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LETTER REGARDING REGULATORY COMMENTS ON THE REMEDIAL INVESTIGATION REPORT FOR OPERABLE UNIT 2 (OU 2) WITH ATTACHMENT NTC ORLANDO FL
5/5/1999
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

May 5, 1999

4WD-FFB

Mr. Wayne J. Hansel
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SUBJ: Comments on the Remedial Investigation, Operable Unit 2, McCoy Annex Landfill, Naval Training Center, Orlando, Florida.

The United States Environmental Protection Agency (EPA) has completed the review of the Remedial Investigation, Operable Unit 2, McCoy Annex Landfill, Naval Training Center, Orlando, Florida. EPA's comments on the subject reports are enclosed.

If you have any questions regarding these comments, please call me at (404) 562-8536.

Sincerely,

Nancy Rodriguez
Remedial Project Manager

cc: Dave Grabka, FDEP
Lt. Gary Whipple, NTC Orlando
Steve McCoy, Tt NUS
Barbara Nwokike, SouthDiv

Remedial Investigation, Operable Unit 2, McCoy Annex Landfill,
Naval Training Center, Orlando

I. Technical Comments:

General Comment:

1. Much data has been collected for this investigation and in many ways the field investigation has been very through. The format of presentation of these data in the graphs and figures of the report is excellent. However, in some aspects, the interpretation of the available data presented in the report is weak or absent. For example, the figures show points where contamination has been sampled, and reports the results of the analyses, but plumes of groundwater contamination are not shown. Areas and volumes of contaminated soil which may require remediation are not defined. Some contaminants, such as the gross alpha and gross beta activity reported in groundwater are described as being from to natural sources without a clearly described comparison to levels found in background areas unrelated to the landfill which would support the idea that the observed gross alpha and gross beta activity is natural.

   Trends in contaminant concentrations over time have not been evaluated. Only one set of monitoring well sample data is presented, so trends in organic contaminant concentrations, an important aspect of monitored natural attenuation, can not be evaluated. Further, I am unable to conclude that the reported exceedances for inorganic contaminants are real or as extensive as indicated from the data presented. I do not believe that the available data is suitable for evaluating the need for remedial measures or selecting the appropriate remedial measure for inorganic contamination in groundwater.

Specific Comments:

1. The text on page 2-13 and Figures 2-4 & 2-6 describe the large water level difference between Shallow Aquifer & Hawthorn Formation caused by a clay layer (Figure 2-3). The clay layer is effective barrier to downward movement of groundwater and probably limits the downward migration of contamination. The text notes (page 2-13) absence of contamination in the Hawthorn Formation below the top of the clay layer, but this good news demonstrating the vertical extent of contamination is not stressed in the text of the report before Chapter 8, and not mentioned in Executive Summary description of Investigation Results.

2. Section 5.2 describes contamination in surface soils, but does not include a map showing the extent of soil contamination. The volume of contaminated soil in excess of Florida SCTLs is not estimated. Estimates of the volume of contaminated soil which may require

remediation should be part of a site characterization.

3. The RI should include the elements necessary to evaluate the transport and fate of the COCs and the elements necessary to evaluate the risk associated with the concentrations of COCs. "The ability to estimate future exposure concentrations depends on the extent to which hydrogeologic properties needed to evaluate contaminant migration are quantified. Repetitive sampling of wells is necessary to obtain samples that are unaffected by drilling and well development and that accurately reflect hydrogeologic properties of the aquifer(s)." (EPA Risk Assessment Guidelines, CHAPTER 4, p. 4-12, http://www.epa.gov/oerrpage/superfund/programs/risk/ragsa/index.htm).

Important physical and chemical characteristics of the soil and groundwater flow system which are important for evaluating fate and transport are not presented in the report. These hydrogeologic properties, including porosity, bulk density, fraction organic carbon, retardation factors for the COCs, etc. may have a significant effect on the risk assessment.

