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THE MEMPHIS DEPOT
TENNESSEE

ADMINISTRATIVE RECORD
COVER SHEET

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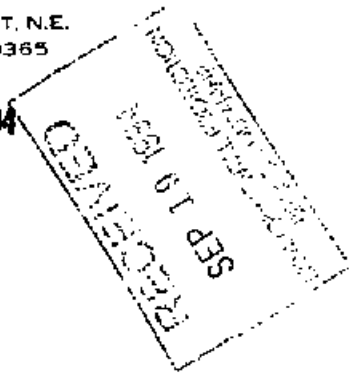
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

MAR 28 1994



4WD-FFB

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

C. Michael Rust, Colonel, USA
Commander
Defense Distribution Depot Memphis
2163 Airways Blvd.
Memphis, Tennessee 38114-5000

SUBJ: Notice of Technical Inadequacy (NOTI) for RFI Work Plans;
Defense Distribution Depot Memphis, Tennessee (DDMT);
EPA I.D. No.: TN4 210 020 570

Dear Colonel Rust:

The Environmental Protection Agency (EPA) has completed its review of the following documents, which were received in this office on January 11, 1994:

Generic Remedial Investigation/Feasibility Study Work Plan

Generic Quality Assurance Project Plan

Generic Health & Safety Plan

Operable Unit 1 Field Sampling Plan

Our comments are enclosed. EPA has reviewed these documents for compliance with the requirements for a RCRA Facility Investigation (RFI) Work Plan pursuant to the RCRA HSWA permit and a Remedial Investigation (RI) Work Plan pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

The current submittal represents a significant improvement over the last revision of these work plans. However, numerous serious deficiencies still remain. These deficiencies must be corrected before EPA can consider these documents for approval as satisfying the requirements for either an RFI Work Plan or an RI Work Plan.

As was stated in the Notice of Technical Inadequacy issued from EPA to DDMT on September 21, 1993 regarding the preceding revision of these work plans, EPA intends to follow the review and revision procedures outlined in Section XV (Consultation Process for Primary and Secondary Documents) of the Federal Facilities

RECORD COPY

Agreement (Agreement) in finalizing these documents. This approach is being followed due to the Parties' plans to sign the Agreement within the next several months. Therefore, a written response to our comments must be submitted to this office as soon as possible, and no later than fourteen (14) days from your receipt of this letter. A revised, "draft final" version of these documents which addresses EPA's comments must be received in this office no later than sixty (60) days from the date on which DDMT receives final comments from all Parties to the Agreement.

Note that until all of the RFI (RI) and CMS (FS) Work Plans for DDMT are approved, DDMT has not fulfilled the requirements for permit conditions II.E.1. and II.G.1. of the EPA RCRA permit effective September 28, 1990. Seven (7) copies of each Work Plan document must be submitted to:

Mr. Joseph R. Franzmathes
Director
Waste Management Division
U.S. Environmental Protection Agency
345 Courtland Street, NE
Atlanta, Georgia 30365

Failure to comply with any permit condition may result in an enforcement action pursuant to Section 3008(a) of RCRA, 42 U.S.C. Section 6928, as amended by the Federal Facility Compliance Act of 1992, under which EPA may seek the imposition of penalties of up to $25,000 for each day of continued non-compliance.

Should you have questions on the review comments, please contact Allison Drew of the Department of Defense Remedial Section at (404) 347-3016. For questions regarding compliance and enforcement, please contact Judy Marshall of the RCRA Compliance Section at (404) 347-7603.

Sincerely,

James S. Kutzman for

Joseph R. Franzmathes
Director
Waste Management Division

Enclosure

cc: Christine Kartman, DDMT
Frank Novitski, DDMT
Bill Forrester, TDEC
Jordan English, TDEC

TECHNICAL REVIEW AND COMMENTS
DRAFT OPERABLE UNIT 1 FIELD SAMPLING PLAN PLAN
DEFENSE DISTRIBUTION DEPOT MEMPHIS, TENNESSEE (DDMT)

GENERAL COMMENTS

1. The field techniques and QA/QC methodologies proposed in the document are generally acceptable. However, the proposed investigative strategy is seriously flawed. It appears that the vast majority of planned sampling locations are based upon a single document of unknown origin and purpose. There is no reason to suppose that this document is either complete or accurate. For instance, there are immense gaps in the timeline presented in this document. No information is given for materials buried prior to 1954, or between 1955 and 1965. Similarly, there is no record of burials between 1969 and 1984. Presumably excess and/or damaged materials were buried during these timeframes also.

Given the available information, all former burial sites must be positively located and examined either by trenching or intrusive sampling. A comprehensive geophysical survey must be conducted to locate other potential burial areas, if the current survey will not serve. Sampling must be biased to provide as complete a picture as possible of the contaminants present.

The RFI/CMS (RI/FS) should also make conservative assumptions regarding the character and extent of unknown disposals, and be open to the possibility that undocumented disposals within and near the known sites may contribute unexpected contaminants. Facility disposal records are valuable, but they do not have the same value as analytical data, and are no substitute for sampling. Sample analysis results should not be dismissed or misinterpreted in order to support conclusions derived from disposal records.

Attachment A is a draft proposed sampling strategy for completing the RFI (RI) once this preliminary information is obtained.

2. Although there are a number of monitoring wells in place at OU-1, there does not appear to have been any regular long term monitoring of static water levels. The present Field Sampling Plan (FSP) uses 1990 static water level data in determining the direction of groundwater flow at OU-1. This data indicates an unusual pattern of flow which requires confirmation by careful and repeated measurements. The FSP should include a schedule of regular static water level measurements for a minimum of one year.

3. For several sites (including Sites 9, 12, 13, 15 and 16) the FSP argues that the contaminants detected in nearby monitoring

wells are not attributable to these sites because the wells are not downgradient or because disposal records do not indicate that the contaminants detected in groundwater were buried at these sites. These arguments are premature, since the groundwater flow regime at OU-1 is poorly understood and possibly seasonally variable; there is insufficient data to conclude that any released contaminants could only have migrated in one particular direction. These arguments are also inconsistent with the approach of the FSP, which proposes that existing wells are adequate to monitor many of the sites.

The RFI/CMS (RI/FS) should proceed on the assumption that groundwater contaminants are attributable to nearby sites until proven otherwise, and should include the installation of more strategically placed monitoring wells to assist in pinpointing the sources of the contaminant plume. Also, unless there are previous data to confirm that a specific class of contaminants (i.e. pesticides, VOCs, etc.) has never been detected in samples from a specific well, the existing wells should be sampled for the full TCL/TAL. All new wells should be sampled at least once for the TCL/TAL.

4. Some of the discussion of previous ground water monitoring results from the Dunn Field area (for e.g. the discussion in Section 3.5.2) is inconsistent with the data presented in Appendix D of the Generic RI/FS Work Plan. Appendix D indicates that a larger suite of contaminants have been detected in some groundwater samples from the Dunn Field area. These inconsistencies must be remedied.

5. Deeper subsurface soil samples (samples from below the water table) may provide information to suggest locations where additional monitoring wells are needed.

SPECIFIC COMMENTS

1. Page 1-2, Paragraph 1:
The text in this paragraph suggests that complete field sampling plans for both the RI (RFI) sites which are included in OU 1 and the screening sites which may be included in OU 1 are included in this FSP. Yet the sampling plans presented later in the document do not support this statement. Please clarify.

2. Page 2-1, Section 2.2:
A. Specify the time period during which Dunn Field was used as a burial disposal site.

B. This paragraph indicates that OU-1 includes 21 burial sites and 2 additional sites. However, the FSP discusses sampling activities for a total of only 19 sites. Table 2-1 lists a number of additional sites, many of which are designated for no

further action. The FSP should be consistent in discussing the number of sites and should provide a discussion of the sites that are not scheduled for investigation.

3. Page 2-1, Section 2.3:
The FSP should include a brief discussion of the hydrogeological conditions at OU-1, and also more discussion of the results of past sampling, in order to provide sufficient information with which to define data gaps and to allow the document to stand alone.

4. Page 2-3, Figure 2.2:
This figure does not include all the areas (sites) under investigation during the RFI/CMS (RI/FS), and does include several areas which are not to be investigated. Please reconcile this figure with the remainder of the FSP.

5. Page 2-4, Figure 2.3:
This figure indicates the direction of runoff within OU-1, but does not indicate the offsite flow directions and pathways for runoff from most of the sub-basins within OU-1. It is important to present this information to determine how surface water bodies receive runoff from OU-1.

6. Page 2-7, Section 2.6:
The FSP does not discuss the need for surface soil samples in OU-1 with the exception of sites 24 and 85. It is understood that most of the contamination at these sites is thought to be in the sub-surface soils and not in the surface soils since the contaminants were originally buried. The RI (RFI) must confirm these suspicions with surface soil samples. Surface soil samples are needed so that the Baseline Risk Assessment can adequately characterize the risks associated with all of the potential exposure routes for each site. As stated in the EPA guidance document Guidance for Data Useability in Risk Assessment (April 1992) (Publication 9285.7-09A): "At least one broad spectrum analytical sample is required for risk assessment, and a minimum of two or three are recommended for each medium in an exposure pathway." (p. 73)

7. Page 3-1, Section 3.0.1:
Define what is meant by phased approach. Describe what type of phased approach will be used to conduct the Remedial Investigation for OU 1.

8. Page 3-1, Section 3.1.1:
The disposal histories of both Sites 1 and 24 indicate that toxic gases could be present, but intrusive sampling is proposed only for Site 1 and not for Site 24. Intrusive sampling will not be conducted at Site 24 because of "the potential hazards associated with intrusive sampling at this site." The FSP should discuss the effects of a gaseous release from Site 1 and should detail

whether special safety precautions will be taken to prevent gaseous releases of the contaminants of concern.

9. Page 3-4, Figure 3-2.1:
Many of the features and soil borings appear to be misplaced, out of scale, and misnamed. For instance:

A. Soil boring STB-103 appears close to Site 3 on the figure, but is intended to be placed in the vicinity of Site 4;

B. Soil borings STB-108 and STB-110 appear to be placed nearly 100 feet from Site 10, but should be located along the perimeter of Site 10;

C. SB-107 is designated STB-107 on the figure;

D. Angled soil boring ASB-129 is designated STB-129 on the figure;

E. Angled soil boring ASB-131 is designated ASB-120 on the figure;

F. Soil boring SB-115 is designated STB-115;

G. Angled soil boring ASB-127 is not shown on the figure.

These problems render the figure difficult to use, and should be corrected. The remainder of the figure should also be checked for additional errors.

10. Page 3-5, Section 3.1.2:
The last sentence in this section should be reworded. Since all of the contaminants that were disposed of at these sites are not known, it is incorrect to state that any contamination is "obviously" not related to any site.

