RHODE ISLAND
DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
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November 21 2008

Winoma Johnson
NAVFAC MIDLANT (Code OPNEEV)
Environmental Restoration
Building Z 144, Room 109
9742 Maryland Avenue
Norfolk, VA 23511-3095

Re: Draft Sampling and Analysis Plan for Sites 12 & 13, (Tank Farms 4 & 5). NETC

Dear Ms. Johnson r

The Rhode Island Department of Environmental Management, Office of Waste Management (RIDEM) has reviewed the. Draft Sampling and Analysis Plan for Sites 12 & 13, (Tank Farms 4 & 5). October 9, 2008. Attached are comments generated as a result of this review. If the Navy has any questions concerning the above, please contact this Office at (401) 222-2797. Ext. 7111.

Sincerely,

Paul Kulpa

Paul Kulpa, Project Manager
Office of Waste Management

cc: Mathew DeStefano, DEM OWM
Richard Gottlieb, DEM OWM
Robert Lim, EPA Region I
Cornelia Mueller, NETC

Comments on
Draft Sampling and Analysis Plan for Sites 12 & 13
Tank Farms 4 & 5.

1. **General Coment**

During the last investigation the approach, which was applied, was to simply identify areas, which exceeded RIDEM residential standards, delineate these areas, and conduct a concurrent removal action. This approach avoided many of the problems and time delays associated with traditional approaches. In addition to greatly expediting the process, the overall cost of the investigation/remedial effort was reduced, and the sites moved closer to site close out. The Office of Waste Management strongly recommends that this approach be continued during this phase of the investigation.

2. **Section 11.3, Identification of/ Study Boundaries**
   Page 39.

The intent of this Work Plan is to identify areas where exceedances were observed during past investigations, as well as, other areas where additional investigation is warranted. In support of the former, please submit a map depicting all areas on the tanks farms where exceedances were observed during past investigations.

3. **Section 11.3, Identification of Study Boundaries**
   Page 39.

The Work Plan proposes dividing the Tank Farms into three or four exposure unit boundaries for the human health risk assessment. These boundaries are quite large and are not reflective of typical exposure scenarios. Locations with elevated risk are considered hot spots and they must be addressed as such. These areas cannot be diluted by averaging the concentrations observed in the hot spots with large areas where contaminants were not found. Accordingly, please modify the work plan to state that any locations, which exceed standards or benchmarks, will be delineated and addressed in the Feasibility Study and/or remediated through a concurrent removal action.

4. **Section 11.3, Identification of Study Boundaries**
   Page 39.

Area 3 in Tank Farm # 5 has been designated as an area not requiring additional investigation. In order to ascertain whether this designation is appropriate, please delineate on a map, the location of both discharge pipes from the oil water separator. In addition, the Work Plan must stipulate that in order to confirm that no discharge pipes, and/or releases has occurred in the wetlands in this area, the area will be inspected for signs of a release. Finally, please delineate the location of the fuel line, which serviced the Tank Farm (additional investigation is warranted on this fuel line).

5. **Section 11.3, Identification of Study Boundaries**
   Page 39.

The Work Plan notes that surface soil is defined as 0-1 feet and subsurface soils is defined as 1-10 feet. Please be advised that under the State Regulations surface soil for industrial commercial is 0-2 feet, surface soil for residential is the vadose zone. Please modify the work plan to reflect these delineations.

6. **Section 11.3, Identification of Study Boundaries**
   Page 40.

The Work Plan proposes limiting sediment samples to the 0-6 inch interval. During the removal action conducted at Tank Farm # 4, at certain location the top 0-6 or 0-12 inches or greater of sediments was clean, however, heavily contaminated sediments were found below these depths which required remediation. Accordingly, as contamination was found at the site beneath clean sediments, the 0-6 inch interval limit must be removed and the work plan must stipulate that both shallow and deep sediment samples will be collected and analysis will be conducted on the interval which exhibits the greatest degree of contamination.

7. **Section 11.3, Identification of Study Boundaries**
   Table 11-1, Page 41.

Exposure to sediments and surface water is not included as an exposure route under the residential scenario. Residents will be exposed to these areas, especially children. Therefore, please modify the residential scenario to include exposure to these media.

