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CORRECTIVE MEASURES STUDY WORK PLAN FOR ZONE C AREA OF CONCERN 517
(AOC 517) AND AREA OF CONCERN 523 (AOC 523) CNC CHARLESTON SC
8/1/2011
TETRA TECH INC

Comprehensive Long-term Environmental Action Navy

CONTRACT NUMBER N62467-04-D-0055



Corrective Measures Study Work Plan for Zone C, Area of Concern 517 and Area of Concern 523

**Charleston Naval Complex
Charleston, South Carolina**

Contract Task Order 0104

August 2011



NAS Jacksonville
Jacksonville, Florida 32212-0030

**DRAFT
CORRECTIVE MEASURES STUDY WORK PLAN**

For

ZONE C, AREA OF CONCERN 517 AND AREA OF CONCERN 523

**CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA**

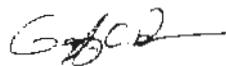
**Submitted to:
Naval Facilities Engineering Command
Southeast
NAS Jacksonville
Jacksonville, Florida 32212-0030**

**Submitted by:
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661 Andersen Drive
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**CONTRACT NUMBER N62467-04-D-0055
CONTRACT TASK ORDER 0104**

AUGUST 2011

PREPARED UNDER THE DIRECTION OF:



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This document, identified as the Corrective Measures Study Work Plan for Zone C, Area of Concern 517 and Area of Concern 523, Charleston Naval Complex, Charleston, South Carolina, has been prepared under the direction of a registered professional engineer. The work and professional opinions rendered in this report were conducted or developed in accordance with commonly accepted procedures consistent with applicable standards of practice.

Geoff Pope, P.E.
Professional Engineer No. 25856

Date: August 31, 2011

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ACRONYMS AND ABBREVIATIONS

AOC	Area of Concern
BCT	BRAC Cleanup Team
bgs	Below ground surface
BRAC	Base Realignment and Closure Act
BTEX	Benzene, toluene, ethylbenzene, and xylenes
CERCLA	Comprehensive Environmental, Response, Comprehension, and Liability Act
CFR	Code of Federal Regulations
CMS	Corrective Measures Study
CNC	Charleston Naval Complex
COC	Contaminant of concern
COPC	Contaminant of potential concern
DoD	Department of Defense
DRO	Diesel Range Organics
EnSafe	EnSafe Inc.
GRO	Gasoline Range Organics
HASP	Health and safety plan
HAZWOPER	Hazardous Waste Operator and Emergency Response
HUD	Department of Housing and Urban Development
LUC	Land Use Control
MCL	Maximum Contaminant Level
$\mu\text{g}/\text{ft}^2$	Microgram per square foot
NFA	No further action
NPDES	National Pollutant Discharge Elimination System
OSHA	Occupational Safety and Health Administration
OWS	Oil-water separator
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PID	Photoionization detector
POTW	Public-owned treatment works
RBC	Risk-based concentration
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
RSL	Regional Screening Level
SCDHEC	South Carolina Department of Health and Environmental Control
SVOC	Semi-volatile organic compound

SWMU	Solid Waste Management Unit
TPH	Total petroleum hydrocarbon
USEPA	United States Environmental Protection Agency
UST	Underground storage tank
VOC	Volatile organic compound
WP	Work Plan

1.0 INTRODUCTION

In 1993, the Charleston Naval Complex (CNC) was added to the list of bases scheduled for closure as part of the Defense Base Realignment and Closure Act (BRAC), which identified excess Department of Defense (DoD) property and provided appropriations to conduct the mission closure and environmental cleanup as required under Comprehensive Environmental, Response, Compensation, and Liability Act (CERCLA), as amended by the Community Environmental Response Facilitation Act.

The corrective action activities at the CNC are being conducted under the Resource Conservation and Recovery Act (RCRA). The South Carolina Department of Health Environmental Control (SCDHEC) is the lead agency for corrective action activities at the site. All RCRA corrective action is performed in accordance with the conditions and requirements of the RCRA Part B permit (Permit No. SC0 170 022 560) issued to the Navy by SCDHEC and the U.S. Environmental Protection Agency (USEPA), Region IV. The layout and location of CNC are shown on Figure 1.

Areas of Concern (AOCs) 517 and 523 are within Investigative Zone C at the CNC. Figure 2 illustrates the location and layout of Zone C, and AOCs 517 and 523. As part of the RCRA corrective action activities, the Zone C Final RCRA Facility Investigation (RFI) report was completed and submitted (EnSafe Inc., [EnSafe], 14 November 1997). Zone C is one of the 12 investigative zones that make up the CNC. Zone C is located on the western facility boundary in the northern portion of the base and is comprised of administrative areas, former military housing, warehouses, and the former base coal storage yard. The zone is bounded by McMillan Avenue on the south, Hobson Avenue on the east, Avenue D on the northeast, Noisette Creek on the north, and St. John's Avenue (facility boundary) on the west.

1.1 AOC 517 BACKGROUND AND SUMMARY FOR CORRECTIVE MEASURES STUDY WORK PLAN

AOC 517 is the area around and including Building M-192, a former indoor firing range that was operated by the Navy between 1959 and 1974. The building was converted into a classroom and storage building in 1974. The building was identified as an AOC because of the potential for lead dust release to the environment from firing range activities.