11. Page 3-5, Section 3.1.3:
The FSP appears to assume that the chemical warfare agents buried at site 1 will migrate downwards only, and there is no plan to sample the upper 10 feet of the angled boring ASB-120. It is possible that these gaseous agents could persist in high concentrations in the upper soil column, and these areas should be sampled. In addition, the FSP should specify the approximate length, angle of descent, and distance from the disposal site for the angled soil boring. This will allow a determination of the depth at which the boring will pass below site 1, and also allow a determination of the lateral distance between site 1 and the point where the angled boring will intercept the saturated zone. This comment applies to all the angled borings planned for OU-1.

12. Page 3-6, Section 3.2.3:
The text states that no sampling is planned for site 2, because disposal records indicate that only two gallons of nonhazardous wastes were placed here. However, undocumented disposals may have occurred in or near site 2 and sampling may be warranted to determine if this is the case. The FSP should also note that monitoring well MW-11A will be downgradient of this site.

13. Pages 3-13, Section 3.3.3:
Soil boring STB-102 is located immediately downgradient of site 3, and should be converted to a monitoring well. From the disposal records, it appears that site 3 is a highly likely source of groundwater contamination. The nearest monitoring well (MW-11A) will be approximately 200 feet away and is intended to monitor several sites. The potential for releases from site 3 warrants a monitoring well in the immediate vicinity of site 3.

14. Page 3-14, Section 3.4.3:
One of the soil borings planned for site 4 should be placed between and west of the two burial pits. This boring should be converted to a monitoring well, for the reasons given above for site 3.

15. Page 3-15, Section 3.5.2:
The FSP claims that the presence of contaminants in boring STB-1 indicates the migration of contaminants from an offsite source, since this boring is upgradient of site 5. However, this soil boring is located downgradient of site 11. In addition, contamination was found in a soil sample collected as much as 40 feet above the saturated zone, suggesting a nearby source. As a result, the claim that offsite contaminants are migrating onsite is premature and unfounded.

16. Page 3-15, Section 3.5.3:
A. The waste volume given in this section (1.3 cubic feet) differs from that given in Section 3.5.1 (3 cubic feet). Please reconcile this inconsistency.

B. The FSP does not propose any soil sampling near site 5, based on the disposal records and the judgement that the site is not a major contributor to the plume of contaminants at OU-1. This judgement as a hypothesis only; sampling is required to confirm that site 5 is not a source of contaminant releases.

17. Page 3-16, Section 3.6:
The FSP does not include sampling at site 6 because the eye ointment medical wastes disposed of there are thought to be nonhazardous. However, the constituents of the waste are undocumented, and it is possible that other wastes were buried at or near site 6. A minimal amount of sampling is needed to confirm that site 6 is not contributing to the contaminant plume.

18. Pages 3-16 through 3-17, Section 3.7:
The location of STB-106 appears to be too far away from the site to provide definition of soil contaminant distribution or releases attributable to this specific waste disposal location. While this definition may be accomplished by the proposed angle boring ASB-130, the placement of STB-106 at such a distance from its correlative source area is inconsistent with other deep soil boring placement relative to disposal sites 1 through 4.

19. Pages 3-17 through 3-18, Section 3.8:
The location of angle boring ASB-127 is not shown on the relevant figures. Please correct.

20. Page 3-19, Section 3.9.3
A. The text states that the contaminants likely to be present at site 9 are expected to have low mobility and site 9 is long and narrow. As a result, several short angled soil borings spaced along the length of the site may provide better coverage than the one long angled boring (ASB-129) indicated in the FSP.

B. The FSP states that tetrachlorodibenzodioxins (TCDD) are potential contaminants at site 9, and proposes to analyze soil samples for TCDD. This section further states that soil samples collected during investigation of Sites 1, 3, 4 and 7 will also serve to characterize site 9. However, these other samples will not be analyzed for TCDD. Please clarify this inconsistency.

21. Page 3-20, Section 3.10.3:
A. The text states that four shallow soil borings are proposed for the perimeter of site 10, as this site's boundary is defined in the EPA RFA. Figure 3-2.1 identifies site 10 as a much smaller area than what would be the perimeter of the site as it would be defined by soil borings SB-108, SB-109 and SB-110. It is unclear which definition of the perimeter of site 10 is more accurate. Therefore, the optimal location of the shallow soil borings is not known. For this site, geophysical or soil gas survey results should probably be used to establish soil boring locations.

B. The proposed location of soil boring SB-107 is not shown on the relevant figure.

22. Page 3-21, Section 3.11.3:
A. This section states that the primary purpose of monitoring well MW-41 is to define the northern extent of the contaminant plume at OU-1, and the secondary purpose is to monitor releases from site 11. However, Figure 2-12 of the Generic RI/FS Workplan indicates that the plume probably extends well north of the planned location of this well. In addition, monitoring well MW-7 is well placed to detect any releases from Site 11, and monitoring well MW-41 is not needed for this purpose. In order to effectively define the northern extent of contamination,

monitoring well MW-41 should be an offsite monitoring well placed some distance north of the railroad tracks.

B. There is also an inconsistency in the placement of proposed well MW-41 as shown in Figures 3-2.1 and 4-1. Figure 4-1 shows this well north of the railroad tracks, although it is still located within the probable extent of the plume.

23. Page 3-23, Section 3.13.1:
It is not reasonable to assert that monitoring well MW-35, which is fifteen feet closer to site 13 than monitoring well MW-12, will provide significantly better characterization of site 13 if both wells are more than 200 feet downgradient. In addition, since definition of the pattern of groundwater flow at OU-1 is somewhat problematic, one set of static water level measurements does not provide enough data to determine that the monitoring wells northwest of site 13 (MW-5 and MW-13) are definitely not impacted by releases from site 13.

24. Page 3-24, Section 3.13.3:
A. Due to the quantity of wastes known to have been buried at Site 13 and the lack of nearby downgradient monitoring wells, a monitoring well should be installed in the immediate vicinity of Site 13.

B. The text states that soil boring STB-115 will be useful for monitoring soil contamination around site 13. Based on the location of this boring, as shown in Figure 3-2.1, it is more likely to monitor soil contamination from other sites. While the presumed contaminants disposed of at site 13 appear to be mostly inorganic sodium compounds, it is unclear what might be leaching from this site. At least one soil boring should be placed in the vicinity of site 13, and the two small areas labeled site 15 to the east of site 13, in order to determine what may be leaching out of these three waste disposal areas.

25. Pages 3-24 through 3-25, Section 3.14.3:
A. The ground water quality discrepancies between wells MW-12 and MW-35 are perplexing, in view of their nearly identical construction (RI/FS Report Table 2.10) and close proximity. Assuming that the existing water quality data, locations and reported construction details for these wells are reasonably accurate, this discrepancy in ground water quality may provide valuable insight into the nature and distribution of ground water contaminants or source areas around these two wells. The FSP should note that monitoring well MW-35 (in addition to MW-12) is downgradient of Site 14.

B. A more thorough analysis of soils is also needed at site 14, because the presence of high concentrations of chlorinated VOCs in MW-12 implies that some part of site 14 is a major source of ground water VOC contamination.

26. Page 3-25, Section 3.15.3:
The FSP should account for the possible disposal of undocumented hazardous wastes at site 15, and sampling should provide coverage of all parts of this site. Therefore, two additional angled soil borings should be installed to sample soils beneath the northern and southern portions of site 15.

27. Page 3-27, Section 3.17.3:
Figure 3-2.1 and Table 3.1A indicate that angled soil boring ASB-128 will be installed at site 17. A description of how this boring will be drilled should be included in the text of this section. See comment 11.

28. Page 3-29, Section 3.19.3:
Surface soil samples are proposed for the area around Building 1184. In order to confirm the absence of pesticides at depth in this location, a shallow subsurface composite soil sample should also be collected from this area.

29. Page 4-2, Section 4.2.4.1:
See comment 6.

30. Page 4-2, Section 4.2.4.3:
"Background soil chemistry will be determined using soil samples at numerous offsite monitoring well and soil boring locations." The number and locations of these samples must be identified in the document. Additionally, it is unclear where, and how many, subsurface background soil samples are proposed. Since soil chemistry can vary appreciably with soil depth, a sufficient number of subsurface background soil samples must also be collected.

31. Page 4-3, Section 4.3:
Surface water and sediment samples must be collected from all drainage ditches proximate to locations of suspected contaminant discharge (i.e. near known burial sites) and where these ditches exit the site. This information is necessary to characterize the surface water pathway for OU 1.

32. Page 5-1, Section 5.3.1.1:
The text states that permeability testing will be performed on samples from specific wells identified in this FSP. This statement implies that laboratory permeability testing on extracted soil samples will be performed. The only such testing discussed in the document concerns a sample from STB-12 (not a monitoring well) and a sample from well MW-43. Several additional confining unit permeability tests should be run on samples from other locations. More than one such test should be run for at least two selected locations to define potential vertical variation in the confining bed hydraulic conductivity. These additional samples may be deferred to later Operable Units, if there is a more critical area for the determination of

vertical permeability and provided the OU1 FSP thoroughly explains why this is the case.

33. Page 5-2, Section 5.3.2.1:
Provide the specific analytical data which indicates that neither the leaching nor the sorption of organic compounds from the PVC well construction materials has interfered with the data quality for previous sampling episodes.

EPA reserves the right to require DDMT to reinstall and resample any well, using stainless steel construction materials, if the results for that well are critical to the investigation or could be affected through the use of construction materials of questionable quality or suitability (see comment 21 on GQAPP and Attachment B to those comments).

34. Page 5-3, Section 5.3.2.4:
"Floating constituents have not been encountered in any previous sampling at OU-1..". Specify which of the existing wells at OU-1 are screened at or near the water table, and so would be suitable for detecting the presence of floating contaminants.

35. Page 5-9, Section 5.3.5:
A. EPA recommends that the text be revised to be less specific regarding the numbers and locations of optional wells. Approval of Section 5.3.5 as it is written could commit the OU 1 investigation to include all of the seven identified optional wells, even if some are clearly not needed. The text should simply state that the results from sampling and testing of offsite monitoring wells and soil samples will be used to determine the need for and location of additional offsite monitoring wells.

B. Two of the monitoring wells already installed at DDMT penetrate into the Memphis Sand Aquifer and there is some concern that these wells may provide a conduit for contaminants to penetrate the overlying confining layer. The FSP should specify that any additional Memphis Sand Aquifer wells will be installed in a manner that will minimize this potential problem. Specifically, a large diameter casing should be installed through a borehole and into the confining unit prior to advancing a smaller diameter borehole into the lower aquifer.

36. Page 5-10, Section 5.4:
This FSP should also include contingency plans for characterizing the confining layer, and the interconnection between the fluvial and Memphis Sand aquifers, in the event that significant groundwater contamination is detected in the fluvial aquifer west of Dunn Field.

37. Page 6-1, Section 6.1:
The results of the geophysical study should be included in these documents. Also, describe how "the results of the [geophysical] investigation will be used to assist placement of soil borings and monitoring wells described in this FSP."

ATTACHMENT A

5/21/97 Revision
Fred Floam, ESD

57 14

EVA

PROPOSAL FOR STREAMLINING THE RI/FS PROCESS

INTRODUCTION

The following proposal is a compilation of several proposals and reviews of the RI/FS process. In addition, many elements were developed by USEPA Region IV ESD, from personal experiences in conducting these type investigations inhouse, plus observations in the field of many of these investigations over a period of many years. Also, many suggestions and refinements have been incorporated from many sources, and it has been tailored to meet the specific needs of federal facilities.

