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MCRD PARRIS ISLAND
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LETTER REGARDING U S EPA REGION IV COMMENTS ON DRAFT DATA QUALITY OBJECTIVES WORKSHEETS 10, 11 AND 17 FOR SITE 27/55 FIBER OPTIC VAULT AREA
MCRD PARRIS ISLAND SC
3/16/2010
U S EPA REGION IV

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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March 16, 2010

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SUBJ: EPA Review of the Draft Site 27 – Fiber Optic Vault LNAPL Delineation Area DQOs (December 2009)

Dear Sirs:

EPA has reviewed the Draft Data Quality Objectives (DQOs) Worksheets 10, 11, and 17 for Site 27/55 Fiber Optic Vault (FOV) Area. Before presenting general and specific comments, some discussion is provided here to lay the groundwork for EPA's comments. This discussion is intended to explain the forthcoming comments, and to provide feedback in general with regard to the document. Therefore, no response is expected with respect to the discussion, however, EPA would like to see a response to the general and specific comments which follow the discussion and a revised set of worksheets and figures, before proceeding with the remainder of the SAP.

Objectives: EPA believes the objective of the current phase of investigation at the Fiber Optic Vault Area is straightforward. Additional sampling is needed to delineate the LNAPL source and hot spots, in preparation and support of a Non-Time Critical Removal Action (NTCRA). According to the most recent Parris Island Team meeting and other previous discussions, EPA

now understands the data gathered during this investigation will be used in the Engineering Evaluation/Cost Analysis (EE/CA), the Removal Action Memo, and the Removal Action Work Plan (RAWP), as well as the Remedial Investigation (RI) Report. Additional post removal data will also be needed for the RI Report. Therefore, the objective appears to be:

- *Obtain sufficient additional data to support development of an EE/CA and Action Memo, as well as completion of the Remedial Investigation at **Sites 9, 16, 27, and 55**, filling previously identified data gaps and answering outstanding questions.*

  * Provide sufficient data to delineate the horizontal extent of LNAPL and hot spot contamination.

  * Provide sufficient data to delineate the vertical extent of LNAPL and hot spot contamination.

  * Provide sufficient data to improve the probability of detection, accuracy of estimated volume of LNAPL and contaminated soil, and associated excavation and disposal costs.

  * Provide sufficient data to compare removal alternatives. Additional information may be needed regarding which removal alternatives should be considered in order to ensure the proper data is obtained to support the alternative analysis. Technical approaches to LNAPL removal may include, but are not limited to: Excavation, Trenches/Drains, Recovery Wells of various designs, Vacuum Extraction, Containment (slurry walls, etc.), Surfactant Co-Solvency, Thermal treatments, etc. EPA would like to hear the Navy's thoughts on which approaches might be appropriate given the nature of the LNAPL, its suspected location in the subsurface, anticipated volume, etc.

  * Provide sufficient data to support development of a streamlined Risk Assessment, as called for in the EE/CA.

  While the objective appears to be straightforward, some of these items needing to be accomplished may not be as simple. Delineation of LNAPL can be complicated.

Likely Vertical Location of LNAPL:

There is strong data which indicates an LNAPL exists at Site 55 (recorded as several inches thick in MW11). Due to the nature of LNAPL, water table fluctuations, and a variety of other factors associated with subsurface characteristics, it can be very difficult to pin down its exact location. However, a review of what information does exist to date seems to indicate a correlation to the clay-rich semi-confining layer present at Sites 55 and 27, near to and downgradient of the Fiber Optic Vault and/or MW11.

- A figure "Chlorobenzene isoconcentrations in shallow groundwater (2002)", contained in the file "Chlorobenzene-05012009.pdf", indicated chlorobenzene concentrations up to 1000 µg/L in a large area between the FOV and the Motor-T area. Also, the presence of an LNAPL was detected in MW11.

- As a conclusion, the report "Source Characterization and Plume Delineation Using Membrane Interface Probe (MIP) and Soil Conductivity (SC) Technologies" stated "The majority of contamination appears to be below the first confining layer, between seven and ten feet" (p. 6).

- The exception to this appears to be in the disturbed soils of the FOV immediate vicinity.

- There is apparently a clay-rich horizon which serves locally as a semi-confining layer. A majority of the contaminant mass including LNAPL is likely sorbed/bound to the clay rich semi-confining layer with saturated aquifer conditions existing below this horizon. Due to a fluctuating water table, a smear zone across this clay-rich layer has been identified at Site 55, in addition to a floating LNAPL layer.