According to the RFI report, 10 soil samples were collected around the exterior of the building and analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), metals, cyanide, and pesticides/polychlorinated biphenyls (PCBs). No contaminants of concern (COCs) were identified as a result. Wipe samples collected inside the building confirmed the presence of lead on wall,

floor, and ceiling surfaces. The RFI report conclusions recommended addressing the lead dust as an industrial hygiene matter, depending on the intended reuse of the building.

This Corrective Measures Study (CMS) Work Plan (WP) provides the rationale for no further action (NFA) for AOC 517. The Navy completed the Zone C RFI and submitted the report to SCDHEC (EnSafe, 1997) and the USEPA for review and comment. The Department's approval letter (SCDHEC, 1998) of the RFI listed this site as requiring a CMS, while noting that there are no regulations governing exposure to lead dust. The Navy has undertaken corrective action for the COCs consistent with appropriate Department of Housing and Urban Development (HUD) regulations and guidance for exposure to lead dust from lead-based paint (HUD, 1995). Beyond taking a corrective action to encapsulate lead dust, there have been five surface soil samples collected at AOC 517 which were all clean, particularly with respect to lead. While there have been no groundwater samples collected at AOC 517, it is the opinion of the Navy that if the lead dust was a surface concern and no surface impacts were detected, then the groundwater can be considered clean. As a result of the completion of these corrective actions, the Navy requests approval to change the status of AOC 517 to NFA, along with the preparation of all appropriate documentation.

Prior to changing the status of any site to NFA in the CNC RCRA permit, the BRAC Cleanup Team (BCT) has agreed that the following issues, collectively referred to as site closure criteria, should be addressed:

- Status of the RFI
- Presence of metals (inorganics) in groundwater
- Potential linkage of Solid Waste Management Unit (SWMU)/AOC to sanitary sewers
- Potential linkage of SWMU/AOC to storm sewers
- Potential linkage of SWMU/AOC to railroad lines
- Potential migration pathways to surface water bodies
- Potential contamination associated with oil-water separators (OWSs)
- Relevance or need for land use controls (LUCs) at the site

These issues are addressed in Section 2.0.

1.2 AOC 517 CORRECTIVE MEASURES SELECTED

The corrective measures selected for AOC 517 is NFA with LUCs, along with the preparation of all appropriate documentation.

**1.3 AOC 523 BACKGROUND AND SUMMARY FOR CORRECTIVE MEASURES STUDY
WORK PLAN**

AOC 523 is the area around and including former Building M-1234, a former gas station which was operated by the Navy between 1958 and 1962. The former building is within the footprint of Building 198, which is currently in use by the DoD as a secured research facility and as such, the structure is not accessible to the public. The site was identified as an AOC because of the potential for waste oil, solvents, or petroleum release to the environment from the former gas station activities. No documentation is available on the status of any waste oil or underground storage tanks (USTs). The gas station was demolished and the USTs removed or closed in place prior to construction of Building 198.

Figure 3 shows the approximate location of Building M-1234 in relation to the Building 198 at the CNC. According to the RFI report, two soil samples, upper interval and lower interval, and two groundwater samples were collected through the Building 198 floor near the footprint of the former Building M-1234 and analyzed for VOCs, SVOCs, metals, cyanide, pesticides/PCBs, and total petroleum hydrocarbons (TPH) (Gasoline Range Organics [GRO]/Diesel Range Organics [DRO]). As reported in the Zone C RFI Report, aluminum, arsenic, barium chromium, cobalt, copper, lead, manganese, nickel, vanadium, and zinc were detected at concentrations greater than background levels. Table 1, below, shows the concentrations detected, the background concentration, and the multiple of which the detected concentration exceeds the background value.

TABLE 1

COMPARISON OF MAXIMUM CONCENTRATION TO BACKGROUND LEVEL AT AOC 523

Constituent		Maximum Detected Concentration (µg/l)	Background Level (µg/l)	Multiple Greater than Background
Aluminum	Al	4040	410	9.9
Arsenic	As	26.6	6.1	4.4
Barium	Ba	48.2	16.7	2.9
Chromium	Cr	7.9	2	4.0
Cobalt	Co	14.2	1.3	10.9
Copper	Cu	5.3	1.9	2.8
Lead	Pb	8.1	3.3	2.5
Manganese	Mn	925	608	1.5
Nickel	Ni	6.9	3.6	1.9
Vanadium	V	10.5	2	5.3
Zinc	Zn	79.1	13.2	6.0
			Maximum	10.9
			Average	4.7

No benzene, toluene, ethylbenzene, and xylenes (BTEX) constituents were detected and there were no polycyclic aromatic hydrocarbon (PAH) exceedances. The RFI approval letter for the Zone C RFI did not require a CMS and instead suggested that the UST program address the site. An issue of inorganics in groundwater was also suggested, which was intended to be resolved by a base-wide study of arsenic and thallium.

This CMS WP provides the rationale for NFA for AOC 523. The Navy completed the Zone C RFI and submitted the report to SCDHEC and the USEPA for review and comment. The Department's approval letter of the RFI (Appendix A) does not require a CMS and instead suggests additional investigation under the RCRA Subtitle I (UST) Program. AOC 523 was transferred to the RCRA Subtitle I Program following a letter requesting the transfer, sent by the Navy (BRAC Division) to the SCDHEC Director of the Division of Health and Infectious Waste Management on April 22, 2002.

