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DET INTERIM STABILIZATION MEASURES REPORTS INCLUDING REVIEW AND
COMMENTS CNC CHARLESTON SC
4/2/1999
ENSAFE

TO: David Dodds, SDIV
FROM: Larry Bowers, EnSafe
RE: DET ISM Report Review and Comment
DATE: 2 April 1999

The following table summarizes the results of EnSafe's review of twenty-six DET ISM Site Completion Reports. The purpose of the review was to provide an independent third party review of the DET ISM Site Completion Reports to determine if ISM objectives were met. It was not the intent of the review to determine if DET ISM activities sufficed as final remedies deemed protective of human health and the environment. This memorandum and its attachments are both objective and subjective in nature and were prepared exclusively for SDIV.

Key Findings and Statements:

- The "overall intent" of the DET ISMs were met at most sites regardless of whether actual objectives were fully satisfied.
- DET ISM objectives were found to change frequently within the same report. This made it difficult at times for the reviewer to determine what the "final" objective was and if it was indeed satisfied. The rationale for these changes were not always clearly communicated in the report. However, and in defense of the DET, it was obvious to EnSafe during the review of the reports that the DET was faced with some of the same obstacles EnSafe has encountered during the RFI/CMS process. These obstacles include multiple and varying remedial objectives, and at times limited risk management execution by the project team.
- DET ISM objectives were sometimes found to be very stringent and based on thresholds such as "RBCs", or the removal of "all" impacted soils. Why RBCs? These USEPA generated numbers are typically used for screening purposes only and are rarely valid as clean up thresholds for multi-contaminant sites under site-specific exposure scenarios.

- Some reports would conclude closure by stating that the project team agreed that the "intent" of the ISM was met. This typically occurred at sites where the clean up objectives were based on RBCs that could not be met despite multiple excavation cycles and confirmation sampling rounds.
- It was not the intent of the DET ISMs to directly address impacted groundwater. However, source material removal via soil mass excavation typified the DET ISM. Therefore, in an indirect sense impacted groundwater was addressed via source material removal.

The attached table summarizes 1) whether the DET ISMs objectives were met, 2) if follow-up ISM action was recommended, and 3) if any special notes have been included. It is very important to note that the failure of a DET ISM to meet its objective did not automatically trigger a recommendation for additional follow-up action.

An example would be AOC 611 where the clean up objective for arsenic and BEQ soil impacts was RBCs. Confirmation sampling indicated that even though arsenic exceeded its RBC of 0.43 ppm it did not exceed its background (with the exception of one confirmation sample that contained arsenic within 1% of the surface background level). Furthermore, confirmation sampling for BEQs produced only one sample that exceeded its respective RBC value. Therefore, AOC 611 proves to be a good example of a site where the "intent" of the ISM was met yet the objective (in a literal sense) was not. Thus, EnSafe did not recommend further DET action at this site even though the ISM objective was not fully satisfied.

DET ISM Report Review and Comment				
Site	ENSAFE Reviewer	ISM Objective Met	ISM Follow-up Recommended	Special Note
SWMU 14	Mike Perlmutter	No	No	Yes
SWMU 21/54	Mike Perlmutter	Yes	No	Yes
SWMU 25 PC	Mike Perlmutter	No	Yes/No	No

DET ISM Report Review and Comment				
Site	ENSAFE Reviewer	ISM Objective Met	ISM Follow-up Recommended	Special Note
SWMU 25 IR	Mike Perlmutter	Yes	Yes	Yes
SWMU 37	Mike Perlmutter	Yes	Yes	Yes
AOC 574	Mike Perlmutter	Yes	No	Yes
SWMU 38	Don Cooke	No	No	Yes
SWMU 42/AOC 505	Don Cooke	Yes	No	No
SWMU 44	Don Cooke	Yes	No	Yes
SWMU 159	Don Schroeder	Yes	No	Yes
AOC 503	Don Schroeder	No	No	Yes
AOC 653	Don Schroeder	Yes	No	Yes
SWMU 9	May Heflin	Yes	No	No
SWMU 6/7 and AOC 635	Chuck Mason	No	Yes	Yes
AOC 626	Chuck Mason	Yes	No	Yes
PCB Grid Sample	Chuck Mason	No	No	Yes
SWMU 3	Larry Bowers	Yes	No	No
SWMU 5/AOC 605 and AOC 621	Larry Bowers	No	No	Yes
SWMU 11	Larry Bowers	Yes	No	Yes
SWMU 166	Larry Bowers	No	No	Yes
AOC 500	Larry Bowers	Yes	No	Yes
AOC 501	Larry Bowers	Yes	No	Yes
AOC 502	Larry Bowers	Yes	No	Yes
AOC 611	Larry Bowers	No	No	Yes
AOC 696	Larry Bowers	No	No	Yes
AOC 707/708	Larry Bowers	Yes	No	Yes

The following report reviews (26) summarize these key points:

1. DET ISM report title and date
2. Reviewer name and EnSafe office location
3. Purpose of review
4. ISM objective
5. ISM performance
6. ISM activity summary
7. ISM recommended follow-up (if applicable)
8. Special notes (if applicable)

It is essential that these report reviews be used in conjunction with the Review and Comment Table and that the reader does not solely rely on the table. In particular, SDIV needs to focus on the ISM performance, ISM recommended follow-up and special note categories.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for SWMU 3 (Zone G)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Stabilization Measure for SWMU 3

Dated 4 Sep 98

Reviewer

Larry Bowers, P.E. (EnSafe Norfolk)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Excavate and dispose of pesticide and PCB impacted soil. The clean up level for pesticide (chlordane, heptachlor, and DDE) was based on EPA RBCs (1 Apr 96 table), and the level for PCBs was based on the federal standard (40CFR761.125) of 1 ppm.

ISM Performance

Objective was met.

ISM Activity Summary

- Excavate and dispose of 22 CY of impacted soil (10 ft x 30 ft x 2 ft).
- Properly abandon well 003GW003.
- VOCs and SVOCs were also checked/sampled for at the site at the request of DHEC.

