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WORK PLAN TO STRIP AND CLEAN THE ADJOINING PUMP ROOMS AND TANKS K, L, M,
N, AND O PIG AND GROUT TRANSFER PIPELINES AND PIPELINES AT CHICORA TANK
FARM CNC CHARLESTON SC
7/1/1998
ENVIRONMENTAL DETACHMENT CHARLESTON



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CHICORA TANK FARM IN
NORTH CHARLESTON, S.C.**



Prepared for:

DEPARTMENT OF THE NAVY
SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING
COMMAND
CHARLESTON, S.C.



Prepared by:

ENVIRONMENTAL DETACHMENT
CHARLESTON
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July 1998

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CHARLESTON NAVAL COMPLEX

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Cog Technical Authority	<u>[Signature]</u> (Approval)	Date <u>7/13/98</u>
Site Manager	<u>Bruce A. Beel</u> (Concur)	Date <u>7/13/98</u>
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SCDHEC	_____	Date _____ (Concur)

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ACRONYM LIST

CFR	Code of Federal Regulations
CGI	Combustible Gas Indicator
CHASP	Comprehensive Health and Safety Plan
CRZ	Contamination Reduction Zone
CTF	Chicora Tank Farm
CVS	Cardiovascular System
DET	Environmental Detachment Charleston
EIC	Engineer in Charge
EPA	U.S. Environmental Protection Agency
EZ	Exclusion Zone
FID	Flame Ionization Detector
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSO	Health and Safety Officer
HSP	Health and Safety Plan
IDLH	Immediately Dangerous to Life and Health
LEL	Lower Explosive Limit
mg/m ³	Milligrams per Cubic Meter
MSDS	Material Safety Data Sheet
NAVBASE	Naval Base Charleston
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
OVA	Organic Vapor Analyzer
PEL	Permissible Exposure Limit
PID	Photoionization Detector
POTW	Publicly Owned Treatment Works
PPE	Personal Protective Equipment
PPM	Parts Per Million
PR	Pump Room
PVC	Polyvinyl Chloride
SP	Sampling Plan
SCBA	Self-Contained Breathing Apparatus
SCDHEC	South Carolina Department of Health and Environmental Control
SOUTHDIV	Naval Facilities Engineering Command Southern Division
SZ	Support Zone
TLV	Threshold Limit Values
TPH	Total Petroleum Hydrocarbons

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1.0 INTRODUCTION

The Chicora Tank Farm (CTF) is located in North Charleston approximately ½ mile west of the Charleston Naval Base. Tanks "K, L, M, and N" are 2.1 million gallon field constructed cut-and-cover tanks on this site of approximately 24 acres. Tank "O" is 1.1 million gallon used oil field constructed cut-and-cover tank. CTF is bounded by Carner Avenue on the west, Chicora Avenue on the east, Clements Ferry Road to the south, and a marshland area to the north. The Norman C. Toole Magnet School abuts the property to the northwest. The site appears to be rolling pasture land. There are two electric transformer substations and one steam building on site. The tanks were constructed in 1942 and are not regulated. The tanks are steel reinforced concrete. Fuel material handled and pumped included: bunker C, diesel fuel, Navy fuel oil, Special Navy fuel oil, oily-waste water, lube oil, and sludge. Each tank has a pump room containing piping and pumps for supplying fuel to the Naval Base Charleston (NAVBASE).

This work plan is to be used to clean CTF tanks "K, L, M, N, and O", excavate the tops of the pump rooms, strip and clean the pump rooms, pig and grout pipelines at CTF and transfer pipelines connecting CTF with NAVBASE. The tanks were previously emptied by the Air National Guard in January 1998. The tanks will be cleaned by high pressure washing. Soil will be excavated from the top of pump rooms in order to facilitate removal of equipment. The pump rooms' removable roof sections are approximately 8' x 24' and under seven feet of soil. The tops of the pump rooms will be excavated to open the removable roof. The pump rooms will be stripped of all pumps, motors, piping, and other equipment and cleaned by high pressure washing. On-site pipeline cleaning will require excavation in order to set up for pigging and grouting. Valves may be removed to install pig launchers/receivers to clean the pipelines. The transfer pipeline runs underground through the Chicora neighborhood from NAVBASE to CTF.

1.1 REFERENCES

Publications listed below were used in the development of this work procedure and are referred to in the text by basic designation only.

AMERICAN PETROLEUM INSTITUTE (API)

API RP 1604 1996 Closure of Underground Petroleum Storage Tanks

API PUBL 2015 1994 Safe Entry and Cleaning of Petroleum Storage Tanks

CODE OF FEDERAL REGULATIONS (CFR)

40 CFR 280 Owners and Operators of Underground Storage Tanks

29 CFR 1910,1926 Occupational Safety and Health Standards

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
(SCDHEC)

R.61-92, Underground Storage Tank Control Regulations, Part 280

GWPD UST Underground Storage Tank Assessment Guidelines

SOUTH DIV SPECIFICATIONS

13219 (enclosure 1) Cleaning Petroleum Storage Tanks

1.2 DESCRIPTION OF WORK

Tanks "K, L, M, N, and O" and the adjoining pump rooms require the following work: excavate the covering soil over "K, L, M, N, and O" pump rooms, strip piping/pumps and clean the pump rooms, and pig and grout the pipelines at CTF and the transfer pipelines connecting CTF to NAVBASE.

1.3 SUBMITTALS

1.3.1 Completion Report

A completion report documenting the cleaning of the tanks and pipelines and the pipe closure activities (pigging, grouting, etc.) shall be submitted to the Engineer-in-Charge at the conclusion of the cleaning and pipe closure operations at Chicora Tank Farm.

1.4 QUALIFICATIONS

This work will be performed by Environmental Detachment Charleston (DET) personnel who have had a wide range of experience with complex industrial work. The Detachment has successfully opened, cleaned, and pumped many underground storage tanks. Only personnel who have been formally briefed are allowed to work. Non-briefed persons including helpers and assistants are prohibited from working at CTF until briefed. The pigging and grouting of the pipelines will be performed by an experienced contractor. Personnel are experienced and capable workers who are familiar with and shall abide by applicable portions of the following:

- a. API RP 1604 and API PUBL 2015

1.5 PROJECT ORGANIZATION

The Environmental Detachment Charleston (DET) will implement this Work Plan. The organizational chart and a brief description of duties are outlined in the DET Health and Safety Plan.

2.0 GENERAL REQUIREMENTS

2.1 HEALTH AND SAFETY PLAN (HSP)

The Health and Safety Plan (HSP) gives information regarding safety and health concerns in performing this work plan.