8. **Section 11.3, Identification of Study Boundaries**
   Table 11-1, Page 41.

Please include residential exposure to vadose soils in this table.

9. **Section 11.3, Identification of Study Boundaries**
   Paragraph 1, Page 41.

This paragraph proposes the use of exposure boundaries in the risk assessment. Please remove this provision and simply state that any locations which exceeds the acceptable risk range will be further delineate and identified as an area of concern which requires remediation.

10. **Section 11.3, Identification of Study Boundaries**
    Paragraph 1, Page 41.

The Work Plan proposes limited the exposure area for residential, industrial, trespasser, etc to certain portions of the site. Please be advised that the entire site is applicable for

each of these exposure scenarios. Please modify the work plan to include this provision and state that any locations which exceed the acceptable risk range will be further delineate and identified as an area of concern which requires remediation. Finally, the residential and recreational scenarios are equivalent under State Regulations. Please modify the work plan to reflect this equivalency.

11. Section 11.4, Develop the Analytical Approach, Decision Rules, Decision Statement # 1
Page 42, First Bullet.

The decision matrix states that if the cancer risk is greater then 1×10^{-4} then a Feasibility Study will be performed, otherwise no action is warranted under CERCLA. Please be advised that under CERCLA action may be deemed necessary if the risk falls within the range of $1 X10^{-4}$- $1x10^{-6}$. Please modify the work plan to reflect this requirement.

In addition, the State regulations stipulate that an individual contaminant cancer risk greater then $1 x10^{-6}$, and a cumulative risk greater then 1×10^{-5} is considered an exceedance of regulatory standards, which require remediation. Therefore, as the State regulations are applicable to the site please also include this provision in the decision statement as a requirement for delineating areas of concern for the Feasibility Study.

12. Section 11.4, Develop the Analytical Approach, 42 Decision Rules, Decision Statement # 1
Page, Second Bullet.

The Work Plan states that if the human health risk assessment is greater then 1×10^{-6} but less then 1×10^{-4} the assumptions of the risk assessment will be reviewed to further evaluate the risk and evaluate the cost effectiveness of the mitigation. Further, if it is determined that it is not cost effect to mitigate an area that no further action will be deemed necessary.

The risk assessment is a stand alone evaluation. It is not modified in order to access whether remediation is required. The risk management process is used to review the results of the risk assessment and to determine the appropriate remedial action. Accordingly, please remove this provision to modify the risk assessment.

Please be advised that under the EPA cost effectiveness is one of the nine criteria use to evaluate a site. Therefore, please remove this statement and state that under the EPA the nine criteria will be evaluated to ascertain whether action is warranted.

Finally, please be advised that under the State Regulations, which are applicable to the site under CERCLA, exceedances must be addressed. Please include this provision in the Work Plan

13. Section 11.4, Develop the Analytical Approach, Decision Rules, Decision Statement # 1
Page 43,4 th Bullet.

The Work Plan states that for the ecological risk assessment if the HQ is between 1-10, and it is determined that it is not cost effect to mitigate an area, then no further action will be deemed necessary. Similar to the human health risk assessment, the ecological risk assessment is a stand-alone evaluation. Risk management is used to ascertain the form of any remedial action. Accordingly please remove this provision from the decision statement.

Please be advised that under the EPA cost effectiveness is one of the nine criteria use to evaluate a site. Therefore, please remove this statement and state that under the EPA the nine criteria will be evaluated to ascertain whether action is warranted.

Please be advised that under the State Regulations, which are applicable to the site, exceedances must be addressed. Please include this provision in the Work Plan.

14. Section 11.4, Develop the Analytical Approach, Decision Rules, Decision Statement # 1,
Page 43 4 th Bullet.

The Work Plan notes that if the risk assessment determines that there is no risk at the site, however the concentration of contaminants in the vadose soils and/or sediments exceed RIDEM Residential Standards then the parties will meet to ascertain whether the States regulations are applicable to the site. Please be advised that in the past the State regulations have been found applicable and applied to all other sites on the base. At the Tank Farms risk assessments have been conducted under the CERCLA program. These assessments have found that both sites represent an unacceptable risk. Further, during the Phase II investigiation of the these sites, which are considered RI sites under the FFA, the sites were investigated and remediated using the State of Rhode Island Remediation regulations and standards. Therefore, as the State regulations have been found applicable at all other sites on the base, and as the State regulations have been found applicable at these sites, please remove this statement and simply state that the State's regulations are applicable to the site.