4. Figure 5-3A through 5-3E shows the locations of groundwater samples which exceeded Florida GWCTLs. None of these figures show plumes of contaminated groundwater or show the extent of groundwater contamination which could be used to estimate the volume of contaminated water which may require remediation. Estimates of the volume of contaminated groundwater which may require remediation should be part of a site characterization. Estimates of the rate of groundwater flow and rates of contaminant migration within the plumes should be part of a site characterization.

The discharge areas at this site (the canals) are well defined, therefore the maximum down gradient extent of contamination is known, but the up gradient areas are not monitored. It may not be desirable to install wells through the landfill cover and source material to get samples up gradient from the discharge area, but without up gradient monitoring wells, we don't know the volume of contaminated water or, more importantly, whether contaminant concentrations are increasing or decreasing with time.

The extent of groundwater contamination probably can be estimated from Figures 2-4 and 5-3A, so the area and volume of contaminated groundwater can be approximated. However, without monitoring wells up gradient from the canals, it is difficult to determine whether the number of monitoring wells with exceedences will increase In the future or whether the concentrations in the wells which already have exceedances will increase In the future. The wells have been sampled only once, and no data to evaluate trends in metals concentrations is presented. The future impact of contaminated groundwater on surface water in the canals has not been evaluated.

5. The average turbidity of 48 groundwater samples collected from monitoring wells for this investigation (Appendix A) was approximately 900 NTU (see the table attached to this

memo), more than 90 times the turbidity level recommended in the EPA Region 4 SOP. The average purging time was only 60 minutes and the average purge rate was approximately 0.5 gpm. The purging time was relatively short and the average pumping rate was higher than the rate which might be considered to be a low flow purge rate.

It seems strange that so many samples which failed the turbidity criteria of the SOP were collected and submitted for analysis without an action by the consultant to resolve the problem.

- Perhaps the sample collection methods could have been changed to purge the wells longer and more slowly to obtain samples which met the sample quality requirements of the SOP.

- Perhaps the wells were developed inadequately prior to purging and more development was needed.

- Perhaps the wells were installed with screen slots too big for the grain size of the formation material.

The slot size used is the smallest commonly available for PVC screens, but smaller slot sizes are available in stainless steel. If smaller slot sizes were needed to produce samples of suitable quality for analysis, smaller slot sizes should have been recommended before all 48 wells were installed. If the slot size is OK but the wells were not adequately developed, they should have been developed before the expense of sample collection and analysis was incurred. Stainless steel well screens are much more expensive than PVC, and additional development and purging time costs money, but as noted in the report, the validity of these sample results for assessing the extent of metals contamination in groundwater is questionable.

The report states (p. 5-91) that "... there were significant differences in the concentrations of some inorganics between the unfiltered and filtered samples." The report also states (p. 5-91) that the results indicate "... that suspended particles or colloids in the shallow and intermediate well samples may have been adversely affected in the concentrations if some inorganic species."

It is important to know if the results of the metals analyses were due to metals dissolved in groundwater, metals suspended on particles and dissolved by the acid preservative, or metals on colloidal particles. Clearly, an exceedance caused by dissolved metals or colloidal transport is cause for concern, but an exceedance caused by metals leached by the acid preservative from suspended particles is likely to be a transient occurrence and not the basis for assessing the risk of drinking this water for a life time.

Pumping removes fine particles near the well screen, causing a natural develop a filter pack to develop near the well. The result is a water supply of low turbidity without suspended particles on which metals may be present. Unfiltered samples from a properly developed monitoring well simulate the quality of water which might be consumed by someone using the aquifer over a long period. Metals may enter a water supply via colloidal transport in some aquifers even with a well developed natural filter pack, but the distinction between metals concentrations by dissolved, suspended and colloidal transport can not be made from these data. Suspended solids sometimes enter filtered samples by breaking through the filter when the source water is turbid and the pressure on the filter is high, so the results from the filtered samples may not be conclusive. Further, it is EPA Region 4 policy to base risk assessment calculations on unfiltered samples only. Samples can be collected by low flow purge methods from properly developed wells which have turbidity levels suitable for water supply purposes. The results of metals analysis from unfiltered samples with low turbidity will be indicative of metals concentrations in the groundwater which should be considered for risk assessment purposes.