2.2 QUALITY ASSURANCE/QUALITY CONTROL PLAN

A copy of the Sampling Plan shall be onsite during all work. Generally, the Sampling Plan (SP) governs environmental sampling QC. Since no environmental sampling is planned, the SP will be used for guidance if a sampling event is needed.

Enterprise Engineering, Inc., performed a study of CTF in October 1995. The study reported no leaks in the tanks and piping (result of tracer testing in 1990). Also, site assessments between 1986 and 1994 found the site to be generally free from contamination. The Ground-Water Monitoring Division of SCDHEC in a letter dated 17 May 1994 stated that "No Further Action" was required at CTF based the Monitoring Report and Assessment Report (See Appendix G for correspondence).

No field screening, soil, or groundwater sampling for petroleum contaminants is planned at CTF.

2.3 SPILL AND DISCHARGE CONTROL

A comprehensive spill prevention and countermeasures control (SPCC) plan exists with the Caretaker Organization. Tank and pumping operations will be performed so as to minimize the possibility of a spill. In the event of a spill, immediate corrective action will be initiated by the work crew, and notification will be made to the Caretaker Site Office and SCDHEC.

2.4 WORK ZONES

Personnel not directly involved with the project shall not enter the work zones, called the EZ and CRZ. The EZ shall be a minimum of 10 feet from the limits of the piping and tank /pump room excavation. The perimeters of these zones shall be determined by the Site Supervisor and HSO using Figure 3 as a guide. The eight foot chain link perimeter fence surrounding the site shall serve as the start of the SZ. There is one access gate onto CTF. **Keep the main access gate shut at all times and locked when the site is unmanned.** Due to the hazards on site the DET shall walk the fence perimeter weekly as a minimum to verify the secure integrity of the fencing or report any problem areas noted.

2.5 SECURITY

During the performance of work, the tank demolition site shall be isolated by the perimeter fence preventing unintentional entrance of the general population into the work zone.

2.6 IGNITION SOURCES

Control ignition sources inside the EZ and CRZ.

2.6.1 Work Area

Prior to performing work that might involve the release of flammable vapors, vehicular and personnel traffic shall be routed away from the immediate area. All sources of ignition, including smoking, welding, burning, or other work that might be a source of ignition, shall be eliminated from the work area where flammable vapors may be present or likely to travel. This should include insuring all openings into surrounding structures are secured so as not to allow any flammable vapors to build up inside. The work area inside the tank/pump room shall be kept free of all sources of ignition, such as electrical motors and internal combustion engines. Normally, the clear zones, inside which ignition sources are prohibited are: (a) 50 feet for storage of tanks and work on tanks and (b) 100 feet from pressurized ducting and the duct discharge area when using mechanical ventilation to ventilate tanks. These distances should be confirmed as safe by gas testing during the work in progress. Required equipment, e.g. a backhoe should be brought inside the perimeter only after testing of the atmosphere. Particular attention should be given to gasoline, or other low flash point flammables,

and also when using mechanical ventilation. Work shall NOT be performed if wind direction would carry explosive vapors into areas that might produce a hazardous condition and/or during an electrical storm or threat of such a storm. A hazardous condition may exist in the area of the tank even following product removal and vapor-freeing due to temperature changes, sludge agitation within the tank, or a variety of other reasons.

2.6.2 Equipment

Vacuum trucks or externally powered vacuum rigs, if used to remove product and sludge from tank/pump room, shall be used after gas testing for explosive vapors and shall be located in an area such that vapors can not reach the internal combustion engines associated with this type equipment. The lower explosive limit shall be less than 10 percent in a 19.5 percent atmosphere. Only explosion proof pumps shall be used. In addition, a bonding/grounding strap shall be used during pumping. Only explosion proof flashlights or explosion proof temporary lighting shall be used, if portable lighting is needed. In hazardous (explosive) locations, extension cords shall be equipped with connectors or switches approved for locations with explosive atmospheres. Ensure that extension cords and other temporary electrical circuits are de-energized prior to connection and disconnection in the immediate area of the tank. Such equipment, when used, should be thoroughly inspected to ensure that it is not a source of ignition.

2.6.3 Unexpected Ignition Sources

Unexpected sources of ignition are an ever present danger. Every effort must be made to avoid the release of vapors near ground level during ventilation and pumping operations since it is not sufficient just to eliminate conditions known to be possible sources of ignition. Night work (is not authorized) will not be allowed except for clean up or breakdown and or emergency actions.

2.6.4 Fire Extinguishers

Fire extinguishers shall be readily available. The area fire department shall be notified prior to the start of work.

2.7 DECONTAMINATION

Previous site assessments found CTF excavation sites to be generally free from contamination. There is residual product inside all pipelines which will be removed and disposed of before dismantling the piping. Should the need arise for contamination control, the following guidelines will be followed. Any waste generated during the decontamination of equipment and/or personnel will be collected, stored, and tested for proper handling and disposal.

2.7.1 Equipment Decontamination

Inspect excavation vehicles/equipment leaving the area to ensure that contaminated materials do not adhere to the wheels or undercarriage. Decontaminate equipment (as needed) before exiting the work zones. Decon will be performed by wiping, sweeping, scrapping, and/or scrubbing with water if needed to remove oil, or oily dirt, sand and mud from equipment. Minimize the use of water. Follow the guidelines of Table 7-2 of the Health and Safety Plan (See Appendix B page 22).

2.7.2 Personnel Decontamination

Emptying and removing pipelines and cleaning the pump room will require personnel to wear personnel protective clothing and use specific equipment. Exiting this area will require positive controls for handling, removal, and processing petroleum contaminated clothing/equipment. DET personnel will establish and maintain a decon station outside the boundary of the EZ, as needed, and follow the guidelines of Table 7-1 of the Health and Safety Plan (See Appendix B, page 21) when exiting.

2.8 WASTE MANAGEMENT

WASTE STREAMS

Water

Water generated during this phase of work shall be stored and tested. If contaminated, transport and dispose of water in accordance with Federal, State, and local requirements.

PPE

Waste classified as PPE will include disposable suits, gloves, boots, respirator cartridges, and plastic sheeting. The amount of PPE generated will depend on the number of times disposable PPE is discarded daily. If PPE becomes contaminated it may be decontaminated per the instructions in the Comprehensive Health and Safety Plan and reused or disposed of as trash. If the PPE cannot be decontaminated it shall be disposed of as solid waste.

Hazardous Waste

No hazardous wastes are anticipated. Every effort to minimize the use of hazardous material during the project will be carefully planned. Any hazardous waste will be packaged, labeled, marked, and transported offsite to a permitted TSD. All hazardous waste shipments must be in accordance with applicable Department of Transportation hazardous material shipping regulations (49 CFR 171 - 179). Proper manifest documentation will be required at the time of shipping per 40 CFR 262 and state equivalent.

