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EXCAVATION WORKPLAN COMBINED SOLID WASTE MANAGEMENT UNIT 14 (SWMU 14)  
ZONE H WITH TRANSMITTAL CNC CHARLESTON SC  
11/29/2001  
CH2M HILL

COMBINED SWAMP 14 Zone H  
EXCAVATION WORKPLAN CRO



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November 29, 2001

Mr. David Scaturo  
Corrective Action Engineering Section  
South Carolina Department of Health and  
Environmental Control  
Bureau of Land and Waste Management  
8901 Farrow Road  
Columbia, SC 29203

Re: Excavation Work Plan (Revision 0) for Combined SWMU 14, Zone H

Dear Mr. Scaturo:

Enclosed please find two copies of the Excavation Work Plan (Revision 0) for Combined SWMU 14 in Zone H of the Charleston Naval Complex (CNC). This work plan has been prepared pursuant to agreements by the CNC BRAC Cleanup Team for completing the RCRA Corrective Action process.

The principal author of this document is Sam Naik. Please contact Mr. Naik at 770/604-9182, extension 255, if you have any questions or comments.

Sincerely,

CH2M HILL

A handwritten signature in black ink that reads "Dean Williamson".

Dean Williamson, P.E.

cc: Rob Harrell/Navy, w/att  
Gary Foster/CH2M HILL, w/att  
Darryl Gates/CH2M HILL, w/att

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*Excavation Work Plan*

**Combined SWMU 14, Zone H**

**Charleston Naval Complex  
North Charleston, SC**

Prepared for  
**U.S. Navy Southern Division  
Naval Facilities Engineering Command**

Prepared by

**CH2M-Jones**

November 2001

Contract N62467-99-C-0960

## Purpose of the Excavation Work Plan

This Excavation Work Plan describes the approach for contaminated soil excavation at Combined Solid Waste Management Unit (SWMU) 14 in Zone H, at the Charleston Naval Complex (CNC). The areas and depths targeted for excavation as part of this plan were determined through an evaluation of analytical data from the Zone H RFI investigations conducted by EnSafe Inc. (EnSafe) (EnSafe, 1997 and 2000), and through pre-excavation delineation sampling conducted by CH2M-Jones during August and October 2001 as part of the Interim Measure (IM). Details of the IM approach can be found in the *Interim Measure Work Plan, Combined SWMU 14, Zone H* (CH2M-Jones, May 2001) which was approved by the South Carolina Department of Health and Environmental Control (SCDHEC).

## Site Background and Setting

Combined SWMU 14 is located in the eastern portion of Zone H at the CNC. The Combined SWMU 14 area encompasses SWMU 14, SWMU 15, Area of Concern (AOC) 670, and AOC 684. The locations of these SWMUs and AOCs are shown in Figure 1-1.

SWMU 14 is an area where miscellaneous chemicals, warfare decontaminating agents, and possibly industrial wastes were reportedly buried.

SWMU 15 is the site of a former propane-fired incinerator reportedly used to destroy classified documents. Only the concrete slab and concrete propane tank saddles remain.

AOC 670 is a former outdoor trap and skeet range operated from 1960 until the late 1970s. Buildings 1887, 1893, and 1896 remain in the AOC 670 area. Building 1897, which was inside the footprint of AOC 670, was demolished during an IM performed by the U.S. Navy Environmental Detachment (DET) during 1997.

AOC 684 is a former outdoor pistol range that was in operation from the early 1960s until 1981.

The Combined SWMU 14 site is mostly unpaved.

## Previous Investigations

Details of the geophysical surveys, initial and supplemental RFI sampling efforts, and lead shot investigations conducted by the Navy/EnSafe team, as well as the geophysical and excavation IMs conducted by the DET are described in the *Interim Measure Work Plan* (IMWP) for Combined SWMU 14 (CH2M-Jones, May 2001).

The pre-excavation delineation sampling events conducted by CH2M-Jones during August 2001 and October 2001 are described in the following section.