Initially, investigations indicated that under the Subtitle I program, the only contaminants of potential concern (COPCs) would be inorganics, as all concentrations of petroleum-related VOCs and SVOCs were not detected or were detected at concentrations less than groundwater Maximum Contaminant Levels (MCLs) and soil Risk-Based Concentrations (RBCs). Also, the Navy has attempted to locate any remaining USTs using geophysical techniques without success. However, upon re-examination of the data and comparison with current screening levels, benzo(a)pyrene would be considered a COC at this time. Also, the data available for a risk assessment has been determined to be too limited, in quantity and in type of data (surface soil only) to conduct an appropriate risk assessment for the site, as stated in memorandum prepared by Ronald J. Kotun, PhD., regarding Zone C, AOC 517 and AOC 523, NFA Status Investigation, July 31, 2008. This memorandum is included in Appendix B.

1.4 AOC 523 INTERIM CORRECTIVE MEASURES SELECTED

Based on the lack of sufficient data to conduct a thorough risk assessment, and the transfer of this AOC to the UST Program, it is recommended that a field sampling effort be conducted including surface soil, subsurface soil, and groundwater analyses. A field investigation will likely be complicated by the current location of Building 198 on the site, thus scanning with a ground-penetrating radar or similar geophysical device may be required to determine if USTs are present or have been present under the building. The data collected during this sampling event will be analyzed and a risk assessment will be conducted. Based on the concentrations and risk levels determined to be present at AOC 523, a CMS will be prepared for the site.

2.0 AOC 517 SITE CLOSURE CRITERIA

2.1 STATUS OF THE RFI

The Zone C RFI is complete and approved without conditions. AOC 517 was recommended for CMS, although the regulatory status of the presence of lead dust is questionable. The Department approval letter recommended lead dust removal on the basis that the reuse is likely to be residential.

2.2 PRESENCE OF INORGANICS IN GROUNDWATER

Release to groundwater was not suspected at this site, therefore no groundwater monitoring wells were installed. Given the non-detects in soil samples, there was no reason to believe that a release occurred to the exterior of the building and, therefore, no subsequent concern of a release to groundwater.

2.3 POTENTIAL LINKAGE OF AOC 517 TO THE SANITARY SEWER

Lead dust may have been discharged to the sanitary sewer system as a component of wastewater during cleaning on the floors. Given the small concentrations found in wipe samples on the floor surfaces, it is unlikely that a significant concentration of lead was contained in the sewage discharges. The wastewater would not be considered a RCRA regulated waste by exclusion under the definition of a hazardous waste. As a result of the cleanup done by the Navy of the interior surfaces, this migration pathway would no longer exist.

2.4 POTENTIAL LINKAGE OF AOC 517 TO THE STORM SEWER

No linkage is suspected to exist between the AOC and the storm sewer based on the investigation results (no COCs in soil).

2.5 POTENTIAL LINKAGE OF AOC 517 TO THE RAILROAD SYSTEM

No linkage is suspected to exist between the AOC and the railroad system based on site investigation results and research of railroad line location.

2.6 POTENTIAL MIGRATION PATHWAYS TO SURFACE WATER BODIES

Lead residue in cleaning water that was discharged to the sanitary sewer prior to 1972 could have migrated to the Cooper River. The sanitary sewer system discharged directly to the Cooper River prior to 1972. After 1972, the sanitary sewer discharged to a main outfall point leading to an offsite, public-owned treatment works (POTW) under a National Pollutant Discharge Elimination System (NPDES) permit

issues to the Navy by the North Charleston Sewer District. No other pathways exist for lead dust from the building interior to migrate to surface water bodies.

2.7 POTENTIAL CONTAMINATION ASSOCIATED WITH OIL-WATER SEPARATORS

No OWSs exist at the facility. Based on the operations of the facility, no OWSs were necessary.

2.8 RELEVANCE OR NEED FOR LAND USE CONTROLS AT THE SITE

Based on the site investigation and subsequent corrective action taken by the Navy for the interior of the building, LUCs in the form of engineering controls are required to maintain the painted surfaces encapsulating the lead dust surfaces in Building M-192. The corrective action taken by the Navy for the lead dust is consistent with HUD guidelines for lead-based paint dust and residue in residential structures. These guidelines, which indicate that the screening level for lead dust in residential structures is 125 micrograms per square foot ($\mu\text{g}/\text{ft}^2$), were used conservatively as remediation goals considering the structure may be used for residential purposes. The lead loading level detected at Building M-193 was found to be 25 $\mu\text{g}/\text{ft}^2$, significantly less than the screening level. As such, existing lead dust controls are consistent with HUD standards.

3.0 AOC 523 SCOPE OF WORK

3.1 HEALTH AND SAFETY PLAN PREPARATION AND IMPLEMENTATION

A site-specific health and safety plan (HASP) will be prepared. Modifications to the plan may be implemented as needed, based on the direction of the Site Safety Officer or Project Manager if there are any changes at the site or in work conditions. Each site worker will be required to have completed a 40-hour course (and 8-hour refresher, if applicable) in health and safety training (Hazardous Waste Operator and Emergency Response [HAZWOPER]) as described under Occupational Safety and Health Administration (OSHA) 29 Code of Federal Regulations (CFR) 1910.120(b)(4) (OSHA, 2002).