15. Section 11.4, Develop the Analytical Approach, Decision Rules, Decision Statement # 2
Page 43.

The Work Plan notes that concentration will be plotted on a map and locations exceeding RIDEM Residential standards and/or ecological benchmarks will be identified. Although not stated it is assumed that historical data will also be plotted in a similar fashion. Please confirm.

16. Section 11.4, Develop the Analytical Approach, Decision Rules, Decision Statement # 2
Page 43, 1 st Bullet.

The Work Plan states that if concentrations in the vadose zone exceed residential standards then additional soil samples will be collected, however, this additional sampling will be limited to the vadose zone. There are a number of cases in which this limitation may not be appropriate. As an illustration, low levels may be found the smear zone at the water table, however, higher concentrations would be found at the source of the release, which may be at the bottom of the tank below the water table. Borings at this location would reveal higher concentrations below the water table (i.e. at the bottom of the tank). Since the intent is to determine the nature and extent of contamination, boring into the water table and taking samples at depth is the appropriate course. In light of the above please remove this limitation and simply state that additional samples may be taken in the saturated zone as warranted.

17. Section 11.4, Develop the Analytical Approach Decision Rules, Decision Statement # 2,
Page 44, 3 rd Bullet.

The Work Plan notes that additional sediment samples will be collected if the concentrations of contaminants exceed RIDEM residential standards. As the focus of this investigation also includes ecological impacts please modify the above to also state that if exceedance of ecological screening criteria are found, then additional samples will be collected.

18. Section 11.4, Develop the Analytical Approach Decision Rules, Decision Statement # 2
Page 44, Paragraph 3.

The Work Plan notes that the Base Wide Background Study will be used to ascertain whether the concentrations of inorganics are represenative of background. Please be advised that as the Base Wide Background Study was not accepted by RIDEM, and as specific background values were not listed in the report, any comparison to background values used within the study will have to meet all of the requirements of RIDEM regulations.

19. Section 11.5, Specify Performance Criteria, Determining the Minimum Number of Samples
Page 46, Paragraph 3

This section of the report refers to Table 2 (a-c), which provide the minimum number of samples for the various decision errors. Please indicate where Table 2 (a-c) can be found.

20. Section 11.5, Specify Performance Criteria, Determining the Minimum Number of Samples
Page 46, Paragraph 3.

The document notes that data from the 0-10 foot interval was used to determine the number of sampling points. Significant contamination in the vadose zone was found at depth deeper then ten feet. Please modify the approach to include these samples.

21. Section 11.5, Specify Performance Criteria, Determining the Minimum Number of Samples
Page 46, Paragraph 3.

The document notes that exTPH was used in determining the sample size. Exceedances were found for PAHs, metals, etc at the site. Accordingly, please modify the approach to include all of the contaminants of concern in the process for determining the minimum number of samples.

22. Section 11.5, Specify Performance Criteria, Determining the Minimum Number of Samples
Page 46.

Please confirm that all locations with dated results will be resampled.

23. Section 11.6, Optimize the Sampling Design, Soil Samples, Tank Farm 5
Page 48.

The document notes that samples in Area 2 of Tank Farm # 5 will not be sampled for TPH, as TPH was not found there in the past. Sampling will be limited to TCL and TAL. Petroleum is the main contaminant of concern at the site. The source of the TAL or TCL contaminants is probably petroleum from either petroleum releases or petroleum sludges. Therefore, please modify the work plan to state TPH will be collected at this and all other locations at the site.

24. Section 11.6, Optimize the Sampling Design, Soil Samples
Page 48.

The document refers to TPH contamination on the site and areas where additional samples will be collected. Please confirm that samples will also be collected at locations where exceedances for PAHs, metals (including lead), PCBs or any other contaminants were observed.

