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FACT SHEET 1 FOR 1998 ENVIRONMENTAL INVESTIGATION RESULTS ZONE E CNC CHARLESTON SC

4/1/1998

NAVFAC SOUTHERN

NAVAL BASE, CHARLESTON
Environmental Cleanup Program

This fact sheet is one of a series to inform interested citizens about the environmental investigations and cleanup actions at Naval Base, Charleston. Distribution is coordinated through the Public Affairs Office at Naval Facilities Engineering Command, Southern Division, (843) 820-5771.

ZONE E - ENVIRONMENTAL INVESTIGATION RESULTS

SUMMARY

This fact sheet summarizes the results of the RCRA Facility Investigation (RFI) recently completed at Zone E. Results of this environmental investigation have been compiled and presented to state and federal regulators who will use them as a basis for making decisions about cleanup efforts.

BACKGROUND

Naval Base Charleston was geographically divided into 12 zones (A - L) to aid in prioritizing the environmental investigation of the base. Zone H was investigated first due to its potential for reuse. The priority for investigation then followed this pattern: Zone I, C, A&B, E, D, F, G, K, L, and J. Investigations are complete for Zones H, B, and D, and reports have been finalized. The remaining zones are in varying stages of the investigative process.

FOR MORE INFORMATION

For more information on the Naval Base Charleston environmental cleanup program, call or write:

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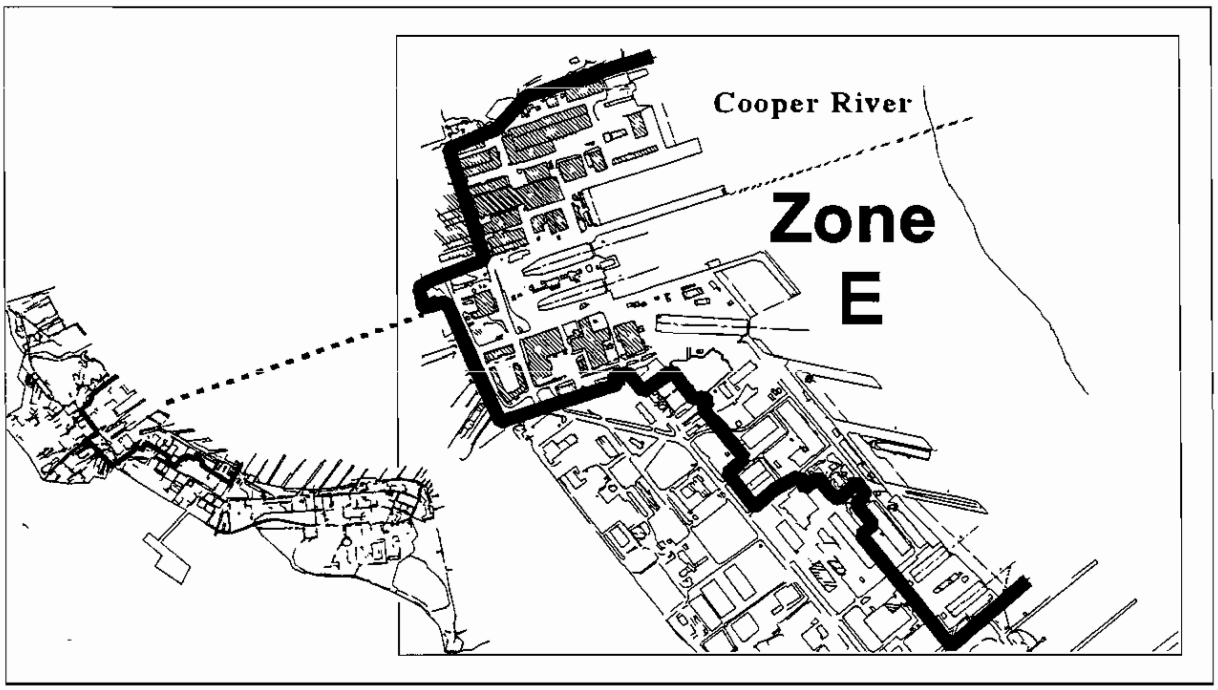
Environmental program documents are maintained at the Information Repository, found at the Dorchester Road Branch of the Charleston County Library, (843) 552-6466.