- The semi-confining nature of the clay-rich layer creates an artesian effect and the potentiometric surface of the water table measured in a well will rise higher than the depth below the ground surface (bgs) of the clay-rich smear zone. If soil samples are collected at the interval just above the water table (7-8 ft bgs or less) as proposed, the zone of greatest contamination may not be sampled due to the local artesian groundwater effects and water table potentiometric surface is now above the clay-rich smear zone.

- Analysis of the LNAPL revealed a variety of contaminants, some so highly concentrated they may be masking even more contaminants at levels below the grossly elevated detection limits. Since it is unsure what exactly is in the LNAPL, it is very difficult to predict much about the fate and transport of the LNAPL, as well as the individual contaminants, in the subsurface over the very extended period of time it has been there (likely since the 1970's or earlier.)

- Due to the elusiveness of the LANPL, and the variety of contaminants it contains, it is advised that a variety of field techniques be utilized to target soil sample depths within this smear zone, in real time in the field, as opposed to relying on a guideline of "just above the water table", which could result in the LNAPL being missed.

Potential existence of LNAPL finger west of MW11 near to PAI-27-SO-28 and FMP12:

There is uncertainty regarding the possibility of a potential "finger" of contamination (appearing to be chlorobenzene(s) and pesticides, but likely also containing remnant petroleum hydrocarbon constituents) extending westward from the vicinity of PAI-27-MW11 to the eastern boundary of the Motor-T area. Previous documents, prior to the drafting of the DQOs, have indicated the potential existence of such a finger. EPA believes the evidence still exists to indicate this potential and does not support the change in the maps and/or Conceptual Site Model. A relatively minor amount of additional sampling is recommended to resolve this uncertainty.

- The June 2009 Conceptual Site Model (CSM) indicated this potential finger of contamination. On CSM Figure 4-3, this finger was defined by a contour labeled "Approximate Limit of Samples with Concentration that Exceed Background and

Residential or Industrial Screening Criteria". This contour was drawn to incorporate detections of relatively higher concentrations of pesticides at the PAI-27-SO-28 location. Only pesticide detections are shown on the CSM Figure 4-3. However, there were also detections of 1,4-dichlorobenzene, benzene, and especially chlorobenzene, at the 5 to 6 ft depth at this location (CSM Figure 4-1).

- Contours drawn for the December 2009 SAP worksheets (on Figures 17-1 for both the Motor-T and the FOV SAPs) had eliminated this potential finger of contamination. Location PAI-27-SO-28 was shown as an isolated hot spot of contamination. A viewpoint has been expressed in site discussions that there is no evidence of any potential finger of contamination, and that an isolated hot spot exists as a result of an activity such as surface release of wastes. However, caution dictates that the issue of this potential finger of contamination be resolved with additional data.

- A review of the available data indicates the following:

  * There are about a half dozen soil boring locations in the immediate vicinity just downgradient of the MW11 area (CSM Fig. 4-1). There are non-detects for select VOCs in soil at most of these locations. However, the non-detects are mostly from relatively shallow depths (e.g., 0 to 1, 3 to 4 ft bgs). Only about half of these locations (in the northern part of this area) have samples including depths below 5 ft (those samples indeed are ND for chlorobenzene). Only one location in the southern part of this area (PAI-55-FDP04) had a sample below 5 ft depth (4 to 6 ft bgs). That sample had an estimated 30 ug/kg chlorobenzene.

  * Additionally, the location PAI-27-SO-28 about 75 ft downgradient had chlorobenzene (380 ug/kg), 1,4-dichlorobenzene, and benzene. This sample was from 4 to 6 ft bgs.

  * The December 2009 Figure 4-2 ("Groundwater exceedances 2007 and 2008 samples") indicates that the ground-water wells in this vicinity had detections of chlorobenzene. These wells include PAI-27-TW-26S (2500 ug/L chlorobenzene), PAI-27-TW-27I, PAI-27-MW11S, PAI-27-MW12I, and the downgradient PAI-27-MW18I. These wells are screened entirely or partly below the shallowest clay layer at the site (see cross-sections in CSM Fig. 3-2). They sample the slightly deeper ground water beneath the shallowest clay layer. It is plausible that there exists a plume of contaminants migrating beneath the clay and resulting from the denser contaminant chlorobenzene (which could have been released as a DNAPL or LNAPL/DNAPL mixture just slightly denser than water).

  * There were no MIP sampling locations in the immediate vicinity of PAI-27-SO-28 or between it and MW11S. However, a MIP sampling location (FMP12) some distance to the northwest of MW11S did indicate some petroleum fuel contamination.

Thus, the available data suggest the possibility that contamination (exemplified by chlorobenzene and pesticides) extends downgradient from the vicinity of MW11S westward toward the Motor-T area. This contamination appears to be primarily beneath the shallowest clay layer. While, if present, it may not greatly affect shallower surface soils and risk assessments for that shallower soil, it does represent a potential problem for more widespread

somewhat deeper contamination that is impacting or could impact the downgradient ground water and the future of the proposed structures in the Motor-T area.

