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DRAFT RESOURCE CONSERVATION AND RECOVERY ACT FACILITY INVESTIGATION
REPORT VOLUME 7 OF 12 SECTIONS 11 TO 13 ZONE L CNC CHARLESTON SC
12/18/1998
ENSAFE INC.

**DRAFT ZONE L
RCRA FACILITY INVESTIGATION REPORT
CHARLESTON NAVAL COMPLEX**

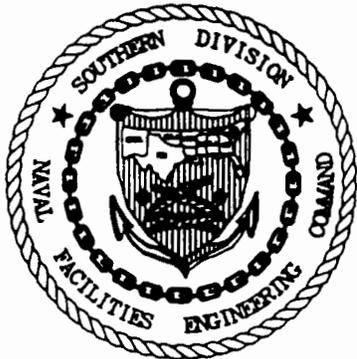


**VOLUME 7 OF 12
SECTIONS 11.0 TO 13.0**

**CTO-029
CONTRACT NO: N62467-89-D-0318**

Prepared for:

**Department of the Navy
Southern Division
Naval Facilities Engineering Command
North Charleston, South Carolina**



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11.0 CONCLUSIONS AND PRELIMINARY RECOMMENDATIONS

The Zone L RFI was conducted to determine which sites, if any, designated as AOCs and/or SWMUs during the RFA pose unacceptable risk to human health or the environment (ecological concerns), and will require additional evaluation under the CMS. The conclusions reached regarding each site are based on a technical evaluation of the data following procedures outlined in the Charleston Naval Complex *Comprehensive RFI Work Plan*, regulatory guidance, and as required by the Part B permit. The Charleston Naval Complex (CNC) project team has established a conservative protocol for using risk- and hazard-based thresholds to make preliminary recommendations for each site. The recommendations will be: no further action, additional evaluation under the CMS, and additional sampling needed to complete the RFI (in which case an addendum to the report will be required). The protocol for determining which course of action may be appropriate is as follows:

- NFA — Human health risks do not exceed the $1E^{-6}$ ILCR and the hazard index is < 1 under a residential scenario. Potential risk to ecological receptors is low based on the criteria described in Section 11.51.
- CMS — One or more of the thresholds listed above for NFA is exceeded.
- Additional Sampling Required — Data gaps exist for one or more media investigated. The data gaps are significant enough to preclude an NFA or CMS recommendation.

The recommendations are to be considered preliminary until the risk managers with the USEPA, SCDHEC, and the Navy have reviewed the data and a final decision is reached. The reason being that the USEPA and SCDHEC generally find a residential risk range of $1E^{-04}$ to $1E^{-06}$ acceptable for human health because of the conservative nature of the baseline risk assessment. This means some sites currently recommended for CMS may not require further action once all the weight of

evidence such as frequency of detection/spatial distribution, realistic exposure potential, nature of contaminants driving risk, data from overlapping zones, etc. are considered. COCs were identified when there were no existing sites investigated in the overlapping zones. No further action recommendations are not acceptable for sites where a potential risk exists under a residential scenario even though an industrial reuse of the property is expected since institutional controls for the site will be required. Final recommendations and the rationale for the risk management decisions will be documented in an addendum to the overlapping zone report.

It should be noted that the screening process for site-specific risk assessments is very conservative and some relatively insignificant chemicals make it through the process to become COCs, although, not all COCs drive risk at individual sites. COCs driving risk are those which are detected consistently above risk-based concentrations (RBCs) and reference concentrations (RCs) in soil, and above maximum contaminant levels (MCLs) in groundwater. First round groundwater results were used for risk assessment purposes.

Identifying potential sources and trends of groundwater contamination included research of subsurface distribution lines (i.e. sewer lines) and reviewing analytical data collected during the Zone L RFI. Maps of subsurface lines have been included in Appendix F as a reference for the distribution of storm drains, sewage collection, and sanitary and industrial sewer lines in Zone E.