ISM Recommended Follow-up

None

Special Note

None

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for SWMU 5/AOC 605 and 621 (Zone E, mostly)
Charleston Naval Complex, Charleston SC
Environmental Detachment Charleston (DET)

Completion Report

*Interim Stabilization Measure for SWMU 5/AOC 605 and AOC 621
Battery Wrecking/Salvage Area
Dated 10 Apr 98*

Reviewer

Larry Bowers, P.E. (EnSafe Norfolk)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Excavate and remove lead impacted soil that exceed 1,300 ppm (total lead). Industrial reuse was the key consideration in the establishment of the clean-up goal.

ISM Performance

Objective not met. However, see comment below in "Special Note."

ISM Activity Summary

- Excavate three isolated areas with lead exceeding 1,300 ppm.
- Initial excavations started out as 6 ft x 6 ft x 2 ft, and ended up as one large hole of 30 ft x 70 ft x 4.5 ft generating approximately 340 CY of impacted soil.
- Well 605GW002 was abandoned post procurement of the 4th quarter of GW sampling.
- Flush acid drain pipes till effluent pH in the 5 to 9 range.
- Remove acid drain pipes.
- First round of confirmation sampling (CS) following initial excavation produced 26 of 34 CS exceeding 1,300 ppm lead.
- Second round of CS following additional excavation produced 11 of 21 CS exceeding 1,300 ppm lead.
- Third round of CS following additional excavation produced 4 of 12 CS exceeding 1,300 ppm lead.
- Fourth round of CS following additional excavation produced 4 of 5 CS exceeding 1,300 ppm lead, and two samples failed TCLP for lead.
- Fifth round of CS following additional excavation did not produce any CS (4 total) exceeding 1,300 ppm lead.
- Prior to backfilling, a one foot layer of lime/soil mix was added to the bottom of the excavation. Its intent was to precipitate remaining leachable lead.

ISM Recommended Follow-up

None. However, see comment below in "Special Note."

Special Note

It was noted by the reviewer of the ISM report that the final, and fifth, round of confirmation sampling was done on the sidewalls of the excavation pit. However, by comparing previous confirmation sampling rounds results with respective sample locations it was apparent that lead

impacted soil exceeding 1,300 ppm remains in the center bottom of the excavation. The likely encounter with the shallow GW table could have been the reason the DET ceased further excavation in the center of the pit yet this was not explained in the report.

However, and in support of the DET, it needs to be noted that the DET did remove several structures during the excavation process and even successfully completed soil removal from under the edge of a pile-supported concrete slab. A very large amount of lead impacted soil, 510 tons, was excavated and shipped off site to a hazardous waste landfill in Pinewood, South Carolina. In addition, the Project Team was continually briefed on progress at this site and agreed to backfill the excavation with a 1 foot layer of lime/soil mix overlain by clean backfill.

In summary, though it appears that this site did not meet the specific objective of removing "all" impacted soil exceeding 1,300 ppm total lead, it was apparent that the DET effort had a significant positive affect on reducing the threat from the lead to human health and the environment. Based on everyday uncertainties and inherent risks at all sites (residential and industrial), the overall intent of the remedial objective for this site has been met.

As a much lessor issue, it was not clear to the reviewer if the DET sampled the flush effluent from both acid drain pipes or one. The report included only a single pH sample result (7.87) and it stated that one sample was collected from each side of the acid neutralization pit. If there were two flush samples taken (one for each PVC acid drain pipe), then one pH result is missing. It has been assumed by the reviewer that the pH level of "all" flush effluents was in the 5 to 9 range.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure, SWMU 6, 7, and AOC 635 (Public Works Storage Yard)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Stabilization Measure for SWMU 6, SWMU 7 and AOC 635

Dated 27 Jul 98

Reviewer

Chuck Mason (EnSafe Norfolk)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Excavate and dispose of the PCB, lead, and pesticide-contaminated soils; remove and dispose of Building 3902; and remove and dispose of the PCB-contaminated concrete pad. The excavation was to continue until samples indicated within reasonable confidence that the concentrations of contaminants at the site were less than the EPA-specified RBCs for pesticides and lead and that PCBs were less than 1 ppm.

ISM Performance

The objective was not met in that cleanup goals for lead, pesticides and PCBs were not attained. However, the project team concluded that the intent of the IM had been met and that work should cease.

ISM Activity Summary

- PCB-contaminated soil excavation began in April 1997 with the removal of 18 cubic yards. After initial removal, it was determined that further excavation was required. In November 1997, an additional 495 cubic yards was removed. After this removal, it was determined that additional excavation would be required. This additional area was excavated in March 1998. After this third removal, two confirmation samples had PCB concentrations above the cleanup goal of 1 ppm. After a risk assessment was performed, the project team agreed that the intent of the IM had been met and that no further action would be required. The site was recommended to be addressed in the CMS.
- Pesticide-contaminated soil excavation began in April 1997, when approximately 4 cubic yards of soil was removed. After removal, it was determined that further excavation was required. In November 1997 an additional 15 cubic yards were removed. After this removal, it was determined that further excavation was required. In April 1998 an additional 20 cubic yards of soil was removed. After this third removal, confirmation samples still showed pesticide concentrations above residential RBCs. After a risk assessment was performed, the project team agreed that the intent of the IM had been met and that no further action would be required. The site was recommended to be addressed in the CMS.
- After removal of the concrete pad, an area of strong creosote or diesel fuel odor was identified. Investigative samples were collected for TPH, PAHs, BTEX, and MTBE, PCBs, and pesticides. Non-hazardous petroleum constituents were the only contaminants to exceed cleanup goals. A total of 45 cubic yards of petroleum-contaminated soil was

removed in March 1998. After a risk assessment was performed, the project team agreed that the intent of the IM had been met and that no further action would be required. The site was recommended to be addressed in the CMS.

ISM Recommended Follow-up

Confirm the extent and removal of lead contamination in soil. Lead contamination was not discussed in the text.

Special Note

Section 2 of the report concludes by stating that the objective of the IM was to remove hot spots of PCB, pesticide, and lead contamination. However, the report initially stated that the objective of the IM was to excavate PCB, lead, and pesticide contaminated soil until contaminant concentrations were less than the USEPA RBCs for pesticides and lead and 1 ppm for PCBs. It appears that the objectives changed during the remedial activities. If so, then the changes in objectives should be restated so that they are in agreement. The discovery of the petroleum compounds and their removal objectives into the overall investigation should also be discussed.