3.2 SAMPLING IMPLEMENTATION

The proposed sampling plan will include the collection of surface soil samples, subsurface soil samples, and groundwater samples, and the measurement of groundwater elevations. All samples will be analyzed for metals, cyanide, SVOCs, VOCs, pesticides/PCBs, and TPH.

Figure 4 shows the proposed sampling locations. A judgmental sampling plan was chosen for this site based on the pre-existing knowledge of the site, including the former activities, the previous results, and the potential for difficulty in obtaining samples in and around Building 198. The proposed sampling plan includes four surface soil samples, between four and eight subsurface soil samples, and four groundwater monitoring wells to be installed and sampled. Surface soil samples will be collected from a depth of 0- to 1-foot below ground surface (bgs), and subsurface samples will be collected from the same locations at depths of 1- to 3-feet bgs, and potentially from 3- to 5-feet bgs. Subsurface soil samples will be screened with a photoionization detector (PID) to determine if the 3- to 5-foot depth sample is necessary at each location. Groundwater wells will be installed with 10-foot screens, intersecting the water table. An additional two to three temporary groundwater monitoring wells will be installed in the grassy areas near AOC 523, and groundwater elevations will be monitored at these wells. This will allow for a better understanding of the flow direction and gradient of groundwater at AOC 523. The table below summarizes the proposed sampling plan, analyses and analytical methods.

TABLE 2

PROPOSED SAMPLING PLAN FOR SOIL AND GROUNDWATER AT AOC 523

MEDIA	NUMBER OF SAMPLES					
	VOCs (USEPA Method 8260B)	SVOCs (USEPA Method 8270)	Metals (USEPA Method 6010B/7000A)	Cyanide (CLP ILM05.4)	Pesticides and PCBs (CLP SOM01.2)	TPH (Method E 418.1 or 1664)
Surface Soil	4+ duplicate + trip blank	4+ duplicate	4+ duplicate	4+ duplicate	4+ duplicate	4+ duplicate
Subsurface Soil	4+ duplicate + trip blank	4+ duplicate	4+ duplicate	4+ duplicate	4+ duplicate	4+ duplicate
Groundwater	4+ duplicate + trip bank	4+ duplicate	4+ duplicate	4+ duplicate	4+ duplicate	4+ duplicate

Once approval is obtained for this CMS WP, the sampling will be conducted and the results will be reported to SCDHEC and USEPA. The data will then be analyzed, a risk assessment conducted, and a CMS will be completed presenting appropriate alternatives for remediating AOC 523, based on the new results.

3.3 COMPARISON CRITERIA

During the data analysis and risk assessment process, soil and groundwater results will be compared with various promulgated screening criteria. For soil samples, data will be compared against federal Regional Screening Levels (RSLs) (including Residential and Industrial soil criteria, and Soil-to-Groundwater criteria) Ecological Soil Screening Levels, and CNC background criteria (as available). Groundwater data will be compared against federal MCLs, Tapwater RSLs, and CNC background criteria (as available). Prior to completion of the CMS, these results will be closely analyzed by the project team and a risk assessor to ensure that the data is sufficient to characterize the site, and then to determine the most appropriate path forward.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 AOC 517

Based on the results of the RFI, no COCs were identified in the soils around the exterior of Building M-192. Corrective Actions taken by the Navy in the interior of the building have addressed lead dust residual on the floors, walls, and ceilings. The source of lead dust, either through the indoor range activities or the wastewater, has been removed. The existing lead dust levels in Building M-192, AOC 517 are below the HUD Lead Hazard Screening Level. Encapsulation is in place and the interior surfaces are within lead loading standards. Maintenance will be required at the painted surface to ensure the continued encapsulation of lead dust. No further restrictions are necessary for use of the building. On the basis on the information provided in this CMS WP and referenced herein, the Navy recommends NFA with LUCs for AOC 517.

4.2 AOC 523

Based on the results of the RFI and the discussions between the Navy, SCDHEC, and USEPA, it is recommended that further sampling and investigation take place at AOC 523 prior to the preparation of a CMS that will present remedial alternatives for the site. While data does exist that previously indicated that NFA may be appropriate for this site, further investigation has showed that the limited data available was not enough to conduct a risk assessment (Tetra Tech, 2008), and the COPCs presented during the previous steps of the investigations for this AOC 523 are no longer appropriate based on adjustments in the comparison criteria used to determine the COPCs. On the basis of the information provided in this CMS WP and referenced herein, the Navy recommends further sampling for AOC 523, to be followed with the preparation of a CMS that will present potential remedial alternatives for AOC 523, based on the findings of the proposed sampling.

REFERENCES

EnSafe, 1997. Zone C Final RCRA Facility Investigation (RFI) Report, Charleston Naval Complex, Charleston, South Carolina. November 1997.