Exposure Units:

According to the draft DQOs and Figure 17-1, Site 27 was placed into one single exposure unit (EU), and Site 55 placed into a separate EU (to be addressed at a later time). Clarification is needed with respect to the PCB transformer storage area, Sites 9 and 16, and the elevated soils hit on the border between the Motor-T EU and the FOV EU. A review of existing data, as well as data gathering objectives, should assist in determining how these areas should be addressed.

- Based on Figure 10-2 it is unclear if the PCB transformer storage area is to be included as part of the Motor-T EU or not, and if not, if it is to be investigated and assessed separately now, or at a later time. In order to clear the entire area for purposes of moving forward with the Motor-T construction, it is advised to include this area, either as part of the Motor-T EU, or as its own separate EU, as appropriate, at this time. A review of historical data and COPCs may assist in this decision.

- Based on Figure 10-2 it is unclear if the areas identified as Site 9 and Site 16 are to be included with the Motor-T Area or the FOV Area investigation, and whether they are to be part of a single EU, or their own EU. It may be appropriate to include them with the Motor-T Facility investigation if RI data gaps exist, however, it may be appropriate to defer addressing them, with respect to risk assessments, etc. until you are ready to complete the RI (after FOV removal action). A review of historical data and COPCs may assist in deciding if they are to be treated as individual EUs or not.

- It is also unclear which data was included when making decisions about EUs and decisions regarding application of the Visual Sampling Plan program. It is unclear why a MARSSIM Sign Test was determined to be the most appropriate application of the VSP for the Motor-T investigation. It is unclear whether or not the elevated hit on the border between the Motor-T Facility Area and the FOV EU was or was not considered as part of this EUs data set. It appears inclusion of this data point may have caused a different approach to the use of VSP for the Motor-T Area, since the standard deviation across the site may have been elevated, in turn raising the number of samples required. When elevated isolated hits occur within a data set, it is often standard practice to create a separate EU to delineate the hit and to keep the number of samples needed for the remaining larger area to a minimum. Creation of a separate EU for the elevated hit lowers the standard deviation within each EU, thereby reducing the number of samples needed in individual EUs. In this case, the elevated hit EU may only have the one data point, (and therefore a std. dev of 0). However, it will be necessary to project how much area within the Motor-T EU should be carved off to represent the investigation area around the hit. This can be done based on a final agreement of sample spacing for LNAPL delineation. The number of samples needed may be based on an extension of the FOV grid into the Motor-T Facility Area. The investigation may still proceed with the Motor-T area, even though the grid is a continuation of the FOV grid. EU boundaries, in turn, can be adjusted after results are in.

Based on the above fundamental beliefs and concerns, EPA offers the following comments:

GENERAL COMMENTS:

1. Given the purpose of the Fiber Optic Vault (FOV) investigation is to delineate the LNAPL contamination, comments previously submitted regarding the LNAPL delineation would apply here in general. This would include the Site 27 CSM comments, feedback on the Pre-IRA memo, etc. Please refer to previously submitted comments, emails, meeting minutes, etc. as appropriate.

2. Given the DQOs address the Site 27 Conceptual Site Model (CSM), previous unresolved comments on the previously submitted Site 27 CSM document would apply here in general, to DQO sections which address the CSM. See previously submitted comments, emails, meeting minutes, etc. as appropriate.

3. In general, to obtain a clearer perspective on contaminant distribution in the source zone/hot spot areas, it is recommended that soil cores extend into the saturated zone. The main purpose for this is that since equipment and staff will be mobilized, collection of soil cores in the saturated zone will be cost efficient and will provide valuable information and data. In general, the collection and analysis of aquifer cores in the unsaturated zone will have a lower probability of detecting LNAPL contaminants. This is partially due to the fact that the core must be collected in the "entry zone" where the contaminant was spilled and migrated vertically downward in order to detect contamination. This is a relatively limited and heterogeneous volume of contaminated media. However, once the LNAPL reaches the water table, it spreads out and is generally distributed across the low and high water table elevations (i.e., smear zone). This information can be used to help better understand the location of possible sources and distribution patterns. Specific comments and recommendations are included below which discuss this matter further.

4. Due to the elusiveness of the LANPL and the variety of contaminants it may contain, it is advised that a variety of field techniques be utilized to target soil sample depths within the smear zone, in real time in the field, as opposed to relying on a guideline of "just above the water table", which could result in the LNAPL being missed. This applies at Site 55, and just across the border of Site 27 downgradient from PAI-27-SO-28, MW11 and FMP 12. (See discussion above.) Modify the DQO worksheets to address this issue.