The significance of $1.9E-05$ as an appropriate residential risk threshold and $3.9E-06$ as an appropriate industrial risk threshold for no further action should be discussed.

**DET ISM Report
Review and Comment
(March 99)**

DET ISM Report

Interim Stabilization Measure for SWMU 9 (Zone H)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Final Report

Geophysical/Intrusive Survey Combined SWMU 9 Closed Landfill

Dated 25 Jan 99

Reviewer

May Heflin, P.E. (EnSafe Nashville)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Perform intrusive geophysical investigation in combination with aerial photo interpretation to identify the extent of the northern boundary of the Combined SWMU 9 landfill.

ISM Performance

Geophysical investigation objectives (to-date) are satisfied. One task – the aerial photo interpretation – is scheduled for later this month.

ISM Activity Summary

- Researched facility files, aerial photographs, RFI data and IM documentation.
- Excavated 116 small test pits, approximately 6 ft long by 2 ft wide and from 1 to 7 ft deep.
- Six test pits were not excavated due to their location in an asphalt parking lot.
- Test pit terminated upon reaching the groundwater table or encountering landfill debris.
- Each test pit was backfilled with the same material that was removed during excavation.
- 56 test pits were photographed; several photographs are included in DET report.
- The northern side of the landfill boundary has been modified based on the test pit findings.
- The revised area of Combined SWMU 9 is now estimated to be approximately 99 acres.

ISM Recommended Follow-up

None

Special Note

None

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for SWMU 11 (Zone G)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Stabilization Measure for SWMU 11

Dated 2 Feb 99

Reviewer

Larry Bowers, P.E. (EnSafe Norfolk)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Excavate and dispose soil in area of ditch and drainage culvert where calcium hydroxide was visible due to erosion.

ISM Performance

Objective met.

ISM Activity Summary

- Visible calcium hydroxide was removed from an area approximately 30 ft x 20 ft x 5 ft (in the area of the ditch and drainage culvert where it was visible).
- 260 CY of nonhazardous soil was removed from the site.
- No confirmation sampling completed. Excavation was based merely on visual observations of impacted soil.

ISM Recommended Follow-up

None

Special Note

It is likely only a typographical error but on page 5-1, the report says that 260.27 CY of calcium hydroxide “pesticide” impacted soil was placed into a Subtitle D landfill as special waste. The reviewer is not aware of any “pesticide” impacts at SWMU 11.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for SWMU 14 (Zone H)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Measure for SWMU 14

Dated 28 Apr 98

Reviewer

Mike Perlmutter, E.I. (EnSafe Memphis)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Perform geophysical investigation of SWMU 14 and remove anomalies; also remove lead contamination identified in the RFI report. Soils were to be excavated until contaminant concentrations were less than 1996 USEPA Region III industrial RBCs.

ISM Performance

Objective not met. See comment in "Special Note" below.

ISM Activity Summary

- All construction debris was excavated.
- 17 screening samples were collected following excavation of DANC containers and associated waste materials.
- 13 confirmation samples were collected after additional excavation was completed to remove residual contamination.
- 225 tons of hazardous soil was shipped offsite.
- 430 tons of non-hazardous soil was shipped offsite.
- Building 1897 was demolished.
- DANC excavations filled with clean backfill.
- Excavated soils were backfilled where construction debris was removed (per DHEC approval).

ISM Recommended Follow-up

None

Special Note

Most of the objective that was met involved the identification and removal of subsurface anomalies, DANC containers and affected materials. However, the DET report initially stated that "lead," as identified in the 1996 RFI report, would be removed. The DET report later defined lead as "lead shot." Three soil samples obtained by the DET did not contain "lead shot" and thus no subsequent excavation based on "lead shot" occurred. It was not clear to the reviewer of this report what the clean up objective was for either "lead or lead shot." Regardless, the CMS for this site is addressing both lead forms.

Furthermore, it was not clear to the reviewer of this report if the DET fully met its secondary objective of clean up to RBCs during excavation. Though the area surrounding the DANC

containers was excavated to an RBC for 1,1,2,2-PCA, it was not clear if other RBCs were pursued. However, as with the “lead” issue described above, the CMS report for this site is addressing the DANC site as well so the lack of “fully” meeting DET defined RBC objectives is a moot point. Also, the CMS will focus on a risk-based clean up for soils and MCLs for groundwater.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for SWMU 159 (Zone H)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston

Completion Report

Interim Stabilization Measure for SWMU 159 Satellite Accumulation Area

Dated 20 May 97

Reviewer

Don Schroeder, P.E. (EnSafe, Nashville)

Purpose of Review

Provide independent review of the above referenced document to determine if the ISM objective was met. It was not the intent of this review to determine if DET ISM activities sufficed as a final site remedy deemed protective of human health and the environment.

ISM Objective

The original objective of the interim measure at this site was to remove and dispose of any contaminated soil and sediment having TPH levels greater than 100 parts per million. During performance of the interim measure, the controlling guidance for soil excavation was changed to soil with petroleum contamination levels greater than the Region III Residential Risk Based Concentrations, (RBCs).

ISM Performance

The revised objective of meeting the Region III RBCs was met by the removal of soil in contaminated areas with petroleum contamination levels greater than RBCs.

ISM Activity Summary

- Removal was performed on an estimated 16 cubic yards of contaminated soil and sediments containing levels greater than RBCs.
- Confirmation samples were taken of the remaining soil to insure compliance with RBCs.
- Site was cleared of all visible debris.
- All excavated areas were backfilled with clean soil.
- All excavated soil was sampled and characterized as non-hazardous and transported to Building 1601 for storage, awaiting disposal.

ISM Recommended Follow-Up

None

Special Note

The ISM Completion Report does not state what all the Region III RBC levels were, so it was not possible to independently review the analytical data to determine compliance with the RBCs.

*Then
how do you
know the
objectives were
met?*

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for SWMU 166 (Zone K)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Measure for SWMU 166

Dated 16 Feb 99

Reviewer

Larry Bowers, P.E. (EnSafe Norfolk)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Excavate and dispose of TCE impacted soil from an area that was assumed to be the point source of GW contamination at SWMU 166. The target for soil removal was agreed upon by the project team and established as 30 ppb TCE. The excavation was to continue until a confirmation sampling program indicated with reasonable confidence that the concentrations of contaminants at the site were less than the listed target goal. In addition, it was the objective of this ISM to obtain soil samples from an oily stained area along the fence line located adjacent the site.