2.9 WORKSITE ATMOSPHERE

The worksite atmosphere shall be monitored during potentially explosive operations. Anytime an atmosphere of greater than 10% of the LEL is encountered, the area shall be ventilated using an **explosive proof blower**. The exhaust from the blower shall be routed to an area downwind and away from all work activities (including crane, backhoe, etc.) and off the ground a minimum of 6 feet. Monitor the exhaust from the blower.

2.10 ENVIRONMENTAL PROTECTION PLAN

The DET has prepared an Environmental Protection Plan which shall be on site for the work. Several oak trees are located on the southwest side of the site. Outside the north side of the site is a marshland swamp area.

2.11 PERMITS

The signing of this work plan constitutes approval to strip and clean pump rooms and tanks "K, L, M, N, and O", and pig and grout the pipelines at CTF and the transfer lines connecting CTF with NAVBASE.

Construction activity- (SC R. 72-300 et seq.)

Construction sites disturbing more than two acres require a permit under the South Carolina Stormwater Management and Sediment Reduction regulations. This site will not disturb more than two acres.

Industrial activity- (40 CFR Part 122.26)

The Chicora Tank Farm is included under the NPDES Water Pollution Control Permit SC0003816 for the Charleston Naval Shipyard. Stormwater from the tank farm is permitted as Outfall 004. Closure of the entire facility will require the NPDES permit to be modified to eliminate the Outfall 004. Coastal Zone Consistency Certification (CZCC) permitting is not required.

Air emissions- Asbestos removal (40 CFR Part 61 Subpart M)

Chicora Tank Farm Tanks and pump room were surveyed to locate asbestos which would be disturbed during this work. Inside the pump room pipe wrap/coating, accessible gasket material, and other suspect materials were sampled for asbestos constituents. No asbestos material was found during the tank and pump room investigation.

3.0 EMPTY TANK "O"

3.1 PROCESS OILY WATER

3.1.1 Remove and recycle/dispose of the fuel and sludge from tank "O"

Remove the fuel from the top layer of fluid in tank "O". Remove and process the oily water from the next layer in tank "O" per paragraph 3.1.3. Remove the solids/sludge from the bottom layer for disposal. The fuel and the solids/sludge will be disposed of by a contractor.

3.1.2 Establish berm

Establish a bermed area near the sewer manhole on site (located near the west perimeter fence between tanks "O and P"). The site will be graded flat and level and the soil compacted to prevent settling of the tanks. Set up plastic lined temporary bermed areas (one per FRAC) to store at least two (2) 21,000 gallon FRAC tanks and a coalescing oil/water separator. Approximate dimensions for the berm are 12' x 75' with 3 foot walls (supported with soil or hay bales or equivalent). Set up a pump with hoses from tank "O" to FRAC tank(s) area and discharge to the sewer manhole.

3.1.3 Process oily water

Provide additional tank(s) to hold processed water for sampling prior to discharging into the North Charleston sewer system. Sample the processed water for BTEX with naphthalene, oil/grease, pH, and metals (lead, copper, zinc, and barium). Approximately 100,000 gallons of water is anticipated to be processed from tank "O". Also process oil/water collected from tank /pump room, and pipe cleaning operations. Gallons discharged will be monitored by tank measurements or a flow meter and will be logged by the processing system operator. Discharge will be into the sewer manhole on site at CTF. **All discharges will be permitted in writing prior to by North Charleston Sewer District, Kelly Singer.**

4.0 EXCAVATIONS; CLEAN PUMP ROOMS

4.1 EXCAVATE TO ROOFS OF PUMP ROOMS "K, L, M, N, AND O", PIPELINE ISOLATION POINTS, AND TANK MANWAYS

Caution: Heavy equipment is not authorized to drive over the top of the pump rooms. Rope or mark off the prohibited areas.

4.1.1 Utilities

Prior to work, all electrical power to CTF will be deenergized and tagged/locked out. Locate area utilities and mark location.

4.1.2 Excavation

Tank manways and pump room roofs

Define tank/pump room perimeters and piping runs and mark locations. The manways on tanks "K, L, M, and N" were previously excavated. Manhole covers must be secured when not in use, e.g. at least two nut and bolt fasteners. These are presently sealed shut and covered with approximately a foot of soil. Tank "O" manways require soil to be excavated. There are three (3) manways on top of and near the wall of the tank. The pump rooms are adjacent to the tanks and the top is under approximately seven feet of soil. The excavation interferences above the pump room roof are three remote shut off valves, one concrete personnel access vault (approximately 5' x 8' x 7' deep), and two eight inch ventilation pipes all penetrating the pump room through the roof. These interferences are not to be removed. Excavate the soil from the manways of the tanks and adjoining pump rooms tops. Slope the excavated soil away from the manways and pump room tops or provide a drainage trench for rain water runoff. Do not cover vaults or other structures around the tanks/pump rooms during the excavation operations.

Pipelines

Locations for pipeline excavations and isolations will be per the direction of the pigging contractor and the Project Engineer. The locations for excavations will be along the header at the CTF site and transfer pipeline endings at NAVBASE fuel farm. All piping except 16" lines from the 18" loop to the pump rooms and piping inside the pump rooms is covered with bitumastic enamel and tarred asbestos. The 16" fuel lines running underground to each pump room are painted with red lead paint and asphalt. Excavate pipelines to drain, remove valves, cut and isolate as needed in preparation for pigging and grouting. Soil from these excavations will be stockpiled for use as backfill. The removed soil shall be stored a minimum of 2' from the edge of the excavation. Pipeline flanges will be capped with a hard blank as needed during the draining and cleaning operations. The valves/piping removed will be cleaned for recycling or disposal. Piping sections will be removed to provide room for the installation of welded flanges and pigging/grouting attachments.

Isolation point at NAVBASE

Approximately 200 feet of the underground 18" south transfer pipeline at the NAVBASE fuel farm has been removed during the AOC 626 interim measure. It was removed from the south valve station on the fuel farm near Hobson and Reynolds Avenue southwest of tank 3900-G. The end remaining from the removal is approximately 10' below ground and has a rubber joint clamped onto it. The rubber joint is up-piped with an 18" PVC elbow and standpipe to above ground level. The 18" north transfer pipeline has been blanked off by a contractor at the NAVBASE fuel farm. A valve was removed to isolated NAVBASE fuel farm from CTF. The blanked pipe end is approximately 50 feet west of the north valve pit near AST 3901.