In summary, there may be a problem with inorganic substances in groundwater at this site. However, the quality of the samples submitted for analysis did not meet the recommended requirements in the Region 4 SOP, which makes it difficult to determine if the exceedances are real. It is impossible to use the existing data to determine if metals are dissolved in groundwater, transported on colloidal particles, or dissolved from suspended solids by the sample preservative. The report acknowledges that inorganic substances probably were dissolved from suspended sediments in the samples.

6. The source of gross alpha and gross beta radiation detected in water and sediment samples has not been evaluated. Have background samples been collected from other areas which show similar gross alpha and gross beta activity?

7. The RI does not contain the elements necessary for an evaluation of monitored natural attenuation (MNA). Guidelines for evaluation of MNA have been available from EPA Region 4 since 1997. These guidelines strongly resemble MNA guidelines from other sources which have been available since 1995 (Air Force Center for Environmental Excellence, AFCEE). National guidelines for implementation of MNA, which evolved from the AFCEE guidelines, were finalized by EPA in November, 1998 (http://www.epa.gov/ada/report.html or http://www.clu-in.org/). The national guidelines are relatively recent, but the requirements and methods for evaluation of MNA are not substantially different than the earlier Region 4 or AFCEE guidelines. The COCs in Area 2/3 groundwater (p.6-12) include a number of fuel related and chlorinated organic compounds which may be suitable for remediation by MNA at this site. MNA probably should be evaluated in the FS, but the site characterization factors which would be used in the FS to evaluate MNA are not presented in this RI.

II. Human Health Risk Comments:

1. Risks from Benzo(a)Pyrene in Surface Water

Calculation of Dermal Dose of Benzo(a)Pyrene in Surface Water
This calculation produced risks four orders of magnitude greater than incidental ingestion of the same surface water. This result did not seem reasonable to me at first glance, and this incorrect result was reached because of inappropriate application of default values for most of the exposure factors.

The draft dermal guidance suggests using $K_{p.max}$ in lieu of K_p for chemicals not well fit by the Potts and Guy empirical correlation, such as benzo(a)pyrene. $K_{p.max}$ is give as 0.17 cm/hr. The lower 95% confidence limit for K_p is 0.025 cm/hr. I have used both in the calculation detailed below to provide bounds on the risk from dermal contact with surface water. The example below is calculated using $K_{p.max}$.

B is a dimensionless ratio of the permeability of the stratum corneum relative to the permeability across the viable epidermis, including other limitations to transfer such as clearance into the cutaneous blood supply.

B is estimated as

$$B = K_{p.\max} \frac{\sqrt{MW}}{2.6} = 0.17 \cdot \frac{\sqrt{250}}{2.6} = 1.0338$$

To estimate Dsc, the effective diffusivity for skin

$$\frac{D_{sc}}{I_{sc}} = 10^{(-2.80 - 0.0056\,MW)} = 10^{(-2.80 - 0.0056 \cdot 250)} = 6.31x10^{-5}$$

$$Hence\ D_{sc} = 0.0631 \frac{cm^2}{hr}$$

The time to reach steady state, t*, is given by

$$If\ B \leq 0.6,\ then\ \ t^* = 2.4\,\tau$$

$$If\ B > 0.6,\ then\ \ t^* = \left(b - \sqrt{b^2 - c^2}\right)\frac{I_{sc}^2}{D_{sc}}$$

where I_{sc} = apparent thickness of the skin (cm)
D_{sc} = effective diffusivity (cm^2/hr)

$$b = \frac{2(1-B)^2}{\pi} - c$$

and

$$c = \frac{1 + 3B + 3B^2}{3(1+B)}$$

Using a value of 10^{-3} for I_{sc}, D_{sc} is 0.0631 cm^2/hr and t* is 1.02×10^{-7} hr.