ZONE E

Zone E is in the west-central portion of the base and includes the Controlled Industrial Area (CIA) and the base power plant. This was the main industrial area of the base, containing most of the maintenance and repair facilities for ships, including metalworking and painting processes. Zone boundaries are outlined in the accompanying map, and are represented by the Cooper River on the north, the CIA perimeter and Carolina Avenue on the south, and the CIA fence on the east and west.



Zone E: Naval Base Charleston

REVIEW OF THE INVESTIGATION AND CLEANUP PROCESS

Beginning in 1993, water, soil, and sediment samples were collected as set forth in the regulator-approved Work Plan. The samples were then analyzed by a laboratory, and the results were used to evaluate risk to human health and the environment. The Zone-specific RFI Reports include all the information collected during this process.

Using information from the risk evaluation, the Navy and regulators will work together to make decisions about the site, such as:

① Should cleanup be undertaken?
② What should cleanup levels be?
③ What cleanup methods should, or can be used?

Answers to these questions are essential for planning the next step in the process, which is cleanup. The public has the opportunity to provide input on cleanup options.

INVESTIGATION RESULTS

The Zone E investigation was conducted to determine which sites pose unacceptable risk to human health or the environment, and will therefore require additional evaluation in a Corrective Measures Study (CMS). Preliminary recommendations for each site have been proposed utilizing a protective risk- and hazard-based approach.

This approach is based on two primary factors affecting human health:

- Incremental Lifetime Cancer risk (ILCR) - a measure of the probability of getting cancer (in excess of the natural chance of 1 in 4) from exposure to the contaminants at that site.
- Hazard Index - a value used to express toxicity (non-cancer causing risk).

Additional sampling may be required to complete the investigation.

SUMMARY OF RESULTS

A summary of Zone E investigation results and draft recommendations are provided in the accompanying table. Below is a brief description of each column header which should help explain the results.

- **SITE:** Each site, called either a Solid Waste Management Unit (SWMU) or Area of Concern (AOC) has its own unique identification number.

- **SITE DESCRIPTION:** This column gives a brief description of each SWMU and AOC.

- **PRIMARY CONTRIBUTORS TO RISK/HAZARD:** This column lists the chemicals at each site that were found in the risk assessment to cause the most concern regarding risk and hazard. Complete results can be found in the RFI Report found at the Information Repository.

- **MATRIX AFFECTED:** The "matrix" is the type of material that was sampled, such as soil or water (GW = groundwater). The "matrix affected" is any contaminated matrix which poses a risk to human health or the environment.

- **DRAFT RECOMMENDATIONS:** Draft recommendations for each site are either
  ① no further action (NFA), or
  ② additional evaluation under the CMS.
  These recommendations may change based upon final review by the regulators.

