June 25, 2002

I have reviewed the NASJRB Willow Grove, Feasibility Study for Site 5 and have the following comments to offer:

1. Executive Summary, Phase II Remedial Investigation, ES-3. The report states, "The post-Phase II RI investigations generally confirm the Phase II RI investigation results; therefore, the risk assessment was not revised from the draft Phase II RI report. Post-Phase II RI results are presented and discussed in the Site 5 RI report." Discussions regarding the Post-Phase II RI results cannot be located in the RI report for Site 5. Please indicate the location(s) of these discussions?
2. Section 1.2.4, Nature and Extent of Contamination. The report states, "Table 1-2 presents the occurrence and distribution of inorganic and organic chemicals detected in groundwater samples and compares them to background." However, Table 1-2 does not provide any background data. In addition, the table includes a column entitled "Representative Concentration" which in the footnotes is indicated as "the determination of representative concentrations is based on comparison of maximum to the 95% UCL, which is presented in a separate table." Please explain the purpose of including the representative concentration in this table? Further, please explain the footnote definition of the representative concentration? Finally, what is the purpose of comparing the maximum concentration to the 95% UCL and where is the location of the indicated table?
3. Section 1.2.4, Nature and Extent of Contamination. The report states, "Table 1-3 present results from the background comparison tests." Table 1-3 appears incomplete. Although several background comparative test statistics are included in the table, there are no corresponding results for most of the comparative test. It appears that only the Site Max value is given for the 96% UTL test statistics and site mean value for the Student's or Satterthwaite T-test. Background results and statistics are not given for any of the test statistics. In addition, please see EPA Toxicological Comment #8 from Site 5 RI Report, dated June 17, 2002.

4. Section 1.2.4.1, Inorganics. The report states, "Lead, arsenic, and beryllium were the only inorganics detected at levels above reference criteria." Please indicate what reference criteria are being referred? If reference criterions' means hazard indexes from the risk assessment, this cannot be evaluated since the RI report did not include attributable risk from each contaminant of concern (COC), see EPA Toxicological comment #54 from Site 5 RI Report. In addition, according to the RI report, Section 4.7.1-Data Evaluation-Groundwater, aluminum, arsenic, barium, beryllium, chromium, iron, lead, manganese and nickel were screened above USEPA Region III RBC reference screening criteria.
5. Section 1.2.6.2, Summary of Human Health Risk Assessment. The section should provide the actual risk (carcinogen and non-carcinogen) results for those chemicals and pathways exceeding EPA's target bench mark values and ranges.
6. Table 1-5, Selection of Chemicals of Potential Concern. Please explain the purpose and significance of the "Representative Concentration?" When screening chemicals against USEPA Region III RBC Table the maximum detected concentration should be used for screening.
7. Section 2.6.2, Site 5 Preliminary Remediation Goals (PRGs). The report states, "PRGs for groundwater contaminants used the applicable numerical values, risk-based groundwater concentrations that do not result in carcinogenic risks exceeding 1E-06 or HI greater than 0.1, and maximum detected background concentrations." This sentence is unclear. When calculating the PRGs the following equations should be applied:

$$\text{For Cancer Risk: PRG} = \frac{\text{EPC}(1\text{E}-06)}{\text{(Calculated Risk Level)}}$$

$$\text{For NonCancer Risk: PRG} = \frac{\text{EPC}(1)}{\text{(Calculated Hazard Quotient)}}$$

Where: EPC is the Exposure Point Concentration
 Calculated risk level is the actual risk calculated in risk assessment
 For Noncancer, 1.0 should be divided by the number of chemicals affecting the same target organ.

When calculating PRGs individual chemical risk, as well as, cumulative risk must be within EPA's carcinogenic target risk range (10^{-4} - 10^{-6}). For non-carcinogens, risk should be added for chemicals affecting the same target organ and this value should not exceed 1.0.