The 12" sludge oil transfer pipeline has been isolated at NAVBASE in Pit No. 1.

Isolation point at CTF

The underground header is east of tanks "K, L, M, and N". The header consists of an 18" fuel oil loop pipe and a 12" sludge oil pipe. The header is buried approximately 3-8' underground. The 12" sludge oil header piping has 6" sludge lines running to each pump room. The 18" fuel oil header loop piping has 16" fuel lines running to each pump room.

The 18" south transfer pipeline can be isolated by excavating and removing two-14" valves on the underground header approximately 3-6 feet deep beside tanks "M and N". The 18" north transfer pipeline can be isolated by excavating and removing two-14" valves beside tank "L".

The 12" sludge oil transfer pipeline can be isolated by excavating to cut the pipeline near tank "N".

The following are guidelines for excavation:

- a) Excavation can be construed by area children as a play area (attractive nuisance). When work area is unattended, ensure the site is properly secured and locked. All DET personnel at CTF tank site shall be alert to unauthorized personnel. The excavations will have as a minimum orange construction fencing surrounding them.
- b) Excavations greater than five (5) feet deep without sloped walls are confined spaces and require confined space permitting. Shoring boxes may be required for excavations where sloping is not attainable.
- c) Schedule operations to minimize the time the excavations are open. Provide protective measures around the work area to prevent water runoff.
- d) Excavate as required to expose manways, pump rooms, and piping. The amount of excavation will depend on the type soil, the size and location of the manways, pipelines, pump rooms, and site interferences. The Site Supervisor will make the determination on the amount of soil that must be removed. Decisions on trenching and sloping the excavation in associated soils shall comply with the OSHA Excavation Standard (a check list is available).
- e) Select methods and equipment for soil removal that minimize surface and subsurface disturbance to areas beyond the necessary limits of the tank manways, pump rooms, and pipelines. The size of the excavation should allow the operations to be worked without excess stress on the removal equipment.

4.2 STRIP/CLEAN ADJOINING PUMP ROOMS AND TANKS "K, L, M, N, & O"

Pig and grout the pipelines entering the pump rooms prior to high pressure washing. Steam piping and heat exchangers have been removed from all pump rooms except from tank "L".

COVER ALL TANK/PUMP ROOM OPENINGS (WHENEVER POSSIBLE) AT CTF WHEN THE SITE IS SECURED AND UNOCCUPIED USING SUITABLE MEANS AND MATERIAL. COVERS SHALL HAVE A LOAD LIMIT OF 500 POUNDS MINIMUM AND SHALL BE MARKED "COVER. NO STEP". Due to the extreme depth of the tanks and pump rooms establish suitable fall protection around the openings. Provide weather protection for openings as required.

THE TANKS AND PUMP ROOMS ARE A CONFINED SPACE AND ENTRY IS PERMITTED BY AUTHORIZED PERSONNEL ONLY PER THE CONFINED SPACE ENTRY PERMIT REQUIREMENTS.

CAUTION

Hot work is NOT authorized inside the pump rooms or tanks. Hot work includes: flame heating, welding, torch cutting, brazing, carbon arc gouging, or any work which produces heat, by any means, of 400° F or more. Hot work also includes, in the presence of flammables or flammable atmospheres, ignition sources such as spark or arc producing tools (except steel hand tools) or equipment, static discharges, friction, impact, open flames or embers, and nonexplosion-proof lights, motors, or equipment. Chemicals and compressed gases may not be taken into tanks, pump rooms, or excavations without the permission of the Project Engineer and the DET Health and Safety Officer.

4.2.1 Ventilation

Test the tanks and pump rooms atmosphere to determine the LEL and oxygen level prior to any ventilation. Test at several locations inside the spaces and at different heights to insure an accurate level is obtained. Install a suitable explosion proof blower at the top of the tanks and pump rooms and ventilate from near the bottom for minimum 1hour before entry. Ventilation shall continue during all entries. If the LEL is greater than 10%, continue ventilating until an LEL of less than 10% is obtained. **No entry shall be made without Engineering approval, specific confined space entry procedures, and monitoring in place.**

4.2.2 Pipeline draining

Provide localized exhaust ventilation at the point of the piping system entry within the confined spaces. The pipelines inside the pump rooms have been gravity drained previously, but residual diesel fuel, oily water, and sludge will be present. All cuts into piping are to be cold cut with non-sparking tools. Any remaining oily water will be considered as potentially contaminated and pumped into suitable containers until tested for disposal in accordance with approved procedures meeting State and Federal regulations. Drill pilot holes in the piping at appropriate locations to allow the use of a reciprocating saw for cutting or equivalent. When sawing or drilling use a light water mist to cool metal and prevent lead paint from becoming airborne. The pilot hole will allow for inspecting and draining from the piping when a flanged connection is not available. The oil, water, and sludge will be pumped out of the pipelines and collected for processing and disposal. After initial cuts, holes may be enlarged based on worker needs and the direction of the Site Supervisor.

Any oil/water separators, FRAC tanks, and drums or tanks used for containerizing waste water/fuel will be furnished by DET. Hard blank piping ends as required to support the cleaning and grouting operations.

4.2.3 Strip the pump rooms

Mechanically disconnect and remove the piping, pumps, motors, conduit, frames/foundations, and other material from inside the pump rooms. Any electrical connections associated with the pump room will be verified as deenergized and removed by a qualified electrician. Ensure the open ends of removed piping and pumps are contained to prevent leaking of oil contaminants while transported to the cleaning facility. In a suitable cleaning area, DET shall flush and clean removed piping, pumps, motors, conduit, frames/foundations, and other material prior to recycling or disposal. Piping removed for disposal or recycling will be cleaned by inserting the cleaning spray wand into the pipe. The pump rooms pipe wrap/coating, accessible gasket material, and other suspect materials were sampled for asbestos constituents. No asbestos material was found during the investigation. Any asbestos wrapped piping and asbestos material encountered will be handled and disposed of in an approved landfill IAW South Carolina Department of Health and Environmental Control (SCDHEC) Reg. 61-86.1.