SUMMARY OF DRAFT RECOMMENDATIONS

Site	Site Description	Primary Contributors to Risk/Hazard	Matrix Affected	Draft Recommendations	
				CMS	NFA
SWMUs 5, 18, AOC 605	Former Battery Electrolyte Treatment Area (Pad 1278); PCB Spill Area (Public Works Resource Recovery Facility Storage Area); Waste Paint Storage Area (Pad 1278)	Antimony, arsenic, beryllium, BEQs, copper, zinc, lead	Surface Soil; Shallow GW	✔	
SWMUs 21, 54	Old Paint Storage Area (Pad 1275); Former Abrasive Blasting Area (Area around Pad 1275)	Antimony, arsenic, beryllium, BEQs, cadmium, lead, thallium	Surface/Subsurface Soil; Shallow GW; Refer to Zone J RFI for Sediment Conclusions*	✔	
SWMUs 22, 25, AOC 554	Old Plating Shop Wastewater Treatment System (Bldg. 5); Old Plating Operation (Bldg. 44); Paint Shop (Former Bldg. 1003)	Antimony, arsenic, cadmium, chromium, BEQs, dieldrin, lead, nickel, TCE, thallium, PCE, alpha & gamma chlordane	Surface/Subsurface Soil; Shallow GW; Sediment	✔	
SWMUs 23, 63, AOCs 540, 541, 542, 543	New Plating Shop Wastewater Treatment System (Bldg. 226); Battery Charging Station (Former Bldg. 73); Plating Plant (Bldg. 226); Oil Storage Shop (Former Bldg. 38); Paint Shop & Oxy-Acetylene Plant (Former Bldg. 22); Storage Facility (Former Bldg. 1026)	antimony, aroclor-1254, BEQs, thallium	Surface Soil; Shallow GW	✔	
SWMU 53, AOC 526	Former Satellite Accumulation Area (Bldg. 212); Paint Area (Bldg. 212).	BEQs, thallium	Surface/Subsurface Soil; Shallow GW	✔	
SWMU 65, AOCs 544, 546	Lead Storage Area (Bldg. 221); Former Pickling Plant (Bldg. 221); Galvanizing/Pickling Shop (Former Bldg. 1025)	aldrin, aluminum, antimony, arsenic, BEQs, beryllium, cadmium, chromium, dieldrin, lead, mercury, thallium, TCE, VC	Surface/Subsurface Soil; Shallow/Deep GW; Sediment	✔	
SWMU 67	Mercury Gauge Room (Bldg. 3)	No COCs identified			✔
SWMU 70, AOCs 548, 549	Dip Tank Area (Bldg. 5); Hydraulic Elevator (Bldg. 5); Former Scrap Yard (Bldgs. 3 & 5)	antimony, BEQs, cadmium, chromium, copper, lead, thallium, PCE, TCE, VC	Surface Soil; Shallow/Deep GW	✔	
SWMU 81	Former <90 Day Accumulation Area (Bldg. 1245)	No COCs identified	Refer to Zone J RFI for Sediment Conclusions*		✔
SWMUs 83, 84, AOC 574	Former Foundry (Bldg. 9); Former Lead Storage Area (Bldg. 9); Fuel Tank (Bldg. 9)	Antimony, arsenic, BEQs, copper, dieldrin, lead, thallium	Surface/Subsurface Soil; Shallow/Deep GW	✔	
SWMUs 87, 172, AOC 564	<90 Day Accumulation Area (Bldg. 80); Steam Cleaning Operations (Bldg. 80); O/W Separator (Bldg. 80)	arsenic, BEQs, chlorobenzene, dieldrin, 1,4-dichlorobenzene, 1,2-dichloroethene, manganese, thallium, TCE, VC	Surface Soil; Shallow/Deep GW	✔	
SWMU 97	<90 Day Accumulation Area (Bldg. 236)	No COCs identified			✔
SWMU 100	Satellite Accumulation Area (Bldg. 218)	No COCs identified			✔
SWMU 102	Mercury Spill (Bldg. 79)	Arsenic, BEQs, dieldrin, lead, mercury, thallium	Surface/Subsurface Soil; Shallow GW	✔	
SWMU 106, AOC 603	Blast Area (Drydock 3); Burning Dump (Drydock 3)	Arsenic, BEQs, thallium	Surface Soil; Shallow/Deep GW	✔	
SWMU 145	Mercury Spill (Bldg. 13A)	Arsenic	Deep GW	✔	
SWMU 170, 171	PCB Removal Operations (Drydock 1Area); PCB Removal Operations (Drydock 2 Area)	No COCs above risk levels			✔
SWMU 173	Lead Storage Areas (Bldg. 1297)	No COCs in soil	Sediment	✔	
AOC 525	Paint Booth (Bldg. 223)	No COCs identified			✔
AOC 528	Steam Cleaning Shop (Bldg. 59)	No COCs identified in GW, No COCs above risk levels in soil			✔
AOC 530	Paint & Oil Storage (Bldg. 25)	Arsenic, BEQs, lead, thallium	Surface Soil; Shallow/Deep GW	✔	
AOC 531	Substation & Storage Area (Bldg. 459)	BEQs	Surface Soil	✔	
AOCs 538, 539	Forge Shop (Bldg. 6); Propeller Shop (Bldg. 6)	Arsenic, BEQs, copper, dieldrin, thallium	Surface Soil; Shallow/Deep GW; Sediment	✔	
AOC 550	Boiler House (Former Bldg. 1111)	Arsenic, BEQs, thallium	Subsurface Soil; Shallow GW	✔	
AOCs 551, 552	Boiler House (Bldg. 1119); Former Galvanizing Shop (Former Bldg. 1030)	BEQs, lead, thallium	Surface/Subsurface Soil; Shallow GW	✔	