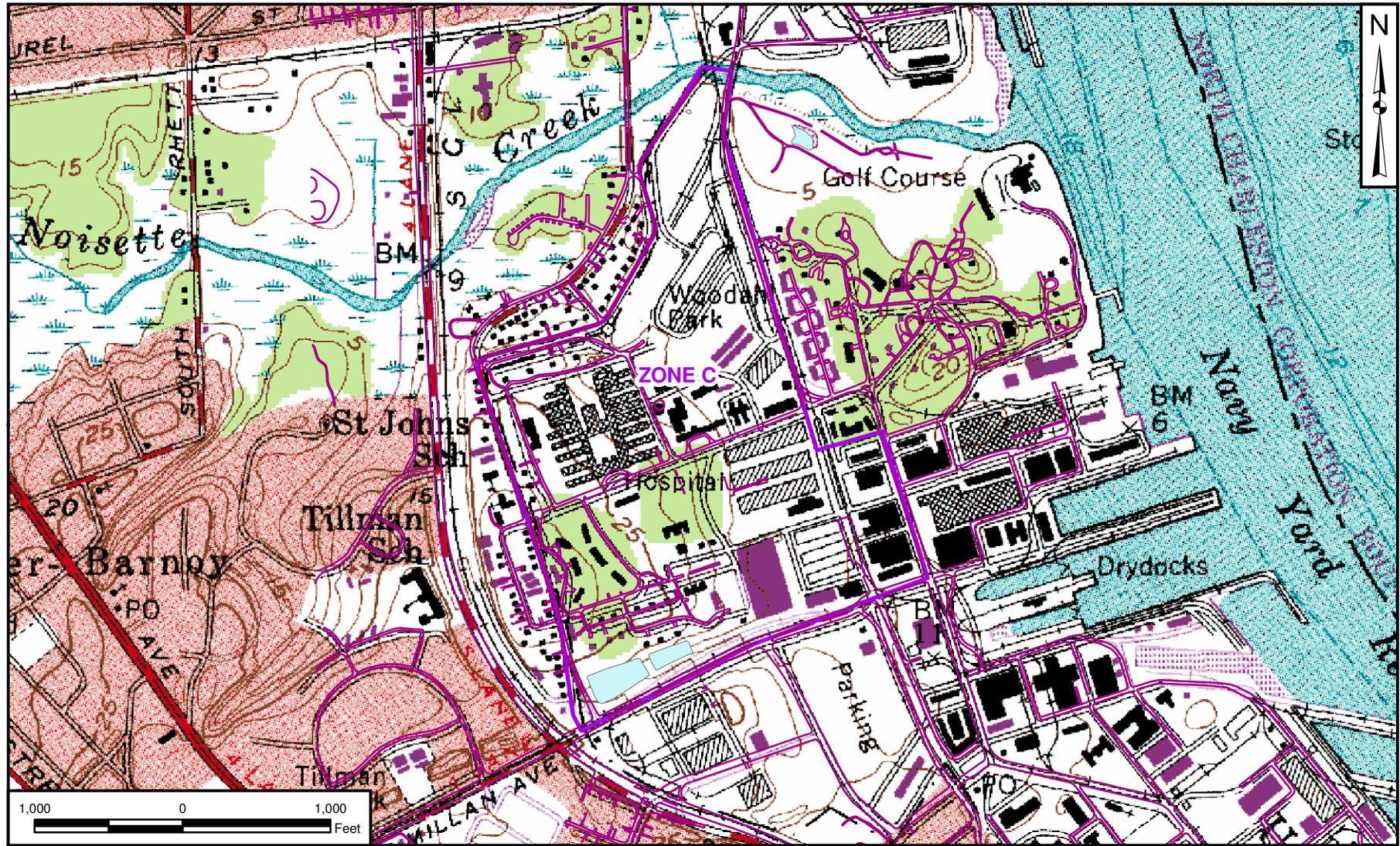
HUD (United States Department of Housing and Urban Development), 1995. Guidelines for the Evaluation and Control of Lead-Based Paint Hazards in Housing. June 1995.

OSHA (Occupational Safety and Health Administration), 2002. 29 Code of Federal Regulations 1910.120(b)(4). 2002.

SCDHEC (South Carolina Department of Health and Environmental Control), 1998. Zone C Final RCRA Investigation (RFI) Report Approval Letter, Charleston Naval Complex, Charleston, South Carolina. May 1998.

Tetra Tech (Tetra Tech, Inc.), 2008. Memorandum RE: Zone C, AOC 517 and AOC 523, NFA Status Investigation, Charleston Naval Complex, Charleston, South Carolina. Prepared by Ronald J. Kotun, PhD. July 2008.