## **Pre-excavation Delineation Sampling**

### **August 2001 Sampling Event**

Based on the distribution of the chemicals of concern (COCs) identified during the RFI, an IMWP was prepared by CH2M-Jones (CH2M-Jones, May 2001) and submitted to SCDHEC for review. The IMWP proposed excavation of surface soils within a 10 ft x 10 ft footprint around those RFI soil boring locations that showed the presence of COCs at concentrations above screening goals. These locations are shown in Figure 1-2. The IMWP proposed collection of four surface soil delineation samples outside a 10 ft x 10 ft footprint placed on each of these RFI soil boring locations and that these delineation samples be collected prior to excavation, in order to determine the presence of COCs outside the proposed 10 ft x 10 ft excavation footprints.

These delineation samples were collected during August 2001. Some of the delineation sample locations showed exceedances of the screening goals for benzo(a)pyrene equivalents (BEQs) and/or inorganics. The delineation sample locations, which include the exceedance locations, are shown in Figure 1-3.

Based on the analytical results from the August 2001 sampling event, two areas show BEQ concentrations above screening goals spread over a wide area instead of as isolated hotspots. These are identified as Area 1 and Area 2 for the purposes of delineating the excavation limits.

#### **Area 1**

In the area south of SWMU 15, where the primary COC is BEQs, the majority of the delineation samples exceeded the surface soil BEQ reference concentration of 1.304 milligrams per kilogram (mg/kg) adopted for CNC. This area is shown on Figure 1-4 as Area 1. While the exceedances of the screening goals in the IM delineation samples in other areas of Combined SWMU 14 are isolated, Area 1 appears to have an areawide source of contamination. The elevated BEQ concentrations in surface soil samples in this area could be due to fragments of targets used in the trap and skeet range that have been entrained in the surface soils.

## **Area 2**

An area north of Building 1896 on the northern boundary of AOC 670 (shown as Area 2 in Figure 1-4) also showed elevated BEQ concentrations during the August 2001 delineation sampling. These BEQ concentrations could be attributed to the presence of total petroleum hydrocarbons (TPH) which were detected in the soil samples in this area during the RFI.

## **October 2001 Sampling Event**

This sampling event was conducted to investigate whether a pattern of vertical stratification of BEQ contamination exists in the 0-1 ft interval below ground surface (bgs) in and around Area 1. The sampling and analysis approach for this event was presented in the *Sampling and Analysis Plan, Combined SWMU 14, Zone H* prepared by CH2M-Jones during September 2001 (CH2M-Jones, September 2001). As part of this approach, six previous delineation sample locations within Area 1 were chosen for resampling. These vertical delineation sample locations are shown in Figure 1-4, along with analytical results of BEQs and/or inorganics. At each resampling location, two samples were collected – one from the 0-6 inch bgs interval and one from the 6-12 inch bgs interval. Additionally, two of the delineation sampling locations near RFI soil borings H684SB015 and H684SB036 (east of Area 1) and H684SB003 (south of Building 1888 in AOC 684) were chosen for resampling for BEQs.

Analytical results from the October 2001 resampling event indicate that the BEQ concentrations in the 0-6 inch depth interval were substantially higher than those in the 6-12 inch depth interval at 5 of the 6 locations within Area 1. The vertical distribution of BEQs in Area 1 determined the soil excavation approach that will be used in Area 1.

No additional sampling was performed at Area 2. Three other locations on the southern side of Combined SWMU 14 which showed exceedances of screening goals for inorganics (arsenic and/or lead) during the August 2001 delineation sampling event were also targeted for resampling during the October 2001 sampling event. These are the exceedance locations at former RFI boring locations H670SB003, H670SB023, and H014SB010 shown in Figure 1-3.

Table 1-1 presents a summary of analytical results for BEQs and inorganics from the October 2001 resampling event.

## **IM Excavation Approach**

Figure 1-5 shows the original RFI soil boring locations targeted for delineation sampling and excavation as part of the remediation approach presented in the IMWP for Combined SWMU 14 (CH2M-Jones, May 2001). As explained in the previous sections, delineation

samples were collected around these locations during the August 2001 and October 2001 sampling events to determine the lateral extent of soil excavations around each of these locations. These locations will be targeted for excavation as shown in Figure 1-5 and described below.