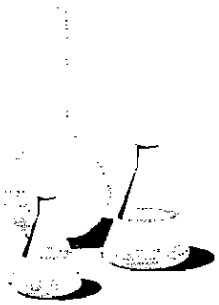
SUMMARY OF DRAFT RECOMMENDATIONS

Site	Site Description	Primary Contributors to Risk/Hazard	Matrix Affected	Draft Recommendations: CMS	Draft Recommendations: NFA
AOC 555	Latrine and Substation (Former Bldg. 29)	Refer to Zone J RFI for Sediment Conclusions*	Refer to Zone J RFI for Sediment Conclusions*		✔
AOC 556	Drydock Discharges (Drydocks 1,2,3,4,5)	Refer to Zone J RFI for Sediment Conclusions*	Refer to Zone J RFI for Sediment/Surface Water Conclusions*		✔
AOC 558	Substation (Bldg. 77)	No COCs identified			✔
AOCs 559, 560, 561	Central Power Station (Bldg. 32); Disinfector (Former Bldg. 34); Substation (Bldg. 451B)	Arsenic, BEQs, benzene, beryllium, aroclor -1254&1260, n-nitrosomethylethylamine, chlorobenzene, 1,2 and 1,4 -dichlorobenzene, thallium, TCE	Surface/Subsurface Soil; Shallow/Deep GW	✔	
AOC 562	Substation (Bldg. 84)	No COCs identified			✔
AOC 563	Locomotive House (Former Bldg. 37)	Arsenic, BEQs, TCE	Surface Soil; Shallow GW	✔	
AOC 566	Paint Shop Storage (Bldg. 194)	Arsenic, BEQs, beryllium, thallium	Surface/Subsurface Soil; Shallow/Deep GW	✔	
AOC 567	Substation (Bldg. 75)	No COCs identified			✔
AOCs 569, 570, 578	Former Gas Station & Oil Storehouse (Former Bldg. 1279); Former Coal Storage Area (Area from Bldg. 30 to 6th Ave, & Carolina Ave. to Hobson Ave.); Transportation Shop & Garage (Bldg. 25)	Arsenic, aluminum, BEQs, benzene, ethyl benzene, xylene, chromium, lead, thallium, PCE, TCE	Surface/Subsurface Soil; Shallow/Deep GW	✔	
AOC 571	Paint Booth (Bldg. 177)	No COCs identified			✔
AOC 572	Motor Area (Bldg. 177)	Arsenic, BEQs, lead, thallium	Surface/Subsurface Soil; Shallow GW; Sediment	✔	
AOC 573	Anodizing Process (Bldg. 177)	Arsenic, BEQs, chromium, lead, thallium	Surface Soil; Shallow GW; Sediment	✔	
AOC 576	Oil & Paint Storehouse/Print Office (Former Bldg. 1012)	Arsenic, BEQs, beryllium, bromodichloromethane,thallium	Surface Soil; Shallow/Deep GW	✔	
AOC 579	Former Paint Shop (Bldg. 1035)	Arsenic, BEQs	Surface Soil	✔	
AOC 580	Former Pattern & Electrie Shop (Bldg.10)	Antimony, arsenic, BEQs, eopper, lead, manganese, thallium, vanadium	Surface/Subsurface Soil; Shallow/Deep GW	✔	
AOC 583	NE Corner of Bldg. 236	BEQs, thallium	Surface Soil; Shallow/Deep GW	✔	
AOC 586	Temporary Powerhouse (Former Bldg. 1014)	Aroclor -1260, BEQs	Surface Soil	✔	
AOC 590	Alley between Bldgs. 1760 & 79	BEQs, beryllium, thallium	Surface Soil; Shallow/Deep GW; Sediment	✔	
AOC 592	Asbestos-Shredding Shelter (Former Bldg. 1225)	No COCs identified			✔
AOC 596	Former Torpedo Storage (Bldg. 101)	Arsenic, BEQs, isophorone, lead, N-Nitro-di-n-propylamine, thallium	Surface/Subsurface Soil; Shallow/Deep GW	✔	
AOC 597	Substation (Bldg. 91)	Antimony, arsenic, aroclor - 1248, 1254, and 1260	Surface Soil	✔	
AOCs 598, 599	Sonar Dome Area (End of Pier J); Pump House (Pier J)	Arsenic, BEQs, eopper, lead, thallium	Surface/Subsurface Soil; Shallow GW; Sediment	✔	
AOC 602	Substation & Storage (Bldg. 95)	No COCs above risk levels			✔
AOC 604	Substation & Storage (Bldg. 96)	Arsenic, lead, thallium, PCE, TCE			✔