4.2.4 Rigging

Ensure that rigging is adequate and the mobile crane is set up securely for lifting the weight of the components and safely transporting them to the ground/dumpster/truck. The 150 horse power motor is estimated to weigh 3 tons. One foot of six inch schedule 80 steel welded seamless pipe weighs approximately 30 lbs., one foot of 12 inch schedule 80 steel welded seamless pipe weighs approximately 90 lbs., one foot of 16 inch schedule 80 steel welded seamless pipe weighs approximately 140 lbs., one cast iron six inch 250# gate valve weighs 200 lbs., one cast iron twelve inch 250# gate valve weighs 700 lbs., one cast iron sixteen inch 250# gate valve weighs 1200 lbs., one 150 H.P. electric motor weighs approximately 5,000 lbs., a section of 1/2" or 1/4" plate, 4' x 8', weighs approximately 640 lbs. and 320 lbs, respectively ($20 \text{ lbs/sqft} \times 32 \text{ sqft} = 640 \text{ lbs}$ & $10 \text{ lbs/sqft} \times 32 \text{ sqft} = 320 \text{ lbs}$). Site supervisor shall develop a communication plan and rigging sequence, and discuss in detail with workers.

4.2.5 Cleaning

Tanks will be cleaned after satisfactory gas testing and ventilating. After stripping the pump rooms and cleaning/grouting pipelines to be abandoned in place, the pump rooms may be cleaned by high pressure washing. The pipelines to be abandoned in place will be pigged clean under a contractor's oversight and the contractor will provide specialty equipment such as pigs, launchers, fittings, etc. Grouting of pipeline ends will be contracted to provide oversight expertise and specialty equipment.

Use the following guidelines for cleaning tanks and pump rooms. **Caution:** Cleaning will produce additional vapors. Maintain ventilation and continue gas testing since an initial low LEL reading may not be permanent. If an LEL of greater than 10% is detected, stop work until ventilation lowers the concentration.

Remove sludge or sediment buildup with a long handled brush, squeegee, hoe, shovel, etc. and contain removed material. Using a pressure washer (3,000 psi hot water four gallons per minute minimum), wash/rinse the tanks and pump rooms. Normally, a triple rinse of making three passes over the interior surface with the spray wand will adequately clean the surfaces. Laboratory grade detergent may be used to break down residue if needed. Water from the cleaning rinse shall be collected and pumped via an explosion proof vacuum truck pump or with a pneumatic/hydraulic pump into a holding tank for processing and disposal.

After completion of cleaning the tanks and pump rooms, perform a visual inspection of the interior surfaces. Pay close attention to sludge, scale, hollow supports, unsealed sections, cracks, splits, leaking bottoms, and any damage. Any suspect areas will be reported to the Project Engineer. In the absence of free product, dirt, loose scale or sludge, the tank and pump room is considered clean. At that time the tanks and pump rooms will be inspected by SOUTHDIV for approval.

4.2.6 Torch cutting removed steel with lead based paint

When required use the lead based paint removal tools with the dust shrouds to strip the lead based paint from the pump room items. Strip the paint down to bare metal. Collect the paint chips in a HEPA filtered vacuum cleaner. Strip the lead based paint from the metal a minimum width of 4 inches. Cut the steel into pieces which are acceptable to the recycling activity.

5.0 PIGGING AND CLEANING PIPELINES

5.1 PREPARATION FOR PIGGING AND GROUTING AT CTF

5.1.1 Install flanges on pipelines

Due to the hazards of pigging and grouting close control is needed between the pigging and grouting work and the other CTF work. Pigging and grouting can create explosion hazards (from pressurization of system components), flammability hazards (from migration of flammable oil into tanks, pump rooms, and other parts of the tank farm), and oxygen deficient atmospheres (from leakage of pressurization gases, such as Nitrogen, into other parts of the system and spaces).

Prior to the work on each section of the system and daily if needed, the Project Engineer and the DET Health and Safety Officer will determine the controls needed to ensure safe work. These may include use of valve line up sheets and lockout/tagout procedures, verification of physical isolation e.g. by piping removal and blanking of open ends, use of access control to prohibit work in endangered areas, and use of gas testing to detect hazards, and ventilation to remove the hazards.

DET will provide labor, materials, and equipment to install flanges as needed on the pipelines in preparation for the pigging and grouting operations. Vapor free pipelines prior to any cutting or welding. After pipelines have been drained to the maximum extent possible, remove the pipe section/valves necessary to allow installation of sleeved flanged connection. Underground piping is wrapped in an asphaltic material which contains asbestos. This pipe wrap tightly adheres to the piping, is considered non-friable, and the pipe section will be removed under proper controls and disposed of at a land fill. Install a pipe plug and wipe out the standing end of the piping. Fit up the standard flange and weld in place.

5.1.2 Pig and Grout the pipelines

The contractors will provide work plans outlining the means and methods for cleaning the pipelines by pigging and closure by grouting. The work plans will provide safety guidelines and precautions during these operations. The cleaning should be completed by driving foam pigs through the pipelines with pressurized nitrogen, other gas, or water. Residual fuels removed during the pigging operations will be diverted into a vacuum truck, FRAC tank or suitable tank and processed for disposal. It is estimated that the pipelines on-site and the transfer pipelines contain up to 130,000 gallons of liquid.

The grouting contractor will provide suitable grout slurries to be pumped approximately 200 feet into each end of the piping based on volume. The contractor will also provide piping connections, pumps and expertise for grouting the pipe ends.

Install hard blanks on the flanged pipeline ends. Backfill the sites after the grouting operations are completed. Ensure the slope is less than 25 percent to prevent soil erosion. Provide a vegetative cover after the soil is graded to minimize erosion. This finished grade will closely match the surrounding grade.

The contractor's site-specific work plan(s) for pigging and closure by grouting will added as an appendix, and will be an official part of this work plan.