Excavation will be conducted using a dozer or backhoe as outlined in the IMWP. Excavated soils will be placed in covered stockpiles or in lined roll-offs and sampled for waste characterization parameters. Waste storage and disposal will be performed according to the U.S. Environmental Protection Agency (EPA) guidance document *Management of Remediation Waste Under RCRA* (EPA, 1998).

### **Area 1 Excavation**

The lateral excavation limits at Area 1 are shown in Figure 1-5. The lateral boundary of the Area 1 excavation has been extended beyond the delineation sampling locations to remove additional material as a conservative measure.

Areas around those vertical delineation samples from the October 2001 resampling event which showed an exceedance of the CNC BEQ screening goal of 1.304 mg/kg in the 0.5 - 1 ft bgs interval, will be excavated down to a depth of 1 ft bgs. A confirmatory soil sample will be collected from the floor of these deeper areas by compositing five grab samples from within the deeper excavation footprint. There are three such areas within Area 1 as indicated in Figure 1-5. These three confirmatory soil samples will be analyzed at an offsite laboratory for BEQs.

Other locations within Area 1 which do not show an exceedance of the CNC BEQ screening goal in the 0.5 ft – 1 ft bgs depth interval will be excavated down to 6 inches bgs. These areas of shallower excavation will not be targeted for post-excavation confirmatory sampling. This area is indicated in Figure 1-5.

The excavation at Area 1 will be cordoned off with caution tape and left open until backfilling is done based on analytical results from confirmatory soil sampling. Since the excavation is shallow (1 ft or less in depth) and in an area that is not being used for pedestrian or vehicular traffic, leaving the excavation open is not anticipated to be a safety hazard. The area will be periodically monitored to ensure that the caution tape around the open excavation is maintained at all times.

### **Area 2 Excavation**

The lateral excavation limits in Area 2 are shown in Figure 1-6. This area will be excavated down to 1 ft bgs based on analytical results from the August 2001 delineation sampling

event. No post-excavation confirmatory sampling will be performed after the Area 2 excavation, and the excavated area will be backfilled with clean soil at the conclusion of the excavation.

### **Excavation at Other Hotspots**

Areas targeted for excavation in the IMWP that are not already part of Areas 1 and 2 will be excavated as hotspots. During the August 2001 delineation event, the delineation samples were collected from four locations outside each 10 ft x 10 ft excavation footprint (see Figure 1-3). The hotspots where delineation samples did not exceed the screening goals will be excavated to a 10 ft x 10 ft lateral extent as shown in Figure 1-5.

At those hotspots with one or more delineation samples exceeding the screening goals, additional samples were collected during the October 2001 resampling event at locations approximately 5 feet from the exceedance. The October 2001 resampling results from these hotspots did not reveal any additional exceedances. The excavation of hotspots with delineation samples exceeding the screening goals will be extended out 15 ft to 20 ft in the direction of the exceedance as shown in Figure 1-5.

### **Soil Sample Analysis**

Soil samples collected during this effort will be delivered by hand or via an overnight carrier to an offsite laboratory for chemical analysis. Sample analyses will be conducted in accordance with the CSAP, the guidance in EPA's *Test Methods for Evaluating Solid Waste, SW-846*, Office of Solid Waste and Emergency Response (OSWER) (EPA, 1996), and in the EPA's *Environmental Services Division Laboratory Operations and Quality Control Manual (ESDLOQCM)* (EPA, 1997).

### **Site Restoration**

Site restoration will be performed as outlined in the IMWP for Combined SWMU 14 (CH2M-Jones, May 2001).

### **References**

EnSafe Inc. *Zone H RCRA Facility Investigation Report, NAVBASE Charleston*. July 1996 with updates on June 24, 1997, and June 18, 1998.

U.S. Environmental Protection Agency (EPA). Office of Solid Waste and Emergency Response (SW846). *Test Methods for Evaluating Solid Waste, SW-846*. Revision 4. December 1996.

U.S. Environmental Protection Agency (EPA). *Environmental Services Laboratory Operations and Quality Control Manual (ESDLOQCM)*. 1997.