FIGURES



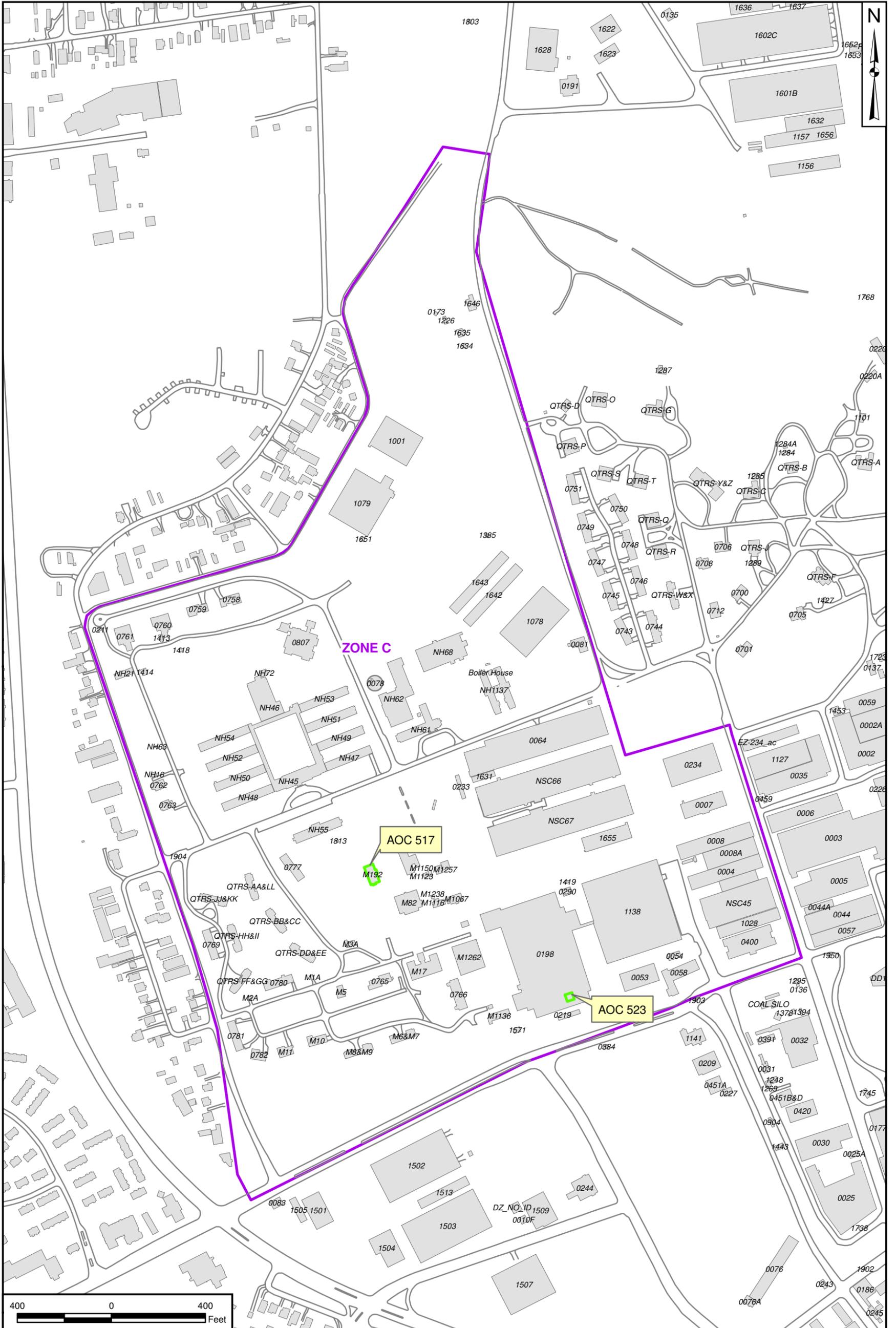
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S. STROZ	08/17/11
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M. BOERIO	08/17/11
REVISED BY	DATE