WORK PLAN-CLEAN TANKS AND PIPING@ CTF

7/13/98 Rev. 0

FIGURE 1

AREA MAP

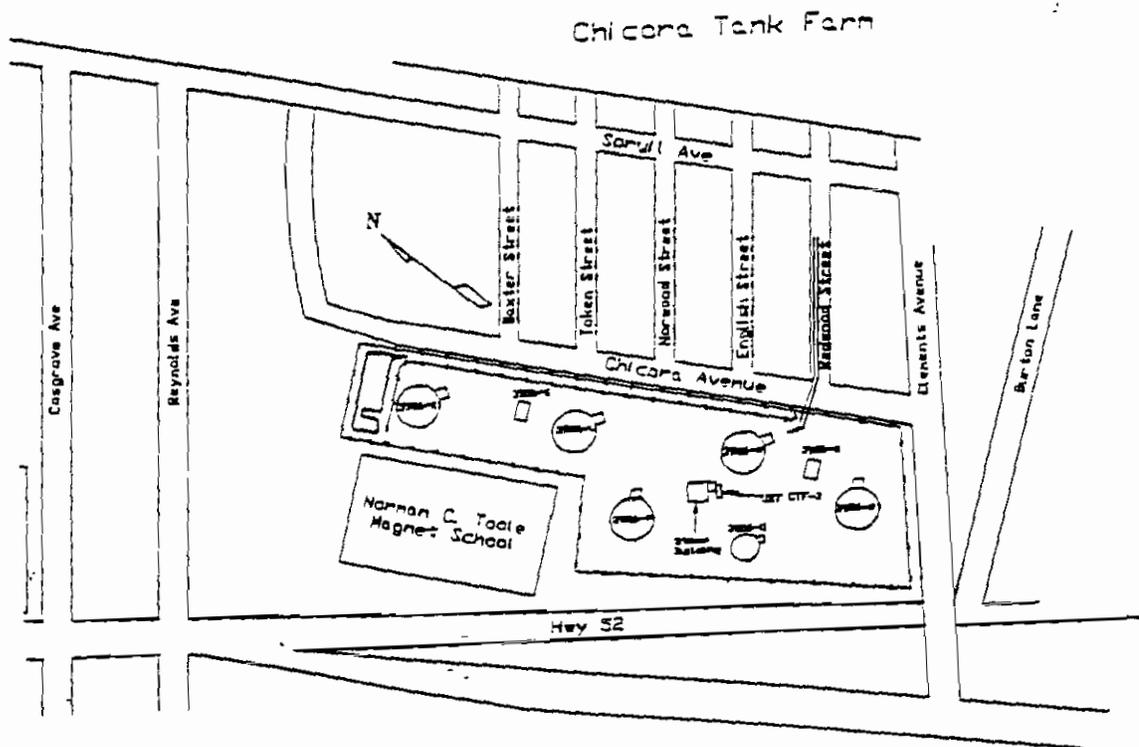


FIGURE 2
SITE LAYOUT

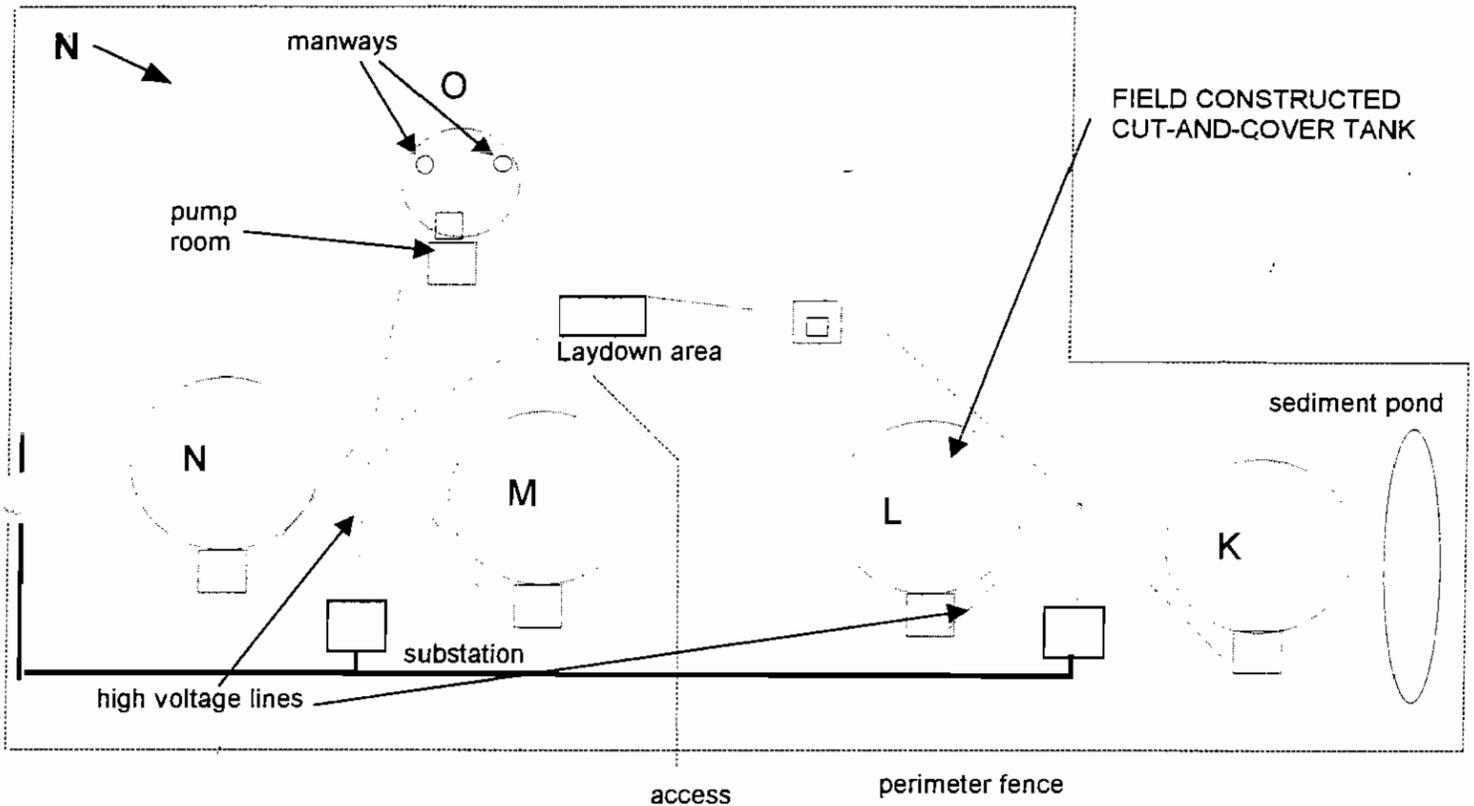
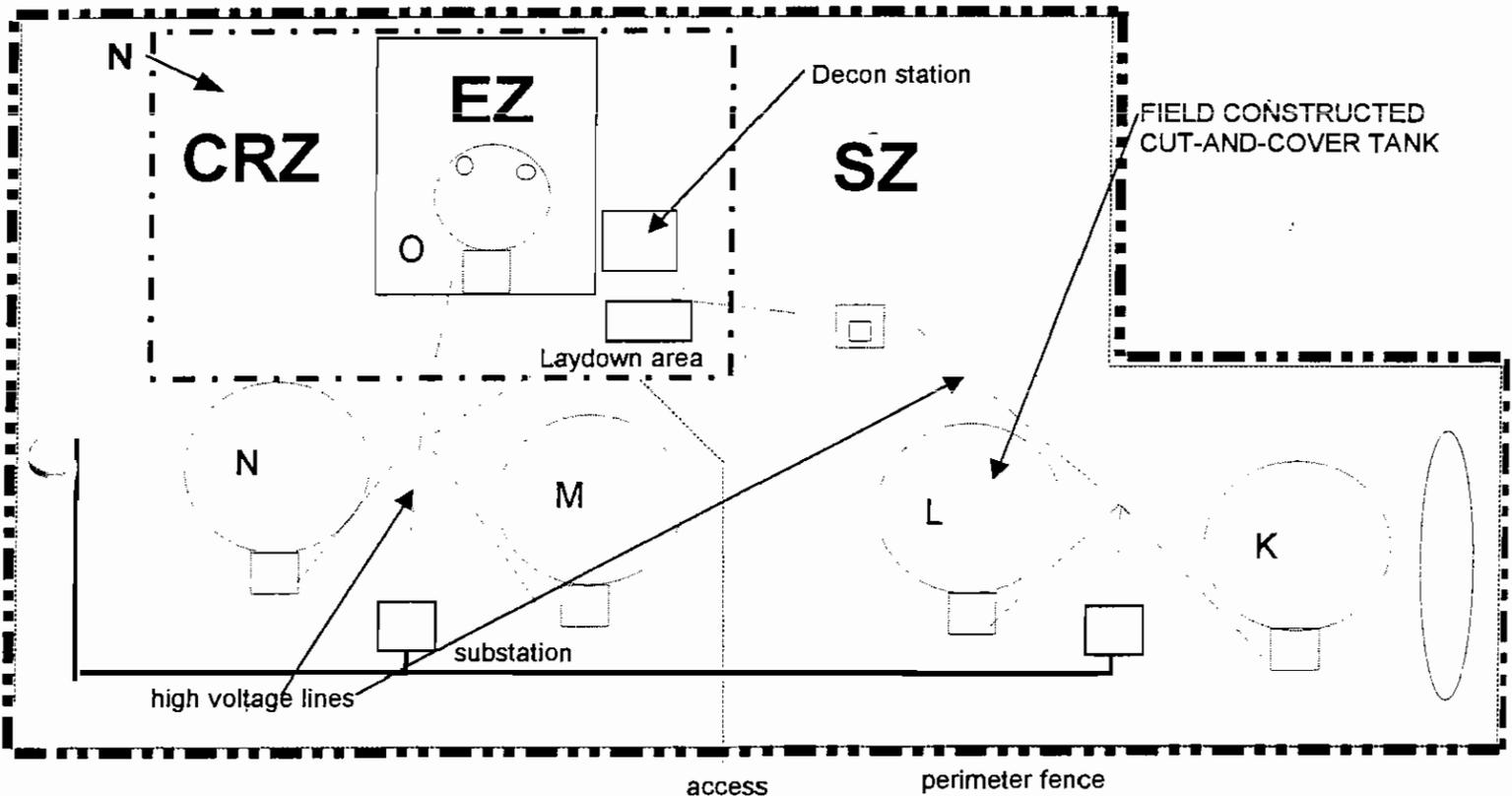


