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LETTER TRANSMITTING DRAFT RESPONSES TO VIRGINIA DEPARTMENT OF
ENVIRONMENTAL QUALITY COMMENTS ON DRAFT REMEDIAL INVESTIGATION REPORT
FIREFIGHTER TRAINING AREA, LIGHTER AMPHIBIOUS RESUPPLY CARGO (LARC) 60
MAINTENANCE AREA, AND AUTO CRAFT AREA FORT STORY VA

2/22/1996

MALCOLM PIRNIE

February 22, 1996

Mr. Steve Cho
CENAB-EN-HM
USAED - Baltimore
10 South Howard Street
Room 10040
Baltimore, Maryland 21203-1715

Re: Draft Responses to VDEQ Comments
Draft RI Report, Fort Story, Virginia
Contract DACA31-94-D-0017
Delivery Order Nos. 17, 20, and 24

Dear Mr. Cho:

Malcolm Pirnie is pleased to provide to the U.S. Army Corps of Engineers (USACE), Baltimore District, these **Draft Responses to Virginia Department of Environmental Quality (VDEQ) Comments to the *Draft Remedial Investigation Report*** for the Firefighter Training Area, LARC 60 Maintenance Area and Auto Craft Building Area sites at Fort Story, Virginia. These comments were copied to Malcolm Pirnie from a letter from Stephen A. McCall, Chief, Environmental and Natural Resources Division, Fort Eustis to Steve Cho, USACE, Baltimore District, dated February 6, 1996.

Several critical issues in VDEQ's comments include:

- **Comments No. 2 and No. 35.** No pesticide or PCB analysis conducted during the RI. As stated in our responses, pesticide and PCB concentrations from the PA/SI did not exceed trigger levels established in the PA/SI; however, BTAG screening levels are much lower than those triggers levels. VDEQ states this is a data gap and probably is. Please review those comments and our responses and advise.
- **Comments No. 38, No. 52, and No. 68.** VDEQ suggests risk modeling for construction activities to estimate future land use risk for construction workers. Our response agrees and states that the revised human health risk assessment will include this scenario. Please advise if there has been any alternate suggestions for dealing with subsurface soil risk such as stating that "the site decision document will include statement that no excavation will be conducted in these areas" or others.

Mr. Steve Cho
USAED

February 22, 1996
Page 2

- **Comments No. 48, No. 65 and No. 74.** VDEQ suggests assessing residential risk for future land use because there is no way to ensure that Fort Story will remain a military installation in the era of base closure. Our response agrees and states that the revised risk assessment will include this scenario. The risk assessment will include residential exposures to groundwater (as drinking water and lawn watering) as well as exposures to soils, sediment and surface water.

Although we state in the RI Report that the water table aquifer at Fort Story is of poor water quality and the expected withdrawal rate is low (this will probably be revised), there are housing communities in the Fort Story area that are currently developing drinking water wells in the shallow water table aquifer with high yield and only requiring sand treatment for iron and solids.

Please review the enclosed responses (Enclosure No. 1) and provide comments so that we may prepare a Final Response for submission to the Virginia Department of Environmental Quality for their review and comment to resolve these issues prior to completion of the Final RI Report. This draft response report has also been submitted to Dan Musel at Fort Eustis for his review.

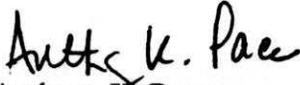
A copy of VDEQ's comments are provided as Enclosure No. 2.

As discussed with you previously, we have initiated the detailed ecological risk assessment as required by VDEQ.

It has been a pleasure to provide this document to the USACE. We look forward to further discussions relative to this project.

Very truly yours,

MALCOLM PIRNIE, INC.


Anthony K. Pace
Senior Project Engineer

amk
0285-588-330

Enclosures

c: Dan Musel, Fort Eustis, w/encl (3 copies)

AKPL0222.WPF

ENCLOSURE NO. 1

**MALCOLM PIRNIE RESPONSES TO VDEQ COMMENTS
DRAFT RI REPORT, FORT STORY, VA**

**RESPONSE TO VDEQ COMMENTS
DRAFT RI FOR FTA, LARC 60 AND AUTO CRAFT SITES
FORT STORY, VA**

COMMENT	RESPONSE
1	Page 2-10: IDW management and disposition for these sites has already been conducted. Future projects at these sites will include IDW management pursuant to the requirements of the VDEQ Policy.
2	Page 2-14: Neither pesticides nor PCBs were detected at concentrations greater than trigger levels established during the PA/SI, and therefore, they were not identified as contaminants of concern and were not included in the RI. The text will be revised to reflect this.
3	<p>Page 2-18: It is not clear which site (FTA or Auto Craft) the reference is made since the text at the top of page 2-18 refers to the Auto Craft site while the text at the bottom of the page refers to the FTA site. It is assumed that since Figures 2-10 and 2-11 show the location of samples collected from the area north of the Auto Craft site that the reference is for the FTA.</p> <p>FTA Site - The northern area of the site was investigated in this RI with four DPT points (#1 through #4), one monitoring well (4MW-1), six surface soil (SS-23 through SS-28), and six soil borings (SB-1 through SB-6) sampled in this area of the site with low levels of various contaminants detected. If the area that VDEQ is referencing is the area north of the site then it is unclear why investigations are required there. No samples were collected from the area north of the road (north of where 4MW-1 and SB-1 were installed during this RI) during previous investigations and no documentation is present that suggests that area was used for industrial operations, storage or past disposal.</p>
4	Page 3-1: Agreed. A detailed revised ecological risk assessment addressing these issues will be conducted. The findings (Section 7.0 of the RI Report) will be submitted to VDEQ for review prior to issuance of the Final RI Report.
5	Page 3-2: Same as response to Comment #4
6	Page 3-10: Based on the estimated groundwater flow direction stated in the PA/SI, monitoring well 4MW-1 was installed as the upgradient location with all parameters including inorganics analyzed for. However, based upon our evaluation, the groundwater flow direction was determined to be towards the Chesapeake Bay to the north. This change in direction makes 4MW-1 a downgradient well and 4MW-4 the upgradient well, however, inorganics were not analyzed at 4MW-4. The text will be revised to reflect this.
7	Page 3-11: There was a typo in the table on Page 3-10. The total arsenic concentration should have read <0.01 not 40.01. The table will be revised.