ISM Performance

Objective not met. See "Special Note" below.

ISM Activity Summary

- Sampled 10 upper and lower intervals in the stained soil along the aforementioned fence line (and no TCE was detected).
- Removed a 22 ft x 24 ft concrete pad at the center of the site.
- Excavated and disposed of TCE impacted soil associated with RFI soil borings no. 006, 007, and 008. A 25 ft x 25 ft x 1 ft pit was produced due to soil removal from around soil boring no. 008. And a 25 ft x 50 ft x 5 ft pit was produced due to soil removal from around soil borings no. 006 and 007.
- First round confirmation samples indicated continued soil contamination on the eastern and western pit walls, and at the bottom of the excavation at its southern end.
- Additional excavation required the abandonment (via over-drilling and grouting) of GW well pair NBCK16603 and 03D. This additional excavation produced a pit of approximately 60 ft x 80 ft x 1 ft.
- Second round confirmation samples at the bottom of the pit did confirm soil exceeding the cleanup limit of 30 ppb TCE. However, deeper excavation in this area of cleanup goal accedence was not attempted due to GW intrusion. Furthermore, GW as SWMU 166 is presently being investigated in the SWMU 166 CMS and its associated treatability study.
- 905 tons of soil and concrete were removed from the subject site (4.4 tons of soil was disposed of in a Subtitle C hazardous waste landfill and approximately 900 tons of soil and concrete rubble were disposed of into a Subtitle D special waste landfill).
- Upon completion of both rounds of excavations and confirmation sampling, the pit was backfilled, compacted, graded and seeded.

ISM Recommended Follow-up

None

Special Note

It is apparent that some soil exceeding the 30 ppb TCE level still remains at the site though a large majority of it was successfully removed. Therefore, the overall intent of the ISM was met even though the "written" objective was not. The soil that did remain at the site and that exceeded the project team directed threshold, however, was located at the GW table and thus was not excavated. Soil below the GW table could be excavated with proper site dewatering but this was beyond the scope of the ISM. Furthermore, it should be noted that solvent impacted GW at SWMU 166 is being addressed by the CMS and its associated treatability study.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for SWMUs 21 and 54 (Zone E)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Stabilization Measure for SWMU 21 and SWMU 54

Dated 11 Feb 97

Reviewer

Mike Perlmutter, E.I. (EnSafe Memphis)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Remove visible spent abrasive blast residue from SWMUs 21 and 54.

ISM Performance

Objective was met based on visual observations.

ISM Activity Summary

- Removed visible spent abrasive blast residue from all exposed surfaces of soil, asphalt, and concrete and to the extent possible, under concrete slab 1275 (SWMU 21).

- Excavation contours were based on investigatory samples collected by EnSafe in 1998.
- Significant quantities of blast residue was unexpectedly encountered and then removed from a compressed air piping trench.
- No blast residue was removed from the marsh mud area on the Cooper River side of the boundary fence — since there was no visible evidence of blast residue it was assumed that any remaining contamination was transferred into the river during high tide.
- Field and confirmatory samples were collected to visually verify the removal of blast residue.
- Approximately 18.6 tons of lead-contaminated material was transported to a hazardous waste landfill.
- Approximately 1443.8 tons of non-hazardous material was transported to Oakridge (Chambers) Landfill in Dorchester County.
- Site was graded to blend into the surrounding area.

ISM Recommended Follow-up

None

Special Note

Other than the removal of blast residue near and under the edges of concrete slab 1275 (SWMU 21), it appeared that the slab itself was not the target of any direct remedial action.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for SWMU 25 (Zone E)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Process Closure/Demolition for SWMU 25 (Building 44 Annex)

Dated 30 Jun 97

Reviewer

Mike Perlmutter, E.I. (EnSafe Memphis)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if *DET ISM* activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Demolish Building 44 electroplating facility and removal of electrical vault 7A.

ISM Performance

Objective was not met. Electrical vault 7A (which is under Building 44) could not be removed because the status of the high voltage lines could not be determined during the demolition effort.

ISM Activity Summary

- Asbestos roof coating and annex pipe were removed.

- Building materials were characterized prior to demolition to estimate hazardous and nonhazardous waste quantities.
- Doorway from Building 44 into the electroplating annex was filled with concrete blocks.
- Plastic sheeting was placed over the annex footprint to prevent water infiltration and storm water runoff.
- Approximately 330 tons of hazardous building debris was transported to Laidlaw Environmental Services of South Carolina.
- Six tons of asbestos material was transported to Chambers Oakridge Landfill in Dorchester County.
- Sixty tons of nonhazardous building debris was transported to Charleston County Landfill.

ISM Recommended Follow-up

Electrical vault 7A must be investigated and removed in order to fully meet DET ISM objective. However, upon review of a follow-up DET ISM report entitled *SWMU 25 Investigation Report, September 14, 1998*, it appeared that vault removal as an ISM objective had been eliminated. If this was indeed the case, then no ISM follow-up is required.

Special Note

None

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for SWMU 25 (Zone E)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

SWMU 25 Investigation Report

Dated 14 Sep 98

Reviewer

Mike Perlmutter, E.I. (EnSafe Memphis)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Determine/delineate the extent of contamination in electrical service vault 7A.

Specific tasks included: 1) sampling and removal of standing water inside vault, 2) monitor infiltration of water into vault, and 3) delineate surface soil contamination exceeding RBCs in the vicinity of the vault. Then, deliver analytical data and potential corrective measure alternatives to SOUTHDIV upon completion.

ISM Performance

Objective was met. However, no additional water samples were collected since there was no further infiltration into the vault. Also, only two core samples (instead of five) of the interior wall of the concrete vault were collected because of confined space restrictions.

ISM Activity Summary

- 6,203 pounds (~ 750 gallons) of chromium contaminated fluid (water) was removed from the electrical vault.
- Two core samples were collected from the interior of the vault.
- Fourteen upper-interval and lower-interval soil samples were collected in the vicinity of the vault. Six lower-interval samples exceeded SSLs for chromium. One sample location (upper- and lower-interval) exceeded the RBC for lead.
- Core sample was collected from a stained wall on the south side of the transformer building (exceeded toxicity characteristics for chromium).