This proposal is not meant to be interpreted as a rigid standard to be followed exactly as presented at all sites. It is being presented as a summation of the process used by ESD to complete the RI/FS process in as efficient a fashion as possible. It has been found to be very successful at all sites in Region IV where it has been used.

Preliminary Data Gathering

This is a crucial step that often seems to be overlooked in the RI/FS process. Information gathered here can result in significant savings of time and money for the project.

This process includes the following steps:

1) File search, employee interviews, examination of aerial photography, examination of historical maps, review of past investigations, etc. It is strongly recommended that high quality CAD maps be developed, overlaying current site development over historical contours and construction. Understanding how the site contaminants were historically disposed and migrated can result in significant time and money savings.

2) Based upon the information gathered in the first step, a decision should be made by the principals involved (i.e., the state, EPA, and the activity). Basically, a review of the existing information should be conducted and a unanimous decision made as to the likelihood the site will require some type of remediation. This decision is intended only to guide prioritizing of sites and initial sampling.

3) Collection of a minimum number of highly biased DQO Level IV samples to support the decision regarding the likelihood of remediation. A decision that the site will most likely not require remediation should lead to more samples at this stage, to support this decision. The location and types of samples must be another unanimous decision: this can be done by the method of overheads, or

the team can visit the sites and drive stakes. Or whatever. If it was decided that the site will most likely require remediation, the same process can be followed with fewer samples.

4) Evaluate the data collected to date and prepare preliminary remediation goals (PRGs). Consider:

- What scenario will be used for PRGs? It is recommended that the residential scenario be used for the purposes of the remedial investigation. Risk management will be utilized in deciding the land use scenario upon which the remediation will be based.

- PRGs are health based numbers based upon generic exposure information (these numbers could be refined during a site-specific risk assessment).

The PRGs will tell us the following:

- What contaminants will require further investigation (i.e., contaminants above PRGs).

- Will there be any special analytical concerns?

- Where do we stop sampling?

- Are the decisions being made supported by the data?

5a) If the site will require remediation, prepare the Work Plan, Field Sampling and Analysis Plan, Quality Assurance Project Plan, Health and Safety Plan. These plans should emphasize:

- All the data collected and joint decisions made to date.
- What type of information the final report will include (i.e., contour maps of contaminants above PRGs, confirmation sampling of soils, installation of a high quality permanent monitoring well network, etc.).
- The screening methods (both field and analytical) that will be used to delineate contaminated areas. The methods selected must be compatible with the contaminants selected and their PRGs. They should also emphasize speed, low cost and should have quantitation limits on the order of ten times less than the PRGs..
- That the screening program will continue until the area of contamination is delineated as determined by the PRGs. A strategy should be presented outlining how the data will be evaluated in the field to determine further sampling.
- Begin the Feasibility Study. Why waste time? Get the engineers started at this stage.

5b) If the data to this point indicates remediation will not be required (i.e., no contaminants present above PRGs), the existing data should again be reviewed giving due consideration to ecological receptors, groundwater protection and multiple chemical effects to determine if sufficient information exists to support a NFRAP.

6) Perform the field and analytical screening work, mapping areas of contaminants above PRGs. This work should be performed using temporary wells, piezocones, hydrocones, field laboratories, immunoassay techniques, etc., if at all possible. All parties should be aware that it is simply not possible to determine in advance where all samples will be collected, or even how many samples will be needed.

7) At this point another unanimous decision is required: Based on the results of the contaminant mapping, design the permanent monitoring well network and pick final sampling points for all other media. All samples collected at this point must be DQO Level IV. The purpose of this sampling event is to confirm the limits

of the mapped contamination and to provide a final check on the screening process to ensure no contaminants were overlooked.

8) RI report finalization, including final baseline risk assessment.

9) FS report finalization.

Advantages

- Little or no chance of data gaps requiring further field work.
- Real time feedback to field crews for mapping contaminated areas.
- Everyone agrees ahead of time when the major field work is completed.
- Speed. An experienced, well equipped field crew can map a sizable plume in 10-15 days.
- Two self checks - the preliminary data collected in step 3 and the confirmation data collected in step 7.
- Gets risk considerations (i.e., PRGs) to the front of the RI/FS process.
- Gets an early start on the FS.
- Perhaps most importantly, the field work is directed to support the decisions made in terms of risk assessment and remediation. Many field investigations seem to wander aimlessly because there appears to be no clear objective.

Disadvantages

- Requires more time invested in the early stages of the project.
- Many DOD activities control their contractors too rigidly, with no opportunity for flexibility in the field.

TECHNICAL REVIEW AND COMMENTS
GENERIC RI/FS WORK PLAN, GENERIC QUALITY ASSURANCE PROJECT PLAN
AND GENERIC HEALTH & SAFETY PLAN
DEFENSE DISTRIBUTION DEPOT MEMPHIS, TENNESSEE (DDMT)

GENERAL COMMENTS

1. By definition, this document is general in nature, with more specific information to be provided in the Operable Unit (OU)-specific Field Sampling Plans (FSPs). However, more information should be provided regarding the previous investigations at DDMT. In particular, this information should be presented in a coherent, concise manner which makes it clear to the reader that all available data and information (e.g. previous sample locations, detected contaminant concentrations, location and nature of removal actions) has been provided. A table listing the results from the previous investigations along with a map showing sampling or removal locations would help to clarify available information.

2. As was stated in the September 21, 1993 Notice of Technical Inadequacy, these work plans must include either the corresponding Corrective Measures Study (CMS) (or Feasibility Study (FS)) Work Plans, or the schedules for submitting these CMS (FS) Work Plans. In order to ensure effective, timely coordination of RFI (RI) and CMS (FS) activities, EPA recommends that the CMS (FS) Work Plans be submitted concurrently with the present documents. If these work plans will be submitted at a later date, adequate justification to support this decision must be provided.

SPECIFIC COMMENTS

GENERIC REMEDIAL INVESTIGATION/FEASIBILITY STUDY WORK PLAN

1. Page TOC-5:
A list of acronyms should be provided in this document and listed in the Table of Contents for reference and clarification.

2. Page 1-1:
The Introduction should name the organization or company which prepared this document and the party for whom the document was prepared.

3. Page 1-2, Paragraph 2:
Spell out the acronym "CEHND".

4. Page 1-3, Section 1.3.2:
The objective of "recommending a preferred alternative consistent with EPA CERCLA requirements" is met in the Proposed Plan for the site, not the FS. Please revise the text as needed.

5. Page 1-4, Section 1.4.2.1:
By definition, Operable Units (OUs) consist only of sites for which an RI is required. If information justifying the need to upgrade a screening site to RI status becomes available, it should be assigned to an OU at that time. Screening sites may also be investigated concurrently with an OU. However, the reporting requirements for the two types of sites are different. The Federal Facilities Agreement requires preparation of an OU-specific RI Report (and subsequent Primary Documents) for RI sites. A screening assessment report, which documents and justifies the No Further Investigation decision, must be prepared in order for a screening site to be dropped from further consideration. Preparation of additional documents (e.g. Feasibility Study, Proposed Plan, Record of Decision) would then not be required for this site. Please revise the text as needed, here and throughout the document.

6. Page 2-3, Figure 2-2:
Additional information should be provided on this figure, including major street names and specific buildings which were referenced in the text. For OU-2, Buildings 1084, 1085 and 1088 should be shown. For OU-3, the Former Transformer Storage Area, Pad 267 and Building T-273 should be shown. For OU-4, Building 737 should be shown.

7. Pages 2-4 through 2-7, Section 2.2:
For each study, both the client and the company or agency that performed the study should be identified.

8. Page 2-5, Paragraph 2:
The text states that concentrations of volatile organic compounds (VOCs) ranged from 3 micrograms per liter (ug/l) to 200 ug/l and that trichloroethylene (TCE) and tetrachloroethylene (PCE) were the only contaminants detected. The text also states that maximum concentrations of 150 ug/l and 81 ug/l were detected for TCE and PCE, respectively. However, neither the 150 ug/l nor the 81 ug/l corresponds to the 200 ug/l value previously mentioned. This discrepancy should be clarified.

A table showing previous sampling results would help clarify the information from previous investigations.

9. Page 2-5, Paragraph 4:
"This investigation revealed the presence of appreciable levels of chlorinated dioxins and furans." Define the term "appreciable levels" in the text.

10. Page 2-5, Paragraph 5:
The text refers to the removal of a liquid waste product and contaminated soils. Specify exactly where the removals occurred through use of text and a figure.

11. Page 2-6, Section 2.2.5.2 and 2.2.5.3:
Please delete all references to EPA approval and concurrence from these sections. The subject meeting described in "Reference 73" was not attended by an authorized EPA official. The letter mentions that a telephone call was made to an EPA Region IV On Scene Coordinator. Information obtained by placing random calls to random EPA Region IV personnel cannot be regarded as final EPA approval, concurrence or authorization on any subject.

12. Page 2-6, Paragraph 4:
The text states that as a result of the Water Quality Biological Study, Lake Danielson and the Golf Course Pond were placed "off-limits" to fishing. Explain what was found during this study to warrant an "off-limits" restriction.

13. Page 2-7, Section 2.2.8:
The numbers of SWMUs identified in the text are inaccurate and incomplete. Per the RCRA Permit, 12 SWMUs require No Further Action, 28 SWMUs require confirmatory sampling and 5 SWMUs are covered under the state's portion of the Permit. These SWMUs plus the 4 SWMUs requiring an RFI total to 49: the number of SWMUs identified.

14. Page 2-7, Paragraph 2:
As has been expressed repeatedly in previous document reviews, EPA strongly believes that the action to treat groundwater at Dunn Field can be more appropriately handled as an Interim Remedial Action than as a Non-Time Critical Removal Action. The remedial action process allows for more formalized, clearly defined input from EPA, the state and the public. Such input is critical for such an important, potentially sensitive, response action.

The text should also briefly describe the current status of this groundwater response action.

15. Pages 2-8 through 2-16, Section 2.3:
A. As indicated in the text, all tables should include all three site numbers (RFA, "RI/FS" and Site) for purposes of clarification and for future reference. Please make the necessary corrections.

B. The FY94 SMP is currently being revised to address EPA and TDEC comments. Once this SMP is finalized, all RI/FS Work Plan documents must be revised to reflect all agreements documented in the SMP (e.g. site investigatory status). These RI/FS Work Plan

documents will not be considered for approval until these changes are incorporated.

C. The text and table describing each OU do not always identify the same sites or even the same number of sites. These discrepancies must be corrected in order to ensure clear identification of each OU.

D. The rationale for establishing each OU should be clearly stated in the first sentence or two of each OU description (e.g list OU-specific information, using the list provided on page 1-2 of this document as a guide). The site listings provided leave the reader with a somewhat disjointed picture of the OU and the reason for its establishment. Better definition of each OU during the scoping phase will help DDMT to clarify and direct investigative efforts toward the ultimate goal of remedy selection and implementation.