5. Figures: EPA has previously requested that MIP locations be included on maps and figures. Include MIP data on all tag maps and MIP locations on Figures in the future, showing the locations of the MIP data points in relation to the other site investigation locations. Revise Figures 10-3, 10-4, and 17-1 to include MIP locations/data. Be prepared to discuss the potential for use of additional MIP data to obtain more detailed vertical delineation and/or to drive sub-sample vertical locations.

6. Available data suggest the possibility that contamination (exemplified by chlorobenzene and pesticides) extends downgradient from the vicinity of MW11S westward toward the Motor-T area. This contamination appears to be primarily beneath the shallowest clay

layer. While, if present, it may not greatly affect shallower surface soils and risk assessments for that shallower soil, it does represent a potential problem for more widespread somewhat deeper contamination that is impacting or could impact the downgradient ground water and the future of the proposed structures in the Motor-T area. The Motor-T Area investigation should be designed to specifically delineate the contaminated area(s) within the Motor-T study area downgradient from PAI-27-SO-28, MW11, and FMP12 during the Motor-T Facility investigation. Otherwise, the boundary of the FOV investigation should be pushed out to accommodate this investigation need. (See Motor-T DQO comments.)

7. Additional soil sampling locations are recommended for the NW corner of the FOV Exposure Area to prevent a data gap in this area (i.e., a uniform sampling grid over the entire FOV Exposure Area is recommended – see FOV comments). This grid could be continued into the Motor-T area to investigate the areas of elevated contamination along the boundary between the two investigation areas.

8. Existing data and objectives of the data gathering effort should be reviewed to clarify exposure units within the FOV investigation area. Specifically, clarify: 1) if the PCB transformer area is part of the Motor-T EU or not, or if it should be a separate EU within the Motor-T Facility investigation area; 2) whether it would be appropriate to include a separate EU for the elevated contamination area just inside the Motor-T boundary from the FOV investigation area, and 3) whether or not Sites 9 and 16 are part of the Motor-T or FOV investigation, and if so, whether or not they are separate EUs.. Modify the DQO Worksheets to address this issue. (See discussion above.)

9. Update maps and figures to include the most recently proposed facility footprint location.

10. For ease of reference, please page number all worksheet pages.

SPECIFIC COMMENTS:

11. **SAP Worksheet 10, Section 10.2.2, Petroleum Hydrocarbons Removal – Site 55 (2001 and 2003), Page 10-3:** This section discusses that petroleum hydrocarbon LNAPL and water were removed from the FOV, Site 55, in 2001 and again in 2003. This section indicates that free product and water removal from the vault were conducted as a previous investigation and removal action. However, it is not clear from the text whether the removal of free product and water was conducted as a CERCLA clean-up removal action as indicated in this section. The volumes of free product and water removed during 2001 and 2003 and their disposition were not reported in this section. Additionally, subsurface soil most likely contaminated due to the presence of free product in the FOV would have had to have been excavated to some depth below the ground surface to facilitate the installation of the FOV. As such, the soil volumes removed and ultimate disposition of the soils was not reported in this section. If the Navy is intending for the free product removal being conducted as a CERCLA "previous investigation and remedial action" the volumes of free product/water and soil removed from Site 55 and their ultimate disposition should be included in the SAP. Alternatively, provide a brief statement as to the type of operational action which occurred and

disposition of soils/materials removed, as well as provide a reference of where the detailed data and information can be located.

12. **SAP Worksheet 10, Section 10.2.5:** Update the 3rd sentence to address the other UFP-SAP and either identify all purposes for which that SAP is being developed, or make the statement more general to indicate the Motor-T but not specify the "purpose(s)" of the investigation (see "objectives" discussion in the Motor-T DQO comments).

13. **SAP Worksheet 10, Section 10.3 Conceptual Site Model, Page 10-5:** There is no discussion in this section regarding the clay-rich horizon which serves locally as a semi-confining layer. A majority of the contaminant mass including LNAPL is likely sorbed/bound to the clay-rich semi-confining layer with saturated aquifer conditions existing below this horizon. Due to a fluctuating water table, a smear zone across this clay-rich layer has been identified at Site 55 as well as a floating LNAPL layer. The semi-confining nature of the clay-rich layer creates an artesian effect and the potentiometric surface of the water table measured in a well will rise higher than the depth below the ground surface (bgs) of the clay-rich smear zone. The text in this section states that in order to address the potential for Site 55 to act as a continuing source of contamination to Site 27, refined delineation is necessary to support a non-time critical removal effort. However, if soil samples are collected at the interval just above the water table (7-8 ft bgs) as proposed, the zone of greatest contamination may not be sampled due to the local artesian groundwater effects and water table potentiometric surface is now above the clay-rich smear zone. The conceptual site model should be revised to address this issue.