Finally, although MCLs are ARARs which should assist in the development of cleanup goals, MCLs are based on technical feasibility, economics, and risk. Cleanup goals or remediation goals should be based on risk only. As stated in the NCP, "*Remediation goals shall establish acceptable exposure levels that are protective of human health and the environment and shall be developed by considering the following: (A) ARARs, if available, and the following factors: (1) For systemic toxicants, acceptable exposure levels shall represent concentration levels to which the human population, including sensitive subgroups, may be exposed without adverse effect during a lifetime or part of lifetime (2) For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} using information on the relationship between dose and response. The 10^{-6} risk level shall be used as the point of departure for determining remediation goals for alternative when ARARs are not available **or not sufficiently protective because the presence of multiple contaminants** at a site or multiple pathways of exposure."* In addition, the NCP states, "*The lead and support agencies may also, as appropriate, identify other pertinent advisories, criteria, or guidance in a timely manner.*" With this in mind, MCLs should **not** be

4. Section 1.2.4.1, Inorganics. The report states, "Lead, arsenic, and beryllium were the only inorganics detected at levels above reference criteria." Please indicate what reference criteria are being referred? If reference criterions' means hazard indexes from the risk assessment, this cannot be evaluated since the RI report did not include attributable risk from each contaminant of concern (COC), see EPA Toxicological comment #54 from Site 5 RI Report. In addition, according to the RI report, Section 4.7.1-Data Evaluation-Groundwater, aluminum, arsenic, barium, beryllium, chromium, iron, lead, manganese and nickel were screened above USEPA Region III RBC reference screening criteria.
5. Section 1.2.6.2, Summary of Human Health Risk Assessment. The section should provide the actual risk (carcinogen and non-carcinogen) results for those chemicals and pathways exceeding EPA's target bench mark values and ranges.
6. Table 1-5, Selection of Chemicals of Potential Concern. Please explain the purpose and significance of the "Representative Concentration?" When screening chemicals against USEPA Region III RBC Table the maximum detected concentration should be used for screening.
7. Section 2.6.2, Site 5 Preliminary Remediation Goals (PRGs). The report states, "PRGs for groundwater contaminants used the applicable numerical values, risk-based groundwater concentrations that do not result in carcinogenic risks exceeding 1E-06 or HI greater than 0.1, and maximum detected background concentrations." This sentence is unclear. When calculating the PRGs the following equations should be applied:

$$\text{For Cancer Risk: PRG} = \frac{\text{(EPC)(1E-06)}}{\text{(Calculated Risk Level)}}$$

$$\text{For NonCancer Risk: PRG} = \frac{\text{(EPC)(1)}}{\text{(Calculated Hazard Quotient)}}$$

Where: EPC is the Exposure Point Concentration
 Calculated risk level is the actual risk calculated in risk assessment
 For Noncancer, 1.0 should be divided by the number of chemicals affecting the same target organ.

When calculating PRGs individual chemical risk, as well as, cumulative risk must be within EPA's carcinogenic target risk range (10^{-4} - 10^{-6}). For non-carcinogens, risk should be added for chemicals affecting the same target organ and this value should not exceed 1.0.

Finally, although MCLs are ARARs which should assist in the development of cleanup goals, MCLs are based on technical feasibility, economics, and risk. Cleanup goals or remediation goals should be based on risk only. As stated in the NCP, "*Remediation goals shall establish acceptable exposure levels that are protective of human health and the environment and shall be developed by considering the following: (A) ARARs, if available, and the following factors: (1) For systemic toxicants, acceptable exposure levels shall represent concentration levels to which the human population, including sensitive subgroups, may be exposed without adverse effect during a lifetime or part of lifetime (2) For known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10^{-4} and 10^{-6} using information on the relationship between dose and response. The 10^{-6} risk level shall be used as the point of departure for determining remediation goals for alternative when ARARs are not available **or not sufficiently protective because the presence of multiple contaminants** at a site or multiple pathways of exposure.*" In addition, the NCP states, "*The lead and support agencies may also, as appropriate, identify other pertinent advisories, criteria, or guidance in a timely manner.*" With this in mind, MCLs should **not** be

used as the primary tool in the development of cleanup goals for groundwater contamination.