* Sediment and Surface Water Samples were collected in the Cooper River as part of the Zone E investigation. These results and conclusions were included in the Zone J RFI Report which addresses all of the bodies of water surrounding the base.

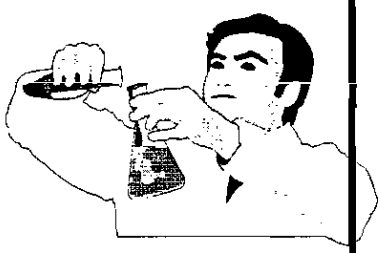
NOTES:
AOC - Area of Concern
BEQ - Benzo(a)pyrene equivalent
COCs - Contaminants of Concern
CMS - Corrective Measures Study
GW - Groundwater
NFA - No Further Action
PCE - Tetrachloroethene
SWMU - Solid Waste Management Unit
TCE - Trichloroethene
VC - Vinyl chloride

Cleanup Process



Samples Collected

Water, soil, air, or sediment samples are collected as set forth in the Work Plan.

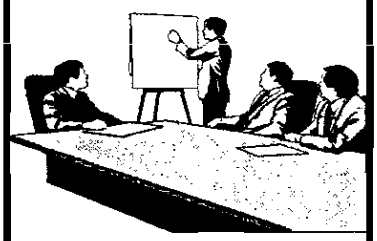


Samples Analyzed

A laboratory analyzes samples to see what contaminants are at each site and at what levels.

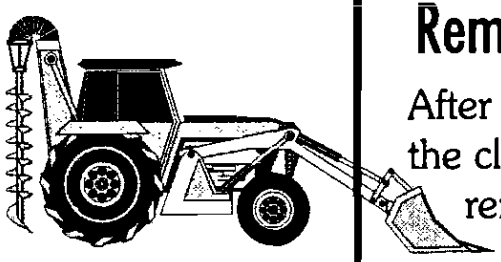
Risk Evaluated

The laboratory data is used to evaluate risk. This process is known as Risk Assessment which is used to determine if potential exposures are great enough to cause human health problems.



Risk Management Decision Made

After Risk is evaluated, regulators decide how to manage the risk. Factors considered include: risk, technical feasibility of the solution, community acceptance, and cost.



Remedy Selection and Cleanup

After risk management decisions are made, the cleanup process can begin, including: remedy selection, design, and cleanup.