14. **SAP Worksheet 10, Section 10.3 Conceptual Site Model, Page 10-5:** There is no discussion in this section regarding the question of whether the elevated hit at PAI-27-SO-28 is an individual secondary spill or potentially a continuation of the LNAPL from further east. There is no mention of the FMP12 MIP hit, and what it may mean with respect to LNAPL distribution. There is no mention of hits near buildings 405 and 401 and what they may mean to the investigation. There is no mention of groundwater contaminant contour lines and what they may tell us about LNAPL distribution. There is no mention of odor/sheen contour lines and what they may tell us. Please expand the CSM discussion to describe what existing data may tell us and what questions they raise.

15. **SAP Worksheet 10, Section 10.3 Conceptual Site Model, Page 10-6:** The first full paragraph indicates what will be covered for a HH risk assessment based on the Conceptual Site Model. Please describe what you believe to be necessary to meet the requirements of the streamlined risk assessment for the EE/CA. Then revise this paragraph to speak to those requirements. It is currently unclear what is required and which specific data (soils, LNAPL, groundwater) will be used pertaining to which specific form of inhalation of vapors (exposed groundwater/LNAPL, showering, building intrusion, etc.). The text here, as well as that which is in Figure 10-5, are still somewhat vague with respect to this. Please further clarify the exposure scenarios specific to soil, groundwater, and or LNAPL for each specific exposure pathway and receptor. A table or bullets may be an easier approach to portray the details.

16. **SAP Worksheet 10, Section 10.3 Conceptual Site Model, Page 10-6:** This section should also clearly state that the presence of Principal Threat Source Material (PTSM) would require treatment and/or removal. EPA's Guide to Principal Threat and Low Level Threat Waste (November 1991) clearly identifies LNAPL as PTSM which requires treatment. This might also be an issue at the border between the Motor-T Facility Area and the FOV Area as described above, for the Motor-T Area data gathering effort. However, we will not know that until the data is in. At that point, if LNAPL is encountered within the boundaries of the Motor-T Facility study area, a decision will be needed as to what would be necessary to move forward with the Motor-T construction (e.g. a change in placement of facility footprint, treatment, removal, etc.) and whether or not that action can take place immediately, or with the FOV removal.

17. **SAP Worksheet 10, Section 10.3 Conceptual Site Model, Page 10-6:** Contaminant migration from soil to ground water is not specifically mentioned or discussed as a potential problem in the FOV area that may require further investigation and/or remediation. However, soil-to-groundwater PALs have been specified in Worksheet 11. This section should clarify that this is an issue and state that it will need to be addressed.

18. **SAP Worksheet 10, Section 10.3 Conceptual Site Model, Page 10-6:** The last paragraph on Page 10-6 states that ecological risk "will not be evaluated as part of this investigation." This appears to be in conflict with Figure 10-5, which represents exposure of small birds and mammals to surface soils. Please resolve this conflict. Once resolved, it should be noted that while a complete ecological risk assessment may not be necessary, at a minimum ecological risk discussions, expanding on what you have here, should be included as part of the RI baseline risk assessment, as well as in the streamlined risk section of the EE/CA as required.

19. **SAP Worksheet 11, Section 11.1 Problem Statements:** Revise the problem statement 3rd sentence to read "... in order to support selection of appropriate removal technologies."Also revise the rest of the paragraph to describe the problem of delineating LNAPL and preparing for the NTCRA. (See objectives above.)

20. **SAP Worksheet 11, Section 11.2 Identify The Inputs To The Decision:** Due to the difficulty in locating LNAPL, identify specifically additional field techniques which will be used to drive sub-sample vertical location. (See discussions above.) Previous documents and technical review comments regarding investigation of the LNAPL mentioned the use or potential use of additional screening methods to supplement the proposed field screening kits, other than just those listed here. These included soil vapor screening with an FID, visual observations, odors, hydrophobic dyes, UV fluorescence, and MIP data. It is recommended that further consideration be given to the use of some of these methods. EPA would like to discuss these approaches. A final decision with respect to these screening methods may result in the need to add inputs to the decisions here in Section 11.2. Things to consider are:

a. It is recommended to consider the use of direct push downhole sensing such as laser-induced fluorescence (LIF) or membrane interface probe (MIP) prior to the collection of soil cores. While downhole sensors may not be applicable to DDT delineation, they could be appropriate for the higher concentrated LNAPL. Delineation

of LNAPL would therefore provide a good indicator for the presence of DDT and other pesticide contaminants. It should be noted that the same GeoProbe rig and crew used for the MIP or LIF screening activities could also be used for the collection of aquifer cores. Ideally, real time data from preliminary field screening efforts could be used to focus aquifer core collection activities during the same mobilization.