COMMENT	RESPONSE
8	<p>Page 3-12: The discussion on ecology will be expanded to include fauna including the identification of endangered species for the Fort Story area.</p> <p>A species inventory was conducted by the USACE in 1993 for the Fort Story/Cape Henry region. This list is included as an appendix to the Draft Fort Story Integrated Natural Resource Management Plan prepared by Horne Engineering and Environmental Services in June 1995.</p> <p>A full fauna survey of Fort Story will not be conducted as part of the Ecological Risk Assessment because this process typically takes months to perform. In conjunction with the database established in the Horne report, a biological survey for each site will be conducted. Each site's ecology will be described based on vegetative community. Qualitative vegetative surveys would be performed to note vegetation diversity and abundance (e.g., line intercept or quadrat sampling). Additional faunal surveys (herpetological, avian, and mammalian) would be conducted in the field through limited trapping and incidental occurrence verification. A full list of species that could occur on the base will be included. This list would be compiled from the existing information.</p> <p>By conducting surveys at each site and utilizing the list of species for the region, receptor species can be selected with certainty and species' use of each site can be more accurately determined and fewer assumptions made during the risk modeling process.</p> <p>VDEQ states that site-specific inventories would not account for terrestrial animals that range over larger areas. However, the potential exposure to contaminants for these animals would be reduced due to their larger range and typically these animals are not selected as indicator species. The selection of a species with a smaller range is more conservative and therefore, preferable since the potential risk of exposure is greater</p>
9	<p>Page 4-1: If the results of the USACE NED laboratory analysis are greater for specific compounds than the original sample, the greater results will be reported in the tables in Section 4.0. The raw data results of the NED QA sampling are provided in Appendix D of the Quality Control Summary/ Analytical Results Report (QCS/ARR) and their impacts on data quality discussed in Section 4.2 of the QCS/ARR. Section 4.0 of the RI Report discusses the nature and extent of contamination, not a review of data quality which is discussed in the QCS/ARR.</p>
10	<p>Page 4-1: Agreed. If any of the sites proceed to a Feasibility Study, the ARARs will be refined to a more site-specific basis.</p>
11	<p>Page 4-6: All discussions in Section 4.0 regarding comparison to industrial soil screening criteria are preliminary in nature. The results are compared to the industrial screening criteria only as a means for discussion of the severity or significance of the concentrations detected. The text will be revised to reflect this. The human health risk assessment discusses both the industrial and residential screening criteria and is the primary means for determining impacts.</p>

COMMENT	RESPONSE
12	Table 4-5: As discussed in Section 2.2.9 and the soil leachability subsection of Section 6.2.1, the acetone is probably the result of decon with isopropyl alcohol. In addition, only one acetone detect out of 72 soil samples exceeded the EPA Region III SSLs for Transfers to Groundwater, and therefore, it is very unlikely that an impact to groundwater would occur.
13	Table 4-5: Agreed. The revised ecological risk assessment will address these chemicals.
14	Table 4-5: Agreed. However, the forum for comparison of soil concentrations to residential criteria will be the risk assessment. The tables in the risk assessment section and associated text will be revised to reflect the RBC for industrial (3.8 mg/kg) and residential soils (0.43 mg/kg) for arsenic as a carcinogen.
15	Table 4-5: Agreed. Same as response to Comment #13.
16	Table 4-6: Agreed. Same as response to Comment #13.
17	Page 4-16: Vinyl chloride was not detected by the USACE NED laboratory in the QA sampling. The text will be revised to reflect this. A discussion of potential degradation to vinyl chloride will be made in the fate and transport section of the report.
18	Page 4-20: As stated on page 4-20 and in the third paragraph on page 3-9, our investigations were limited to the site and adjacent to the site. No evaluation of the suspected groundwater divide discussed in the PA/SI could be made. As shown on Figure 2-3 in the PA/SI and Figure 3-5 in the RI report, the FTA site is located on a relatively flat groundwater area with minimal gradient. There is insufficient data available to determine the exact location of the groundwater divide. However, because groundwater elevations are greater in wells (4MW-3 and 4MW-4) south of the site than wells on the site, the groundwater divide may be south of 4MW-4. The text will be revised to reflect this.
19	Table 4-9: A comparison to residential criteria is provided in the risk assessment.
20	Table 4-9: A discussion of the leachability of methylene chloride and TCE in the soils at the LARC 60 site is provided in the risk assessment section (page 6-14). Additional discussions related to methylene chloride and TCE leachability will be added to the Fate and Transport Section.
21	Table 4-9: Comparison to residential criteria for arsenic is provided in the risk assessment section, but as discussed for Comment #14, the text and tables will be revised to include the carcinogenic RBC for arsenic.

COMMENT	RESPONSE
22	<p>Page 4-23: As discussed in paragraph 2 on page 6-12 of the risk assessment, impacts to the site are evaluated based on the concentrations of the hazardous constituents associated with petroleum hydrocarbons, primarily BTEX and PAHs. No additional text is required.</p>
23	<p>Table 4-11: As stated in the response to Comment #11, the comparisons made in Section 4.0 are only as a means to describe the significance of the concentrations of chemicals detected. Surface water quality criteria are used in the risk assessment to evaluate the contaminants detected in surface water.</p> <p>A revised ecological risk assessment will evaluate the data versus the BTAG screening levels and federal and state surface water quality criteria for aquatic organisms.</p>
24	<p>Table 4-12: A discussion of these compounds' impacts on the site are discussed in the risk assessment. The text in Section 4.0 describes the nature and extent of contaminant, not associated impacts.</p>
25	<p>Table 4-12: Total and dissolved arsenic impacts are discussed in the risk assessment and fate and transport sections. The text in Section 4.0 describes the nature and extent of contaminant, not associated impacts.</p>
26	<p>Page 4-34: Vinyl chloride was not detected by the USACE NED laboratory. The text will be revised to reflect this.</p>
27	<p>Table 4-13: The impacts associated with volatile organics in groundwater at the LARC 60 site are discussed in the risk assessment. Migration potential is discussed in the fate and transport section.</p>
28	<p>Table 4-13: As previously stated, the screening in Section 4.0 is to provide some general significance to the data, not to screen the data. A discussion of metal concentrations in groundwater to all standards and criteria including the Virginia Groundwater Standards is provided in the risk assessment, however, only dissolved data is used because this indicates the component that could potentially migrate to receptors.</p> <p>As stated in the last paragraph on page 2-19, due to the high suspended solids present due to the DPT sampling procedure, no dissolved samples could be collected. However, data collected from the monitoring wells indicated that no dissolved cadmium, chromium or lead were detected indicating that these metals detected in the total samples from the wells and DPT points are associated with sediment not groundwater. Zinc was detected in only 1 dissolved sample and at concentrations less than all standards and criteria. Arsenic was identified as a chemical of potential concern in the risk assessment due to its high dissolved concentrations. Additional text will be added to the fate and transport section further discussing the relationship between the total and dissolved data.</p>

COMMENT	RESPONSE
29	Page 4-38: The highest concentrations measured were within the former UST pit where the leaks probably occurred. If the concentrations of the chlorinated organics are not above 1% of the solubility limit at this location, it is unlikely that a DNAPL is present. Numerous groundwater samples have been collected in the shallow and deeper areas of the water table aquifer downgradient of the pit and no DNAPL has been detected. Additional groundwater monitoring in this area is unnecessary.
30	Page 4-39: Agreed. The text will be revised to include a discussion for potential degradation to vinyl chloride. This information will also be included in the fate and transport section.
31	Table 4-14: A detailed discussion of the potential leachability and transfer to groundwater for these compounds is provided in the risk assessment section on page 6-20 for Soil Leachability for the Auto Craft site.
32	Table 4-14: They are compared in the risk assessment on page 6-20.
33	Table 4-14: The industrial and residential RBC for arsenic as a carcinogen will be added to the risk assessment and further evaluations will be made to discuss its impacts.
34	Page 6-3: Agreed. A revised ecological risk assessment will include all of these factors and potential receptors.
35	Page 6-3: As stated in the response to Comment #2, neither pesticides nor PCBs were detected at concentrations greater than trigger levels established during the PA/SI, and therefore, they were not identified as contaminants of concern and were not included in the RI. However, as VDEQ states, pesticides and PCBs may play a significant role in determining ecological risk. If the results of the ecological risk assessment indicate that a risk to the environment is present from metals and additional investigations are necessary to define the extent of metal contamination then additional analysis to include pesticides and PCBs can be included.
36	Page 6-3: As stated on page 4-2 in the Final Work Plan dated December 1994, due to their infrequent detection during the PA/SI with concentrations typically lower than the trigger levels, only 20 percent of soil samples were analyzed for total metals to determine whether significant levels were present. If the results of the ecological risk assessment indicate that metals are at unacceptable levels due to adverse risks to the environment then additional investigation to establish the extent of metal contamination may be necessary.
37	Agreed. The use of the 95th UCL is preferred over the use of maximum concentrations in order to more accurately assess risk. However, because of the 20% screening conducted for metals, insufficient numbers of samples are available to calculate UCLs and maximum concentrations will be used for the quantitative risk assessment calculations.