ISM Recommended Follow-up

- Evaluate, de-energize (if necessary), and remove electrical cables and associated conduits from electrical service vault 7A.
- Remove electrical service vault 7A and backfill with clean soil.
- If Transformer Building is demolished, characterize stained building debris as hazardous waste.

Special Note

The report stated that both core samples exceeded the toxicity characteristic for chromium; however, only the first core sample exceeded the limit of 5 mg/L (sample 1: 7.81 mg/L; sample 2: 2.88 mg/L).

The ISM report does not address potential corrective measures for lower-interval soil that exceeds SSLs for chromium and upper- and lower-interval soil that exceeds RBCs for lead.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for SWMU 37 (Zone L)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Process Closure for SWMU 37 Dye Test Cross-Connect Resolution in Buildings 3, 9, and 68

Dated 6 Nov 98

Reviewer

Mike Perlmutter, E.I. (EnSafe Memphis)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

The objective of this ISM was to use dye injection testing to identify sanitary sewer cross-connects to the storm sewer system downstream of industrial sources/facilities identified in the Zone L RFI Report. The cross-connects were to be eliminated upon identification in Buildings 3, 68, and all of 9 except for the restroom facility in the north wing.

ISM Performance

Objective was met.

ISM Activity Summary

- **Building 3:** Two cross-connected floor drains were plugged and filled with concrete.
- **Building 9:** Two sumps with storm system outlets were filled with rock and covered with concrete. Six funnel drains were cut flush at the floor; the remaining pipes were filled with concrete. An eye wash station drain pipe was capped and sealed. A shop sink pipe was removed; the remaining pipe was filled with concrete.
- **Building 68:** Approximately 600 feet of cast iron floor drain piping was cut, removed, and recycled; lead joints and asbestos gaskets were disposed as hazardous waste. Approximately 240 feet of PVC piping was removed and disposed as construction debris. Twenty floor drains, six funnel drains, and two sump drains were filled with concrete. Six lead funnel drain pipes were removed and recycled. Twenty-inch piping was either plugged or removed.

ISM Recommended Follow-up

Eliminate the remaining cross-connects in Buildings 13, 69, 177, 1119, and in the restroom facility in the north wing of Building 9. These cross-connects were identified in the DET ISM but were not eliminated (per the ISM report).

Special Note

All cross-connects in Building 68 were eliminated. All *designated* cross-connects in Buildings 3 and 9 were eliminated.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for SWMU 38 (Zone A)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Measure for SWMU 38

Dated 29 Oct 98

Reviewer

Don Cooke, P.E. (EnSafe Memphis)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective 1:

The DET's initial work plan objective was to excavate and dispose of pesticide contaminated soil until sampling results indicated with reasonable confidence that the concentrations of contaminants at the site were less than residential limits specified by the USEPA Region III residential Risk Based Concentrations (RBC's) for pesticides.

ISM Activity Summary

- Excavation of two 6 ft x 6 ft x 2 ft pits at boring locations 505SB005 and 0422SB009 for a total of 5.4 CY.
- Ten confirmation samples were collected, five from each pit (four from each side wall and one from the bottom).
- The pits were backfilled with clean soil and graded level.
- 5.4 CY of non-hazardous material was transported to a Subtitle D Landfill.

ISM Recommended Follow-up

None

Special Notes

None

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for SWMU 42 (Zone A)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Measure for SWMU 42 Former Asphalt Plant Tanks

Dated 17 Jul 97

Reviewer

Don Cooke, P.E. (EnSafe Memphis)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective:

The DET's objective was to remove and dispose of lead contaminated soil having lead concentrations greater than 400 mg/kg.

ISM Performance

The objective was achieved based on confirmation sample results that did not reflect concentrations greater than 400 mg/kg.

ISM Activity Summary

- Excavation of two 6 ft x 6 ft x 2 ft pits at boring locations 505SB005 and 0422SB009 for a total of 5.4 CY.
- Ten confirmation samples were collected, five from each pit (four from each side wall and one from the bottom).
- The pits were backfilled with clean soil and graded level.
- 5.4 CY of non-hazardous material was transported to a Subtitle D Landfill.

ISM Recommended Follow-up

None

Special Notes

None

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for SWMU 44 (Zone C)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Stabilization Measure for SWMU 44 (Coal Storage Yard)

Dated 10 Feb 97

Reviewer

Don Cooke, P.E. (EnSafe Memphis)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

The DET's objective was to remove and dispose of bulk coal as a source of contamination.

ISM Performance

The objective was achieved based on visual observations.

ISM Activity Summary

- Excavation of 2 to 5 feet occurred over 4.14 acres.

- 6,443 tons of recoverable coal disposed of through Omni Environmental to Giant Cement Company, Harleyville, South Carolina.
- 3,300 tons of coal/dirt mixture (50% coal/50% dirt) was transported to Southeastern Soil Recovery Incorporated, Summerville, South Carolina.
- 3,503 tons of coal/dirt mixture (5% coal/95% dirt) was transported to Charleston County Landfill at Bee's Ferry Road in Charleston, South Carolina for use as a daily cover.
- Open areas were graded and groomed to prevent erosion.

ISM Recommended Follow-up

None

Special Note

The excavated area should be grid-sampled during the CMS and a risk analysis performed to determine post-interim measure risk to human health. Based on the results of the risk analysis, the need for further action will be determined and a decision will be made whether to continue the CMS.

The DET did not remove coal from between the tracks since any removal action would require hand shoveling and pick axes and would render these sections of track unuseable. During the CMS, the Charleston Naval Complex Redevelopment Authority will need to decide the potential for continued use of the track to support the evaluation of remedial alternatives for the areas between the tracks.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for AOC 500 (Zone J)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Measure for AOC 500

Dated 17 Aug 98

Reviewer

Larry Bowers, P.E. (EnSafe Norfolk)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Locate, excavate and remove identified anomalies/UXOs and any associated contaminated soil. Secondary objective (if no UXO found) was to perform a due diligent search and verify via a geophysical survey that the ordnance was either previously removed or is located several feet below the river bottom to allow for unrestricted release of the property.

ISM Performance

Objective was met.

ISM Activity Summary

- Electronic metal locating equipment directed by boat and underwater diver was used by UXO subconsultant, Safe Environment, to identify and recover (if possible) metal bearing anomalies located in the UXO search area.
- Metallic anomalies were identified and recovered (some, not all), and none were found to be ordnance of any type.