FIGURE 3
WORK ZONE

Note: The drawing represents an example of the typical worksite.



Verify power secured to the Chicora Tank Farm prior to any excavations or before any entries into the pump room. As a minimum, lock open and tag all substation breakers. Also, verify fire alarm systems as deenergized.

The SZ is the entire fenced area @ Chicora Tank Farm. The EZ is orange fenced/ribbon areas as shown on "O".

APPENDIX A

WORK PLAN AMENDMENT

Amendment # _____ Date: _____

Site Name: _____

Work Assignment: _____

Type of Amendment: _____

Reason For Amendment: _____

Required Change: _____

Project Engineer

Date

APPENDIX B
HEALTH AND SAFETY PLAN

SUPSHIP PORTSMOUTH, VA. ENVIRONMENTAL DETACHMENT CHARLESTON

HEALTH AND SAFETY PLAN
CHICORA TANK FARM
CLEANING AND PIGGING

Approval Signatures

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7/21/98
Date

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7/22/98
Date

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7/22/98
Date

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ACRRONYM LIST

ACGIH	American Council of Governmental Industrial Hygienists
AL	Action Level
CFR	Code of Federal Regulations
CGI	Combustible Gas Indicator
CHASP	Comprehensive Health and Safety Plan
CNSY	Charleston Naval Shipyard
CNSYDINST	Charleston Naval Shipyard Instruction
CRZ	Contamination Reduction Zone
dBA	Decibels on A-Weighted Scale
DOD	Department of Defense
F°	Degrees Fahrenheit
EPA	Environmental Protection Agency
EZ	Exclusion Zone
HAZWOPER	Hazardous Waste Operations and Emergency Response
IDLH	Immediately Dangerous to Life and Health
LEL	Lower Explosive Limit
MPH	Miles Per Hour
MSDS	Material Safety Data Sheet
NAVBASE	Naval Base Charleston
NAVHOSPINST	Naval Hospital Instruction
NIOSH	National Institute for Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
PAH	Polycyclic Aromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
PEL	Permissible Exposure Limit
PHSO	Project Health and Safety Officer
PID	Photoionization Detector
PPE	Personal Protective Equipment
PPM	Parts Per Million
REL	Recommended Exposure Limits
SAR	Supplied-Air-Respirator
SCBA	Self-Contained Breathing Apparatus
SOP	Standard Operating Procedure
SZ	Support Zone
TLV	Threshold Limit Values
USCG	U.S. Coast Guard
VOC	Volatile Organic Compound

1.0 INTRODUCTION

This Health & Safety Plan applies to cleanup of underground fuel Tanks K,L, M, N, and O and its attached pump rooms at the Chicora Tank Farm, located between Rivers, Clements, and Chicora Avenues in North Charleston, South Carolina. It includes pump room equipment removal and pump room cleaning. It also includes pipeline pigging and grouting which will also be addressed in the work plan added by the contractor for these operations This plan supports Environmental Detachment Charleston job order "T-Chicora Clean".

1.1 Scope and Applicability of this Health and Safety Plan

All Department of Defense (DOD) Navy personnel, visitors, and non-Detachment personnel present in work areas, including contractors and sub-contractors, shall adopt and abide by this plan, or shall have their own safety plans, which at a minimum, meet these same requirements. In the event that a visitor does not adhere to these provisions, he/she will be requested to leave the work area.

Certain unexpected activities may present a level of hazard that must be dealt with case by case. Examples of such activities are: unplanned confined space entry; unplanned hot work, presence of unexpected asbestos, and moving or sampling unknown drums or containers. If necessary to perform such activities, the Project Health and Safety Officer (PHSO) will determine if an addendum is needed to this plan.