U.S. Environmental Protection Agency (EPA). Management of Remediation Waste Under RCRA, EPA-530F-98-026, October 1998.

CH2M-Jones. *Interim Measure Work Plan, Combined SWMU 14, Zone H, Charleston Naval Complex*. May 2001.

CH2M-Jones. *Sampling and Analysis Plan, Combined SWMU 14, Zone H, Charleston Naval Complex*. September 2001.

**TABLE 1-1**  
 BEQ and Inorganic Delineation Sampling Results, October 2001 Sampling Event  
 Excavation Work Plan, Combined SWMU 14, Zone H, Charleston Naval Complex

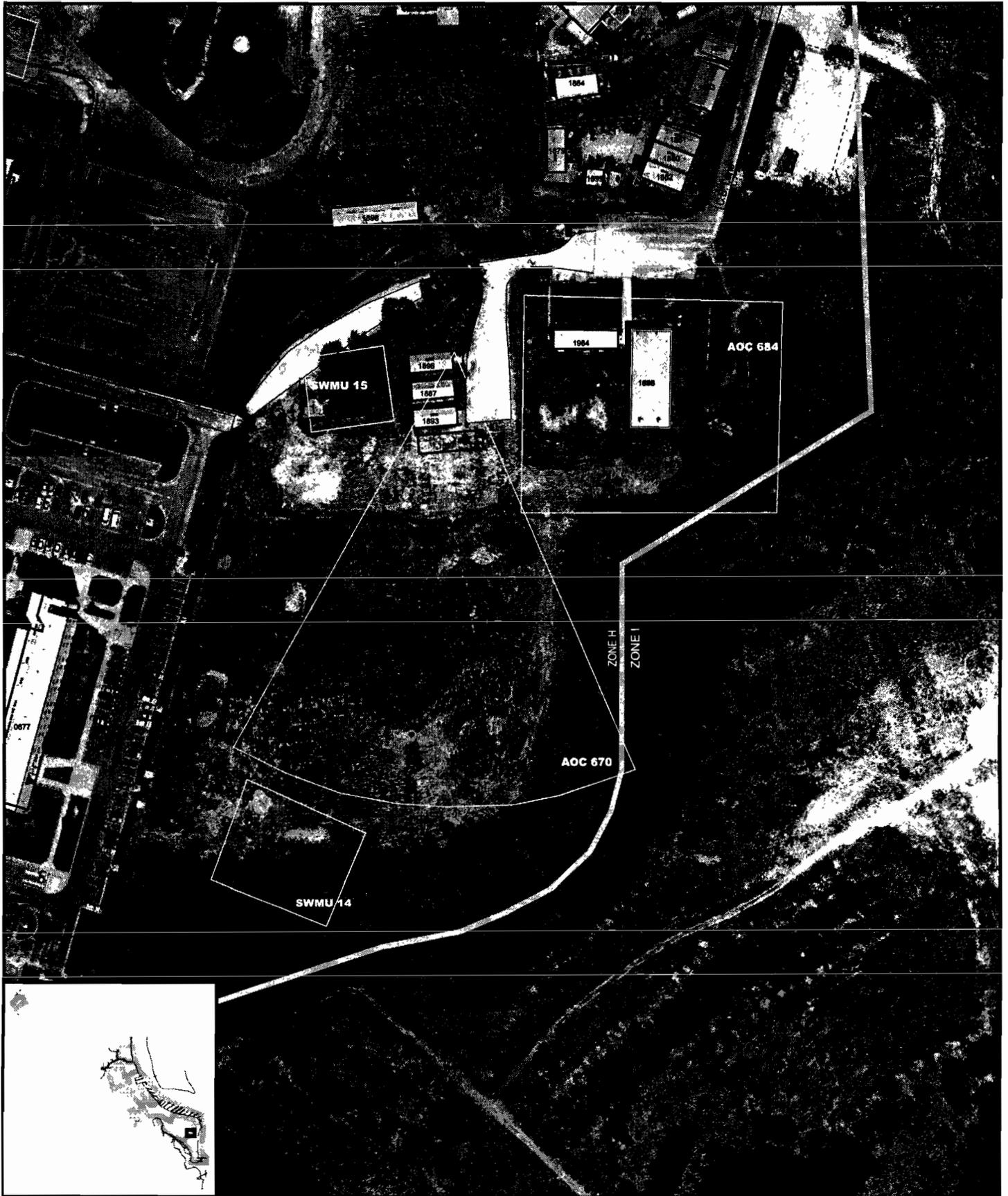
Former RFI Soil Boring Location	October 2001 Delineation Sample Location Associated with RFI Soil Boring Location	October 2001 Delineation Sample ID	Sample Interval (ft bls)	BEQ Concentration (mg/kg)	Arsenic Concentration (mg/kg)	Lead Concentration (mg/kg)
<b>Screening Goal:</b>				<b>1.34</b>	<b>15.6</b>	<b>400</b>
H684SB015	H684SB117	684SB11703	0 to 0.5	0.08	NS	NS
H684SB015	H684SB117	684SB11704	0.5 to 1.0	0.073	NS	NS