ISM Recommended Follow-up

None

Special Note

The ISM report should mention the possibility of the ordnance no longer being present due to 1) past dredging operations that could have removed ordnance and redeposited it in a dredge spoils area near or on the base, and 2) Cooper River currents and associated river basin sedimentation/erosional processes over the past 50 years since the UXO was reported to have been dropped into the river which could have (in theory) relocated the ordnance several miles downstream.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for AOC 501 (Zone J)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Measure for AOC 501

Dated 15 Oct 98

Reviewer

Larry Bowers, P.E. (EnSafe Norfolk)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Locate, excavate and remove identified anomalies/UXOs and any associated contaminated soil. Secondary objective (if no UXO found) was to perform a due diligent search and verify via a geophysical survey that the ordnance was either previously removed or is located several feet below the river bottom to allow for unrestricted release of the property.

ISM Performance

Objective was met.

ISM Activity Summary

- Electronic metal locating equipment directed by boat and underwater diver was used by UXO subconsultant, Reactives Management, to identify and recover (if possible) metal bearing anomalies located in the UXO search area.
- Metallic anomalies were identified and recovered (some, not all), and none were found to be ordnance of any type.

ISM Recommended Follow-up

None

Special Note

The ISM report should mention the possibility of the ordnance no longer being present due to 1) past dredging operations that could have removed ordnance and redeposited it in a dredge spoils area near or on the base, and 2) Cooper River currents and associated river basin sedimentation/erosional processes over the past 50 years since the UXO was reported to have been dropped into the river which could have (in theory) relocated the ordnance several miles downstream.

**DET ISM Report
Review and Comment
(Mar 99)**

DET ISM Report

Interim Stabilization Measure for AOC 502 (Zone J)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Measure for AOC 502

Dated 18 Aug 98

Reviewer

Larry Bowers, P.E. (EnSafe Norfolk)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Locate, excavate and remove identified anomalies/UXOs and any associated contaminated soil. Secondary objective (if no UXO found) was to perform a due diligent search and verify via a geophysical survey that the ordnance was either previously removed or is located several feet below the river bottom to allow for unrestricted release of the property.

ISM Performance

Objective was met.

ISM Activity Summary

- Electronic metal locating equipment directed by boat and underwater diver was used by UXO subconsultant, Safe Environment, to identify and recover (if possible) metal bearing anomalies located in the UXO search area.
- Metallic anomalies were identified and recovered (some, not all), and none were found to be ordnance of any type.

ISM Recommended Follow-up

None

Special Note

The ISM report should mention the possibility of the ordnance no longer being present due to 1) past dredging operations that could have removed ordnance and redeposited it in a dredge spoils area near or on the base, and 2) Cooper River currents and associated river basin sedimentation/erosional processes over the past 50 years since the UXO was reported to have been dropped into the river which could have (in theory) relocated the ordnance several miles downstream.

**DET ISM Report
Review and Comment
(Mar 99)**

DET ISM Report

Interim Stabilization Measure for AOC 503 (Zone H)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston

Completion Report

Interim Stabilization Measure for AOC 503

Dated 10 Oct 97

Reviewer

Don Schroeder, P.E. (EnSafe, Nashville)

Purpose of Review

Provide independent review of the above referenced document to determine if the ISM objectives were met. It was not the intent of this review to determine if DET ISM activities sufficed as a final site remedy deemed protective of human health and the environment.

ISM Objective

The primary objective of the interim measure at this site was to locate, excavate, and remove identified anomalies/UXOs and any associated contaminated soil. If UXO's were not found, the secondary objective was to perform a due diligence search and verify via a geophysical survey that the ordnance was either previously removed or is located a safe distance below the ground surface to allow for unrestricted release of the property.

ISM Performance

Several, but not all, of the anomalies in the target area were identified and excavated, however no UXOs were found. A due diligence search was conducted, but the results of the search did not

provide findings that would allow for the unrestricted release of the property. Therefore, the ISM objective was not fully met.

ISM Activity Summary

- The area of investigation was identified and cleared of underbrush.
- A QA/QC survey was conducted by successfully identifying the locations of three fifty-five gallon test drums that had been buried in the target area.
- A geophysical survey was conducted in the target area that identified nine subsurface anomalies that were marked for excavation.
- Six of the nine anomalies were located and successfully excavated.
- A separate analysis of the Naval EOD Technology Division (EOD) findings was performed by *UXB International Inc. (UXB)*.

ISM Recommended Follow-Up

Follow-up investigations are not recommended, but the site should not be released without deed and/or access restrictions.

Special Note

Three of the anomalies that were identified during the geophysical survey could not be located during excavation activities. The separate analysis of the EOD findings by UXB states that portions of the target area were not surveyed with the magnetometer. The UXB review of the EOD data suggested the possible presence of two additional anomalies that were not excavated. These two additional anomalies were identified in an area adjacent to the three anomalies that were not located during EOD excavation activities. The UXB review of the EOD data concluded that numerous unaccounted anomalies exist. Given this conclusion, it is not possible to recommend that this site should be released without deed and/or access restrictions.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for AOC 574 (Zone E)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Measure for AOC 574

Dated 17 Jul 97

Reviewer

Mike Perlmutter, E.I. (EnSafe Memphis)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Remove petroleum contaminated soil from AOC 574.

ISM Performance

Objective was met. However, see "Special Note" below.

ISM Activity Summary

- Approximately 45 cubic yards of petroleum contaminated soil was removed; the excavation was 15 feet (ft) by 20 ft and 4 ft deep.

- *Plan modification:* Confirmation sample results were compared to BTEX, naphthalene, PAH, and RCRA metals industrial RBCs rather than TPH cleanup levels.
- Confirmation samples were collected following excavation of the contaminated soil.
- One confirmation sample was collected after additional excavation was completed to remove residual contamination along the west wall of the excavation
- The excavation was backfilled and graded to prevent erosion.
- All excavated waste was characterized as nonhazardous and stored in Building 1601 prior to disposal.