b. The use of several techniques to screen and/or measure LNAPL and DDT have been proposed, including, (1) soil vapor screening with an FID, (2) visual observations for hydrocarbon staining or sheens, (3) odors, (4) DDT soil field screening test kits, (5) TPH screening field test kits, (6) laboratory analysis confirmation samples, and (7) observation of sheens or LNAPL in boreholes left open. Although this list of screening and measurement techniques is extensive, there are two other techniques to consider or substitute in this list that may improve the screening. These include hydrophobic dyes for NAPL detection, and UV fluorescence as an indication of petroleum contamination. For example, Oil Red O dye is a powder that will dissolve in NAPL but not water and will show up as a red dye (in NAPL). Oil Red O has fewer health risks relative to other dyes (i.e., Sudan IV), requires less stringent personal protection, is cheap, and can be purchased commercially.

21. **SAP Worksheet 11, Section 11.2 Identify The Inputs To The Decision:** The second bulleted item (#5) on Page 2 indicates the USEPA Regions 3, 6 and 9 Regional Screening Levels for Chemical Contaminants at Superfund Sites; Residential and Industrial Soil Values and Risk-Based Migration to Groundwater Soil Screening Level (SSL) values, Tap Water. However, the proper screening levels utilized for this investigation should be the USEPA Regional Screening Levels (RSLs) for Superfund sites. The most recent RSL was updated in December 2009. Revise the text and appropriate figures to indicate the most recent version of the USEPA RSLs will be utilized as screening criteria for this investigation.

22. **SAP Worksheet 11, Section 11.2 Identify The Inputs To The Decision:** The same bullet mentioned above identifies soil-to-groundwater SSLs as being PALs. Contaminant migration from soil to ground water is not specifically mentioned or discussed as a potential problem in the Motor-T Area that may require further investigation and remediation It is not obvious based on the text up to this point that a comparison to these SSLs would be necessary, however, for the record EPA does expect this to be a part of the analysis.

23. **SAP Worksheet 11, Section 11.2 Identify The Inputs To The Decision:** It is not clear if the appropriate migration to ground-water screening levels (e.g., 0.087 mg/kg for total DDT, as mentioned in the August 21, 2009 memo from Lila Llamas to Charles Cook and Tim Harrington) will be considered or used in the investigation. Item 4 in section 11.2 mentions risk-based screening levels. The second bullet specifies a soil field screening value of 1.4 mg/kg for total DDT. The first bullet refers to EPA Regions 3, 6, and 9 regional screening levels (not accurate) and risk-based migration to ground-water soil screening level values; however, no values are specified. Item 4 also mentions that the screening levels are listed in Worksheet 15; however, that Worksheet was not available for review. Figure 10-3 lists a soil to ground water value for total DDT (half ND) of 60,

with a source citation, but it is not clear if that is an appropriate value. Clarification is recommended in all instances for soil-to-groundwater screening levels.

24. **SAP Worksheet 11, Section 11.3 Define the Study Boundaries:** Section 11.3 states "*The horizontal boundary for the Motor T Exposure Unit is presented in Figure 10-2.*" Figure 10-2 is unclear, does not relate the Motor-T Facility Investigation area to the FOV area boundaries and is more difficult to use. Consider referencing a different figure for boundaries, such as Figures 10-3, 10-4, or 17-1, or add the FOV Area to 10-2 for better representation.

25. **SAP Worksheet 11, Section 11.3 Define the Study Boundaries:** Section 11.3 apparently indicates a single exposure unit (EU) for the Motor-T Area, and another for the FOV area investigation. Please explain if the PCB transformer area is to be addressed in the Motor-T investigation or the FOV investigation, and as one EU or separate EUs, addressed now or deferred until later. (See Exposure Unit discussions above.)

26. **SAP Worksheet 11, Section 11.3 Define the Study Boundaries:** Section 11.3 apparently indicates a single exposure unit (EU) for the Motor-T Facility Area, and another for the FOV area investigation. Please explain if Sites 9 and/or 16 are to be addressed in the Motor-T investigation or the FOV investigation, and as one EU combined or separate EUs, addressed now, or deferred until later. (See Exposure Unit discussions above.)

27. **SAP Worksheet 11, Section 11.3 Define the Study Boundaries:** Section 11.3 apparently indicates a single exposure unit (EU) for the Motor-T Area, and another for the FOV area investigation. However, the FOV EU fails to include areas where samples have been determined to be necessary which are outside the current horizontal EU boundary, such as those near building 405. Please modify the worksheets to address this issue.