H684SB035	H684SB118	684SB11803	0 to 0.5	<b>10.15</b>	NS	NS
H684SB035	H684SB118	684SB11804	0.5 to 1.0	<b>5.39</b>	NS	NS
H684SB043	H684SB119	684SB11903	0 to 0.5	<b>19.96</b>	NS	NS
H684SB043	H684SB119	684SB11904	0.5 to 1.0	0.42	NS	NS
H670SB034	H670SB072	670SB07203	0 to 0.5	<b>29.69</b>	NS	NS
H670SB034	H670SB072	670SB07204	0.5 to 1.0	<b>3.02</b>	NS	NS
H684SB044	H684SB120	684SB12003	0 to 0.5	<b>2.34</b>	NS	NS
H684SB044	H684SB120	684SB12004	0.5 to 1.0	0.28	NS	NS
H670SB031	H670SB073	670SB07303	0 to 0.5	<b>12.2</b>	NS	NS
H670SB031	H670SB073	670SB07304	0.5 to 1.0	1.07	NS	NS
H670SB003	H670SB074	670SB07403	0 to 0.5	1.53	NS	NS
H670SB003	H670SB074	670SB07404	0.5 to 1.0	<b>2.41</b>	NS	NS
H684SB003	H684SB121	684SB12101	0 to 1	0.079	NS	NS
H684SB036	H684SB122	684SB12201	0 to 1	1.21	NS	NS
H670SB005	H670SB075	670SB07501	0 to 1	0.092	NS	NS
H670SB005	H670SB076	670SB07601	0 to 1	1.15	NS	NS
H670SB023	H670SB077	670SB07701	0 to 1	NS	11	90
H014SB010	H014SB036	014SB03601	0 to 1	NS	NS	57