SCALE
AS NOTED

SITE LOCATION MAP
CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
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APPROVED BY	DATE
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FIGURE NO.	REV
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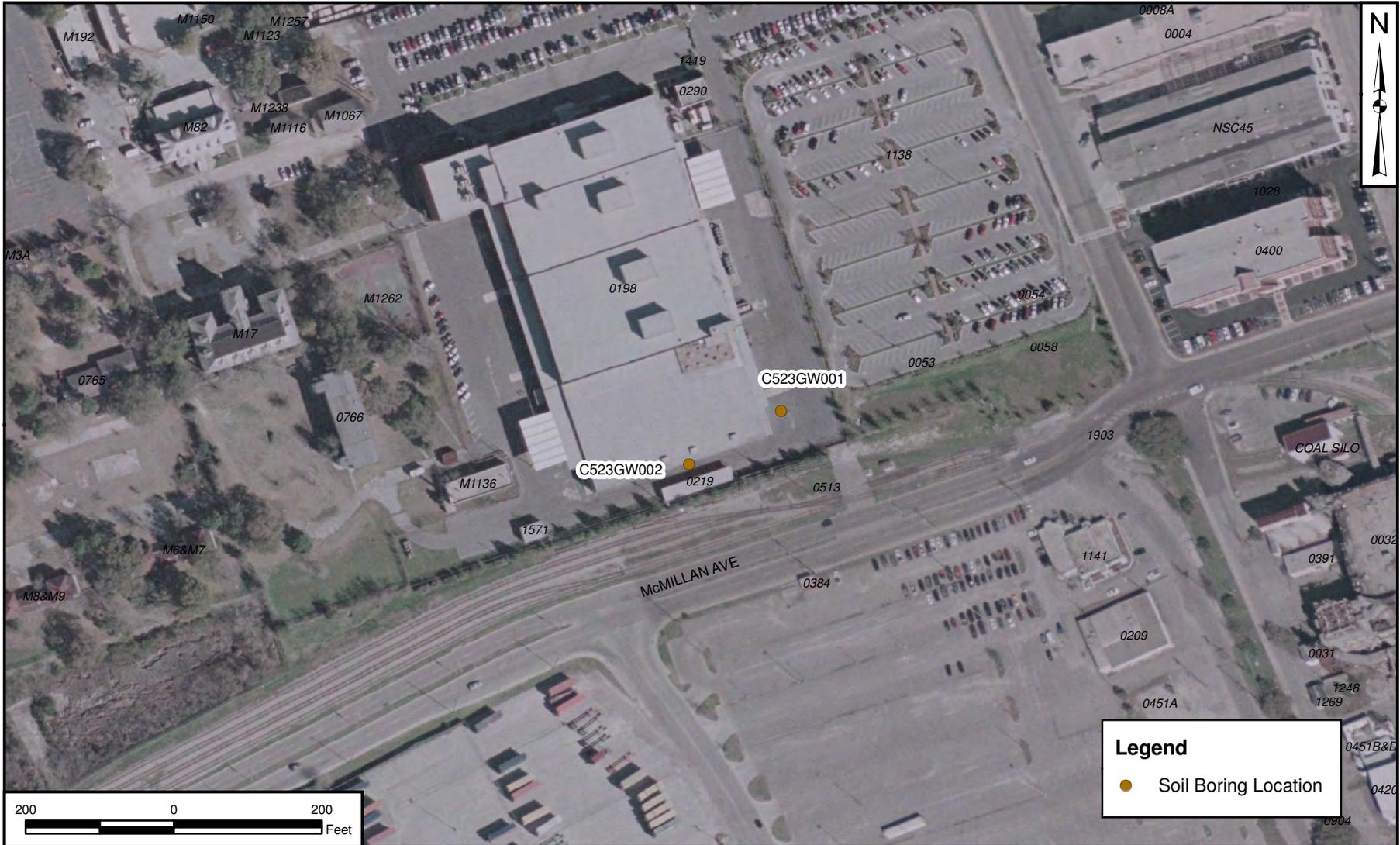


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**ZONE C, AOC 517, AND AOC 523 LOCATIONS
CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA**

CONTRACT NUMBER	CTO NUMBER 0104
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FIGURE NO. 2	REV 0



Legend

- Soil Boring Location



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AOC 523 SITE LAYOUT AND PREVIOUS SOIL BORING LOCATIONS
 CHARLESTON NAVAL COMPLEX
 CHARLESTON, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
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APPROVED BY	DATE
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APPROVED BY	DATE
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FIGURE NO.	REV
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Legend

- Previous Soil Boring Location
- Co-located Surface Soil, Subsurface Soil, and Groundwater Sampling Location



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AOC 523 PROPOSED SAMPLING LOCATIONS
CHARLESTON NAVAL COMPLEX
CHARLESTON, SOUTH CAROLINA

CONTRACT NUMBER	CTO NUMBER
	0104
APPROVED BY	DATE
APPROVED BY	DATE
FIGURE NO.	REV
4	0

SCALE
AS NOTED

APPENDIX A

SCDHEC APPROVAL LETTER OF THE ZONE C RFI REPORT



2903-12240

1111 North Main Street
Columbia, SC 29201-1708

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CERTIFIED MAIL

May 5, 1998

Henry Shepard II, P.E.
Caretaker Site Office
NAVFACENGCOC, Southern Division
1690 Turnbull Avenue
Building NH-51
Charleston, SC 29405

Re: Zone C Final RCRA Facility Investigation (RFI) Report
Dated November 14, 1997
Charleston Naval Complex
SC0 170 022 560

Dear Mr. Shepard:

The South Carolina Department of Health and Environmental Control (Department) has reviewed the above referenced Zone C Final RFI Report, the response to comments and additional information received on April 27, 1998. The review was performed according to applicable State and Federal Regulations and the Charleston Naval Base Hazardous Waste Permit effective June 5, 1990. The units (AOCs/SWMUs) located at Zone C are classified as follows:

SWMU 44	CMS
SWMU 47 / AOC 516	CMS
AOC 508 / AOC 511	CMS
AOC 512	CMS
AOC 517	CMS (Lead dust removal is necessary since there are no regulations governing this kind of exposure. Most of zone C is planned to have a residential reuse)
AOC 518	CMS (Candidate for Interim Measures)
AOC 700	CMS (To be addressed as part of SWMU 44 CMS effort)
AOC 515 / AOC 519	NFA
AOC 510	NFA
AOC 513	NFA
AOC 520	NFA
AOC 522	NFA
AOC 523	(Decision Pending verification that the UST program has or will address the unit, and the base-wide thallium study by the RCRA Subtitle C program.
Ecological subzone C1	Further evaluation required under the Zone J (water bodies) RFI investigation.
Ecological subzone C2	No further evaluation required
Ecological subzone C3	No further evaluation required

H Shepard
May 5, 1998
Page two

In addition, at grid location 001 high DDT concentrations were detected. Limited soil removal is recommended

The Department made the comment and confirmed with EPA, that screening total dioxin detections (TEQs) against the EPA's recommended cleanup level of 1 ppb is not appropriate. This approach departs from the Department's approved use of RBCs for soil ingestion for screening purposes, which if exceeded should be carried out into the risk assessment. Considering that detections of TEQs did not exceed EPA's recommended 1 ppb cleanup level, the Navy is not required to recalculate the risk at units where TEQs were present, however, a qualitative discussion related to dioxins (TEQs) is required for all units at Zone C. This discussion shall be included in a modified Section 11 of the Final RFI Report, that upon receipt of this letter shall be prepared and submitted to the Department.