If you have any questions regarding these comments, please contact me at (215) 814-3116.

cc: Eric Johnson

ENCLOSURE D

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

SUBJECT: NASJRB Willow Grove
Remedial Investigation Report for Site 5

FROM: Linda R. Watson, Toxicologist
Technical Support Section (3HS41)

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

DATE June 17, 2002

I have reviewed the NASJRB Willow Grove, Remedial Investigation Report for Site 5 and have the following comments to offer:

1. The arrangement of the report is confusing and difficult to follow. For example, Section 3.0 Risk Assessment Approaches should be incorporated with Section 4.7 Baseline Human Health Risk Assessment. In addition, the figures and tables in the report should be within their own perspective section instead of being incorporated within the text. This makes reading the report extremely difficult. Finally, all risk assessment reports should follow *USEPA RAGS, Volume I, Human Health Evaluation Manual (Part D, Standardized Planning, Reporting, and Review of Superfund Risk Assessments)*, January 1998. This standardized reporting method has been required by USEPA Headquarters since January 1998.
2. Executive Summary - Discussion of Results at Site 5 - Fire Training Area. The report states, "Consistent with EPA guidelines, the "reasonable anticipated future land use" exposure scenario is Occupational Worker." Is this stating the future land use for this area is expected to be industrial? If yes, have institutional controls been obtained for this area? As stated in USEPA "Land Use in the CERCLA Remedy Selection Process, OSWER Directive 9355.7-04, May 25, 1995; *"The baseline risk assessment generally needs only to consider the reasonably anticipated future land use however, it may be valuable to evaluate risks associated with other land uses. The NCP preamble (55 Fed. Reg. 8710) states that in the baseline risk assessment, more than one future land use assumption may be considered when decision makers wish to understand the implications of unexpected exposures. Especially where there is some uncertainty regarding the anticipated future land use, it may be useful to compare the potential risks associated with several land use scenarios to estimate the impact on human health and the environment should land use unexpectedly change. The magnitude of such potential impacts may be important consideration in determining whether and how institutional controls should be used to restrict future uses."* Since the residential receptors exceed USEPA target benchmark values, it would appear institutional controls will be warranted for this area.

3. Executive Summary - Potential Receptors. Please explain why the child is the only recreational receptor being evaluated? If it is determined that the area will be used in the future for recreational purposes, the adult and adolescent receptors would also be potentially available for exposure. Therefore, these receptors should also be evaluated in the risk assessment.
4. Throughout the report, Appendix J is referred as containing Risk Assessment documentation. Appendix J is entitled "Groundwater Sampling Endpoint Turbidity Values" which contains no risk assessment information and Appendix I is entitled "Risk Assessment Documentation" which also does not contain any information.
5. Executive Summary - Human Health Risk Assessment. The report states, "For the reasonable anticipated land use risk scenario, human health risk assessment indicates that exposure to groundwater would result in estimated risk levels within EPA's acceptable risk range." This statement is not true since the risk for the Occupational Worker exposed to groundwater was not evaluated. This sentence statement should be removed from the report.
6. Section 1.5.6 - September 2000 Groundwater Sampling. The report states, "Since these analytical results confirm previous results and are being used to refine nature and extent, no additional data validation beyond that performed under contract by the analytical laboratory was deemed necessary." Since this is the case, please explain the relevance of Appendix A were groundwater data collected in September 2000 is being compared to USEPA RBC for tap water? All data used for risk assessment purposes must be validated.
7. Section 2.3 - Establishment of Background Concentrations. The report states, "Background surface soil samples were also used for comparison to subsurface soil." Is the subsurface soil of the same characteristic soil type as surface soil? If not, these differing soil types should not be used for comparative purposes. When comparing background data to site data the soil should be of the same characteristic soil type. For example, sandy loam site soil should only be compared to sandy loam background soil.
8. Section 2.3 - Establishment of Background Concentrations. The report states, "Each statistical test run using a decision-making probability level (P-level) of 0.05, which means that, in situations where the test conclusion states that site-related results are greater than background, the chance of the test yielding a false conclusion caused by random variations in the data set is five percent or less. The overall conclusion (whether site results are greater than background) was assumed to be "yes" if any one of the quantitative tests concluded that site data is elevated above background." When developing hypothesis testing the Navy must bare the burden of proof. Therefore, the following hypothesis should be applied: Null Hypothesis - the site related concentration is less than or equal to the background concentration. Where Type I error () (false positive) should be set at a minimum of 20 percent (Confidence Level is 80 percent where 80 out of 100 cases, contaminated site-related concentrations would be correctly identified as no different, statistically, from background concentrations, while in 20 out of 100 cases, site-related concentrations could be incorrectly identified as greater than background), and Type II error () (false negative) should be set at a minimum of 10% (Power is 90 percent where 90 out of 100 cases, site-related contaminants would be correctly identified as greater than background concentrations, while in 10 out of 100 cases, site-related concentrations would be incorrectly identified as less than or equal to background concentrations). See *USEPA Engineering Forum Issue, Determination of Background Concentrations of Inorganics in Soils and Sediments at Hazardous Waste Sites, Office of Research and Development, December 1995.*
9. Tables 2-4 and 2-5, Sediment and Surface Water Sampling Summary. Two samples (plus one duplicate) is not enough to adequately characterize site conditions.