COMMENT	RESPONSE
38	Page 6-5: Agreed. A future scenario to include potential exposure to soils through construction activities will be evaluated in the revised risk assessment.
39	Table 6-1: The EPA Region III RBCs for non-carcinogens will be adjusted to a target hazard quotient of 0.1 by dividing the RBCs by a factor of 10 because of the detection of multiple contaminants within each media.
40	Agreed. The RBCs for arsenic as a carcinogen will be added to all risk assessment tables.
41	Table 6-2: Although the aluminum data was rejected during data validation, they are evaluated in the risk assessment. This is a conservative approach to evaluating risk.
42	The "F" designated denotes filtered or dissolved samples. The data summary tables in the QCS/ARR provide the results of MW-211F which is a duplicate sample of MW-112F, thereby, showing 4 samples instead of the 3 shown in Table 4-7 and 6-2 of the RI report. The tables in the RI report show the highest concentration of a given compound detected, whether in the original, duplicate or QA split sample. All analytical data will be reviewed again to ensure that the highest concentration detected for each contaminant is presented in the data tables in Sections 4.0 and 6.0.
43	Tables and text will be revised to show barium concentration of 0.14 mg/l for 4MW-2F.
44	Same as response to Comment #39.
45	<p>Table 6-3: Same as response to Comment #39.</p> <p>The carcinogenic RBC for arsenic will be added to the table.</p> <p>The RBCs for thallium carbonate, thallium chloride and thallium sulfate will be used for the thallium. These RBCs are the lowest for the thallium compounds.</p>
46	Page 6-7: The exposure assessment will be expanded to discuss site controls, surrounding land use, and base housing.
47	Page 6-8: Since there are no current potable or non-potable users of the groundwater at Fort Story, no quantitative analysis will be conducted for the "Current Situation". An evaluation of the potable use of the aquifer will be made for the "Future land Use" scenario.
48	Page 6-8: A residential scenario will be evaluated for the revised human health risk assessment. Base worker scenarios will be quantitatively evaluated if COPC are identified from comparison to screening levels and it is determined that an exposure pathway is available.

COMMENT	RESPONSE
49	Page 6-8: Agreed. A quantitative evaluation will be conducted if screening levels are exceeded and exposure pathways are complete.
50	Page 6-10: Agreed. If COPC for surface soils at the FTA site are identified in the revised risk assessment, a quantitative evaluation will be conducted for inhalation exposures.
51	Page 6-10: A revised ecological risk assessment will be conducted that addresses these issues.
52	Page 6-11: Same as response for Comment #38.
53	Table 6-7: Same as response to Comment #39. Carcinogenic RBC for arsenic will be added to the table and associated text.
54	Table 6-8: Same as response to Comment #39 for RBCs adjustment and same as response to comment #54 for arsenic RBC.
55	<p>Tables 6-8 and Table 4-12 will be revised to show a dissolved arsenic result of 0.04 ug/l instead of 0.045 ug/l. Only dissolved inorganic data is provided.</p> <p>Table 6-8 will be revised to show a dissolved barium concentration range of 0.012 to 0.07 ug/l instead of 0.012 to 0.072 ug/l. Table 4-12 will also be revised.</p> <p>Table 6-8 will be revised to show cis 1,2-DCE results at 20 to 150 ug/l. As shown on Table 4-13, the on-site lab detected the 150 ug/l at GW06-002. The other detects were 20 ug/l at GW06-003 and 20 ug/l at MW-711 (which is a duplicate sample of MW-117 which was 19 ug/l). In all cases, the highest concentration is noted whenever duplicates, QA splits or on-site analysis was conducted.</p> <p>Table 6-8 will be revised to show TCE results at 18 to 260 ug/l instead of 18 to 180 ug/l. Also the frequency of detection should be 4/33 instead of 3/33.</p> <p>Table 6-8 will be revised to show tetrachloroethene at 8.5 to 170 ug/l instead of 8.5 to 160 ug/l. In all cases, the highest concentration is noted whenever duplicates, QA splits or on-site analysis was conducted. Sample MW-711 is a duplicate of MW-117 and the highest PCE concentration (8.5 ug/l) was noted.</p> <p>Table 6-8 will be revised to show xylenes at 37 to 2,900 ug/l instead of 37 to 3,100 ug/l.</p>
56	4-Methyl-2-pentanone (methyl isobutyl ketone - MIBK) will be added to Table 6-8 and the associated text discussing its potential risk.
57	Table 6-9: Same as response for Comment #39.

COMMENT	RESPONSE
58	Table 6-10: Summary tables for surface water samples will be added to the QCS/ARR.
59	Page 6-14: In addition to PCE only exceeding the SSL in 1 of 49 samples, PCE was only detected in 3 of 49 samples. Although PCE is a COPC in groundwater, soil results indicate that the majority of PCE may have already leached out due to a high infiltration rate associated with the sands present in the subsurface. The exceedance of the one PCE result does not justify continued analysis.
60	Page 6-14: Methylene chloride was detected in the USACE NED split samples, however, they had a "B" designation indicating that it was also detected in the lab blank samples. The QC data including lab blanks did not demonstrate widespread methylene chloride detects. The risk assessment will be revised to include methylene chloride as COPC for soil leachability.
61	Page 6-15: Same as response to Comment #46.
62	Page 6-15: Same as response to Comment #47.
63	Page 6-16: Same as response to Comment #48.
64	Page 6-16: Same as response to Comment #49.
65	<p>Table 6-15: The fluoranthene result of 5,800 ug/kg and benzo(g,h,i)perylene result of 2,000 ug/kg at SB07-001-01 are correct. The summary table result does not include the results from a dilution sample run. The pyrene result of 11,000 ug/kg reported in Table 4-14 and 6-15 exceeded the calibration range, however, as a conservative approach, the number was used in the risk assessment evaluation. The summary table only reports the 9,000 ug/kg result because it was within acceptable reporting quality.</p> <p>Table 6-15 is an evaluation of surface soils. Only 1 metal result was available for surface soils.</p> <p>The greatest concentration whether in original, duplicate, QA split or dilution sample was used in the risk assessment.</p> <p>The nickel result will be added to Table 4-14 and evaluated in the hazard assessment in the revised risk assessment.</p> <p>As previously stated, this hazard assessment addresses potential exposures to surface soils, the arsenic detect of 1.5 mg/kg was in sample SB07-004-24 which is a subsurface sample collected at a depth of 2 to 4 feet below land surface. The evaluation of subsurface soil contaminant concentrations will be addressed in the future land use scenario for construction activities.</p>