Types of Contaminants

Metals

Metals are naturally occuring elements that are generally flexible and good conductors of electricity. These properties, along with the relative abundance of metals, make them valuable materials in industrial and manufacturing processes.

Uses: Paints and enamels, batteries, coins, electrical components

Examples: Aluminum, Arsenic, Beryllium, Copper, Manganese, Mercury, Vanadium

Semivolatile Organic Compounds (SVOCs)

SVOCs are common components of asphalt, coal tar, and pitch. Some SVOCs are components of diesel, jet fuel, waste oil, and hydraulic oil.

Uses: Mothballs, stains, varnishes, finishes, and varnish thinners

Examples: Benzidine, BEHP, Benzo(a)pyrene equivalents (BaP), and Dioxins/Furans

Volatile Organic Compounds (VOCs)

VOCs are commonly used chemicals. Many VOCs are solvents, which are liquid compounds used to dissolve other substances.

Uses: Paint thinners, mineral spirits, hair sprays, air fresheners, oven cleaners

Examples: Chlorobenzene, Chloroform, Chloromethane, Hexachlorobenzene, Vinyl Chloride, 1,2,4-Trichlorobenzene, 1,4-Dichlorobenzene

Pesticides/Herbicides/Polychlorinated Biphenyls (PCBs)

Pesticides are chemicals used to eliminate insects and other pests. Herbicides are chemicals used to kill unwanted plants or weeds. PCBs are industrial compounds that are used as insulating and heat exchange fluids.

Examples: Pesticides/Herbicides: Chlordane, Dieldrin, 4,4'DDE, Heptachlor Epoxide
PCBs: Aroclor-1248, -1254, -1260

Review of Risk

Risk Assessment

Procedure to evaluate risk

Environmental regulators use a procedure known as risk assessment to evaluate the potential risks to human health and the environment at hazardous waste sites.

~~~~~~~ Four elements are used to assess risk ~~~~~~~

Hazard Identification

Samples are collected and analyzed for type and concentration of contaminants.

Exposure Assessment

Will people come into contact with the hazard? And if so, who? how? how often? and why?

Without exposure, there is no risk.

Toxicity Assessment

What is harmful about the chemicals?

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Two types of risk:
Carcinogenic
(cancer-causing)
Non-carcinogenic
(not cancer causing)

Risk Characterization

Exposure and toxicity information is used to estimate if risk is great enough to cause human health problems.

South Carolina Department of Health and Environmental Control (DHEC), the United States Environmental Protection Agency (EPA), and the Navy are using risk assessment to help guide cleanup and land re-use efforts at Naval Base Charleston.

Risk Management

How to manage risk

After risk is evaluated through the Risk Assessment process, Navy representatives and environmental regulators decide how to manage the risk.

Risk Management Questions

- ◇ Should cleanup be undertaken?
- ◇ What should cleanup levels be?
- ◇ What cleanup methods should be used?

Risk Management Process

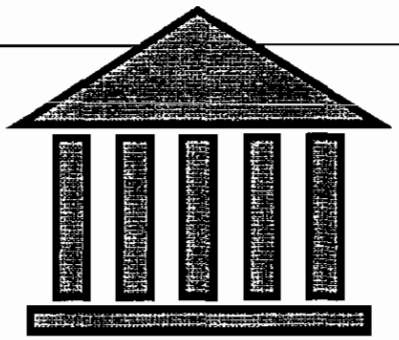
- ◇ Navy considers best cleanup alternative.
- ◇ Public input and comments are requested.
- ◇ Modifications are made to cleanup plan considering risk factors, technical feasibility, cost, and public input.

Many factors are considered in Risk Management

For More Information

An information repository which contains reports, technical documents, fact sheets, and more, pertaining to environmental investigations and cleanup at the Base is maintained at:

Information Repository



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The repository is available to the public and everyone is welcome to read and review the material it contains. A photocopier is available at the library to make copies (10 cents each) of any of the material in the repository.

For more information on the Naval Base Charleston environmental cleanup program, call or write:

For More Information

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