25. Section 11.6, Optimize the Sampling Design, Soil Samples Page 48.

Typically, when creating a data gap work plan, figures and tables are created with the compiled results from the previous investigations which exhibited concentrations of contaminants above benchmarks. These figures are used to guide the next phase of the investigation. In order to ascertain whether the proposed sampling locations are appropriate, please submit figures and tables with the results from the previous investigations, which exhibited concentrations of contaminants above benchmarks. A separate figure for each matrix, soil, sediment, and groundwater should be submitted.

26. Section 11.6, Optimize the Sampling Design, Soil Samples Page 48.

The proposed sampling design does not include sampling at locations, which previously exhibited elevated levels of lead. Please modify the Work Plan to include collection of samples at these locations.

27. Section 11.6, Optimize the Sampling Design, Page 48.

As noted, a figure has not been submitted with the results of the previous investigations. As such the following are preliminary recommendations for sample locations. Final recommendations will be submitted once the aforementioned figures are incorporated into the document.

Tank Farm 4

Area 1

Oil Water Separator Removal Action (Southwestern corner of site)

The remnants of a berm exist along the southern edge of the removal action. TPH is present in this location. Please collect additional soil samples in the berm at the depth of the observed TPH.

Please confirm that a number of the proposed samples along the western end of the removal action reflect locations, which previously exhibited TPH above standards.

Please confirm that a number of the proposed soil samples along the western edge of the removal action are in the former drainage swale, which serviced the tank farm.

Oil Water Separator Tank # 41

An oil water separator serviced Tank # 41. The separator discharged into a stream south of the separator. Please depict the location of the discharge pipe on the map.

Please clearly depict the location of the stream on the map (this will allow one to access the location of the stream and proposed sediment samples).

During the previous investigation the streambed was inspected and test holes 0-2 feet deep were dug to find areas of contamination. If these locations were documented please indicate whether the proposed sampling locations represent these documented areas. If these areas were not documented please incorporate the aforementioned inspection procedure into the proposed sampling plan.

A drainage swale, which previously exhibited elevated levels of TPH in the soil was found down gradient of Tank 41. Please collect two samples from this swale and sample them for TPH.

A wetland was created in the former location of the oil water separator, which served Tank # 41. As this wetland received water from the ring drain of Tank # 41 it should be inspected for the following:

Evidence of contamination.
Status of constructed wetland.

Area 2

Please indicate whether the wells located on the western edge of the tank farm, which previously exhibited elevated levels of contamination, were found. Also indicate when they were last sampled. If these wells have not been recently sampled please look for them and sample them as part of this investigation.

Please confirm that the PCB Transformer Building adjacent to the access road was sampled for PCBs.

Area 3

Based upon experience gained at the other tanks farms the Office of Waste Management recommends additional borings around each tank. The entire perimeter should be examined. In lieu of standard boring the SCAPs unit may be employed as it was found effective during a study of Tank #50 at Tank Farm # 5.

Area 3 A/B

Prior to installing the proposed wells the Navy may elect to employ the SCAPs unit.

Please depict the location of the pipeline from the tanks to the loop and shunt piping as this would represent a preferential flow path.

A number of the wells shallow and deep are located cross gradient from the tanks, a distance away from the tanks. Unless there is evidence of contamination in these areas it is recommended that the wells be installed closer to the tanks within the area of backfill around each tank.

It would be helpful if known areas of contamination around each tank were depicted.

Areas 1-3

Please confirm that all locations, which were not remediated and previously exhibited elevated levels of contaminants, are being investigated as part of this study.

Tank Farm 5

Area 2/3

Please depict the location of both discharge lines from the oil water separator on a map (this is necessary to access the locations of the proposed sampling points).

Please depict the location of the discharge pipe from the piping chamber to confirm that it is located in Area 2 and to allow one to access the proposed locations of the sampling point with respect to the discharge pipe and adjust as necessary.

During the previous investigation the streambed was inspected and test holes 0-2 feet deep were dug to find areas of contamination. If these locations were documented please indicate whether the proposed sampling locations represent these documented areas. If these areas were not documented please incorporate the aforementioned inspection procedure into the proposed sampling plan.

Please depict the location of the pipeline, which serviced the tank farm. Samples should be collected in the wetlands in the vicinity of this fuel line.

Please include sampling along the fuel line which serviced Tank Farm # 5, (sampling would follow the same protocol which was used for the rest of the fuel line located in the tank farm).