E. The relationship between the screening and NFA sites identified in the tables and the RI sites and OUs identified in text and tables should be explained and clearly planned out. How will RI and screening site investigations differ? How and when will the decision to upgrade screening sites or drop them from further consideration be made? If screening sites are upgraded to RI status, how will they fit into the ongoing RI process? Will it be possible to incorporate them into existing OUs, given schedule constraints, or will additional OUs have to be established? If a screening site is located proximate to an RI site, or potential pathway from that site, will it be feasible to conduct separate investigations of these two sites?

16. Page 2-15, Paragraph 3:
EPA and TDEC will need to see written reports and documentation before agreeing to an NFA decision for a site. These reports should be submitted as soon as possible so that the site status can be determined quickly and any investigations deemed necessary for these sites can be performed concurrently with other site investigations.

17. Page 2-16, Table 2-7:
The work plan should summarize the available information on sites 86, 22 and 23. There is a concern for undocumented co-disposal of hazardous wastes. Supporting documentation of the effectiveness of the removals at sites 42, 43 and 46 should also be submitted to ensure that residual hazardous constituents meet health based criteria.

18. Page 2-39, Paragraph 1:
"A minimum thickness for the clay confining unit was determined to be 15 feet in boring STB-8." There are not enough borings, nor are the borings of sufficient depth to make this statement with confidence. Additional investigative efforts (e.g. borings

and/or monitoring wells which penetrate the confining unit, other investigative methods) are needed to determine the minimum thickness of the confining unit at DDMT.

19. Page 2-42, Figure 2-11:
Much of the text in this figure is illegible. The figure quality must be improved.

20. Page 2-47, Figure 2-15:
See preceding comment.

21. Page 2-48, Figure 2-16:
The contours of the top of the Jackson/Upper Claiborne confining unit within DDMT boundaries differ significantly between this figure and Figure 2-15. Please correct this discrepancy.

22. Page 2-49, Paragraph 4:
The text states that information on the permeability of specific site soil was not available, so a range of typical values for clayey soils was assumed for the groundwater flow calculations. In order to make accurate calculations, the site specific soil permeability must be determined during the upcoming RI.

23. Page 2-50, Paragraph 1:
"..in areas where the confining unit has thinned or where sand or silt beds exist within the clay unit, the rate of penetration [of groundwater] could be much faster." Quantitative information regarding the estimated rate of penetration through the thinner portions of the confining unit should be provided in this section.

24. Page 2-51, Section 2.4.6.5:
The wells in the Allen Well Field may also be contaminated because of a poor seal in the confining unit, or deteriorating casings. These possibilities must be considered, since they may greatly impact the investigation.

Depending on the extent of groundwater contamination identified in the fluvial aquifer west of Dunn Field, the presence/absence of windows in the confining layer west of DDMT may also be a data gap to be filled during the RI.

25. Page 2-53, Section 2.4.6.5:
Raw water samples should be collected from the wells nearest the DDMT.

26. Page 2-54, Table 2-11:
Analytical results for operating production wells and the "IT-" series wells in the Allen Well Field should also be included in this table.

27. Page 3-9, Section 3.1.1.5:
"The sites described below are the only screening sites which were characterized... with surface soil samples. Other screening sites...were evaluated with surface water samples....and are discussed in Section 3.1.3." In general, in order to achieve a coherent discussion of existing site information, all available results should be organized and presented by site and/or OU rather than by media. (See General Comment 1.)

28. Page 3-17, Paragraphs 3 through 5:
Figures should be included showing the well locations and contaminant concentrations detected at OU-2, OU-3 and OU-4, as was done for OU-1.

29. Page 3-18,
"..the Law study failed to detect any consistent pattern of groundwater contamination on the Main Installation." This statement requires clarification. What type of pattern would be expected, given the areally diverse distribution of a wide variety of potential contaminant sources on the Main Installation?

30. Page 3-39, Section 3.3.3.1:
"The Fluvial Aquifer is not a drinking water aquifer." This statement is incorrect and/or misleading. The Fluvial Aquifer may not be presently being used as a drinking water source, but under EPA's groundwater classificiation system it is a Class IIB aquifer (potential source of drinking water). This section should be reworded to indicate that, while the fluvial aquifer is not currently used as a source of drinking water in the immediate area of the site, the aquifer has a potential for future drinking water uses.

31. Pages 3-44 through 3-45, Section 3.3.4:
The following general comments are provided regarding adequate characterization of the nature and extent of contamination at DDMT insofar as it poses a potential threat to the environment:

A. Adequate sediment sampling must be performed to determine if contaminants are reaching Tarrent Branch, Cane Creek and Nonconnah Creek and persisting in sediments and/or surface waters of these streams. Sampling stations should also be located beyond DDMT boundaries as needed to determine the extent of surface water and/or sediment contamination.

B. Analytical results of samples for environmental media must be evaluated relative to Region IV screening values. Additional assessment may be required for those substances which exceed the screening levels to determine impacts on biota (aquatic and terrestrial).

C. The percentage of types of ground cover within each OU must be calculated (i.e. grassed area, forest area, buildings, paved surfaces, etc.) for each OU.

D. Additional investigations into the potential presence of endangered/threatened species must be completed and presented as planned.

E. In preparing the ecological risk assessment, the transport and fate of pesticides, metals and PAHs must be determined relative to biotic receptors that may be impacted.

F. In preparing the ecological risk assessment for each OU, a strategy to look at the cummulative effects for all four OUs should also be developed.

32. Pages 3-46 through 3-49, Section 3.4:
In general, this section represents a good proactive attempt to define the ultimate goal of these investigations. These descriptions should facilitate the development of more focused and directed investigative efforts.

33. Page 3-46, Paragraph 3:
Please revise the third sentence of this paragraph to read "...the principal contaminant source area is located within Dunn Field."

34. Page 3-47, Section 3.4.1.1:
Ground water clean up levels are established for CERCLA Remedial Actions as ARAR levels, or as risk-based numbers in the absence of standards, except where at least one of the criteria for an "ARAR waiver" are met. The potential for a ground water remedial action to attain the remedial objective is not predictable before the nature and extent of contamination have been adequately determined, and is generally not predictable until a sufficient amount of ground water quality data have been generated during the Remedial Action. As a statement of Remedial Action Objectives for ground water, this work plan must state that those objectives are ARARs or risk-based concentrations. Please revise the work plan text accordingly.

35. Page 3-52, Paragraph 1:
The Federal Facilities Agreement which has been negotiated by the Parties outlines the following procedure for ARAR identification: "For those...Documents that consist of or include ARAR determinations, prior to issuance of a draft document, the Project Managers shall confer...to identify and propose...all potential ARARs pertinent to the document being addressed. ...Draft ARAR determinations shall be prepared by DLA... (Section XV.E.1.) Consequently, "In commenting on a draft document which contains a proposed ARAR determination, whenever EPA and/or TDEC objects, it shall explain the basis for its objection in detail.

EPA and TDEC shall also identify any ARARs which it believes were not properly addressed in the proposed ARAR determination." (Section XV.D.3.) Therefore, in accordance with the FFA, while the Parties may meet in order to discuss and attempt to identify potential ARARs, the first formal ARAR list shall be prepared by DDMT and submitted as a part of the corresponding Primary or Secondary Document. The FFA does not require EPA or TDEC to prepare a formal ARAR list, not does it mention the 30-day requirement. Given the anticipated signature of the FFA in the near future, EPA proposes that all Parties begin complying with the terms of the FFA now, in order to ensure a smooth transition from compliance under the RCR HSWA Permit to compliance under the FFA.

36. Pages 3-54 through 3-57, Table 3.7:
This table contains numerous mistakes regarding EPA's Maximum Contaminant Levels (MCLs) and Maximum Contaminant Level Goals (MCLGs). Please make the corrections listed below and check the remainder of the table for other errors:

There is no MCLG for benzo(a)anthracene or benzo(b)fluoranthene.

The MCL and MCLG for bis(2-ethylhexyl)phthalate is 0.006 ug/l and 0.0, respectively.

There is no MCLG for butylbenzylphthalate, chrysene or dibenz (a,h) anthracene.

There is no MCL or MCLG for 1,3-dichlorobenzene.

There is no MCLG for indeno(1,2,3-cd)pyrene.

The MCL and MCLG for methylene chloride is 0.005 ug/l and 0.0, respectively.

The MCL and MCLG for 1,1,2-trichloroethane is 0.005 ug/l and 0.003 ug/l, respectively.

37. Pages 3-64 through 3-70, Tables 3.9 and 3.10:
Replace the term To-Be-Considered (TBC) with Preliminary Remediation Goal (PRG).

The two tables refer to RCRA Sub-Part S health-based values and the State of Tennessee's (TN) Guidance Levels as TBCs. It would be acceptable to use the SubPart S values for PRGs only if the values are recalculated using the most current toxicity values available. The TN guidance levels must also be updated if used as PRGs.

EPA has developed a guidance document for calculating PRGs. This document is the Risk Assessment Guidance for Superfund (RAGS) Part B. I would recommend that this guidance be used to

calculate PRGs instead of the other two guidance documents, but they would be considered acceptable if the calculations are updated.

38. Page 3-77, Section 3.7.1:
Another Overall Data Gap is groundwater flow between the Fluvial and Memphis Sand Aquifers and within the Memphis Sand Aquifer. The text refers to two monitoring wells which were installed in the Memphis Sand Aquifer. Two wells are not sufficient to adequately characterize this or any other aquifer, nor the overlying confining unit. Additional study will be required to characterize the Memphis Sand Aquifer and its relationship to the Fluvial Aquifer.

39. Page 3-77, Section 3.7.2:
Future data collection for OU-1 must also include surface soil samples. Adequate surface soil characterization is apparently missing for all areas of the site. The surface soil contamination must be adequately characterized for the Baseline Risk Assessment to be complete and accurate. EPA Region IV defines surface soil samples as those which are collected from the top foot of soil.

40. Page 5-6, Section 5.3.1.2:
In order to determine soil properties related to soil contaminant transport, soil samples must also be collected at various depths from at least two background locations. Principal among these soil properties is the amount of organic carbon in the soil.

41. Pages 5-6 through 5-7, Section 5.3.2.1:
A soil gas survey may be another useful investigative approach. This method may be used to identify likely source areas for volatile organic compounds detected in the ground water, particularly in the Dunn Field area.

Geophysical methods will likely provide ambiguous results, in particular with respect to organic contaminant source areas. Some geophysical methods may also be adversely influenced by cultural features.

42. Page 5-9, Section 5.6.2:
This approach to developing the Baseline Risk Assessment is acceptable, provided it does not delay submittal of the RI Report.

43. Page 5-10 through 5-11, Section 5.8.2:
A copy of EPA's preferred format for status reports is provided as Attachment A. Also, please note that the Federal Facilities Agreement only requires the submittal of Quarterly Progress Reports.

44. Page 5-12, Section 5.9.3:
PRGs are established early in the investigative process. Upon completion of the Remedial Investigation and the Baseline Risk Assessment, final remediation goals must be established.