COMMENT	RESPONSE
66	Same as response to Comment #39 and Comment #53.
67	Arsenic will be added to the COPC list in the revised risk assessment. However, as stated on page 6-19, the PAHs present are probably the result of leaching from the asphalt and should not be included as COPC. Even if they were selected, due to the presence of an asphalt parking lot over these soils, there is no potential for exposure.
68	Page 6-19: A future scenario to include exposure through construction activities will be quantitatively evaluated.
69	The last paragraph will be revised to state that "although several PAHs exceeded EPA RBC, they are probably related to asphalt leaching rather than to petroleum leaks or spills."
70	The sampling location (SB07-001) is upgradient of the former Auto Craft building with no historical evidence that any petroleum hydrocarbons were spilled or leaked at this area. The base intends to maintain the integrity of the asphalt parking lot at this site.
71	Page 6-21: This paragraph will be revised to include a discussion of the limited data available for metals as related to the potential for barium leaching. Continued groundwater monitoring at this site is expected and if barium is detected in future sampling, further evaluations can be made to the potential for significant leaching of metals. At this time, the barium levels and detection frequencies do not indicate a potential leaching problem.
72	Page 6-21: Same as response to Comment #46.
73	Page 6-21: Same as response to Comment #47.
74	Page 6-22: Same as response to Comment #48.
75	Page 6-22: Same as response to Comment #49.
76	A discussion on the uncertainty will be added to the revised risk assessment.
77	Page 6-22: Ecological inventories will be included in the revised Ecological Risk Assessment.
78	Page 6-23: The revised ecological risk assessment will address potential exposures at receptors in the Chesapeake Bay and Atlantic Ocean and through the soil to air pathway.
79	Table 6-18: Agreed. The revised ecological risk assessment will evaluate exposures to the PAHs.

COMMENT	RESPONSE
80	Section 7: This section will be revised based on the results of the revised risk assessment.
81	Section 8: This section will be revised based on the results of the revised risk assessment.

ENCLOSURE NO. 2

**VDEQ COMMENTS TO DRAFT RI REPORT
FORT STORY, VA**



DEPARTMENT OF THE ARMY

U. S. ARMY TRANSPORTATION CENTER

FORT EUSTIS, VIRGINIA 23004-5000

February 6, 1996

REPLY TO
ATTENTION OF:

Directorate of Public Works

MEMORANDUM FOR Commander, US Army Corps of Engineers, Baltimore District,
HTRW Branch, ATTN: CENAB-EH-HM (Steve Cho),
Baltimore, Maryland 21201

SUBJECT: Fort Story Draft Remedial Investigation Report Review Comments

1. Enclosed are Virginia Department of Environmental Quality's review comments for the *Draft Remedial Investigation Report, Firefighter Training Area, LARC 60 Maintenance Area, Auto Craft Building Area, Fort Story, Virginia* dated December 1995. As part of this project, Malcolm Pirnie needs to respond to these comments before the Final Report is produced.

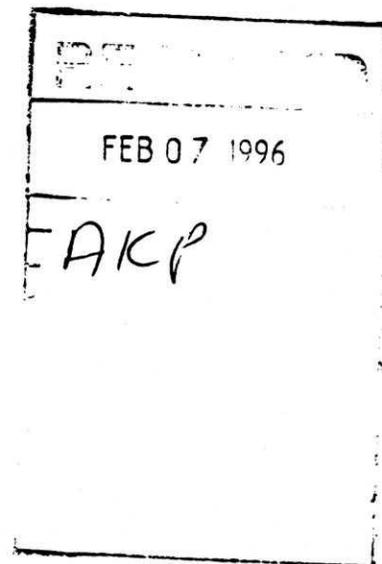
2. We will mail a copy of these comments to Mr. Tony Pace at Malcolm Pirnie. If you have any questions, please contact Mr. Dan Musel at (804) 878-3817.

Encl


Stephen A. McCall
Chief, Environmental and
Natural Resources Division

Copy Furnished:

Malcolm Pirnie, Tony Pace





COMMONWEALTH of VIRGINIA
DEPARTMENT OF ENVIRONMENTAL QUALITY

Peter W. Schmidt
Director

P. O. Box 10009
Richmond, Virginia 23240-0009
(804) 762-4000

February 1, 1996

Commander
US Army Transportation Center
ATZF-PWE (Musel)
Building 1407, Room 111
Fort Eustis, Virginia 23604-5332

Dear Mr. Musel:

Thank you for providing the Department of Environmental Quality, Office of Federal Facilities Restoration and Superfund, the opportunity to review the draft "Remedial Investigation Report Firefighter Training Area, LARC 60 Maintenance Area, Auto Craft Building Area, Fort Story, Virginia, December 1995".

Attached are the staffs' comments concerning the Fort Story Report. If you have any questions concerning these comments please contact me at (804) 698-4192.

Sincerely,

A handwritten signature in cursive script that reads "Durwood H. Willis".

Durwood H. Willis
Office of Federal
Facilities Restoration and
Superfund

Attachments

cc: Erica S. Dameron, DEQ
Larry McBride, DEQ

Comment on the draft "Remedial Investigation Report
Firefighter Training Area, LARC 60 Maintenance Area,
Auto Craft Building Area, Fort Story" December, 1995.

1. Page 2-10: Section 2.2.10 Investigation Derived Waste Management-Please find attached the Department of Environmental Quality Policy regarding investigation derived wastes.
2. Page 2-14: The PA/SI for several sites included in this RI indicated that pesticides or PCBs were detected. This class of compounds were not evaluated in the RI. Some explanation should be provided as to the reason for not evaluating the pesticide/PCB fraction in this RI. Comments on the ecological risk will also address this point.
3. Page 2-18: It is noted that samples were not collected north of the site. In a comment provided by the staff in October, 1991 it was suggested that the area north of the site be further investigated, even though the contaminant levels were low. Some additional discussion of the determination not to sample in the north area seems appropriate.
4. Page 3-1: Physical Characteristics. This section states that the land features at Fort Story consist of sand ridges, sand flats, and wetland areas. These areas as well as the Chesapeake Bay and Atlantic Ocean are all potential targets and should be addressed in an ecological assessment.
5. Page 3-2, Section 3.1.3: This section states that "surface water on Fort Story is conveyed by drainage ditches or storm water lines to the Chesapeake Bay on the northwestern portion of the facility, to the Atlantic ocean on the northeast portion of the base, to wetland areas adjacent to Broad Bay on the southern portion of the facility". These areas are all potential targets and need to be addressed in an ecological assessment with sampling results included and continued monitoring.
6. Page 3-10: It is not clear why no inorganic analyses were performed for the upgradient well at the Firefighter Training Area.
7. Page 3-11: The first paragraph on this page indicates that arsenic was not detected in the upgradient wells. However, the table on the previous page indicates an arsenic concentration of 40.01 mg/L in well MW-118. The data validation summary table indicates that arsenic was undetected at this well. Please clarify.