τ_{event} is given by:

$$\tau_{event} = \frac{I_{sc}^2}{6 D_{sc}} = \frac{(10^{-3})^2}{6 \cdot 0.0631} = 2.64 \, x \, 10^{-6} \, hr \, / \, event$$

t_{event} for the adult resident is 2.6 hr, much greater than t*. Hence DA_{event} is given by:

$$DA_{event} = K_{p,\max} \, C_{water} \left[\frac{t_{event}}{1+B} + 2\, \tau_{event} \left(\frac{1 + 3B + 3B^2}{(1+B)^2} \right) \right]$$

Using a value 0.341 µg/L as the benzo(a)pyrene concentration, $DA_{event} = 5.7 \times 10^{-9}$ mg/cm^2-event.

Alternatively, if one assumes that K_p for benzo(a)pyrene is 0.025 cm/hr, the lower 95th percent confidence limit on the mean, DA_{event} becomes 6.2×10^{-11} mg/cm^2-event.

Administered Dose to Absorbed Dose Correction for the benxo(a)pyrene slope factor
Another example of misapplication of the default values was the use of 50% as the oral absorption efficiency for B(a)P. Hecht et al (1979) have shown that almost all of ingested B(a)P is absorbed.[1] Using a correction of 90% for administered to absorbed dose, the B(a)P slope factor for the dermal route is 8.1 mg/kg-day.

Risk from Dermal Exposure to B(a)P in Surface Water
For the two bounding values of $_{Daevent}$ given above the risk from dermal contact with

B(a)P in surface water are 2.5×10^{-9} and 2.3×10^{-6}. This is, of course, a huge range indicating the uncertainty with the B(a)P dermal risk assessment for surface water. It is very likely that the risks for this pathway are less than 10^{-6}.

Recommendations for the Dermal Pathway
The risks from surface water should be recalculated using the methods shown above.

2. The Exposure Unit Concept
The text states on page 6-2 that OU-2 was divided into two exposure units based on exceedance of PAH concentrations of 1 mg/kg. This reasoning is spurious. The Region 4 risk guidance[1] states with regard to exposure units:

> An exposure unit denotes the areal extent of a receptors movements during a single day.

Hence, to choose exposure units based on the appearance of contamination suggests a significant lack of understanding of this fundamental risk assessment concept.

The exposure point concentrations (EPC) should be chosen based on the size of the exposure unit for the receptor in question. For residential receptors, adults and children both, the EPC should represent the true mean[2] concentration in the most contaminated area the size of a residential lot. For the site maintenance worker, trespasser, golfer and construction worker, the EPC should be based on the entire areal extent of the OU unless a more specific future land use is indicated in the redevelopment plan. For the future resident, the EPC should be based on an exposure unit the size of a residential lot. Often this is about an acre. Soil samples were taken at OU-2 using a grid based scheme with 1 sample per acre. Hence, the concentrations in the sample location showing the highest risk should be used as the EPCs for the future residential scenario.

Based on a casual inspection of the maps of OU-2, the two exposure units discussed appear to be between 15 and 25 acres. Obviously, this is too large for a residential exposure unit.

The risk estimates presented are an upper bound on the RME risk estimate because maximum detected concentrations were used for both arsenic and B(a)P. For a residential

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[1]USEPA (1995) Supplemental Guidance to RAGS: Region 4 Bulletins, Human Health Risk Assessment, Bulletin #3 Exposure Assessment.

[2]It would be prohibitively expensive to determine a value close to the true mean. As a health-protective surrogate for the true mean, EPA suggests that the 95% upper confidence limit of the arithmetic mean should be used as an EPC.

exposure, this may be appropriate.

The discussion regarding exposure units should be rewritten.

3. Lead in Area 2/3 Groundwater

Lead was discovered in groundwater at 164 µg/L, about ten time the action level. A sample from OU2MW04B00 had a lead concentration of 182J µg/L in the unfiltered sample and 42.4J µg/L in the filtered sample. It may be advisable to resample the groundwater with ultra-low flow techniques to determine if these lead levels are actually present.