45. Pages 5-12 through 5-13,
The proposed preparation and submittal of 3 separate technical memos prior to preparation of the CMS (FS) may provide an excellent means for ensuring the efficient development of a quality CMS (FS). This approach is acceptable to EPA so long as the preparation of these memos does not delay submittal of the Draft CMS (FS). Please attach a generic RFI/CMS (RI/FS) timeline to this section which includes anticipated submittal, review and revision/finalization times for all proposed technical memos and primary and secondary documents.

46. Page 6-1, Section 6.1.1.2:
EPA cannot agree to a generic 30 day review period for all secondary documents. These review periods should be negotiated and agreed to by the Parties on a case-by-case basis.

47. Pages 6-2 through 6-3, Section 6.3.1:
While all three Parties may discuss, and attempt to reach agreement on, the most appropriate corrective action in the event of a schedule breakdown, EPA and TDEC shall make all final determinations with regards to enforceable schedules.

GENERIC QUALITY ASSURANCE PROJECT PLAN

1. Page 1-1, Section 1.1:
This section provides an incomplete listing of project objectives with respect to the nature and extent of contaminant releases to the environment. Please revise as needed.

2. Page 2-1, Section 2.1:
This paragraph should also specify the client(s) for whom the project team is working (i.e. who is responsible for ultimately getting the work done), and provide a better definition of the working relationship between the client and the project team.

3. Page 3-2, Table 3.1:
Specify the relative percentage of Level III and Level IV analyses to be performed. As was discussed during the December 1993 RPM meeting, EPA may accept Level III data in many instances. However, adequate and specific justification for performing Level III analyses, rather than Level IV, must be provided in order for EPA to consider these work plans for approval. Also, the analytical levels specified in this table appear to be in conflict with the text in Section 3.2.2 which states that "The data level will be level 4." Please clarify.

4. Page 3-5, Table 3.2:
A. SW-846 methods are incomplete without the appropriate extraction/preparation methods. Please provide this information.

B. EPA is not familiar with Method UW22. Please provide a copy for our review.

5. Pages 3-6 through 3-7, Table 3.3:
Periodic revisions are made to SW-846. If a particular method has been revised, the updated version should be used. The reference should indicate from which edition or update the methods are taken.

6. General Comment:
There are no tables showing methods for soil/sediment samples. Please provide.

7. Pages 3-10 through 3-11, Table 3.4:
Detection limits are shown in ug/L; however, the analytical method shown for mercury is the one for solid and semi-solid waste. Please clarify.

8. Page 4-2, Section 4.2:
Blank samples must also be collected from the organic free water system, potable water used in drilling, bentonite, sand, drilling mud and sample preservatives.

9. Page 4-6, Table 4.2:
A. Metals and mercury samples must also be preserved with HNO_3 to pH <2.

B. A table(s) which addresses sample containers, preservation and holding times for surface water samples and for surface soil, subsurface soil and sediment samples must also be provided in this document.

10. Page 4-13, Paragraph 1:
EPA strongly opposes the use of Teflon bailers to purge monitor wells. Bailer purging has the potential for creating very turbid ground water samples. Since metals are a concern at this site, slow rate well purging to minimize sediment mobilization is advised.

11. Page 4-13, Section 4.9.2.2:
"Wells will be sampled within 6 hours of purging or within 10 hours for slow recharging wells." Wells should be sampled as soon as possible after purging. For most wells at this facility, this delay should only be a few minutes.

12. Page 4-14, Section 4.10.2:
Per EPA Region IV risk assessment policy, all surface soil samples must be collected from the top foot of soil.

13. Page 4-15, Sections 4.10.3 and 4.10.4:
Soil sampling for vertical hydraulic conductivity (permeability) testing of the confining layer between the Fluvial aquifer and the Memphis Sand is a recommended approach to site characterization. According to the OU 1 Field Sampling Plan (Sections 4.2.3 & 5.3.3) samples used to achieve this goal will be collected from only one offsite soil boring location and one onsite well location at OU 1. Samples should be collected from additional locations for this and other OUs, to determine spatial (variation by depth and across the area of the confining unit permeability). Alternatively, it would be acceptable to perform an aquifer test to determine the characteristics of the confining layer in each area where it is suspected to be absent, thinner, or more likely to leak.

14. Page 4-16, Paragraph 2:
The text discusses surface water sampling procedures and states that surface water samples may be collected using a decontaminated Kemmerer sampler or bailer. Please provide the construction material for the Kemmerer sampler and bailer in this section.

15. Page 4-17, Paragraph 3:
Sediment samples which are to be analyzed for VOCs must not be mixed, but should be immediately transferred to the sample jars.

16. Page 5-1, Section 5.1:
A more comprehensive adjunct to the EPA Region IV ECBSOPQAM is the EPA document Handbook of Suggested Practices for the Design and Installation of Ground-Water Monitoring Wells, EPA/600/4-89/034. This document is preferred to the "RCRA Ground-Water Monitoring Technical Enforcement Guidance Document" as comprehensive guidance for the design and installation of monitoring wells.

17. Page 5-1, Paragraph 5:
Describe the procedure to be followed in backfilling the borings with bentonite and state the type of bentonite to be used.

18. Page 5-2, Section 5.2.3.1:
If heaving sands are encountered, it is recommended that a center plug be used. If this does not solve the problem, water rotary should be attempted. Mud should be used only as a last resort.

19. Page 5-2, Section 5.2.3.2:
A tremie pipe must be used to install the bentonite slurry, and the grout. For PVC wells, a pure bentonite grout is recommended. The concrete pad must be as specified in the Engineering Branch Standard Operating Procedures and Quality Assurance Manual, (ECBSOPQAM), February 1, 1991.

20. Page 5-2, Paragraph 3:
The text discussion of the hollow stem auger technique for monitoring well installation must also include the method to be used for the installation of the sand pack.

21. Page 5-4, Paragraph 1:
Provide the specific analytical data which indicates that neither the leaching nor the sorption of organic compounds from the PVC well construction materials has interfered with the data quality from previous sampling episodes.

Per the Region IV FFB guidance on this subject, the justification for use of PVC as a well construction material must be provided on an Operable Unit-specific (not a facility-wide) basis. Also, EPA reserves the right to require DDMT to reinstall and resample any well, using stainless steel construction materials, if the results for that well are critical to the investigation or could be affected through the use of questionable construction materials (see Attachment B).

22. Page 5-4, Section 5.2.5.2:
The casing and screen must be devoid of all inks and printing.

23. Page 5-5, Section 5.2.5.4:
Oil, grease and paints are LNAPL materials. Some wells must be screened at the top of the aquifer.

24. Page 5-6, Section 5.2.5.8:
The bentonite seal thickness specification and grout specifications presented in this section are inconsistent with information presented in Sections 5.2.3.2 and 5.2.3.3. Please revise the text as needed.

25. Pages 5-6 through 5-7, Section 5.2.5.9:
See comment 14.

26. Page 5-10, Section 5.2.9.1:
The drill rig must be inspected and decontaminated as specified in the ECBSOPQAM.

27. Pages 5-10 through 5-11, Section 5.2.9.2:
The sampling equipment must be cleaned as specified in the ECBSOPQAM.

28. Pages 5-11 through 5-12, Section 5.2.9.3:
A. The sampling equipment must be cleaned as specified in the ECBSOPQAM.

B. The decontamination procedures for the miscellaneous groundwater sampling equipment are not consistent with Section B.7 of the ECB SOPQAM. The decontamination for submersible pumps must also include pumping a sufficient amount of soapy tap water

through the hose to flush out any residual purge water. The hose must then be pumped with tap water, followed by deionized water. In addition, the exterior of the hose must be scrubbed with hot soapy tap water, followed with a tap water rinse and a deionized water rinse.

29. Page 8-10, Table 8.2:
If pesticide-grade acetone is used, the detection of acetone in samples collected in accordance with acetone-rinsed equipment is suspect. EPA Region IV recommends the use of pesticide-grade isopropanol.

30. Page 9-1, Section 9.0:
All data should be managed and submitted in accordance with EPA Region IV's data locational policy, as outlined in Attachment C.

31. Appendix A:
A. Reference 3: See comment 5.

B. Reference 19: EPA Region IV is not familiar with Contract Laboratory Program Statement of Work 87J001. Please clarify.

GENERIC HEALTH AND SAFETY PLAN

33. Appendix B:
Provide a map which illustrates the emergency route to the nearest hospitalute to the nearest hospital. The phone number for the U.S. Army Health Clinic should also be provided.

ATTACHMENT A

PROJECT EXECUTIVE SUMMARY DEFENSE ENVIRONMENTAL RESTORATION PROGRAM	PROJECT:	PEAR CODE:	DATE:
	CONTRACT NO.:	MSC:	DISTRICT:
	PROJECT MANAGER:	OFFICE SYMBOL:	TELEPHONE:

PROJECT PHASE	PERCENT COMPLETE	
	SCHEDULED	ACTUAL
PA/SI		
RI/FS or EE/CA		
Remedial/Removal Des		
Remedial/Removal Act		
O & M		
TOTAL		

I. STATUS SUMMARY

Funds Received from HQUSACE	
Current Baseline Cost Est.	

NAME and RELEASE DATE:

PROJECT MANAGER: _____

DIST PRB CHAIR: Fred Kitchens, P.E.

MSC PRB CHAIR: _____

HQUSACE PRB CHAIR: _____

II. STATUS OF PROJECT COSTS: ($000) - FULLY FUNDED ESTIMATES

WORK BREAKDOWN STRUCTURE ITEM OR FEATURE (1)	BASELINE ESTIMATE (2)	CURRENT FY BASELINE EST (3)	CURRENT APPROVED EST (4)	MONTHLY VARIANCE (5)	TOTAL VARIANCE (6)	FORECAST ESTIMATE (7)
Date of Estimate (Month/Year)						
TOTAL PROJECT COST						

III. STATUS OF PROJECT SCHEDULE: (MONTH/YEAR)

MAJOR MILESTONES (1)	BASELINE PROJECT SCHEDULE (2)	CURRENT APPROVED SCHEDULE (3)	MONTHLY SCHEDULE VARIANCE (4)	TOTAL SCHEDULE VARIANCE (5)	FORECAST SCHEDULE (6)	ACTUAL COMPLETION DATE (7)

NG FORM 5043-2-R, Sep 92

ER 5-7-1 (ER) 1

Proponent: CECW-LI

PROJECT EXECUTIVE SUMMARY DEFENSE ENVIRONMENTAL RESTORATION PROGRAM	PROJECT:	PEAR CODE:	DATE:
	CONTRACT NO.:	MSC:	DISTRICT:
	PROJECT MANAGER:	OFFICE SYMBOL:	TELEPHONE:

MAJOR MILESTONES (1)	BASELINE PROJECT SCHEDULE (2)	CURRENT APPROVED SCHEDULE (3)	MONTHLY SCHEDULE VARIANCE (4)	TOTAL SCHEDULE VARIANCE (5)	FORECAST SCHEDULE (6)	ACTUAL COMPLETION DATE (7)

ENG FORM 5843-2-R, Sep 92

PROJECT EXECUTIVE SUMMARY DEFENSE ENVIRONMENTAL RESTORATION PROGRAM	PROJECT:	FEAR CODE:	DATE:
	CONTRACT NO.:	MSC:	DISTRICT:
	PROJECT MANAGER:	OFFICE SYMBOL:	TELEPHONE:

IV. PROJECT ISSUES AND CONCERNS: A. List of Significant Project Issues. B. Project Synopsis including (1) Description and (2) Current Status

C. Description of Significant Issues.

ATTACHMENT B

JJUSTIFICATION FOR USE OF ALTERNATE MATERIALS IN MONITORING WELL CONSTRUCTION
U.S. EPA REGION IV
DEPARTMENT OF DEFENSE REMEDIAL SECTION

Below are the U.S. EPA Region IV Department of Defense (DOD) Remedial Section's minimum information requirements to justify the use of PVC as an alternate casing material for groundwater monitoring wells.