Mr. Dan Musel
Fort Story
Page 2

8. Page 3-12: Section 3.1.6. Ecology-This section should address fauna as well as flora. It is difficult, or impossible, to know if receptors are exposed to the contaminated media when it is unknown what potential receptors exist on or near the sites. It is recommended that a species inventory be performed at Fort Story to establish potential receptors. Performing site specific inventories would not account for terrestrial animals that range over larger areas.
9. Page 4-1: Section 4 Nature and Extent of Contamination-The results of the quality assurance checks by the U.S. Army Corps of Engineers New England Division (NED) Laboratory should be provided and discussed.
10. Page 4-1: Section 4.1.1 Definition of ARARs-Attached is a preliminary identification of Commonwealth of Virginia ARARs. This information identifies state statutes and regulations which may serve as ARARs. As the site proceeds to the feasibility phase these ARARs may be refined or expanded.
11. Page 4-6: Section 4.3.1 Surface and Subsurface Soils-Is access to this site(s) sufficiently restricted to justify the use of the industrial soil screening criteria?
12. Table 4-5: Fire Training Pit Soils Data-Volatile Organic Compounds. The concentration of acetone in SB04-022 may be sufficient to result in transfer from soil to groundwater.
13. Table 4-5: The concentrations of fluoranthene and pyrene at all sampled soils levels in SB04-022 exceed the Biological Technical Assistance Group (BTAG) screening levels for ecological risk (100 ppb for fluoranthene and pyrene).
14. Table 4-5: The total metals data indicate that levels of arsenic in several soil samples at the Fire Training Pit exceed the EPA Region III Risk Based Concentration (RBC) for residential soils.
15. Table 4-5: From an ecological risk perspective chromium, copper, lead and zinc may pose some concern at the Fire Training Pit and should be compared to the BTAG screening levels.
16. Table 4-6: Fire Training Area-Sediment. The concentration of lead exceeds the BTAG screening level for ecological risk in SD04-001.
17. Page 4-16: Fire Training Area-Groundwater. It is indicated that vinyl chloride concentrations detected by onsite methods could not be confirmed by offsite lab analysis. How

did the New England Division Lab data compare to the onsite lab and the Savannah Lab? Vinyl chloride is a degradation product of perchloroethylene (PCE) and trichloroethylene (TCE) and could be present in future samples even if not confirmed at this time.

18. Page 4-20: This section of the report mentions a change in flow direction from previous determinations. Does this statement relate to the issue in the PA/SI on pages 2-37 and 2-38 concerning a groundwater divide? Please clarify.
19. Table 4-9: Soil Results for the LARC 60 Area. While the data indicate the concentrations are less than the industrial screening level, some consideration should be given to the residential level proposed by EPA since Fort Story is not a restricted access Area. This issue of residential versus industrial will be addressed in the risk assessment section.
20. Table 4-9: Levels of methylene chloride greater than 10 ppb would have the potential to transfer from soil to groundwater. A number of soil boring samples contained methylene chloride concentrations greater than this level and the impact on groundwater should be discussed. The levels of TCE in several samples were also at concentrations at which groundwater would be impacted. Please address TCE in the discussion.
21. Table 4-9: The levels of arsenic in SB06-001 (0-1 ft) and (5-7 ft) exceed the EPA region III RBC for residential exposure in soil of 0.37 mg/kg.
22. Page 4-23: Twenty-nine soil samples had total petroleum hydrocarbons as heavy oils at concentrations greater than the screening level of 100 mg/kg. What is the impact of these concentrations on the site?
23. Table 4-11: Surface Water Results. The surface water data should be compared to Virginia's Surface Water Standards VR 680-21-00, May 20, 1992.
24. Table 4-12: The groundwater data in Table 4-12 indicates tetrachloroethene (PCE) and trichloroethene (TCE) have MCLs of 5 ppb. Concentrations of PCE and TCE in MW-117 exceed the 5 ppb MCL. Please discuss the impact of these compounds.
25. Table 4-12: The concentrations of total and dissolved arsenic in MW-117 exceeds the Virginia Groundwater Standard as well as the EPA Region III RBC. This should be addressed.
26. Page 4-34: Was vinyl chloride detected in the samples sent to the New England Division Laboratory?

Mr. Dan Musel
Fort Story
Page 4

27. Table 4-13: The MCLs for cis 1,2-DCE, toluene, TCE and PCE were exceeded in several groundwater samples. Please discuss the significance of these compounds in groundwater.
28. Table 4-13: Metals concentrations in Table 4-13 should be compared to the Virginia Groundwater Standards. The following metals appear to exceed the standards in one or more groundwater samples: arsenic, cadmium, chromium, lead, and zinc.
29. Page 4-38: While the concentration of PCE, TCE, or DCE may not exceed the 1% to 10 % rule of thumb, the level of solvents present would suggest that the groundwater may be contaminated with DNAPL and if the sampling was expanded the non-aqueous phase may be located.
30. Page 4-39: Some discussion of vinyl chloride as a degradation product seems appropriate since vinyl chloride is one of the final breakdown product of PCE and TCE.
31. Table 4-14: The concentration of methylene chloride and TCE in SB07-001 (0-1 ft) would indicate a potential transfer to groundwater.
32. Table 4-14: The levels of semivolatile organic compounds in soil should be compared to the EPA soil screening levels for transfer from soil to groundwater.
33. Table 4-14: Arsenic exceed the residential screening concentrations for soils compared to the EPA Region III RBC Tables.
34. Page 6-3: Ecological Risk Assessment. A significant exposure pathway which has been overlooked includes groundwater to surface water (i.e., Chesapeake Bay and the Atlantic Ocean) where aquatic receptors could be exposed. Groundwater flow information obtained from the monitoring wells (including the direct push technology) indicates contaminated groundwater from the Fire Training Area (FTA) likely discharges to the Chesapeake Bay, and contaminated groundwater from the LARC 60 Area and the Auto Craft Area likely discharge to the Atlantic Ocean. A preliminary evaluation using EPA Region III's interim guidance should be conducted. The groundwater Contaminants of Potential Concern (COPCs) and the BTAG aquatic marine values should be used to calculate an EEQ (or hazard quotient). The calculated EEQ will dictate whether additional studies are necessary (e.g., modelling studies).
35. Page 6-3: Ecological Risk Assessment

The collection of pesticide and PCB data has been excluded from the Remedial Investigation at all three sites. Data presented in the Preliminary Assessment Report Addendum for Fort Story, VA shows DDT and its metabolites were detected in the surface soil at all three sites. It is also noted that PCBs were detected in the sediments at Site 8, which comprises the drainage outfall line for the LARC maintenance area. Since these chlorinated compounds were detected during an earlier study, this by itself is a valid reason to have included these compounds in the RI. These compounds generally play a significant role in the evaluation for ecological risk. This is considered a data gap.

36. Page 6-3: Ecological Risk Assessment
Relative to the number of surface soil samples/soil borings collected at each site, limited samples were analyzed for total metals. This concern is raised since the metals that have been detected in the surface soils and sediments appear to be the COPCs driving the ecological risk. In fact, when EEQ's are calculated for these contaminants, many of the calculated numbers are well above the values established in the Region III guidance which suggest there is potential for moderate ($EEQ \geq 10$) to extreme risk ($EEQ \geq 100$). With limited metals data, the extent of contamination may not be fully delineated.
37. A shortage of metals data also precludes the use of the 95% Upper Confidence Level (UCL). In order to calculate a statistically valid UCL, a minimum of 7 independent data points at each site for that medium are necessary. This is important because the EEQ calculations derived by VDEQ are based on the maximum concentrations which may be overly conservative (unless hot spots exist).
38. Page 6-5: The third paragraph on this page indicates that there is no opportunity for human contact with subsurface soils as long as they are not disturbed. For the future use scenario, it should be assumed that construction activities may occur in the future and subsurface soils could be brought to the surface and be available for direct contact.
39. Table 6-1: The Region III risk based concentrations (RBCs) should be adjusted to a target hazard quotient of 0.1 for noncarcinogens. (Divide noncarcinogen RBCs by 10.)
40. The RBC values for arsenic on this table are for noncarcinogenic effects. The RBC for carcinogenic effects should also be included.
41. Table 6-2: The values shown as the minimum and maximum

highly disturbed from numerous training and operational activities (little or no vegetation is present), and no minimal habitat is available, no pathways for exposure are present. Therefore, no impacts to the environment through contact with surface soils from the site are expected". Due to the lack of vegetative cover, soil contaminants are likely to be transported through the air pathway.