Results for arsenic in the soil boring and DPT soil sampling along the railroad lines investigated in Zone L RFI, DPT soil sampling along the sewer lines, and the soil boring sampling near the installation of the Zone L wells confirm that the constituent is wide-spread across Zone L as well as CNS in general. The results for the BEQs detected in the soil borings along the railroad lines and at the soil borings near the Zone L wells confirm that BEQs are rather ubiquitous throughout CNS. Since arsenic and BEQs are rather ubiquitous throughout CNS, they are not considered an unacceptable risk/hazard in an industrial scenario unless concentrations are beyond those

commonly detected in soil, however, concentrations commonly detected in Zone L are considered unacceptable in a future residential scenario and have increased the number of sites recommended for CMS.

Table 11.1 lists all AOCs and SWMUs investigated in Zone L and the preliminary recommendations for no further action or additional evaluation under the CMS for the overlapping zone.

**Table 11.1
 Zone L Site Conclusions**

Site Designation	Conclusions/Recommendations
Subzone A - SWMU 37, AOC 504	Recommended for Zone A CMS evaluation – Soil
Subzone B - SWMU 37	No Further Action
Subzone B - AOC 504	Recommended for Zone B CMS evaluation – Soil
Subzone C - SWMU 37, AOCs 504	Recommended for Zone C CMS evaluation – Soil
Subzone E - SWMU 37, AOCs 504, 699	Recommended for Zone E CMS evaluation – Soil; Groundwater
Subzone F - SWMU 37, AOCs 504, 699	Recommended for Zone F CMS evaluation – Soil; Groundwater
Subzone G - SWMU 37	Recommended for Zone G CMS evaluation – Soil; Groundwater
Subzone H - SWMU 37	Recommended for Zone H CMS evaluation – Groundwater
Subzone I - SWMU 37	Recommended for Zone I CMS evaluation – Soil

The following sections summarize the recommendations for each site, level of risk/hazard posed by each of the sites recommended for corrective measures, the media affected, and the chemicals driving that risk.

11.1 Subzone A, SWMU 37 and AOC 504 1

SWMU 37 – Sanitary sewer system 2

AOC 504 – Railroad system 3

Table 11.2 identifies the media affected, the risk/hazard, and the chemicals driving the risk. Data generated and conclusions/recommendations made from the Zone A RFI report should be incorporated into the final decisions to be made at Subzone A. 4
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**Table 11.2
 Subzone A, SWMU 37, AOC 504
 Conclusion Summary**

Affected Medium	Unacceptable Risk/Hazard in the Future Residential Scenario	Chemical Driving Risk
Soil	Yes – ILCR (1E-05)	BEQs

Notes:
 ILCR = Incremental Lifetime Cancer Risk
 BEQs = Benzo(a)pyrene equivalents

11.2 Subzone B, SWMU 37 and AOC 504 1

SWMU 37 – Sanitary Sewer 2

No COCs were identified in soil or groundwater; therefore, no further action is recommended. 3

AOC 504 – Railroad System 4

Table 11.3 identifies the media affected, the risk/hazard, and the chemicals driving the risk. Data generated and conclusions/recommendations made from the Zone B RFI report should be incorporated into the final decisions to be made at Subzone B. 5
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Table 11.3
Subzone B, AOC 504
Conclusion Summary

Affected Medium	Unacceptable Risk/ Hazard in the Future Residential Scenario	Chemicals Driving Risk
Soil	Yes – ILCR (3E-04) and HI (6)	Aroclor 1254, arsenic, BEQs, thallium
	Yes	Lead

Notes:

- ILCR = Incremental Lifetime Cancer Risk
- BEQs = Benzo(a)pyrene equivalents
- HI = Hazard Index

11.3 Subzone C, SWMU 37 and AOC 504	1
SWMU 37 – Sanitary Sewer System	2
AOC 504 – Railroad System	3

Table 11.4 identifies the media affected, the risk/hazard, and the chemicals driving the risk. Data generated and conclusions/recommendations made from the Zone C RFI report should be incorporated into the final decisions to be made at Subzone C.