Based on this review, and contingent that the above conditions are met the Department approves the Zone C final RFI report with minor deviations from the decisions reached at the Project Team meeting of April 1998.

It should be noted that according to condition IV.E.2. the permit shall be modified pursuant to R.61-79.270.41. The permit modifications can be made as part of the permit renewal, currently underway. The US EPA has not provided written comments or an approval letter to date.

The Department's concurrence is based on the information provided by the Navy to date. Any new information contradicting the basis for this concurrence may require further investigation or action.

Should you have any questions regarding this issue, please contact Johnny Tapia at (803) 896-4179 or Paul Bergstrand at (803) 896-4016.

Sincerely,


Joan Hartley, Manager
Corrective Action Engineering Section
Bureau of Land & Waste Management

cc Paul Bergstrand, Hydrogeology
Rick Richter, Trident EQC
Tony Hunt, SOUTHNAVFACENGNCOM
Dann Spariosu, EPA Region IV

APPENDIX B

**MEMORANDUM – Re: ZONE C, AOC517 AND AOC 523, NFA STATUS
INVESTIGATION**



MEMORANDUM

To: Chris Pike, P.E., Tetra Tech
From: Ronald J. Kotun, Ph.D., Tetra Tech
CC:
Date: July 31, 2008
Re: **Zone C, AOC 517 and AOC 523, NFA Status Investigation
Charleston Naval Complex
Charleston, South Carolina**

Introduction

The purpose of this memo is to present my opinion regarding whether data from previous investigations sufficiently warrant that No Further Action (NFA) is needed at Zone C, AOC 517 and AOC 523.

Upon reviewing the documents provided from the Naval Facilities Engineering Command (NAVFAC), there appears to be some residual issues at Sites AOC 517 and AOC 523 that have yet to be addressed in an approach that is satisfactory to the regulating agencies. This conclusion has been drawn from the reluctance that the SCDEH and the United States Environmental Protection Agency (USEPA) have to granting a NFA for these Sites.

AOC 517

AOC 517 is the site of building M-192 that was used as a firing range from 1959 until 1974 and then it subsequently served as classrooms and storage facilities. While there were no exceedances of lead detected in the soils surrounding the former firing range, lead dust was discovered on surfaces inside the building. A remediation effort of lead dust was performed on the interior of Building M-192 in January of 1999. Following the remediation of the inside surfaces of the building it was found that the remediation had addressed the residual lead dust to levels less than 25 $\mu\text{g}/\text{ft}^2$, which is the method detection limit. As an outcome of the remediation measures on the inside surfaces of Building M-192, a No Further Action was requested. It was also recommended that any impact to the environment that was potentially caused through the migration of lead dust in sanitary or storm sewers would be addressed in an RFI for Zone J.

It appears that the primary risk at this AOC was attributable to the inside of the building. Apparently, this has been rectified; therefore, it could be concluded that NFA would be required for the inside of the building. Five soil borings were collected in the area surrounding building M-192 and no constituents of potential concern (COPC) were identified, i.e., concentrations were less than risk-based screening concentrations. Therefore, it could be concluded that no further action would be needed for soil in this area. No groundwater samples were collected for this area

beneath this building. It is the Navy's decision in concurrence with the regulatory agencies how they would choose to evaluate groundwater with respect to this AOC. Specifically, is the groundwater being treated as its own operable unit with Zone C? Overall, NFA could be granted for the soil for AOC 517.

AOC 523

AOC 523 is the existing location of Building 198 that is currently in use. The Site formerly contained a gas station and Building M-1234 that was operated from 1958 until 1962. In the Zone C RFI submitted in November 1997, COCs were detected above the screening or reference levels in the soil and groundwater for: TPH, arsenic chromium, barium mercury, and vanadium.

Two surface soil samples provided the basis for the risk assessment at this AOC. No subsurface soil samples were collected. The potential primary source of contamination would have been the USTs that would have been associated with the gas station, yet no subsurface soil samples were collected to determine if there was any potential contamination associated with these USTs. The lack of subsurface soil data in combination with an inadequate number of surface soil samples provides uncertainty associated with evaluation of soil risks. Moreover, with regards to soil, benzo[a]pyrene was not identified as a constituent of potential concern. However, using current screening levels, it now would be considered a COPC and would be retained in the risk assessment.

The determination of NFA was based on the most likely receptors and the most likely exposure pathways that were identified in the RFI. However, risks calculated for the potential future receptors associated with groundwater exceeded 1×10^{-4} . The risks are primarily attributed to groundwater exposure, which is not identified as a likely exposure pathway. Nonetheless, it may be difficult to render a NFA decision with unacceptable groundwater risks. As identified for AOC 517, a determination of whether groundwater is being treated as its own operable unit must be made.