Please include a provision for the inspection of any access chambers in the fuel line, which serviced Tank Farm # 5. If evidence of contamination is present appropriate samples should be collected. If drains or sumps are present they need to be tracked to their final discharge point and sampled accordingly. The stripper line should be inspected to ascertain if it still contains fuel.

Please include a provision to collect three sediment samples north of the stream in the wetlands which contain the fifty-five gallon drum.

Please include a provision to inspect the stream/ wetlands in Area 3 for signs of a release, discharge pipes etc. If signs of a release or potential sources are evident sediment samples should be collected.

Areas 4a-d

Please include provision to install borings (SCAPs unit may be used) around Tanks 49, 55, 57, 58, 59.

Areas 1-4

Please sample the following:
Locations, which previously exhibited, elevated levels of lead along the fence line.
Locations, which were not remediated, and previously exhibited elevated levels of contaminants.

28. Section 11.6, Optimize the Sampling Design,
SAP Work Sheet 17, Sample Design and Rationale,
Page 103.

Please modify the report to state that soil samples will be examined in the field for evidence of contamination, (visual, olfactory, etc) and the most contaminated intervals will be sent to the lab for analysis.

29. Section 11.6, Optimize the Sampling Design,
SAP Work Sheet 17, Sample Design and Rationale,
Page 103. Paragraph 3

The Work Plan state that the 0-1, 2-4 and 8-10 foot interval will be sent to the lab for the risk assessment and that this will also be the interval for contamination delineation in Areas 1 and 2. While it is acceptable to propose intervals for analysis, the intervals, which are ultimately sent to the lab, are biased towards areas, which exhibit field evidence of contamination. In order to avoid confusion in the field please modify the report to state the final interval to be sampled will be based upon field evidence of contamination.

Finally, please specify that all borings in the vicinity and/or down gradient of the tanks must at a minimum go to the depth of the tanks.

30. Section 11.6, Optimize the Sampling Design,
SAP Work Sheet 17, Sample Design and Rationale, Analytical Groups
Page 102.

The Work Plan proposes using the low flow method to collect groundwater samples. Please be advised that as the main contaminant of concern at the site is petroleum the following procedures must be applied to groundwater sample collection:

The well will be assessed for NAPLs prior to purging the well using both an oil water interface probe and a bailer.

If NAPLs, including sheens, are present they will be collected via a bailer.

Groundwater samples will be collected via a bailer.

The Navy may elect to collect additional samples via low flow. During the purging process the purge water will be analyzed with a FID as the purge pump is raised through the well screen interval. The low flow sample devise will be placed at the interval, which exhibits the highest FID reading. Depending upon the location of the well, and the nature of the petroleum contamination, the FID may have limited utility in determining which interval to sample. In these cases the results of the boring logs will be accessed to determine the sample interval to set the low flow device. If LNAPLs are encountered the groundwater sample will be collected by placing the devise immediately below the groundwater surface.

31. Section 11.6, Optimize the Sampling Design, SAP Work Sheet 18, Sample Locations and Methods, Page 109.

This section of the Work Plan designated certain sample intervals that will be subject to analysis, 0-2, 2-4, 8-10, 14- 16, etc. It is assumed that these intervals were proposed based upon contaminant distribution observed during the previous investigations. Please confirm.

While it is acceptable to propose sample intervals for analysis, the intervals which are ultimately sent to the lab are based upon field observations. As an illustration, the work plan may propose samples from the 14-16 foot interval, however, if heavy contamination is observed in the 16-18 foot interval and the 14-16 intervals is clean, obviously the 16-18 foot interval will be sent to the lab. It is assumed that this is the intent of the work plan. In order to avoid confusion in the field please stipulate that continuous split spoon samples will be collected at all locations and the intervals to be sent to the lab will be biased towards the intervals, which exhibit the greatest evidence of field contamination.

32. Section 11.6, Optimize the Sampling Design, SAP Work Sheet 18, Sample Locations and Methods, Page 109.

The work sheet contains a typographical error in that Tank # 50, and Area 2, does not include a provision of TPH analysis of groundwater. Petroleum is the main contaminant of concern at the site; therefore please include petroleum analysis at these locations and all other samples for all media at the site.