51. Page 6-10, Section 6, Baseline Risk Assessment FTA site: This section indicates that several metals were detected at concentrations above EPA Region III BTAG screening levels in the lowland area. This section also indicates that "because sediment is covered with a minimum of three inches of pine needles and leaves, no exposure pathway is identified for wildlife to the sediment in the lowland area". It is not clear how this would prevent exposure to wildlife. Please provide an explanation to how wildlife and ecological receptors would not be at risk. It is also a valid pathway for the transport and migration of contamination.
52. Page 6-11: The third paragraph on this page indicates that there is no opportunity for human contact with subsurface soils as long as they are not disturbed. For the future use scenario, it should be assumed that construction activities may occur in the future and subsurface soils could be brought to the surface and be available for direct contact.
53. Table 6-7: As noted above, the RBCs on this table should also be adjusted to a target hazard quotient of 0.1 and the RBC for carcinogenic effects for arsenic should also be included. This will effect the conclusion on the top of page 6-12.
54. Table 6-8: As noted above, the RBCs on this table should also be adjusted to a target hazard quotient of 0.1 and the RBC for carcinogenic effects for arsenic should also be included. This will result in additional contaminants exceeding the screening levels.
55. The maximum values listed on Table 6-8 for arsenic, barium, cis-1,2-dichloroethene, trichloroethene, tetrachloroethene, and xylenes could not be verified from the summary tables. Please clarify.
56. It also appears that two detections of 4-methyl-2-pentanone were not included on the hazard assessment table.
57. Table 6-9: As noted above, the RBCs on this table should also be adjusted to a target hazard quotient of 0.1

Mr. Dan Musel
Fort Story
Page 8

58. Table 6-10: Summary tables for surface water samples could not be located to verify the table values. Federal Ambient Water Quality Criteria for manganese should also be included on this table.
59. Page 6-14: The third paragraph on this page indicates that additional impacts to groundwater quality due to leaching of tetrachloroethene (PCE) would not be anticipated since the concentration exceeded the soil screening level in only one sample. However, PCE is a contaminant of potential concern in groundwater. Therefore the potential for leaching to groundwater should not be ruled out at this time.
60. Page 6-14, Section 6: This section states that "Methylene chloride is a common laboratory contaminant which may account for the widespread detection in site soils". While it is true that methylene chloride is a common laboratory contaminant, it should not show widespread detection in soils. Was methylene chloride detected in samples sent to the New England Lab? Were lab blanks analyzed which would indicate the level of lab contamination?
61. Page 6-15: The exposure assessment should also describe site access controls and surrounding land use as discussed in a previous comment. Could children or other trespassers wade in the ditch at this site?
62. Page 6-15 (Current Situation): Since the aquifer is apparently capable of supporting non-potable uses, the risk due to exposure to groundwater during nonpotable use should be assessed quantitatively for any contaminants exceeding the screening level.
63. Page 6-16 (Future Land Use): Since the decisions concerning base closure are not made by the facility, continued government ownership cannot be assumed. For risk assessment purposes, the most conservative scenario (residential) should be assumed for future use of the installation. In addition, military and civilian workplace scenarios should be assessed for contaminants that exceed the screening levels.
64. Page 6-16 (Human Health Evaluation Summary): If the results of the risk-based screen change due to the above comments, a quantitative assessment of risk should be performed. The conclusions should be revised as appropriate.
65. Table 6-15: The concentrations shown for fluoranthene, pyrene, and benzo(g,h,i)perylene could not be verified from the summary tables. For metals, it is not clear why there

is only one sample when two are shown on the summary table. If these are duplicate samples, why were they taken on different days? Please discuss how duplicate samples were treated for risk assessment purposes. Why is the nickel detection not included in the hazard assessment? Why is the maximum arsenic concentration shown as 1.3 mg/kg when sample SSB07-004-24 had a detection of 1.5 mg/kg?

66. As noted above, the RBCs on this table should also be adjusted to a target hazard quotient of 0.1 and the RBC for carcinogenic effects for arsenic should also be included. This will result in additional contaminants exceeding the screening levels.
67. Arsenic, benzo(a)anthracene, benzo(b)fluoranthene, benzo(a)pyrene, and indeno(1,2,3-cd)pyrene should be listed as contaminants of potential concern on this table.
68. Page 6-19: The second paragraph on this page indicates that there is no opportunity for human contact with subsurface soils as long as they are not disturbed. For the future use scenario, it should be assumed that construction activities may occur in the future and subsurface soils could be brought to the surface and be available for direct contact.
69. The last paragraph on this page (and the top of the following page) indicates that PAHs were less than the RBCs although the previous paragraph indicates that some PAHs exceeded RBCs. The last paragraph should be modified accordingly.
70. While it is probably true that the levels of PAHs detected at this site are consistent with leaching from asphalt, the levels would also be consistent with used motor oil. Is there any way to definitively link the contaminants to the asphalt cover? It would be preferable to assess risk for those contaminants that exceed RBCs. However, if the installation chooses not to, it should be noted that any decision document related to this site should include a provision to maintain the integrity of the asphalt cover.
71. Page 6-21: The first paragraph on this page states that there is only minimal potential for barium to impact groundwater quality since it was only detected in one sample above the soil screening level. However, metals were analyzed in only a limited number of samples. It is therefore difficult to justify this statement.
72. Page 6-21: The exposure assessment should also describe site access controls and surrounding land use. For example,

Mr. Dan Musel
Fort Story
Page 10

is there housing on the installation? Is the site fenced?
Could children or other trespassers access the site?

73. Page 6-21 (Current Situation): Since the aquifer is apparently capable of supporting non-potable uses, the risk due to exposure to groundwater during nonpotable use should be assessed quantitatively for any contaminants exceeding the screening level.
74. Page 6-22 (Future Land Use): Since the decisions concerning base closure are not made by the facility, continued government ownership cannot be assumed. For risk assessment purposes, the most conservative scenario (residential) should be assumed for future use of the installation. In addition, military and civilian workplace scenarios should be assessed for contaminants that exceed the screening levels.
75. Page 6-22 (Human Health Evaluation Summary): If the results of the risk-based screen change due to the above comments, a quantitative assessment of risk should be performed. The conclusions should be revised as appropriate.
76. A section presenting an uncertainty analysis should be added to the risk assessment.
77. Page 6-22: Section 6 Baseline Risk Assessment, Ecological Assessment. According to this section, on-site vegetation and wildlife inventories were not conducted as part of this investigation. Ecological inventories should be developed for all of the sites in this investigation.
78. Page 6-23, Section 6, Groundwater/Soil: This section states that "groundwater probably discharges to the Atlantic Ocean", but that "no impacts to the environment through groundwater contact are expected, and no potential ecological risk will be conducted". Due to the Atlantic Ocean being a potential target, an ecological risk assessment should be done to determine the effect, if any that these contaminants are having on it. This section also states that because the site is partially paved and little vegetative cover exists, that no impact to the environment through contact with the surface soils from the site are expected. Due to the lack of vegetative cover, soil contaminants are possibly transported through the air pathway.
79. Table 6-18: In the ERA portion of Section 6 for the Auto Craft Building Area, Table 6-18 does not identify many of the PAHs as "Potential Concern?" Please note that 10 of

Mr. Dan Musel
Fort Story
Page 11

these compounds exceed the Fauna BTAG screening levels plus the majority have EEQs >10.