10. Section 3.1.1.1 - Distributional Analysis of the Data. The last sentence in the paragraph states, "If neither distribution matched well, the default assumption of an underlying lognormal distribution was followed." Although the USEPA is willing to accept the described assumption for this report, the above described assumption has been found to be invalid. Therefore, additional statistical tools should be used to determine the appropriate data distribution. (E.g., Chebychev, Central Limit Theorem, Jack-Knife, Boot-Strap, etc.).
11. Section 3.1.1.3 - Identification of Chemicals of Potential Concern. The report state screening was conducted by using USEPA Region III RBC dated 1993. The most recent version of the Region III RBC Table should be used for screening and toxicity values. The most current table is dated April 2, 2002. The USEPA RBC Table is updated every six months since toxicity values are always being modified to reflect most recent studies.
12. Section 3.1.1.3 - Sediment Exposure COPC Selection. The report states the residential soil RBC was used to compare sediment concentrations. USEPA Region III recommends using the residential RBC multiplied by 10 to account for media variations.
13. Section 3.1.1.3 - Surface Water Exposure COPC Selection. The report states the tap water RBC was used to compare surface water concentrations. USEPA Region III recommends using the tap water RBC multiplied by 10 to account for media variations.
14. Section 3.1.1.4 - Representative Concentrations. The report states, "... blank qualified results (B) will be eliminated from further consideration." Although blank qualified data should not be used when screening, 1/2 the detection limit of the B qualified data should be included in the data set when determining the 95% UCL.
15. Section 3.1.1.7 - Special Note Concerning Analysis of PCBs at Site 1. Please explain why information pertaining to Site 1 is included in this report?
16. Table 3-1 - Dose-Response Parameters. See comment #10 regarding updated toxicity values. In addition, the Absorption Values (Oral-to-Dermal Extrapolation per RAGS Appendix A) for many of the listed chemicals has since been updated. The most recent version of this document is April 8, 1999.
17. Section 3.1.3.2 - Potential Receptors, Future Resident, second bullet. The last sentence in the paragraph states, "Potential exposure to subsurface soils following real estate development will be discussed qualitatively." Please explain the purposes of the sentence?
18. Section 3.1.3.3.2 - Subsurface Soil. The report states, "The exposure scenarios for subsurface soil are based on the assumption that subsurface soil could eventually become surface soil if excavations, erosion, construction, or landscaping activities occurred." If this assumption is being made, then risk to the future resident (adult and child) should also be calculated using subsurface soil.
19. Section 3.1.3.5.1 - Inhalation of COPCs in Fugitive Dust. The section discusses the use of the Cowherd et al (1984) Model to estimate air modeling values. USEPA requires the use of the Johnson & Ettinger Model as this model has been peer reviewed by USEPA and found to be an acceptable air modeling tool. The use of the Cowherd Model and/or the parameters have not been previously peer reviewed by USEPA and thus the model and/or parameters cannot be validated.
20. Tables 3-6 through 3-25. Please see comment #1 regarding the use of RAGS, Part D.