1. The Data Quality Objective(s) (DQO) for the samples to be collected from wells with PVC casing per EPA/540/G-87/003, "Data Quality Objectives for Remedial Response Activities".

2. The anticipated compounds and their concentration ranges.

3. The anticipated residence time of the sample in the well and the aquifer's productivity.

4. The reasons for not using a hybrid well.

5. Literature on adsorption/desorption characteristics of the compounds and elements of interest for the type of PVC to be used.

6. If an anticipated increase in casing thickness will require a larger annular space.

7. The type of PVC to be used and if available the manufacturers specifications. And an assurance that the PVC to be used does not leach, mask, react or otherwise interfere with the contaminants being monitored within the limits of the DQO(s).

Acceptance does not constitute approval. Therefore, if PVC is accepted for use by EPA, the following conditions shall apply:

1. The Facility/DOD Agency accepts the risks that the use of alternate materials for groundwater monitoring may cause interferences or inaccuracies in the chemical analysis of samples from such wells. All compounds found in samples collected from the well will be considered to originate in the aquifer being monitored.

2. Any such acceptance applies only to the implementation of the specified RFI/RI Work Plan. Any other use of alternate materials for groundwater monitoring must be granted by EPA separately. Any major amendments or revisions to the referenced RFI/RI Work Plan or the intended DQO(s) of the work plan may also require reassessment of the acceptance for use of alternate materials by the EPA.

3. EPA reserves the right to refuse groundwater monitoring data from groundwater wells constructed of alternate materials from those specified in the Region IV SOP/QAM whenever such construction materials could cause the Groundwater monitoring data to fail to meet the necessary data DQO(s).

last revised: 11/30/93

ATTACHMENT C

The USEPA Region IV Federal Facilities Branch is utilizing the Interchange File Format (IFF) to electronically receive data generated during Remedial Investigations. The enclosure entitled Interchange File Format for Electronic Data Reports provides instructions and a data dictionary for the IFF format.

All basemaps should be provided in a digitized, ARC/INFO compatible format, which includes the .dxf format. A list of layer names and definitions, and necessary data to allow the basemaps to be projected into the "real world" should also be provided.

The enclosure entitled IFF Field Worksheet may be used to assist DDMT's contractor in recording the appropriate IFF data in the field. It is provided as an assistance to DDMT, and may be used as is, modified, or not utilized at all.

The Department of Defense is working with Region IV on a national level to comply with the requirements of the IFF and the delivery of digitized basemaps. Data generators should contact appropriate internal departments to obtain assistance in complying with EPA's request and to assure that internal compliance regarding electronic data requirements are met.

Questions may also be forwarded to Richard Hammond, FFB Database Manager, at (404) 347-3016.

INTERCHANGE FILE FORMAT FOR ELECTRONIC DATA REPORTS

This document establishes, for EPA Region IV, the required format for electronic reporting of monitoring data.

Data will be transported as a set of four ASCII files:

STATION.DAT	Contains basic information about monitoring station location and type.
WELL.DAT	Contains detailed information about construction and characteristics of groundwater monitoring stations.
SAMPLE. DAT	Contains basic information about the collection and characteristics of samples.
PARM. DAT	Contains measured values and reporting units for specific parameters.

The first line of EACH of the four files MUST contain the following text starting with position one: 19901001

These files are to be transmitted in ASCII format using 5.25 inch flexible disk, nine-track magnetic tape (1600 or 6250 bpi) or, in the future, via communications channels yet to be defined. Hardcopy reporting requirements will continue as currently required until further notice. Additional files may be defined in the future for non-groundwater station types should the need arise.

Several of these files will contain data that is usually static in nature. For example, the basic information contained in STATION.DAT will not normally change for any single station; therefore, once the data has been submitted for a particular station, it will not be required to resubmit that information. If, however, the station record is updated or corrected, the record would have to be resubmitted. After the initial report then, STATION.DAT would be submitted

only when new stations are created, or when an old station record is modified, and need only continue the new or modified records. The same is true of file WELL.DAT. SAMPLE.DAT would, of course, be submitted each time one or more new samples were to be reported, or any sample record required updating. Again, the file need only contain the new or updated records. PARM.DAT is expected to be submitted at each required reporting interval, since it will contain the analytical results needed to determine compliance. It must contain all new results for the reporting interval, and may contain corrections and updates to older records. As may be observed, the format allows for synchronous reporting, provided that no sample may be reported before the station with which it is associated, and no parametric record before its sample record.

For each file described in the appendices, all fields must be reported. The null, or "no data", value for all fields is the pound sign (#), and must appear in the first column position of its field. Field values may be listed on per line in the export file, or multiple values may be reported on a single line, provided that field values are reported in the specified order, and each value is terminated by a comma (,). Lines containing multiple values may not exceed 80 characters in length, including the delimiters.

DO NOT CRRATE LINES LONGER THAN 80 CHARACTERS! EVEN THOUGH LONGER RECORDS MAY APPEAR TO LIST PROPERLY ON THE SCREEN, LINES LONGER THAN 80 CHARACTERS WILL NOT BE ACCEPTED BY THE IFF POST PROCESSOR!

Since the comma is used as a delimiter for data values, the values themselves may not contain any comma, even though the value may be a text stream.

Datafile STATION.DAT

Field No.	Field Name	Field Description
1	STATION_KEY	Unique station identifier. Consists of a twenty-seven character ALPHANUMERIC field, left justified, containing:

Column:	Description:
01-12	Unique site identifier as assigned by EPA. Must be ALPHANUMERIC.
13-17	Unique solid waste management unit designator. Must be ALPHANUMERIC.
18	Media status indicator. Must contain one of the following:

C - Compliance monitoring station
B - Baseline monitoring station
A - Ambient monitoring station

19-27	Unique station identifier. Must be ALPHANUMERIC. If this data is to be used with the Region IV Query Menu, the naming convention recommended for stations is as follow. Monitoring wells should contain "MW, test pits 'TP', bore holes 'BH', surface soils 'SS'.

2	TYPE	Type of monitoring station. Consists of a four character

		ALPHANUMERIC field, left justified, containing one of the following: AIR, SWTR, GWTR, SOIL, SED, and SLDG. The meanings of these abbreviations are as follows: AIR - Air sampling station SWTR - Surface water sampling station GWTR - groundwater sampling station SOIL - Soil sampling station SED - Stream bed sediment SLDG - Process sludge sampling
3	**LATITUDE**	Geographic position of the station in degrees north of equator. Must be in the format DDMMSS.xxxx, where DD represents degrees, MM represents minutes, and SS.xxxx represents seconds, with available precision to four decimal places.
4	**LONGITUDE**	Geographic position of the station in degrees west of the Prime Meridian. Must be in the format DDDMMSS.xxxx, where DDD represents degrees, MM represents minutes, and SS.xxxx represents seconds, with available precision to four decimal places.
5	**LSDAT**	Elevation in feet (MSL) of land surface at the location of the monitoring station. Must be a DECIMAL NUMERIC field with a maximum of twelve characters (including the decimal point) and may have up to two digits after the decimal point.
6	**RFDAT**	Elevation in feet (MSL) of the point from which height above ground, water level and sampling depth measurements are taken. DECIMAL NUMERIC field with a maximum of twelve characters (including the decimal point) and

may have up to two digits after the decimal point.

7	CONDT	Date construction of the station was completed. Eight character integer field consisting of:

COLUMNS	CONTENT
1-4	Year including century, e.g. 1989
5-6	Numeric month
7-8	Numeric day of month

Column numbers are relative to the beginning of the CONDT Field. Each subfield described above must be right justified, and may contain leading zeros.

8	ACCUR	Estimated accuracy for the reported latitude and longitude, in meters. DECIMAL NUMERIC field with a maximum of six characters (including the decimal point) and may have up to two digits after the decimal point.
9	LLMETH	One character ALPHANUMERIC field which indicates the method used to determine the latitude and longitude. Contains one of the following:

C - Calculated from map
D - Digitized from a map
G - Global Positioning System
L - Loran-C
U - Unknown
O - Other method not listed above

10	OMETH	Any method for which there is no code. This field consists of 32 character ALPHANUMERIC field, left justified. This field is REQUIRED if "O" is entered in the method field above.
11	COMMENT	Any additional information the user

feels is necessary, which may not be accommodated in a defined field. Must be ALPHANUMERIC consisting of up to 40 characters.

Datafile WELL.DAT

FIELD NO.	FIELD NAME	FIELD DESCRIPTION
1	STATION_KEY	Unique station identifier. Consists of a twenty-seven character ALPHANUMERIC field, left justified, containing:

COLUMN	DESCRIPTION
01-12	Unique site identifier as assigned by EPA. Must be ALPHANUMERIC.
13-17	Unique solid waste management unit designator. Must be ALPHANUMERIC.
18	Media status indicator. Must contain one of the following: C - Compliance monitoring station. B - Baseline monitoring station. A - Ambient monitoring station.
19-27	Unique station identifier. Must be ALPHANUMERIC.

2	AQNAM	USGS Aquifer Code for aquifer from which samples are obtained. ALPHANUMERIC field with up to eight characters.
3	TOTDP	Total depth to which the hole was drilled, bored or dug in feet below land surface datum. DECIMAL NUMERIC field with a maximum of twelve characters (including the decimal point) and may have up to two digits after the decimal point.

4	DRMTH	Method by which well was constructed. Must be ALPHANUMERIC, consisting of a single character. The character must be one of the following: H - Hollow stem auger C - Cable tool V - Reverse rotary J - Water jet S - Solid stem auger R - Rotary D - Dug A - Air percussion O - Other
5	DRFLD	Fluid used to lubricate cutting tool and/or remove materials from hole. Must be ALPHANUMERIC, consisting of a single character. The character must be one of the following: A - Air B - Bentonite W - Water M - Other Mud N - None O - Other fluid
6	DVMTH	Method by which well was developed. Must be ALPHANUMERIC, consisting of a single character. The character must be one of the following: A - Air lift pump B - Bailed C - Compressed air J - Jetted P - Other pump S - Surged Z - Other method N - None
7	DVHRS	Time in hours during which well was developed. Must be INTEGER NUMERIC, consisting of up to 5 digits.