80. Section 7: This section may need revision after revision of the baseline risk assessment.
81. Section 8: The no further action recommendations cannot be supported until human health risk is adequately assessed at the sites. The groundwater at the LARC 60 site is a particular concern. In the section on fate and transport, it was noted that levels of degradation products of tetrachloroethene (PCE) have increased since the PA/SI. Note that vinyl chloride, a degradation product of PCE, is more toxic than the original compound and may be a concern in the future. Therefore, at the very least, continued groundwater monitoring should be considered.

Department of Environmental Quality
Waste Operations
Policy for the Handling of
Investigation Derived Waste (IDW)

The Department of Environmental Quality (DEQ), Waste Operations has received a request for guidance from the regulated community concerning the Commonwealth of Virginia's requirements regarding the management and disposal of investigation derived waste (IDW). Because Virginia administers an authorized state RCRA program, the Virginia Solid Waste Management Regulations (VSWMR) and the Virginia Hazardous Waste Management Regulations (VHWMR) will serve as the governing requirements in lieu of Federal RCRA regulations contained in the Code of Federal Regulations (40 CFR 260 - 270) except for the Land Disposal Restrictions of 40 CFR 268. For reference, please see the Virginia Waste Management Act, Code of Virginia §10.1-1400 et seq.; the Virginia Hazardous Waste Management Regulations (VHWMR) (VR 672-10-1); the Virginia Solid Waste Management Regulations (VSWMR) (VR 672-20-10); Federal: the Resource Conservation and Recovery Act (RCRA), 42 USC 6901; and the U. S. Department of Transportation Rules for the Transportation of Hazardous Materials, 49 CFR Part 107, 171.1 - 172.558.

With regard to IDW, it is the site manager's responsibility to determine whether the wastes generated during an investigation meet the definition of a solid or hazardous waste. The site manager will be either the on-scene coordinator (i.e., either the federal official predesignated by the Environmental Protection Agency (EPA) or the U.S. Coast Guard to coordinate and direct federal responses under subpart D or the official designated by the lead agency to coordinate and direct removal actions under subpart E of the National Contingency Plan (NCP)), or the remedial project manager (i.e., the official designated by the lead agency to coordinate, monitor, or direct remedial or other response actions under subpart E of the NCP).

If there is a possibility that either the ground water or the soil at the location where a monitoring well is installed is contaminated, the site manager must determine whether or not the well cuttings, purge water, and/or other IDW are contaminated (i.e., whether they are solid or hazardous wastes). In these cases, the site manager may use knowledge of the contaminated media to declare that the IDW is solid or hazardous waste. If analysis shows that no contamination is present in the soil or the ground water at the location where the monitoring well is installed, neither the well cuttings, nor the purge water would be regulated as a solid waste. An example of a situation where the site manager might use knowledge to determine proper disposition (i.e., testing would not be required) would involve materials generated at locations where wells are installed for the purpose of ascertaining naturally occurring levels of

inorganic constituents and there is no basis to expect contamination, i.e., there is no past history of hazardous waste management activities or releases in these areas. If this is the case, the soils, cuttings, purge water, etc. would not be regulated as solid wastes. Test results or knowledge of the waste should be used to screen the well cuttings, purge water and other IDW to demonstrate that concentrations of contaminants are below or equal to background levels.

Purge water, well cuttings from monitoring wells, and other IDW, if tested, must be done so in accordance with EPA SW-846, Test Methods for Evaluating Solid Wastes, Physical/Chemical Methods, 3rd edition, 1986, as updated. If contaminant levels are found to be above background levels, the IDW would be considered a solid waste. Should test results further indicate that the IDW contains a listed hazardous waste, or if the IDW exhibits a characteristic of hazardous waste, the IDW is a hazardous waste and must be managed and disposed in accordance with the VHWMR. Alternatively, contaminated IDW that contains a listed hazardous waste must be managed as a hazardous waste until it no longer "contains" the hazardous waste, i.e., until the constituent levels are below site specific risk based levels. This is consistent with EPA's Contained In Policy. The DEQ should be contacted directly to determine the site specific risk based levels that would apply to IDW that contains listed hazardous waste.

If the IDW is not a hazardous waste, but contains levels of contaminants above background levels, the IDW must be managed in accordance with the VSWMR. Solid waste generated from cleanup or investigation activities is considered a special waste under Part VIII of the VSWMR. Prior to acceptance of a special waste for disposal at a solid waste management facility, the operator must obtain prior authorization from the Department. Purge water, on the other hand, must be disposed at a publicly owned treatment works (POTW) or other wastewater treatment system operating in accordance with its Virginia Pollutant Discharge Elimination System (VPDES) permit, provided that all other pertinent criteria are satisfied.

The on-site treatment, storage, or disposal of IDW must be authorized by a permit from the DEQ. A generator of hazardous IDW may accumulate such wastes in tanks or containers in accordance with VHWMR §6.4.E. Treatment of hazardous waste in tanks or containers within the 90 day accumulation period may only occur upon prior written approval from the appropriate DEQ Regional Office.

Investigation Derived Waste
Policy
Page 3 of 3

This policy may be revised or rescinded at any time as Federal and/or State regulations change.

Signed:



Hassan Vakili, Director
Waste Operations

6-28-95
Date

Commonwealth of Virginia ARARs

This is a preliminary identification of Commonwealth of Virginia ARARs. Following a review and discussion of proposed remedial alternatives for a given site, state ARARs and To Be Considered Materials (TBCs) can be more specifically identified.

The material below includes state statutes and regulations that may serve as state ARARs (along with corresponding federal statutes and regulations for informational purposes). The information includes the citation for each source and a short explanation of each item indicating how it may be pertinent with regard to a proposed remedy.

1. Virginia State Water Control Law, Code of Virginia Sections 62.1-44.2 et seq.; Virginia Water Regulations entitled "Water Quality Standards" (VR 680-21-00); "Virginia Pollutant Discharge Elimination System (VPDES) and Virginia Pollution Abatement (VPA) Permit Program" (VR 680-14-01); and "Virginia Water Protection Permit" regulations (VR 680-15-01). Federal: the Water Pollution Control Act, 33 U.S.C. 1251; and the Safe Drinking Water Act, 42 U.S.C. 300(f).

Groundwater underlying the site should be remediated in accordance with CERCLA guidelines. Cleanup levels for potential drinking water sources are typically based on MCLs. In the absence of MCLs, other health-based standards or criteria from the Virginia and/or federal regulations, or best professional judgment based on risk assessment, may be employed. Where groundwater that is a potential drinking water source discharges to surface water, the cleanup level at that discharge point would be the more stringent level between the MCL (or acceptable risk-based level) and a discharge limit based on the state or federal surface water standard or criteria for the protection of aquatic life.