21. Tables 3-6 through 3-25. Throughout the tables, EPA, 1991a is indicated as the source of the reference parameter. However, most of the cited references are not from the cited source: USEPA Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors, Interim Final, March 25, 1991. In addition, this reference is not included in the reference section of the report. Finally, many of the listed sources are outdated and have since been updated by USEPA Exposure Factors Handbook (EFH), Volumes I-III, August 1997.
22. Tables 3-6 through 3-25. The listed averaging time (AT) is incorrect. The correct AT for cancer is $70 \times 365 = 25550$ and the correct AT for non-cancer is exposure duration (ED x 365).
23. Tables 3-6 and 3-7, Occupational Worker, Surface Soil, RME and CTE. The inhalation rate of 0.833 m³/hour is used consistently for all receptors with the exception of the Excavation Worker. Please see USEPA EFH, August 1997, Table 5-23 regarding varying IR's depending upon age and activity patterns. The USEPA Region III recommends using an IR of 1.0 - 1.2 m³/hour for this receptor.
24. Table 3-8 and 3-9, Adolescent and Adult Trespassers, Surface Soil, RME and CTE. An Exposure Frequency (EF) of 30 days/year appears low for this receptor. USEPA recommends using an EF of 60 days/year for RME and 30 days/year for CTE. Please see comment #21 regarding the cited reference.
25. Table 3-8 and 3-9, Adolescent and Adult Trespassers, Surface Soil, RME and CTE. The Surface Area for the Adolescent Trespasser is listed as "See Appendix A." Appendix A contains analytical data and if the SA was given for the Adult why is it necessary to look in an Appendix for the SA for an Adolescent?
26. Table 3-8 and 3-9, Adolescent and Adult Trespassers, Surface Soil, RME and CTE. The inhalation rate of 0.833 m³/hour is used consistently for all receptors with the exception of the Excavation Worker. Please see USEPA EFH, August 1997, Table 5-23 regarding varying IR's depending upon age and activity patterns. The USEPA Region III recommends using an IR of .63 m³/hour for the adolescent and adult trespasser. Please see comment#21 regarding the cited reference.
27. Table 3-9, Adolescent and Adult Trespassers, Surface Soil, CTE. Please explain how the SA for the CTE Adult (5750 cm²) is more conservative than the RME SA (3508 cm²) for the Adult Trespasser? Please see comment #21 regarding the cited reference.
28. Table 3-9, Adolescent and Adult Trespassers, Surface Soil, CTE. An IR of 50 mg/day for the Adult and Adolescent Trespasser is not cited in the listed reference. If this value is based on professional judgement than the reference should state "professional judgement." Please see comment #21 regarding the cited reference.
29. Table 3-9, Adolescent and Adult Trespassers, Surface Soil, CTE. An exposure duration (ED) of 2 years for the Adolescent and 7 years for the Adult Trespasser appears low. CTE values should be mean or median values and RME values should be 95 percentile values. USEPA recommends using an ED of 6 or 7 years for the Adolescent and 9 or 10 years for the Adult Trespasser. Please see comment #21 regarding the cited reference.
30. Tables 3-10 and 3-11, Recreational Child, RME and CTE. An EF of 7 days/year is extremely low. USEPA recommends 100 days/year to account for the summer months when adolescent and children are not in school (e.g., June through August) and an additional 10 days for the remainder of the calendar year. Please see comment #21 regarding the cited reference.
31. Tables 3-10 and 3-11, Recreational Child, RME and CTE. The USEPA recommended body weight for a child is 15 kg.