4. Goodness of Fit Tests and Calculation of Upper Confidence Limits

Goodness of fit tests such as the Shapiro-Wilk test for normality cannot show that a sample was obtained from a population with a normal distribution. Rather, the Shapiro-Wilk test and other GOF tests can merely fail to reject (or reject) the assumption of normality. Gilbert (1987) states in this regard:

> ... one of the most powerful tests available for detecting departures from a hypothesized normal density function.[3]

GOF tests cannot prove that a sample was obtained from a distribution with a normal or a lognormal distribution. Both the text and appendices show an apparent misunderstanding of this point.

Chemicals on site should be assumed to occur in a lognormal distribution. The Land method[4] should be used to calculate the 95% UCL. If the 95% UCL is greater than the maximum detected concentration (MDC), then the MDC should be used. Both the 95% UCL and the MDC are health-protective surrogates for the true mean within the exposure unit.

The discussion of the use of GOF tests and the concentration term should be rewritten.

5. Use of the Fraction Ingested term

Page 6-23 in chapter 6, the risk assessment, indicates that an FI term of 0.1 was used to account for the sparse density of B(a)P detections. In lieu of using an FI term, the EPC should be calculated based on the exposure unit appropriate for the receptor being

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[3]Gilbert RO (1987) Statistics Methods for Environmental Pollution Monitoring, Van Nostrand Reinhold, New York, p. 158.

[4]Gilbert RO, op. cit. p. 170

considered.

6. Sediment Contact
Generally, Region 4 does not require risk evaluation for sediments that are perenially convered by water. Region 4 risk guidance states:

> In most cases, it is unnecessary to evaluate human exposures to sediments covered by surface water.

The evaluation of sediment contact does not appreciably add to the risk estimate and may be left in the document.

7. Need for an Additional Table
The risk assessment would be improved by including a table in the body of the chapter 6 that provided individual chemical risks for receptors and media. The table of page 6-41 would be a good starting point and risks from each individual chemical of concern (COC) could be added.

III. Ecological Risk Comments:

General Comments:

1. Potential impacts to gopher tortoise should be explicitly addressed. Routes of exposure to this receptor should be evaluated, such as burrowing into contaminated soils. Effects for this state-listed species are more appropriately evaluated for individuals. Thus, conclusions regarding widespread population- or community-level effects do not apply to receptors of concern.

2. The RI report indicates that the National Wetlands Inventory map classified the entire extreme southeastern portion of the central section of OU-2 as a palustrine, forested, intermediate deciduous, seasonally flooded wetland. The RI report indicates that contractors who went out to the field in the summer did not see water standing except in a small pond, and concluded that the wetland was confined to the pond area. The extent of the wetlands need to be delineated by trained personnel using an appropriate wetlands manual. Absence of water during the site visit does not mean that this area. Cypress forests are a valued ecological resource in Florida. A map should be provided showing the extent of various land cover and habitat types. The map should illustrate the boundaries of the cypress, the NWI mapped wetlands, and the ponds. The location of the gopher tortoise burrow mentioned on Page 7-7 should also be marked on the map.

3. Several inconsistencies were noted between the ecological risk assessment discussion and the hydrogeology section. A consistent conceptual site model of how the landfill interacts with the surface water is needed. Better data or interpretation of data may be needed to justify this model.

4. One purpose of the screening-level ecological risk assessment is to provide the scope and focus of the baseline ecological risk assessment. The RI report, however, includes a broad list of assessment endpoints, which cover essentially all receptor guilds. When little information is available to help the risk assessor decide which assessment endpoints are the most sensitive, this approach will work. However, EPA prefers a more focused approach where assessment endpoints are chosen based on the constituents present. When abiotic screening values are available, assessment endpoints need not be presented until after the screen. At that time the list of chemicals of potential concern will be shorter, allowing the risk assessor to focus on assessment endpoints for these few chemicals.