8	SPLTRT	Any special treatment that was applied during the well development process. Must be ALPHANUMERIC, consisting of a single character, which must be one of the following: C - Chemicals D - Dry ice E - Explosives F - Deflocculant H - Hydrofracturing M - Mechanical Z - Other N - None
9	LIFT	Type of lift indicator. Must be ALPHANUMERIC, consisting of a single character. The character must be one of the following: A - Air lift 3 - Bucket C - Centrifugal pump J - Jet pump P - Piston pump R - Rotary pump S - Submersible pump T - Turbine U - Unknown Z - Other
10	NOSEG	Number of bore hole sections. A bore hole section is defined as a length of bore hole of constant diameter. Bore hole sections are designated numerically from top to bottom of bore hole. INTEGER NUMERIC field containing a value of one, two, or three.
11	SGDIA1	Diameter of first bore hole section, in inches.
12	SGDIA2	Diameter of second bore hole section, in inches.
13	SGDIA3	Diameter of third bore hole section, in inches.

		Each of the SGDIAx fields is DECIMAL NUMERIC, containing up to twelve characters (including the decimal point), and may have up to two digits following the decimal point.
14	STELV1	The depth to the top of the first bore hole section.
15	STELV2	The depth to the top of the second bore hole section.
16	STELV3	The depth to the top of the third bore hole section.
		Each of the STELVx fields is DECIMAL NUMERIC with a maximum of twelve characters (including the decimal point), and may have up to two digits after the decimal point. These depths are measured relative to land surface datum.
17	SBELV1	The depth to the bottom of the first bore hole section.
18	SBELV2	The depth to the bottom of the second bore hole section.
19	SBELV3	The depth to the bottom of the third bore hole section.
20	NOCAS	Number of casing sections. A casing section is defined as a length of casing of constant diameter and uniform material. Casing sections are designated numerically from top to bottom of well. INTEGER NUMERIC field containing a value of one, two, or three.
21	TCELV1	The depth to the top of the first section of casing (in feet).
22	TCELV2	The depth to the top of the second section of casing (in feet).

23	TCELV3	The depth to the top of the third section of casing (in feet). The TCELVx fields are DECIMAL NUMERIC, each with a maximum of twelve characters (including the decimal point) and may have up to two digits after the decimal point. These depths are measured relative to land surface datum.
24	BCELV1	The depth to the bottom of the first section of casing, in feet.
25	BCELV2	The depth to the bottom of the second section of casing, in feet.
26	BCELV3	The depth to the bottom of the third section of casing, in feet. The BCELVx fields are DECIMAL NUMERIC, each with a maximum of twelve characters (including the decimal point) and may have up to two digits after the decimal point. These depths are measured relative to land surface datum.
27	CIDIA1	Inside diameter of the first section of casing, in inches.
28	CIDIA2	Inside diameter of the second section of casing, in inches.
29	CIDIA3	Inside diameter of the third section of casing, in inches. The CIDIAx fields are DECIMAL NUMERIC, each with a maximum of twelve characters (including the decimal point) and may have up to two digits after the decimal point.
30	CODIA1	Outside diameter of the first section of casing, in inches.
31	CODIA2	Outside diameter of the second section of casing, in inches.

32 CODIA3 Outside diameter of the third section of casing, in inches.

The CODIAx fields are DECIMAL NUMERIC, each with a maximum of twelve characters (including the decimal point) and may have up to two digits after the decimal point.

33 CMATR1 Description or name of casing material from which the first section of casing is made.

34 CMATR2 Description or name of casing material from which the second section of casing is made.

35 CMATR3 Description or name of casing material from which the third section of casing is made.

The CMATRx fields are ALPHANUMERIC, each with a maximum of eight characters.

OPEN INTERVAL - Any portion of the well in which the interior of the well is not isolated from the surrounding soil and rock by unbreached casing.

36 OPTYP Indicator of the type of opening in the open interval. The field is ALPHANUMERIC, consisting of a single character. The character must be one of the following:

O - Open end
P - Perforated or slotted
S - Screened
T - Sand point
W - Walled
X - Open hole
Z - Other

37 TOELV The depth to the top of the open interval. The TOELV field is DECIMAL NUMERIC with a maximum of twelve characters (including the

decimal point) and may have up to two digits after the decimal point. Measured relative to land surface.

38 BOELV — The depth to the bottom of the open interval. The BOELV field is DECIMAL NUMERIC with a maximum of twelve characters (including the decimal point) and may have up to two digits after the decimal point. Measured relative to land surface.

39 OMATR — Description or name of material used to screen the open interval. The OMATR field is ALPHANUMERIC with a maximum of eight characters.

40 OWIDT — Width or short dimension of slot or mesh of screen material for the open interval, in inches. The OWIDT field is DECIMAL NUMERIC with up to twelve characters (including the decimal point), and may have up to three digits following the decimal point.

41 OLENG — Length or long dimension of slot or mesh of screen material for the open interval, in inches. The OLENG field is DECIMAL NUMERIC with up to twelve characters (including the decimal), and may have up to three digits following the decimal point.

FILTER PACK - Material placed in the annulus of the well between the bore hole wall and the well screen to prevent formation material from entering through the well screen.

42 FPMTH — Indicator for method of filter pack placement. Must be ALPHANUMERIC consisting of a single character. The character must be one of the following:

A - dropping material down the hole and tamping

B - dropping material down hollow-stem auger
T - Tremie pipe
O - Other

43	FPMAT	Description or name of the material which forms the filter pack. Must be ALPHANUMERIC, consisting of up to eight characters.
44	FPGRN	Grain size of the material which forms the filter pack, in mesh gauge. Must be INTEGER NUMERIC, with up to four characters.
45	TFELV	The depth to the top of the filter pack. The TFELV field is DECIMAL NUMERIC with the maximum of twelve characters (including the decimal point) and may have up to two digits after the decimal point. Measured relative to land surface.
46	BFELV	The depth to the bottom of the filter pack. The BFELV field is DECIMAL NUMERIC with a maximum of twelve characters (including the decimal point) and may have up to two digits after the decimal point. Measured relative to land surface.

ANNULAR SEALANT - Material used to seal the space between the bore hole and the casing of the well. The annular sealant is placed directly above the filter pack to prevent the migration of contaminants to the sampling zone from the surface or intermediate zones and prevent cross contamination between strata.

47	SLMTH	Indicator for method of sealant placement. Must be ALPHANUMERIC consisting of a single character. The character must be one of the following:

A - dropping material down the hole and tamping

		B - dropping material down hollow-stem auger T - tremie pipe O - other
48	SLMATR	Description or name of the material which forms the seal above the filter pack against entry of surface water. Must be ALPHANUMERIC, consisting of a single character. The character must be one of the following: B - Bentonite C - Clay G - Cement Z - Other N - None
49	TSLELV	The depth to the top of the annular seal. The TSLELV field is DECIMAL NUMERIC with a maximum of twelve characters (including the decimal point) and may have up to two digits after the decimal point. Measured relative to land surface.
50	BSLELV	The depth to the bottom of the annular seal. The BSLELV field is DECIMAL NUMERIC with a maximum of twelve characters (including the decimal point) and may have up to two digits after the decimal point. Measured relative to land surface.
51	SRFSL	Surface seal indicator. Indicates whether or not the upper portion of the bore hole is sealed to prevent inflow of surface water. Single character ALPHANUMERIC, containing "Y" if well is sealed. Otherwise, contains "N".
52	DNGRAD	Downgradient indicator. Indicates whether or not the well has been installed hydraulically downgradient of the source of potential groundwater pollution,

		and is capable of detecting the migration of contaminants. Single character ALPHANUMERIC containing "Y" if well is downgradient from waste disposal site. Otherwise, contains "N".
53	DRLOG	Drillers log indicator. Indicates availability of drillers log. Single character ALPHANUMERIC, containing "Y" if log is available. Otherwise, contains "N".
54	LTHLG	Lithologic log indicator. Lithologic log shows distribution of lithology with depth in the bore hole. Single character ALPHANUMERIC, containing "Y" if log is available. Otherwise, contains "N".
55	WLUSE	Well use indicator. Must be ALPHANUMERIC, consisting of a single character. The character must be one of the following: D - Domestic (private) water supply I - Industrial water supply M - Monitoring well P - Public water supply O - Other
56	COMMENT	Supplemental information as needed. May contain up to 80 ALPHANUMERIC characters.

Datafile SAMPLE.DAT

FIELD NO.	FIELD NAME	FIELD DESCRIPTION
1	SAMPLE_KEY	Unique sample identifier. Consists of forty-two character field, left justified, containing:

COLUMN	DESCRIPTION
01-12	Unique site identifier as assigned by EPA. Must be ALPHANUMERIC.
13-17	Unique solid waste management unit designator. Must be ALPHANUMERIC.
18	Media status indicator. Must contain one of the following: C - Compliance monitoring station B - Baseline monitoring station A - Ambient monitoring station
19-27	Unique station identifier. Must be ALPHANUMERIC.
28-42	Unique sample identifier. Must be ALPHANUMERIC.

2	DELTH	Vertical displacement of sample from the reference elevation (in feet) of the sampling station. For surface water, soils, and groundwater stations, this would be the depth of the sample and for air monitoring stations, the height above ground. Must be DECIMAL NUMERIC consisting of a maximum of six characters (including the decimal) and may have up to two

digits after the decimal point.

3 **DATE** Date of sample collection. Eight character integer field consisting of:

COLUMNS	CONTENT
1-4	Year, including century, e.g. 1989
5-6	Numeric month
7-8	Numeric day of month

Column numbers are relative to the beginning of the DATE field. Each subfield described above must be right justified, and may contain leading zeros.

4 **TIME** Time (in military format) of sample collection. INTEGER NUMERIC consisting of four characters.

5 **SSTAT** Station status of condition. Used primarily for groundwater monitoring stations. ALPHANUMERIC consisting of one character. The character must be one of the following:

D - Dry
F - Flowing
O - Obstructed
P - Pumping
W - Destroyed
S - Surficial inflow
Z - Other

FIELD MEASUREMENTS

6 **TEMP** Sample temperature in degrees Celsius. DECIMAL NUMERIC consisting of six characters (including the decimal) and may have up to two digits after the

		decimal point.
7	PH	Sample pH in standard units. DECIMAL NUMERIC consisting of six characters (including the decimal) and may have one digit after the decimal point.
8	COND	Specific Conductance in uMhos. INTEGER NUMERIC consisting of a maximum of six characters.
9	TURB	Turbidity. INTEGER NUMERIC consisting of a maximum of eight characters. May be reported in JTU or NTU, as required by program.
10	WLEVEL	Well water level, or stream gage height, in feet. Measured relative to the reference datum. Item is DECIMAL NUMERIC consisting of a maximum of six characters (including the decimal) and may have up to two digits following the decimal point.
11	WINDSP	Wind speed in km/h. DECIMAL NUMERIC consisting of a maximum of six characters (including the decimal), and may have up to two digits after the decimal point.
12	WINDIR	Wind direction in degrees. INTEGER NUMERIC consisting of a maximum of four characters.
13	SAMMETH	Method used to collect sample. ALPHANUMERIC field, left justified, consisting of up to 20 characters.
14	SAMPLER	Name of agency or organization that collected the sample. Must be ALPHANUMERIC consisting of up to 20 characters.
15	COMMENT	Any additional information the user feels necessary, which may not be accommodated in a defined field.