Note: Concentrations which exceeded the screening goal are in bold text and outlined within the table.

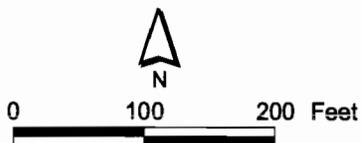
ft bls Feet below land surface

mg/kg Milligrams per kilogram

NS This analyte not sampled at this location



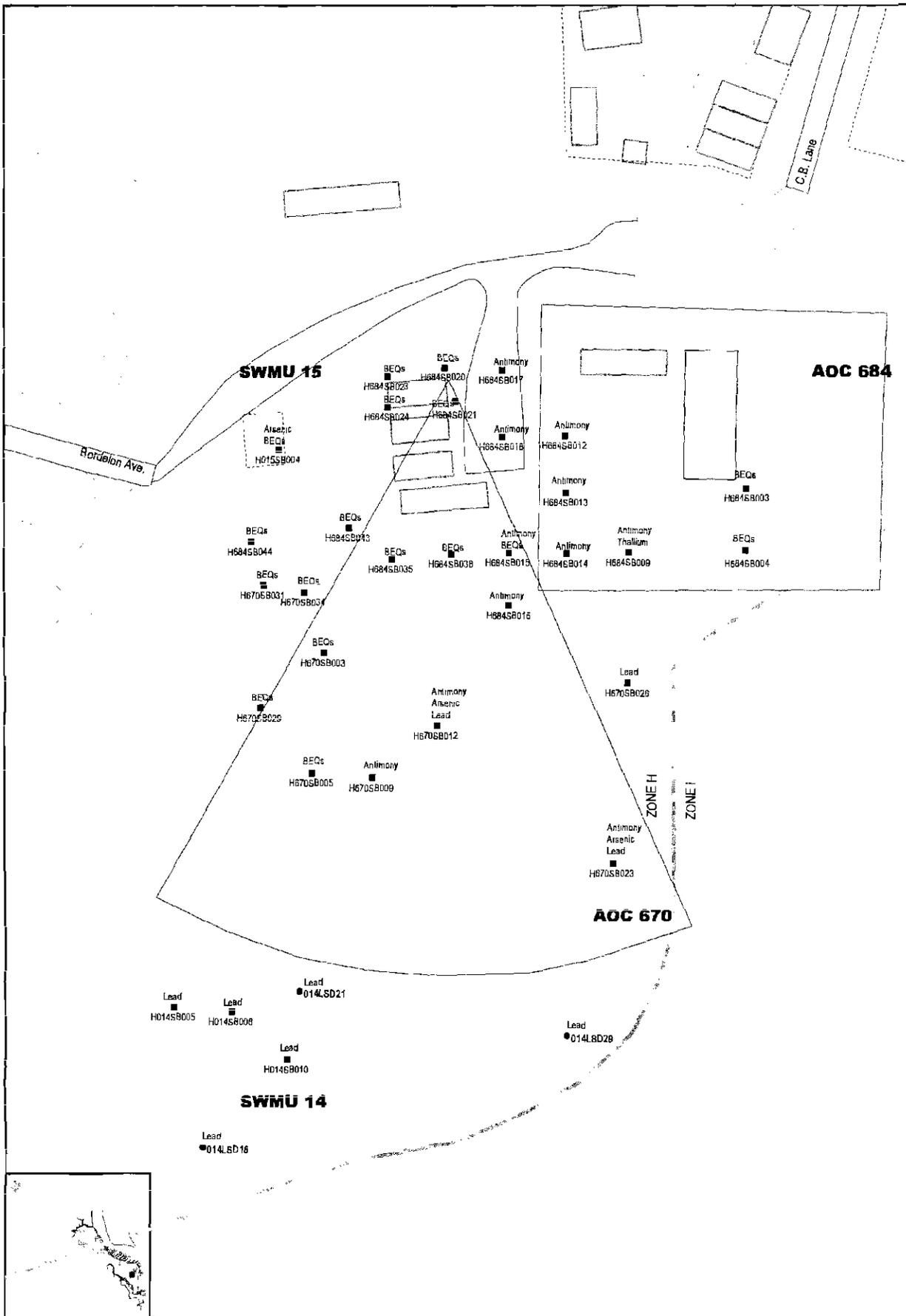
-  AOC Boundary
-  SWMU Boundary
-  Buildings
-  Zone Boundary



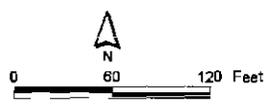
**Figur 1-1**  
 Site Location  
 Combined SWMU 14, Zone H  
 Charleston Naval Complex