ISM Recommended Follow-up

None

Special Note

As stated in the ISM Activity Summary, the plan was modified leading to a cleanup threshold based on industrial RBCs and not TPH concentration. Subsequently, it was found that detection limits for several PAH compounds were higher than industrial RBCs. Therefore, as a precaution, a geotextile liner was used to cover the bottom of the excavation prior to backfilling.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for AOC 611 (Zone F)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Stabilization Measure for AOC 611

Dated 29 Jan 98

Reviewer

Larry Bowers, P.E. (EnSafe Norfolk)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Excavate and remove arsenic and PAH (BEQ) impacted soils to a level below the RBC (residential scenario) as stated in the USEPA Region III RBC Table dated 23 Sep 96.

ISM Performance

Objective not met. However, see comment below in "Special Note."

ISM Activity Summary

- 280 CY (approximately 75 ft x 100 ft x 1 ft) of impacted soil was removed from the subject site.
- However, two confirmation samples exceeded residential RBCs for the parameters of interest so additional excavation was completed at the two hot-spots (2 ft x 2 ft x 1 ft deeper).
- Two subsequent confirmation samples from the two hot-spots did not produce soil exceeding the residential RBC for PAHs, or background for arsenic (yet arsenic RBC was exceeded).

ISM Recommended Follow-up

None. However, see comment below in "Special Note."

Special Note

The ISM clearly defines a clean-up objective based on USEPA Region III RBC values (residential). Therefore, the objective was not met.

All first round confirmation samples (6 total), and both second round confirmation samples (2 total) contained arsenic greater than the RBC (0.43 ppm). However, it was noted in the ISM report that all confirmation rounds (with the exception of one sample) did NOT contain arsenic exceeding background for Zone F. The only exception was confirmation sample 004-01 which contained arsenic at 20 ppm versus a Zone F background of 19.9/18.2 ppm for the surface/subsurface, respectively. Yet, the magnitude of this excursion above the estimated background value seems insignificant to the reviewer and it was within two standard deviations of the mean.

In regards to PAHs (BEQs in particular), only one confirmation sample 007-01 contained PAHs greater than the RBC. However, this detection was sporadic and not representative of site conditions based on the results of the seven other confirmation samples (which were essentially nondetect for PAHs).

In summary, the objective (as written in the report) of the ISM was not met yet its intent was met if approval has been granted by the approving agency (DHEC in this case) that background values for arsenic were acceptable in determining the clean-up level. In addition, a risk management decision is required to address any concerns associated with the two excursions noted above (sample 004-01 exceeding background arsenic and sample 007-01 exceeding PAHs RBCs). It was not clear to the reviewer of the ISM report if background values were considered a viable clean up threshold, or if the two excursions were addressed and dismissed by risk management actions among appropriate parties. Regardless, and in the opinion of the reviewer, the overall intent of the ISM was met by removing a majority of impacted soil exceeding RBCs "or" background for certain site COCs.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for AOC 626, Fuel Distribution System Diesel Spill (Zone G)
Charleston Naval Complex, Charleston SC
Environmental Detachment Charleston (DET)

Completion Report

Interim Stabilization Measure for AOC 626 (Fuel Farm)

Dated 22 May 97

Reviewer

Chuck Mason (EnSafe Norfolk)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Remove petroleum-saturated soil, a 200-foot section of the 18-inch pipeline, and install a product recovery system as required. The scope was limited to a specific spill area along Viaduct Road.

ISM Performance

Objective was met.

ISM Activity Summary

- Approximately 450 cubic yards of petroleum-saturated soil was removed.

- Approximately 229 linear feet of the 18-inch pipeline was removed and the pipeline was plugged.
- A product recovery system was installed and includes monthly pumping not to exceed one year.

ISM Recommended Follow-up

None

Special Note

The original work plan specified the removal of a 12-inch sludge line atop the 18-inch diesel line. Excavation revealed that the sludge pipeline was approximately three feet to the side of the diesel pipeline, and not atop the diesel pipeline as originally thought. Since there were no signs of corrosion on the sludge pipeline, it was left in place.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for AOC 653 (Zone H)

Charleston Naval Complex, Charleston, SC

Environmental Detachment Charleston, (DET)

Completion Report

Interim Stabilization Measure for AOC 653, Base Hobby Shop

Dated 7 Jul 97

Reviewer

Don Schroeder, P.E. (EnSafe, Nashville)

Purpose of Review

Provide independent review of the above referenced document to determine if the ISM objective was met. It was not the intent of this review to determine if DET ISM activities sufficed as a final site remedy deemed protective of human health and the environment.

ISM Objective

The original objective of the interim measure at this site was to remove and dispose of any contaminated soil and sediment having TPH levels greater than 100 parts per million. During performance of the interim measure, the controlling guidance for soil excavation was changed to soil with petroleum contamination levels greater than the EPA Region III Residential Risk Based Concentrations, (RBCs).

ISM Performance

The revised objective of meeting the Region III RBCs was generally met by the removal of approximately 700 cubic yards of contaminated soil. Of the 16 confirmation soil samples that were taken and analyzed for 30 constituents each, there was only one detection each of benzo(a)pyrene and arsenic above the Residential RBCs. (Industrial RBCs were not exceeded.)

ISM Activity Summary

- A metal structure housing hydraulic lifts was removed and disposed.
- Approximately 4500 ft² of asphalt was removed and disposed
- Approximately 1000 ft² of concrete pad was removed and disposed.
- All hydraulic components including rams, supply tanks and a vault were removed, decontaminated and disposed.
- Removal was performed on an estimated 700 cubic yards of contaminated soil containing levels greater than RBCs.
- Confirmation samples were taken of the remaining side walls and bottom of the excavated area to insure compliance with RBCs.
- Site was cleared of all visible debris and all excavated areas were backfilled with clean soil.
- All excavated soil was sampled and characterized as non-hazardous and stockpiled on-site awaiting disposal.

ISM Recommended Follow-Up

None

Special Note

While the completion report did identify two confirmation samples that each had a single parameter that exceeded RBCs, we do not believe that any additional sampling is warranted. We

believe that the objective of substantially removing all petroleum contaminated soils has been met. Furthermore, the ISM Completion Report does not state what all the Region III RBC levels were, so it was not possible to independently review the analytical data to determine compliance with the RBCs.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for AOC 696 (Zone K)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Stabilization Measure for AOC 696

Dated 27 Jan 98

Reviewer

Larry Bowers, P.E. (EnSafe Norfolk)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met. It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

The primary objective was to excavate and dispose of soil exceeding arsenic, beryllium, and PCB clean-up goals per the table on page 1-2 of the report. Arsenic goal based on EPA RBC value of 0.43 ppm (though background is 3 ppm), beryllium goal based on EPA RBC value of 0.15 ppm (though background is 0.17 ppm), and PCB (Aroclor-1260) goal was 1 ppm based on federal regulations. The secondary objective was to demolish/remove transformer station.