Must be ALPHANUMERIC consisting of
up to 40 characters.

Datafile PARM.DAT

FIELD NO.	FIELD NAME	FIELD DESCRIPTION
1	PARAM_KEY	Unique data record identifier. Consists of fifty-four character field, left justified, containing:

COLUMN	DESCRIPTION
01-12	Unique site identifier as assigned by EPA. Must be ALPHANUMERIC.
13-17	Unique solid waste management unit designator. Must be ALPHANUMERIC.
18	Media status indicator. Must contain one of the following: C - Compliance monitoring station B - Baseline monitoring station A - Ambient monitoring station
19-27	Unique station identifier. Must be ALPHANUMERIC.
28-42	Unique sample identifier. Must be ALPHANUMERIC.
43-54	Parameter identifier. For chemical constituents for which CAS numbers exist, the CAS number will be the identifier. For other constituents, the identifier will be determined on an as-needed basis.

		55-58 Replicate number. Identifies the value as one of two or more analytical results for the same parameter on the same sample. INTEGER NUMERIC, right justified, up to four characters. Not used unless replicate results are reported.
2	QUALF	Qualifier field. ALPHANUMERIC, may contain up to four STORET qualifier codes.
3	VALUE	The reported analytical result for the chemical. Must be DECIMAL NUMERIC, consisting of up to twelve characters (including the decimal), and may have up to four digits after the decimal point.
4	UNITS	The units of measurement in which analytical results are reported. ALPHANUMERIC, consisting of up to six characters.
5	METHOD	The name or code of the analytical method or technique used to obtain the reported value. ALPHANUMERIC, containing up to fourteen characters.
6.	DATE	Date of analysis. Eight character INTEGER field consisting of:

COLUMN	CONTENT
1-4	Year, including century, e.g. 1989
5-6	Numeric month
7-8	Numeric day of month

Column numbers are relative to the beginning of the DATE field. Each subfield described above must be

		right justified, and may contain leading zeros.
7	DETLIM	Detection limit. Must be in same units as the reported value. Must be DECIMAL NUMERIC, consisting of up to twelve characters (including the decimal), and may have up to four digits after the decimal point.
8	LAB	Name of lab that performed the analysis. ALPHANUMERIC field containing up to 28 characters.
9	COMMENT	Any additional information the user feels necessary, which may not be accommodated in a defined field. Must be ALPHANUMERIC consisting of up to 40 characters.

IFF FIELD WORKSHEET

Sample Station Information

1. Site Identification No. _|_|_|_|_|_|_|_|_|_|_|_|_|_|

2. Waste Management Unit _|_|_|_|_|_|

3. Compliance, Baseline, or Ambient Monitoring (C, B, or A) _|

4. Unique station identifier _|_|_|_|_|_|_|_|_|_|

5. Unique sample identification _|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|_|

6. Type of media collected _|_|_|_|_|

   AIR - Air sample station
   SWTR - Surface water station
   GWTR - Ground water station
   SOIL - Soil sampling station
   SED - Sediment sampling station
   SLDG - Process sludge station
   OTHR - Other type of sample station

7. Latitude _|_|_|_|_|_|_|_|.|_|_|_|_|

8. Longitude _|_|_|_|_|_|_|_|.|_|_|_|_|

9. Elevation of land surface _|_|_|_|_|_|_|_|_|_|.|_|_|

10. Reference elevation (i.e top of casing) _|_|_|_|_|_|_|_|_|_|.|_|_|

11. Date of station installation _|_|_|_|_|_|_|_|_|
    y y y y m m d d

12. Estimated accuracy of the longitude and latitude _|_|_|_|.|_|_|

13. Method used to determine longitude or latitude _|

    C - Calculated from map
    U - Unknown
    G - Global positioning system
    O - Other method not listed
    L - Loran-C
    D - Digitized from map
    S - Field survey

Site ID #_____
Waste Man Unit_____
Station ID_____
Sample ID_____

14. Any method for which there is no listed code

15. Additional comments

16. Vertical displacement of sample from reference datum

17. Date sample was collected

y y y y m m d d

18. Time (military) sample was collected

19. Condition of sample location

D - Dry
O - Obstructed
W - Destroyed
F - Flowing
P - Pumping
Z - Other

20. Temperature

21. pH

22. Specific conductivity in uMhos

23. Sample turbidity

24. Well water level (or stream gage height)

25. Wind speed

26. Wind direction

27. Sample collection method

28. Name of organization collecting samples

29. Comment field. May be up to 40 alphanumeric characters

Site ID #_____
Waste Man Unit_____
Station ID_____
Sample ID_____

Well Installation Information

30. Aquifer name _|_|_|_|_|_|_|_|

31. Total depth of boring _|_|_|_|_|_|_|_|_|.|_|

32. Drilling method _|

H - Hollow stem	S - Solid stem
C - Cable tool	R - Rotary
V - Reverse rotary	D - Dug
J - Water jet	A - Air percussion
O - Other	

33. Lubricating fluid _|

A - Air	M - Mud other than bentonite
B - Bentonite	N - None
W - Water	O - Other fluid

34. Method of development _|

A - Air lift	B - Bailed
C - Compressed Air	J - Jetted
P - Other pump	S - Surged
Z - Other	N - None

35. Hours of development _|_|_|_|_|

36. Special treatment of well during drilling or development _|

C - Chemicals	D - Dry ice
E - Explosives	F - Deflocculant
H - Hydrofracture	M - Mechanical
Z - Other	N - None

37. Type of lifting mechanism _|
(This field is used to record the well setup. For instance, a domestic well may have a permanently installed pump.)

A - Air lift	R - Rotary pump
B - Bucket	S - Submersible pump
C - Centrifugal pump	T - Turbine
J - Jet pump	U - Unknown
P - Piston pump	Z - Other

Site ID #_____
Waste Man Unit_____
Station ID_____
Sample ID_____

38. Number of borehole sections _|

39. Diameter of first borehole _|_|_|_|_|_|_|_|_|_|·_|_|

40. Diameter of second borehole _|_|_|_|_|_|_|_|_|_|·_|_|

41. Diameter of third borehole _|_|_|_|_|_|_|_|_|_|·_|_|

42. The depth to the top of the first borehole section, measured from ground surface _|_|_|_|_|_|_|_|_|_|·_|_|

43. The depth to the top of the second borehole section _|_|_|_|_|_|_|_|_|_|·_|_|

44. The depth to the top of the third borehole section _|_|_|_|_|_|_|_|_|_|·_|_|

45. The depth to the bottom of the first borehole _|_|_|_|_|_|_|_|_|_|·_|_|

46. The depth to the bottom of the second borehole _|_|_|_|_|_|_|_|_|_|·_|_|

47. The depth to the bottom of the third borehole _|_|_|_|_|_|_|_|_|_|·_|_|

48. Number of casing sections _|

49. The depth to the top of the first section of casing _|_|_|_|_|_|_|_|_|_|·_|_|

50. The depth to the top of the second section of casing _|_|_|_|_|_|_|_|_|_|·_|_|

51. The depth to the top of the third section of casing _|_|_|_|_|_|_|_|_|_|·_|_|

52. The depth to the bottom of the first section of casing _|_|_|_|_|_|_|_|_|_|·_|_|

53. The depth to the bottom of the second section of casing _|_|_|_|_|_|_|_|_|_|·_|_|

54. The depth to the bottom of the third section of casing _|_|_|_|_|_|_|_|_|_|·_|_|

55. Inside diameter of the first section of casing _|_|_|_|_|_|_|_|_|_|·_|_|

Site ID #_____
Waste Man Unit_____
Station ID_____
Sample ID_____

56. Inside diameter of the second section of casing _|_|_|_|_|_|_|_|_|_|·_|_|

57. Inside diameter of the third section of casing _|_|_|_|_|_|_|_|_|_|·_|_|

58. Outside diameter of the first section of casing _|_|_|_|_|_|_|_|_|_|·_|_|

59. Outside diameter of the second section of casing _|_|_|_|_|_|_|_|_|_|·_|_|

60. Outside diameter of the third section of casing _|_|_|_|_|_|_|_|_|_|·_|_|

61. Casing material of first section of casing material _|_|_|_|_|_|_|_|

62. Casing material of second section of casing material _|_|_|_|_|_|_|_|

63. Casing material of third section of casing material _|_|_|_|_|_|_|_|

64. Type of screen _|

O - Open hole
S - Screened
H - Hydropunch
Y - Other
P - Perforated or slotted
W - Well point
Z - Piezometer

65. Depth to the top of the open or scrrened section _|_|_|_|_|_|_|_|_|_|·_|_|

66. Depth ot the bottom of the open or screened section _|_|_|_|_|_|_|_|_|_|·_|_|

67. Screen material _|_|_|_|_|_|_|_|

68. Screen or slot size _|_|_|_|_|_|_|_|_|·_|_|_|

69. Reserved field _|_|_|_|_|_|_|_|_|·_|_|_|

70. Filter pack placement method _|

A - Dropping material down the hole
B - Dropping material down hollow stem auger
T - Tremie pipe
O - Other

Site ID #_____
Waste Man Unit_____
Station ID_____
Sample ID_____

71. name of filter pack material _|_|_|_|_|_|_|_|_|

72. Filter pack grain size _|_|_|_|_|_|_|_|_|

73. The depth to the top of the filter pack _|_|_|_|_|_|_|_|_|_|.|_|_|

74. The depth to the bottom of the filter pack _|_|_|_|_|_|_|_|_|_|

75. Method of sealant placement _|

A - Dropping material down the hole
B - Dropping material through hollow stem auger
T - Tremie pipe
O - Other

76. Description of sealant material _|

B - Bentonite
G - Cement
Z - Other
N - None

77. Depth to the top of the annular seal _|_|_|_|_|_|_|_|_|_|.|_|_|

78. Depth to the bottom of the annular seal _|_|_|_|_|_|_|_|_|_|.|_|_|

79. Surface seal indicator _|

80. Downgradient indicator _|

D = Downgradient
U = Upgradient

81. Driller's log indicator _|

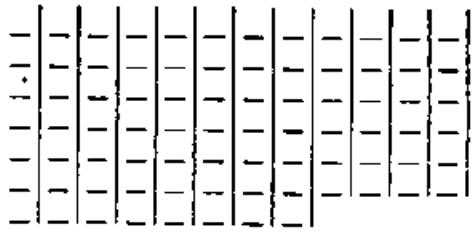
82. Lithologic log indicator _|

83. Well use indicator _|

D - Domestic
M - Monitoring well
O - Other
I - Industrial
P - Public

Site ID #_____
Waste Man Unit_____
Station ID_____
Sample ID_____

84. Supplemental comments



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