32. Tables 3-12 and 3-13, Future Resident, RME and CTE. Please explain the listed parameters; Sai, Edi, Bwi? If these parameters vary with age what values were actually used for quantification and for what purpose are these values included?
33. Table 3-13, Future Resident, CTE. An ED of 2 years for the Child and 7 years for the adult appears low. USEPA recommends using an ED of 3 years for the Child and 12 years for the Adult Resident. Please see comment #21 regarding the cited reference.
34. Tables 3-14 and 3-15, Excavation Worker, RME and CTE. An EF of 30 days/year appears low. USEPA recommends using and RME EF of 90 days/year and a CTE EF of 45 days/year. Please see comment #21 regarding the cited reference.
35. Tables 3-16 and 3-17, Adult and Adolescent Trespasser, Sediment, RME and CTE. Please see comment #24 regarding EF.
36. Tables 3-16 and 3-17, Adult and Adolescent Trespasser, Sediment, RME and CTE. Please see comment #32.
37. Table 3-17, Adult and Adolescent Trespasser, Sediment, CTE. Please see comment #33 regarding ED.
38. Tables 3-18 and 3-19, Recreational Child, Sediment, RME and CTE. Please see comment #30.
39. Tables 3-18 and 3-19, Recreational Child, Sediment, RME and CTE. Please see comment #31.
40. Tables 3-18 and 3-19, Recreational Child, Sediment, RME and CTE. Please see comment #32.
41. Tables 3-20 and 3-21, Adult and Adolescent Trespasser, Surface Water, RME and CTE. Please see Risk Assessment Guidance for Superfund, Part A, Exhibit 6-12 to determine the correct formula to use for the ingestion rate (IR) for surface water.
42. Tables 3-20 and 3-21, Adult and Adolescent Trespasser, Surface Water, RME and CTE. Please see comment #32.
43. Tables 3-20 and 3-21, Adult and Adolescent Trespasser, Surface Water, RME and CTE. Please see comment #24 regarding EF.
44. Tables 3-20 and 3-21, Adult and Adolescent Trespasser, Surface Water, RME and CTE. Please see comment #33 regarding exposure durations (ED).
45. Tables 3-22 and 3-23, Recreational Child, Surface Water, RME and CTE. Please see comment #41 regarding IR, comment #30 regarding EF, comment #31 regarding Bw, and comment #32.
46. Tables 3-24 and 3-25, Adult and Child Resident, Groundwater, RME and CTE. Please explain why know SA value is recorded for the child resident?
47. Tables 3-24 and 3-25, Adult and Child Resident, Groundwater, RME and CTE. Please see comment #32.
48. Table 3-25, Adult and Child Resident, Groundwater, CTE. The USEPA recommended ingestion rates for the Child and Adult resident under both RME and CTE scenarios are 2 liters/day for the Adult and 1 liter/day for the Child. Please see comment #21 regarding the cited reference.
49. Table 3-25, Adult and Child Resident, Groundwater, CTE. Please see comment #33.