5. This risk assessment is not following EPA's ERAGS guidance known as the "Process Document," which divides the ecological risk assessment into the screening-level risk assessment and the baseline risk assessment. The first step is the abiotic screen of maximum detected concentrations by environmental medium. Errors in this risk assessment include the elimination of "essential nutrients" and performance of background screen prior to the

toxicity screen. The screening-level risk assessment is to be completed prior to refinement of chemicals of potential concern. Note that Steps 1 and 2 of EPA's ERA Process do not include background screening or elimination of essential nutrients. Refinement of COPCs occurs in Step 3. Refinement can involve background screening or consideration of such factors as frequency of detection, pattern of detection, or magnitude of exceedance. Food chain models can be part of COPC refinement.

6. The RI report is not organized according to the ERAGS guidance. The screening-level ERA and the problem formulation refinement of COPCs are blended together rather than broken out in the order specified in the guidance. The ordering has eliminated information that risk managers need to make a decision about this site. The missing pieces that need to be added are: (1) the comparison of "essential nutrient" concentrations to background screening values and (2) the comparison of chemical concentrations that are below background screening values to available ecotoxicity screening values. Either the report should be reorganized to include this information up front in the tables or the missing information should be added to the uncertainties section. Tables could easily be modified to incorporate this information.

7. The RI report puts forth a management goal to evaluate whether the landfill cover is thick enough to burry contaminated soils and prevent surface-water runoff from transporting contaminants to waterbodies. The ecological risk assessment should carry through with this evaluation. Areas of localized contamination should be checked for presence of a thin landfill cap.

8. Aluminum, chromium, copper, lead, iron, mercury, and zinc exceed surface water screening values in nearly all three landfill sections. The screening levels are based on ambient water quality criteria, which may be ARARs for this site. Surface water quality may need additional evaluation, perhaps by collection of background data. The variation between samples and their duplicates or re-samples appears great. Metals are often detected at elevated concentrations in surface water but are not particularly elevated in sediments. This may indicate that the canals receive their metals primarily from inputs of dissolved metals from ground water versus particulate metals from soil erosion or particulate matter in highway and parking lot runoff. Further investigate why sediments are not sequestering the metals detected in surface water. Address the potential transport of metals to the downstream lake.

9. The sediment data should be examined for grain size and other physical parameters to possibly explain the lack of constituent detection.

10. Vanadium has a hazard quotient above 1 for at least one receptor in each of the landfill sections. However, the RI report quotes a statement by Mailman (1980) that vanadium is of no toxicological consequence in the environment. These statements are contradictory and imply that the Mailman reference may be applied out of context. Please eliminate the statement that vanadium is generally not considered to be toxic in the environment. The

statement that vanadium is generally not toxic may be because vanadium is generally not detected at elevated levels like those found at this landfill. This general statement cannot be used to annul a site-specific finding of potential risk.

11. The ecological risk assessment lacks a table summarizing the final COPCs or final conclusions. Instead of summarizing the discussion section, Section 7.9 should present conclusions to the risk manager who wants to know whether the landfill impacts sediment or surface water.

12. Dividing the site up into three sections may make sense for the selection of COPCs, however, the final summary (Section 7.9) should combine the various sections as a summary for the entire site to be consistent with the rest of the RI report.

<u>Specific Comments:</u>

1. Page 5-47, Section 5.2.6, Inorganics. The second sentence states that "Calcium, total chromium, magnesium, potassium, and sodium are abundant in natural soils, have a low toxicity to humans, and have no State of Florida SCTLs for Residential Direct Exposure." A similar statement occurs on the bottom of Page 5-110, the section on inorganics in sediment. However, on Page 5-110 a different set of inorganic constituents is described as abundant in natural soils and of low toxicity to humans. These two lists should be examined for consistency and modified appropriately. Chromium should not be classified as having low toxicity to humans. If the form of chromium is unknown, it should be considered the most toxic form, which may differ between human health and ecological risk assessment.