Table 11.4
Subzone C, SWMU 37 and AOC 504
Conclusion Summary

Affected Medium	Unacceptable Risk/Hazard in the Future Residential Scenario	Chemicals Driving Risk
Soil	Yes – ILCR (6E-05) and HI (2)	Aluminum, antimony, arsenic, BEQs, chromium, manganese, thallium, vanadium

Notes:

- ILCR = Incremental Lifetime Cancer Risk
- BEQs: = Benzo(a)pyrene Equivalents
- HI = Hazard Index

- 11.4 Subzone E, SWMU 37 and AOCs 504 and 699 1
- SWMU 37 – Sanitary Sewer System 2
- AOC 504 – Railroad System 3
- AOC 699 – Storm Sewer System 4

The COPCs identified in Subzone E are located in areas that have been previously investigated in the Zone E RFI. Data generated and conclusions/recommendations made from the Zone E RFI report should be incorporated into the final decisions to be made at Subzone E. 5
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- 11.5 Subzone F, SWMU 37 and AOCs 699 and 504 8
- SWMU 37 – Sanitary Sewer System 9
- AOC 504 – Railroad System 10
- AOC 699 – Storm Sewer System 11

Table 11.5 identifies the media affected, the risk/hazard, and the chemicals driving the risk. Data generated and conclusions/recommendations made from the Zone F RFI report should be incorporated into the final decisions to be made at Subzone F. 12
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Table 11.5
Subzone F, SWMU 37 and AOCs 699 and 504
Conclusion Summary

Affected Medium	Unacceptable Risk/Hazard in the Future Residential Scenario	Chemical Driving Risk
Soil	Yes – ILCR (2E-04) and HI (5)	Aluminum, antimony, arsenic, BEQs, chromium, copper, lead manganese, thallium, vanadium
Groundwater	Yes – ILCR (7E-05) and HI (1)	Tetrachloroethene

Notes:
 ILCR = Incremental Lifetime Cancer Risk
 BEQs = Benzo(a)pyrene Equivalents
 HI = Hazard Index

11.6 Subzone G, SWMU 37 1

SWMU 37 – Sanitary Sewer System 2

The COPCs identified in Subzone G are located in areas that have been previously investigated in the Zone G RFI. Data generated and conclusions/recommendations made from the Zone G RFI report should be incorporated into the final decisions to be made at Subzone G. 3
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11.7 Subzone H, SWMU 37 6

SWMU 37 – Sanitary Sewer System 7

Table 11.6 identifies the media affected, the risk/hazard, and the chemicals driving the risk. Data generated and conclusions/recommendations made from the Zone H RFI report should be incorporated into the final decisions to be made at Subzone H. 8
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**Table 11.6
 Subzone H, SWMU 37
 Conclusion Summary**

Affected Medium	Unacceptable Risk/Hazard in the Future Residential Exposure Scenario	Chemicals Driving Risk
Groundwater	Yes – ILCR (ND) and/or HI (6)	Thallium

Notes:

- ILCR = Incremental Lifetime Cancer Risk
- HI = Hazard Index
- ND = Value can not be determined due to insufficient information.

11.8 Subzone I, SWMU 37 1

SWMU 37 – Sanitary Sewer System 2

Table 11.7 identifies the media affected, the risk/hazard, and the chemicals driving the risk. Data generated and conclusions/recommendations made from the Zone I RFI report should be incorporated into the final decisions to be made at Subzone I. 3
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Table 11.7
Subzone I, SWMU 37
Conclusion Summary

**Unacceptable Risk/Hazard in the
 Future Residential Exposure
 Scenario**

Affected Medium	Unacceptable Risk/Hazard in the Future Residential Exposure Scenario	Chemicals Driving Risk
Soil	Yes - ILCR (1E-05)	BEQs

Notes:

ILCR = Incremental Lifetime Cancer Risk
 BEQs = Benzo(a)pyrene Equivalents

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13.0 SIGNATORY REQUIREMENT

Condition I.E. of the Hazardous and Solid Waste Amendments (HSWA) portion of RCRA Part B Permit (EPA SCO 170 022 560) states: *All applications, reports, or information submitted to the Regional Administrator shall be signed and certified in accordance with 40 CFR §270.11.* The certification reads as follows:

I certify under penalty of law that this document and all attachments were prepared under by direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.


Henry N. Sheppard II, P.E.
Caretaker Site Office, Charleston

23 Dec 1998
Date

Weems, R.E. and Lemon, E.M. (1993). *Geology of the Cainhoy, Charleston, Fort Moultrie, and North Charleston Quadrangles, Charleston and Berkley Counties, South Carolina*. USGS Survey Map I-1935. 1
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