28. **SAP Worksheet 11, Section 11.3 Define the Study Boundaries:** Section 11.3 apparently indicates a single exposure unit (EU) for the Motor-T Area, and another for the FOV area investigation. However, the FOV EU fails to include areas where groundwater samples have reported elevated contamination which is outside the current horizontal EU boundary; such as those near building 401. Please note that if the delineation results in a need to expand past the EU boundaries, this may be necessary regardless of where the boundaries are drawn. Areas resulting in odors and sheens may also be outside the boundary, but this cannot be determined from the groundwater tag map, since observed odors and sheens were not reflected. Please add odor and sheen observations to the groundwater tag maps, here and in the Motor-T UFP SAP.

29. **SAP Worksheet 11, Section 11.3 Define the Study Boundaries:** If it is decided to create an additional exposure unit to address the elevated hit at the border, EPA would suggest agreement be reached on the sample spacing for the LNAPL delineation for the FOV Area, then that spacing be applied to the FOV Area and continued into the Motor-T Area to an agreed upon distance from the border. Since it has not yet been determined if LNAPL exists at the border, the Motor-T Facility elevated hit investigation using this grid may still proceed with the Motor-T investigation. Once data is in, if LNAPL is

encountered within the boundaries of the Motor-T Facility study area, the team will have to decide if the contamination requires removal. If so, it is understood that the removal would be part of the FOV removal action.

30. **SAP Worksheet 11, Section 11.3 Define the Study Boundaries:** It is unknown what the exact depth to the top of the water table is, or will be, at the time of the investigation. However, given the amount of precipitation experienced in the regional area, it would be expected that the groundwater table is relatively high. The vertical boundary has been defined for surface soils and subsurface soils. It may be necessary to also define a vertical boundary for LNAPL delineation, if sampling for that purpose is in some way contrary to what may be needed for a risk assessment for the EE/CA. It is not clear what is required for the EE/CA risk assessment. If needed, it could be decided what depth would be most appropriate for use in a risk assessment. Then, in the area of LNAPL investigation in the Motor-T Facility along the border with the FOV area, additional vertical samples could be taken for delineating the LNAPL/hot spots. Currently the subsurface soil vertical boundary is defined as the foot of soil just above the water table (Worksheet 11 indicates the depth to the water table is 5 to 8 ft bgs, and Worksheet 17 indicates the soil sample interval just above the water table would be 7 to 8 ft bgs). If the soil sampling takes place during high water table conditions, the soil samples might be collected above any soil that would have been previously contacted by ground water. These soil samples might not be indicative of contamination that has previously been transported downgradient in ground water or by an LNAPL plume at a greater depth. Contamination may be most evident in the soil interval that is in contact most of the time with ground water and/or any LNAPL plume, or bound in the clay-rich layers. While such samples would contain both ground water and soil, they are more likely to be indicative of the extent of LNAPL contamination. If desired, after such soil samples had been analyzed, phase-partitioning calculations could be used for a rough approximation of the contaminant concentrations and mass that would occur in the dissolved, sorbed, and NAPL phases. Please clarify how you will reconcile what vertical sampling is needed for the risk assessment with what is needed for LNAPL delineation in your defined vertical boundaries. Based on the points raised above, it is recommended that the saturated soils in the top portion of the water table (and likely in the clay-rich layer) be sampled, for purposes of contaminant extent delineation (these samples would likely be in addition to those subsurface soil samples that are collected for human health risk assessment and may be targeted via field screening techniques discussed above).

31. **SAP Worksheet 11, Section 11.3 Define the Study Boundaries:** As noted in the comment above as well as previous technical reviews and memos, it is not clear if the deepest proposed soil samples would include the interval just below the shallowest clay layer where previous work has indicated the presence of contamination. If not, it is recommended that the interval be sampled. Field screening techniques could help to determine when these samples would be appropriate.

32. **SAP Worksheet 11, Section 11.4 Develop Decision Rules:** Explain why the chosen field screening values are appropriate, considering all of the screening levels named in Inputs to the Decision. EPA would like to discuss this approach and how exactly it plays out.

given in section 11.5, and, apparently, was computed using methods for the MARSSIM Sign Test. The values of α and β are specified in the text; however, the text does not provide other parameters nor an explanation to justify this approach.

35. **SAP Worksheet 17, Sampling Design and Rationale, Page 1:** If it is decided to use more than 1 EU for the Motor-T area, modify Worksheet 17 to address each EU sampling design accordingly.