2. Page 7-8, Section 7.2.2, Major Chemical Sources and Migration Pathways. The sections on the migration pathways and exposure routes are too general. This section should add a paragraph summarizing the constituents detected in environmental media. Then tailor the discussion of migration pathways specifically to the constituents detected at McCoy Annex Landfill.

3. Page 7-8, Between Sections 7.2.2 and 7.2.3. The risk assessment lacks a section on Ecotoxicity and Potential Receptors. Insert a new section here. Given the particular constituents at the landfill and what you know about their ecotoxicity, describe what ecological receptors are likely to be affected. This section is intended to focus selection of assessment endpoints on the chemicals, their potential ecological effects, exposure pathways, and potential receptors appropriate to the specific situation at McCoy Annex Landfill. This discussion is needed to justify the assessment endpoints chosen for the risk assessment. You must link the ecotoxicity of the site-related constituents to sensitive receptors at the site.

4. Page 7-8, Section 7.2.3, Exposure Routes. This section is too general and fails to mention exposure to biota that work the soil or inhabit burrows, such as soil invertebrates. The section does not take into account the specific constituents present when evaluating the

routes of exposure. The section should emphasize exposures to the specific constituents detected at McCoy Annex Landfill. Pathways should be site-specific, focusing on those that are reasonably anticipated and are to be evaluated quantitatively. Instead of discussing dermal contact with contaminated media as in human health, discuss direct contact exposure with surface water, sediment, and soils by organisms living within and in close contact with impacted media. Consider exposure through the food chain as indirect exposure. Evaluate whether site-specific constituents will bioaccumulate into forage material or prey items before discussing dietary exposures. Since the gopher tortoise has been identified as a receptor of concern to the State, describe how this important receptor might become exposed to site constituents.

5. Page 7-9, Section 7.2.4, Selection of Analytes to be Investigated. This section eliminates four essential nutrients and chemicals within background ranges. No chemicals should be eliminated prior to the toxicological screen. This type of discussion should be moved to Page 7-54 before the Discussion.

6. Page 7-11, Section 7.2.6, Conceptual Site Model. The conceptual site model shown in Figure 7-1 does a fairly good job of diagraming constituent fate and transport with movement of constituents to receptors. However, the diagram depicts transport pathways, such as wind erosion and dust, that are negligible. The diagram is inclusive of everything and fails to distinguish pathways that will be quantified from those that theoretically could occur but are not quantified. (Shading did not show up.) Also, the diagram fails to trace the constituents through the ecosystem. Relationships between predator and prey are not depicted by the diagram. It may be helpful to illustrate food chains or food webs with a separate figure.

7. Page 7-11, Section 7.2.6, Conceptual Site Model. Text in Section 7.2.6 is also important. Currently the text describes what a conceptual site model is but does not describe the CSM for McCoy Annex Landfill. The conceptual site model section should summarize the findings of the previous sections on ecotoxicity and potential receptors and complete exposure pathways in a succinct statement, which includes justification for the assessment endpoints.

8. Page 7-23, Section 7.4.2, 2nd paragraph. The report states that drinking water exposure represents a minor route of exposure for most receptors. This is true for chemicals that are strongly bound to soils or sediments. However, for some chemicals surface water exposure is significant. This determination cannot be made based on other Navy sites, but must be based on the physical/chemical properties of the chemicals detected at McCoy Annex Landfill. Based on the fact that chemicals are showing up in the surface waters at levels of concern more often than in sediments, surface water may be a significant route of exposure for this site. Better justification is needed for excluding surface water exposure.

9. Page 7-25, Section 7.5, Preliminary Risk Calculation, third paragraph. The risk assessment screens COPCs by maximum concentration and average concentration. The text appears to

imply that chemicals with a hazard quotient greater than 1 for both the average and the maximum concentrations are more of a concern for remediation than those chemicals that hazard quotients greater than 1 for only the maximum concentration. Comparing the maximum and the average concentration is a measure of the "patchiness" of chemical distribution. An isolated area of elevated concentration may be a logical place to remediate. Chemicals with a hazard quotient less than 1 for the average concentration should not be categorically eliminated, especially for receptors with a small home range.