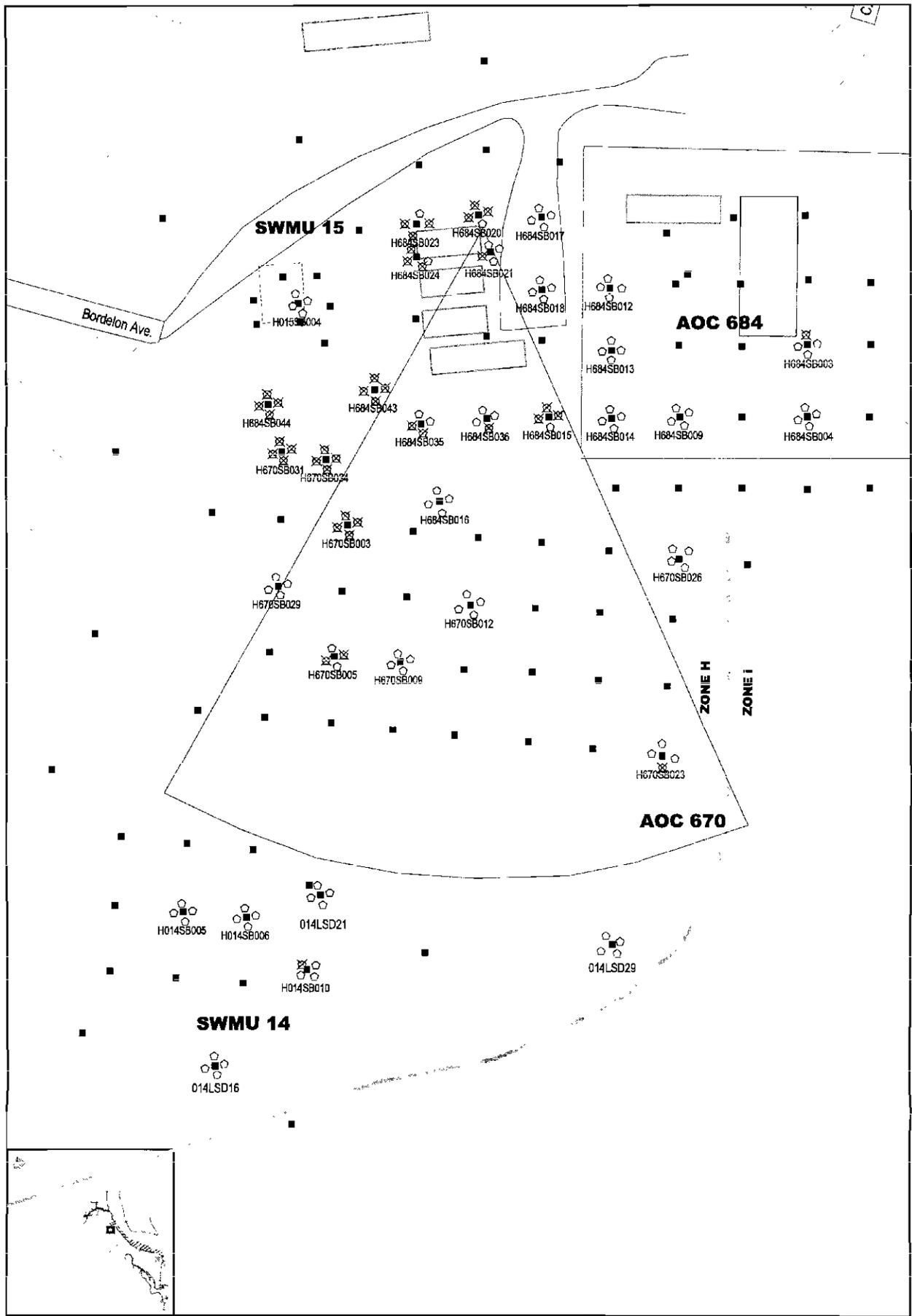
Note:  
 Aerial photograph dated 1997 .



- Soil Sampling Location
- H684SB038 Soil Boring ID
- Lead Shot Dist. Sampl. Location
- AOC Boundary
- ▭ SWMU Boundary
- ▭ Buildings
- ▭ Zone Boundary



**Figure 1-2**  
 Soil COCs and Exceedance Locations  
 Before August 2001 Sampling Event  
 Combined SWMU 14, Zone H  
 Charleston Naval Complex



○ Pre-excavation Delineation Sampling Location (August 2001)

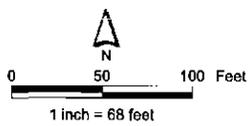
⊗ Delineation Sampling Location with Exceedance of Screening Goal

■ RFI Soil Sampling Location

— Roads - Lines

□ AOC Boundary

□ Buildings Zone Boundary



**Figure 1-3**  
 Pre-Excavation Delineation  
 Locations with Exceedances of  
 Screening Goals  
 Charleston Naval Complex

**CH2MHILL**