36. **SAP Worksheet 17, Sampling Design and Rationale Soil Sampling, Page 1:** See comments above. It is recommended that the clay-rich semi-confining layer be targeted for sampling. Modify Worksheet 17 as needed to do so.

37. **SAP Worksheet 17, Sampling Design and Rationale Soil Sampling, Page 1:** Worksheet 17 discusses the depth intervals for collection of soil samples, including subsurface soil collection in the one-foot interval just above the water table. As discussed above in a comment for Worksheet 11, it is recommended that subsurface soil samples be collected in an interval at the water table that is or has previously been under saturated conditions (to ensure that the soil had been in contact with any shallow dissolved contaminant or LNAPL plume) in the areas near the boundary between the Motor-T and FOV.

38. **SAP Worksheet 17, Sampling Design and Rationale Soil Sampling, Page 1:** EPA recommends agreement be reached on the sampling interval and approach for the FOV LNAPL delineation, then that approach be applied for sample location determination across the FOV EU and continued across the border into the Motor-T Area to investigate areas downgradient from the PAI-27-SO-28, MW11, and FMP12. This may or may not be a separate EU (see above) and can be addressed within the Motor-T investigation. Modify Worksheet 17 to address this issue.

39. **SAP Worksheet 17, Sampling Design and Rationale Soil Sampling, Page 1:** For the Motor-T Area, it is unclear what would be driving the decision between sampling at 4-5 feet as opposed to "just above the water table" at 7-8 feet. Alternatively, could a decision be made as to what sample depth(s) would be appropriate for the risk assessment in general based on construction design, and those samples taken? Then additional samples should be taken at depth, into the saturated soils, as the need is indicated by field screening methods, etc.

40. **SAP Worksheet 17, Sampling Design and Rationale Soil Sampling, Page 1:** Figure 17-1 indicates two grid-based soil sample locations downgradient of the border from the FOV area. It is recommended that at least a few soil sample locations and a groundwater sample or two be placed downgradient of the boundary near PAI-27-SO-28, and also down from MW11 and FMP12. EPA recommends this sampling focus on the saturated subsurface below the shallowest clay layer and follow the FOV design.

41. **SAP Worksheet 17, Sampling Design and Rationale, Groundwater Sampling, Page 2:** This section indicates that only 20 of the existing groundwater wells will be sampled as part of the SAP investigation. The current interpretation of the magnitude and extent of the contaminant plumes is based on data that is several years old. As such, it is

recommended that baseline groundwater conditions be established prior to the removal action by collecting groundwater samples from all wells for full TAL, TCL, pesticides, and PCB analysis. Also, any additional wells which may have been requested in previous RI comments pertaining to data gaps should be installed and sampled, as well as additional wells requested within this set of comments.

42. **SAP Worksheet 17, Sampling Design and Rationale, Groundwater Sampling, Page 2:** Table 17-1 lists the proposed ground-water sampling locations. In general, the proposed locations appear appropriate, although the well pairs PAI-27-MW53S/PAI-27-MW54I and PAI-27-MW58S/PAI-27-MW59I may be so far distant cross-gradient that they do not add much to the delineation (except to provide "background" samples).

However, a serious deficiency is that there are no proposed shallow ground-water locations between the known contamination in the vicinity of MW11 and the marsh. Figure 17-1 shows one available shallow monitoring well in the Motor-T area between MW11 and the marsh (PAI-27-MW17S). It is recommended that a ground-water sample be collected from this well. Although MW17S had detections of only two pesticides in August 2008, sample collection and analysis will indicate current conditions. Alternatively, one or more new wells might be necessary downgradient of the MW11S vicinity. It is also recommended that a ground-water sample be collected at PAI-27-MW20S, downgradient of the Motor-T area.

Resolution to the comment above may in turn partially resolve this comment.

43. **Table 17-1:** This table does not indicate any deep wells being sampled. The comments above are intended to include deep wells. This data is needed to clarify questions which had been raised previously regarding vertical plume delineation, as well as the need for a new baseline. Explain if additional deep wells might be needed.

44. Also, be sure to include a table which reflects soil sample design as well if separate EUs are established which may have different vertical boundaries and anticipated sample depths due to contaminant delineation.

EPA appreciates the coordination efforts put forth by the Base and Navy in developing Data Quality Objectives for Sites 27 Motor-T Facility Area, however, DQOs for Site 55 Fiber Optic Vault were never fully discussed. In the future, EPA would appreciate DQO discussions prior to the drafting of DQO documents. If there are any questions on these comments and feedback sections, please do not hesitate to contact me at (404) 562-9969.

Sincerely,

Lila Llamas

Lila Llamas
Senior RPM

cc: Meredith Amick, SCDHEC
Annie Gerry, SCDHEC
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