10. Page 7-26, Section 7.6.1.1, Northern Section Surface Water. Iron has a surface-water screening value, as shown in Table 7-5. However, the first sentence in this section leaves iron out. The second sentence lists iron as one of the chemicals lacking a screening value. These discrepancies regarding iron should be corrected.

11. Page 7-29, Section 7.6.1.2, Northern Section Sediment. Heptachlor is shown on Table 7-6 as having being detected in sediment. However, the text does not mention this chemical as a COPC. Text should be revised.

12. Page 7-29, Section 7.6.1.3, Northern Section Surface Soil. The tables for surface soil (Tables 7-7, 7-15, and 7-23) include all detected constituents, which is appreciated. However, the fact that only those constituents that exceed background screening values are discussed in the text is problematic. The sections on the surface soil should start out by listing all of the constituents that exceeded the screening values. Afterwards it can be mentioned that chromium and aluminum were screened out for having concentrations below 2x background. This is necessary to be consistent with the tables and with EPA's approach of not screening for background before toxicity. The same applies with chromium in Section 7.6.2.3 and chromium and vanadium in Section 7.6.3.3.

13. Tables 7-7, 7-15, and 7-23 show selection of chemicals of potential concern in soils. Currently, the tables do not calculate a hazard quotient for chemicals with concentrations below the background screening value. The hazard quotients should be added to be consistent with EPA's approach of screening for toxicity before screening for background.

14. Page 7-47, Section 7.6.3.1, Southern Section Surface Water. The first sentence in this section fails to mention that iron was detected in southern section surface water at concentrations greater than Region 4 screening levels (Table 7-21). The second sentence should not list iron as one of the chemicals lacking a screening value. Please correct.

15. Page 7-66, Section 7.7.1, Northern Section Surface Water. The first paragraph describes "upgradient" sources, such as roads and parking lots, which are suggested to transport chemicals in surface-water runoff to the drainage ditch. Section 5.4.8, hydrogeology, however, concludes that the presence of the same metals in surface water as in ground water is consistent with the local hydrogeologic system, because the aquifer discharges to the canal. Section 5.4.6 expresses an opinion that the concentrations in sample SW010 may

indicate a local source: because the downstream sample, station SW012, also had elevated concentrations. Highway runoff was indicated to be a potential source for metals detected in sample SW021, but no such conclusion was advanced for SW010. Section 2.2.3, hydrogeology, indicates that the surficial aquifer will discharge water to the canal during baseflow conditions. The report also indicated that no highflow conditions were encountered in the field when net flow from the canal might have been observed. This implies that the surface-water samples were taken during baseflow or hydrograph recession and were, thus, reflective of releases from the surficial aquifer rather than reflective of stormwater runoff inputs from local highways and parking lots. Section 7.7.1 appears inconsistent with the rest of the RI report. The contribution of ground water to elevated concentrations in surface water deserves further attention.

16. Page 7-69, Northern Section Surface Soil, first paragraph, last sentence. I agree that widespread population or community level effects are unlikely due to the PAHs in Sample S103. However, given the nature of PAHs not to bioaccumulate, one should consider potential effects to biota inhabiting soil in the immediate vicinity rather than effects to wide-ranging receptors. For rare species, like the gopher tortoise, effects to individuals are all that might be necessary to produce effects of ecological consequence. Moreover, elevated concentrations of PAHs in soils in the Hole 7 area are associated with detections in surface water at levels of concern. PAHs in surface soil may, therefore, be of concern for migration to surface water. The discussion should address these two points.

17. Page 7-72, Central Section Sediment, first sentence. The statement that surface soil is not contributing to central section surface water is contradictory to Section 5.4.2. This inconsistency needs to be reconciled and points to a general deficiency in providing an integrated conceptual site model.

Reference:

USEPA, 1997. *Ecological Risk Assessment Guidance for Superfund, Process for Designing and Conducting Ecological Risk Assessments,* U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC, EPA 540-R-97-006.