The Virginia Standards for Surface Water (VR 680-21-01.14) should be listed as a Chemical-Specific ARAR along with the National Primary Drinking Water Regulations and the federal Ambient Water Quality Criteria. These standards and criteria will serve as ARARs and TBCs for purposes of developing soil and groundwater cleanup levels. Soil cleanup levels will be developed by using the more stringent concentration level resulting from the following analyses: (1) risk assessment taking into account all potential soil exposure pathways; (2) soil modeling to determine the concentration of contaminants that can remain in the soil such that water in equilibrium with the soil will not result in contaminant concentrations in the groundwater greater than MCLs; and, (3) soil modeling to determine the concentrations of contaminants that can remain in the soil such that water in equilibrium with the soil will not lead to a natural discharge to surface water resulting in an in-stream contaminant concentration greater than its surface water standard.

The Virginia Pollution Discharge Elimination System Regulations (VR 680-14-01) should be referenced along with the National Pollutant Discharge Elimination System Requirements. Any treated groundwater, decontamination water or other wastewater to be discharged to surface waters must meet effluent discharge limits established by the Water Division, Virginia Department of Environmental Quality. These limits are established on a case-by-case determination. Site-specific limits may be established following receipt of initial design and estimated discharge rates of the treatment unit.

The Virginia Water Protection Permit Regulations (VR 680-15-02) delineate the procedures and requirements to be followed in connection with activities such as dredging, filling or discharging any pollutant into, or adjacent to, surface waters, or any activity which impacts the physical, chemical or biological properties of surface waters. (The definition of surface waters includes wetlands.) The standards are typically required in addition to the U.S. Army Corps of Engineers § 404 permit, and are established in coordination with requirements of the Chesapeake Bay Preservation Act administered by local permitting boards or requirements of the Virginia Marine Resources Commission.

2. Virginia Waste Management Act, Code of Virginia Sections 10.1-1400 et seq.; Virginia Hazardous Waste Management Regulations (VHWMR) (VR 672-10-1); Virginia Solid Waste Management Regulations (VSWMR) (VR 672-20-10); Virginia Regulations for the Transportation of Hazardous Materials (VR 672-30-1). Federal: the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. 6901, and the applicable regulations contained in Title 40 of the Code of Federal Regulations; and the U.S. Department of Transportation Rules for Transportation of Hazardous Materials, 49 CFR Parts 107, 171.1-172.558.

If the remedial response contemplated involves storage, treatment or disposal of a VHWMR/RCRA hazardous waste, various VHWMR/RCRA requirements may need to be complied with as specified in VHWMR and/or the applicable 40 CFR Parts. Because Virginia administers an authorized state RCRA program, the Virginia Hazardous Waste Management Regulations (VHWMR) will serve as the governing ARAR in place of the RCRA regulations contained in the 40 CFR Parts, except for the Land Disposal Restrictions of 40 CFR Part 268. (At this time, Virginia does not have authorization for administering the LDR's.)

Some sample VHWMR Part X Sections corresponding to RCRA regulations of 40 CFR Part 264 are listed below:

	<u>VHWMR §</u>	<u>40 CFR Part 264</u>
Releases from Solid Waste Management Units	10.5	Subpart F
Closure and Post-Closure	10.6	Subpart G
Use and Management of Containers	10.8	Subpart I
Tank Systems	10.9	Subpart J
Surface Impoundments	10.10	Subpart N
Waste Piles	10.11	Subpart L
Land Treatment	10.12	Subpart M
Landfills	10.13	Subpart N

The transportation of hazardous waste must be conducted in compliance with VHWMR Parts VI and VII and the Virginia Regulations for the Transportation of Hazardous Materials.

The disposal of any soil, debris, sludge or any other solid waste from a site must be done in compliance with VSWMR.

3. Virginia Air Pollution Control Law, Code of Virginia Sections 10.1-1300 et seq.; Virginia Regulations for the Control and Abatement of Air Pollution (VR 120-01).
Federal: the Clean Air Act, 42 U.S.C. 7401; and 40 CFR Subchapter C.

Any emission from the disturbance of soil at a site, or treatment of soil or water, must meet the Virginia air emission standards for toxic pollutants, particulates and volatile organic compounds.

4. Virginia Erosion and Sediment Control Law, Code of Virginia Sections 10.1-560 et seq., and the Virginia Erosion and Sediment Control Regulations (VR 625-02-00).

Before engaging in any land-disturbing activity, as defined in the statute, an erosion and sediment control plan must be submitted for review by the soil and water conservation district or locality and the plan must be approved by the plan-approving authority.

5. Virginia Board of Game and Inland Fisheries, Code of Virginia Sections 29.1-100 et seq.; Virginia Endangered Species Act, Code of Virginia Sections 29.1-563 et seq..
Federal: the Endangered Species Act, 16 U.S.C. 1531.

Biological assessments should be conducted and submitted to VDEQ for review by the Virginia Board of Game and Inland Fisheries to determine whether endangered species or their habitats are threatened by the site. Certain species of fish and wildlife are identified as being threatened and are entitled to special preservation and protection measures under these statutes.

6. Virginia Wetlands Act, Code of Virginia §§ 62.1-13.1 et seq.; Virginia Wetlands Regulations (VR 450-01-0051); federal Water Pollution Control Act, 33 U.S.C. § 1344(f) (2) (commonly referred to as § 404 of the Clean Water Act); 33 CFR Part 323.2(c) and (e); and federal Executive Order 11990 related to wetlands management.

Any activity to take place in, or impact on, a tidal wetland must meet the provisions of the Virginia Wetlands Act and regulations as applicable. (The Virginia Water Protection Permit regulations cited above is also applicable to activities impacting wetlands, as well as the Chesapeake Bay Preservation Act which is referenced below.)

7. Chesapeake Bay Preservation Act, Code of Va. § 10.1-2100 et seq.; Chesapeake Bay Preservation Area Designation and Management Regulations (CBPA Regulations) (VR 173-02-01).

Require that certain locally designated tidal and nontidal wetlands, as well as other sensitive land areas, be subject to limitations regarding land-disturbing activities, removal of vegetation, use of impervious cover, erosion and sediment control, stormwater management, and other aspects of land use that may have effects on water quality.

8. Virginia Stormwater Management Act, Code of Va. § 10.1-603.1 et seq.; Virginia Stormwater Management Regulations (VR 215-

02-00), and local stormwater management programs.

All land-disturbing activities must be in compliance with local stormwater management programs, where they exist. (The adoption of a program by a locality is optional, but if locality adopts, must meet state requirements.) In the absence of a local program, if impervious surface is to be created by remedy, then state requirements may be relevant and appropriate.

9. Coastal Management Plan, City of _____;
Federal: Coastal Zone Management Act, 16 U.S.C. 1451 et seq.;
National Oceanic and Atmospheric Administration (NOAA) Regulations
on Federal Consistency With Approved State Coastal Zone Management
Programs, 40 CFR Part 930.

Activities within a Coastal Management Zone must be in compliance with local requirements.

10. Virginia Historic Resources Law, Code of Va. § 10.1-2200-2214; Virginia Antiquities Act, Code of Va. § 10.1-2300-2306.

Activities impacting resources governed by these statutes must comply with state requirements.

11. Federal Executive Order 11988 related to floodplain management.

Any activity located in a floodplain must comply with the provisions of this Executive Order. The Order requires that federal activities in floodplains must reduce the risk of flood loss, minimize the impact of floods on human safety, health and welfare, and preserve the natural and beneficial values served by floodplains.

As stated above, this list is only a preliminary identification of potential state ARARs. As site-specific information is presented and various remedial alternative are considered, more specific ARARs will be established in conjunction with the appropriate federal or state regulatory division.