ISM Performance

Primary objective was not met. Secondary objective was met. However, see "Special Note."

ISM Activity Summary

- 50 CY of impacted soil was removed and disposed.
- Of the 50 CY, 10 was arsenic and beryllium impacted soil (to 1 foot of depth).
- Of the 50 CY, 40 was PCB impacted soil (to 1 foot of depth).
- Demolished and removed transformer station, fence and concrete slab.
- Obtained confirmation samples from below concrete pad to check for potential PCBs.

ISM Recommended Follow-up

None

Special Note

PCBs were cleaned up to below 1 ppm. Beryllium was cleaned up to less than 0.15 ppm (RBC). But arsenic was not cleaned up to below 0.43 ppm (EPA RBC). Note however, that arsenic was cleaned up to below background for Zone K (3 ppm) and that the RBC for beryllium has recently been changed to 160 ppm.

If the goal was to clean up site soils to EPA RBCs, then the ISM did not fully satisfy this requirement due to arsenic. Yet, if the goal was to clean up site soils to EPA RBCs "or" background, then the DET did indeed satisfy the requirements and the intent of the ISM.

Furthermore, it was noted that the clean up objective table on page 1-3 did not provide the same target values as listed in Table 4.2 of the analytical results. Regardless, professional judgment dictates that clean up to background is an acceptable and prudent approach, whereas clean up to RBCs that are significantly less than background has no technical basis.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure for AOC 707/708 (Zones I and H)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Measure for AOC 707 Diesel Fuel Oil Spill, AOC 708 Petroleum Release

Dated 4 Aug 97

Reviewer

Larry Bowers, P.E. (EnSafe Norfolk)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met.

It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Excavate and remove petroleum impacted soil.

ISM Performance

Objective met. However, see comment below in "Special Note."

ISM Activity Summary

- At AOC 707, 5.6 CY (approximately 5 ft x 15 ft x 2 ft) of petroleum impacted soil was removed from the subject site. The ISM report stated that five confirmation samples did

not exceed residential RBCs for BTEX, PAH, TPH, PCB or total metals, yet based on the analytical results presented in the report some of these parameters were exceeded (metals mostly and some PAHs). The background concentration for metals, for the most part, were not exceeded though. There is no RBC for TPH yet it was noted that TPH did exceed 100 ppm from two of the five confirmation samples.

- At AOC 708, three grab samples were taken to determine if remedial action was required. The ISM report stated that the three grab samples did not exceed residential RBCs for BTEX, PAH, TPH, PCB or total metals, yet based on the analytical results presented in the report some of these parameters were exceeded (metals mostly and some PAHs). The background concentration for metals, for the most part, were not exceeded though. There is no RBC for TPH yet it was noted that TPH did exceed 100 ppm from two of the three grab samples.
- Backfill excavation at AOC 707, grade and seed.

ISM Recommended Follow-up

None. However, see comment below in "Special Note."

Special Note

The ISM report stated the objective was to remove and dispose of petroleum contaminated soil. However, it does not define a clean-up threshold or end point. Was the site excavated based on visual observation of TPH impacted soil, or via vapor screening with an OVA or similar device? Or was the extent of the excavation based on a TPH threshold of 100 ppm? Regardless, the site still contains soil exceeding 100 ppm and it was not clear to the reviewer if this level of TPH was considered acceptable as an endpoint for the ISM.

Furthermore, the ISM report refers to BTEX, PAH, PCB, and RCRA metals. The rationale for defining, sampling and analyzing these constituents is not presented in the ISM report. A remedial

objective for these constituents was not spelled out in the report so it is assumed by the reviewer that this information was irrelevant to the primary defined objective of TPH impacted soil removal.

In summary, if the intent of the ISM was to remove a majority of the TPH impacted soil to some undefined threshold, then it was met. Furthermore, if an additional intent of the ISM was to remove a majority of BTEX, PAH, PCBs and metal impacted soil to RBCs or background, then it was met also.

**DET ISM Report
Review and Comment
(March 1999)**

DET ISM Report

Interim Stabilization Measure, PCB Grid Sample (Zone G)

Charleston Naval Complex, Charleston SC

Environmental Detachment Charleston (DET)

Completion Report

Interim Measure for Zone G Grid PCB Contamination Site

Dated 27 Jan 99

Reviewer

Chuck Mason (EnSafe Norfolk)

Purpose of Review

Provide independent party review of aforementioned document to determine if ISM objective met.

It was not the intent of this review to determine if DET ISM activities sufficed as a final remedy deemed protective of human health or the environment.

ISM Objective

Delineate the extent of PCB-contaminated soil and excavate and dispose of all PCB-contaminated soil at the site. The excavation was to continue until soil sampling indicated with reasonable confidence that the concentrations of PCBs at the site were less than 1.0 ppm.

ISM Performance

Objective was not met.

ISM Activity Summary

- Sixty-three first interval soil samples were collected to delineate the extent of PCB contamination using a field immunoassay technique.
- Removed soil was characterized and disposed. Confirmation samples collected outside of the excavation area were below 1.0 ppm except for two areas outside of the initial excavation. A confirmation sample collected outside the east boundary had a soil PCB concentration of 8.2 ppm. This sample was located near underground gas and communication lines. From the second area, a soil sample outside of the northeast portion of the excavation area had PCB levels of up to 16.0 ppm. The soil in this northeast area was further excavated to reduce PCB levels to below 1.0 ppm.
- The dump site in the southwest portion of the PCB site was not investigated as part of the overall PCB investigation.

ISM Recommended Follow-up

None. However, see "Special Note" below.

Special Note

Although the objective was not met, a risk management decision was made to discontinue excavation to the east of the original excavation (near the 8.2 ppm PCB sample point) due to safety considerations.

The text should state the reasons for why the dump site was not investigated for PCB contamination and what the future plans are, if any, for investigating and remediating the dump site.