50. Section 3.1.3.5, Exposure Estimates. When assessing dermal risk, please refer to USEPA Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment), Interim, September 2001.
51. Section 3.1.4.4, Receptor Risks. In some cases, surrogate values can be used when there is no available reference dose (RfD). Please consult with the site assigned Toxicologist to determine the appropriate surrogates.
52. Section 3.1.5.4, Soil Dermal Absorption Model Applicability. The report states, "Because of the lack of reliable data regarding dermal absorption factors, the risk assessment provides default soil absorption factors for all substances except four chemicals for which well documented absorption factors are available (arsenic, cadmium, pentachlorophenol, PCBs, chlorinated dioxins, ethylbenzene, toluene, xylenes, and PCE)." What default soil absorption values are being referred? In addition, why does the sentence state "except four chemicals" and then provides a listing of nine chemicals?
53. Section 3.1.5.8, Risk Characterization Uncertainty. The report states, "To reduce the extent of overestimation when significant risks occurred at an area of interest, a less conservative approach was used wherein noncancer risks were grouped and summed together for only those chemicals affecting the same target organ/organ system." This is not a less conservative approach but instead USEPA guidance. In other words, USEPA guidance dictates that all non-cancer causing chemicals are grouped together according to the same target organ. Thus, the above statement should be reworded.
54. All risk results could not be duplicated because all of the necessary parameters needed to duplicate results were not included in the report. In addition, the report should provide the individual chemical risk as well as the overall receptor and pathway risk. Finally, the 95% UCL values that were used to calculate risk must be provided in order to duplicate results.
55. Section 4.7.3, Exposure Assessment. The report states, "The COPCs that were selected for each environmental medium sampled at Site 5 are presented in Section 7.5." This statement is not true because there is no Section 7.5 in the Exposure Assessment section.
56. Section 4.7.4. Throughout the section risk values are sometimes reported and sometimes suggested. All risk values should be provided. In addition, the report only provides the risk results according to the receptor but not the media (soil, sediment, groundwater, etc.) nor routes of exposure (ingestion, dermal, inhalation). These important risk parameters should also be included in the text.
57. Section 4.7.4, Carcinogenic Risks. The report only provides the total risk, not individual risks for each contaminant, media, and route for exposure.
58. Section 4.7.4, RME Risks, Estimated Cancer Risks Equal to or Exceeding EPA's Target Risk Range of 1E-04 to 1E-06. There is a typo error in the second sentence. This comment also applies for the CTE scenario.
59. Section 4.7.4, RME Risks, Cancer Risks Within EPA's Target Risk Range of 1E-04 to 1E-06. The last paragraph is confusing. The section initially states there was no risk or risk was within EPA's target risk range. Since this is the case, why include this last paragraph discussing "contribution to risks?" this comment also applies for the CTE scenario.
60. Section 4.7.4, RME Risks, Noncarcinogenic Hazard Indices Above 1.0. Please check the recorded target organs against the most recent USEPA RBC table to find the appropriate reference and updated target organ. In addition, the report should provide the actual risk value and not just state "exceeds 1.0."

61. Section 4.7.4, Lead Risks. When using the IEUBK Model the average lead concentration should be used to assess risk or blood lead levels.
62. Section 4.7.4, Lead Risks. The report states, "the IEUBK Lead Model (v. 0.99) was used to characterize risks from lead in soil, dust, and water . . ." Was USEPA default value used for dust? The report should include a printout of the actual graphical model results.
63. Section 4.7.4, A Discussion of the Impact of Subsurface Soil Exposure Risks to Future Residential Receptors. Although the reported text states subsurface soil exposure for the resident is within EPA's target cancer risk range, the actual risk results and parameters used to calculate risk must be presented. All results must be reproducible.
64. Section 4.7.4, A Discussion of the Impact of Subsurface Soil Exposure Risks to Future Residential Receptors. Please explain why Site 3 is being reference in this section?
65. Section 4.7.4, Uncertainties. Please explain why Site 3 is being reference in this section?
66. Section 4.7.4, Uncertainties. Third bullet. The toxicity values for 2-hexanone are RfDo- 4E-02 and RfDi - 1.4E-03. The reference for this value is NCEA. The surrogate for phenanthrene is anthracene.
67. Section 4.9, Evaluation Summary and Risk Management Recommendations. I disagree with the recommendation of "No further Action" for soil, surface water, and sediment because the report is not complete and risk results could not be duplicated. Thus, the above comments and subsequent changes could alter the actual risk results.

The review of this document is incomplete because the risk results could not be duplicated since all risk results and parameters were not included in the report.

If you have any questions regarding these comments, please contact me at (X3116).

cc: Eric Johnson