2.0 SITE CHARACTERIZATION

2.1 Work Areas and Site Control

Each site is an unregulated petroleum fuel tank with attached pump room. The tanks are in a fenced field of six tanks located in a residential area, with residences on two sides, a marsh on one side, and a public middle school on the other side. The tanks were constructed in the 1940s and used since that time for storage of ship fuels. The tanks are partially underground and covered with soil. The transfer piping connects the NAVBASE

fuel farm with CTF. The tanks, the pump room, and connecting piping for the planned work are confined spaces with the usual hazards of confined space entry or work: asphyxiation, fire, flammable liquids, explosion, collapse, and entrapment. See the basic work document for additional information.

Personnel shall attend a briefing on this plan and sign the plan acceptance form (see Appendix A) or a Sign-in Sheet before starting site activities. This plan is based on and maintained according to recommendations in the U.S. Environmental Protection Agency's (USEPA), *Standard Operating Safety Guides*. Accordingly, three zones of operation may be established, to minimize the potential for worker exposure and to reduce the potential for cross-contamination. The three zones are the:

- Exclusion Zone (EZ) or hot zone
- Contamination Reduction Zone (CRZ)
- Support Zone (SZ)

The **Exclusion Zone (Hot Zone)** is defined as the area where contamination is either known or likely to be present, or because of activity, will provide a potential to cause harm to personnel. Entry into the Exclusion Zone generally requires the use of PPE. This zone will be the area of the tanks, pump rooms, and piping due to the residual fuel in these areas. These areas will be marked off, e.g. by barrier fencing.

The **Contamination Reduction Zone** serves as a buffer between the EZ and SZ and is intended to prevent the spread of contaminants. This zone will only be required if needed to control unexpected petroleum releases in the pump room or to control potential spread when cleaning the tanks, pump rooms, and piping. All decontamination procedures are conducted in this zone. The CRZ shall be adjacent to and upwind of the EZ. All decontamination stations and operations shall be conducted within the CRZ. When leaving the SZ and entering the CRZ, personnel must be wearing the prescribed PPE.

The **Support Zone (Cold Zone)** is the outermost area and is considered a clean area. The SZ will be equipped with an appropriate first-aid station and equipment to support activities occurring in the EZ and CRZ. The SZ will be adjacent to and upwind of the CRZ. Existing site conditions such as wind direction, location of utilities, roads, security,

etc., will be considered when determining zone locations. This zone will be between the main entrance gate and the CRZ. Personnel shall enter the SZ and don their PPE, then move through the CRZ and into the EZ. After completing their work or when taking a break, they will leave the EZ through the CRZ. Personnel and equipment will be decontaminated in the CRZ. When using Level A, B, or C PPE, all personnel entering the EZ must use the "buddy system". Additionally, at least one person for each person entering the EZ shall remain outside the EZ and have available at least the same level of PPE as those entering the EZ.

2.2 Work Area Access

All personnel entering work areas must meet the training and medical monitoring requirements. Additional work area access requirements may be specified by the project manager for unique work operations, e.g. sewage exposure, if encountered.

Contractors, sub-contractors, DOD personnel, and other site visitors must provide the project manager or PHSO documentation showing their HAZWOPER training is current, and must agree to comply with this plan prior to site entry. Personnel failing to meet or abide by the provisions of this plan, or equivalent shall be restricted from entering work areas.

2.3 Site History and Description

The tanks K, L, M, N, and P were emptied into O in early 1998. Fuel oil residuals are in the pump rooms in piping and on the floor, and also in supply and return piping to the tanks. No petroleum leakage has been detected around the tanks/pump rooms and the CTF area is not a RCRA site. This site has many common construction hazards, e.g. material handling, sloping ground, wet soil, heavy equipment operation, noise, possible unauthorized public access, fall hazards, trenching, excavations, electrical lines, and confined space hazards.

3.0 SITE ACTIVITIES

Specific health and safety procedures associated with specific site activities, hazards, and/or specific sites are addressed in this plan. The site supervisor will manage the day-to-day work activities. The site supervisor has the authority to suspend or postpone specific operations if he or she believes them to be unsafe.

4.0 HAZARDS

4.1 Chemical Hazards

A primary health hazard is from petroleum oils, which are a primary irritant. Some petroleum oils have been shown to produce skin cancer in experimental animals upon repeated skin application over the lifetime of the animals. Interim results from an ongoing mouse skin painting study have reported tumor production. Petroleum hydrocarbons have been shown to produce kidney damage and tumors in male rats following prolonged inhalation exposures. The primary route of entry is inhalation. The recommended Permissible Exposure Limit is 100 PPM. A secondary health effect is dermatitis, a defatting of the skin, which can result from continued skin contact. Some individuals can also develop hypersensitivity. Quickest entry into the body of petroleum products is by ingestion, therefore do not siphon fuel by mouth.

Lead based paint is on the equipment in the pump room. Lead is readily digestively absorbed and distributed in the body. When absorbed in the body in certain doses, lead is a toxic substance. Lead is not absorbed through your skin. Inhalation of airborne lead is generally the most common occupational source. Lead may be absorbed through the digestive system from ingestion. Repeated exposure can cause a gradual accumulation of lead, mainly in the bones. Short term occupational exposures of a toxic magnitude are unusual but not impossible. Longer exposure affects body systems and is more common for periods of exposure ranging from days to years. Anemia, kidney damage, and reproductive effects in both men and women can be caused by chronic exposure to lead. Lead is not a carcinogen. The Permissible Exposure Limit (PEL) for airborne lead is 50 $\mu\text{g}/\text{m}^3$ of air and the action level is 30 $\mu\text{g}/\text{m}^3$ of air.

4.2 Physical Hazards

Physical hazards at closure sites may include rigging, slippery surfaces, uneven walking and working surfaces, and manual handling of heavy material. Material being transported will be secured as needed, for example by tie-downs, to prevent personnel injury and equipment damage. This is especially important on the sloping grades around the tanks.

Personnel will use only those stairs, passages, and ladders designated by their supervisor. Stairs, ladders, and other workspaces will be inspected daily and kept clear of debris, including oil and grease. Work and transit areas will be adequately lighted.

The tank room top will not support vehicle weight. The tank top will only support 25 tons total weight. The Detachment mobile crane may not be placed on the tank top.

Cranes will be operated per 29 CFR 1926.550.

Contractors entering the site must be escorted at all times to ensure they do not endanger Det. personnel.

4.3 Extreme Weather Conditions

Extremes in hot or cold weather can cause illness, injury, physical discomfort, fatigue, reduced mental clarity, and loss of efficiency.

4.3.1 *Exposure to Hot Weather*

A major physical factor threatening workers during clean up of Chicora in Summer is heat.

4.3.1.1 Heat Stress

Prevention of Heat Stress. The education of supervisory personnel and workers is a key factor in heat stress prevention. Those workers already showing symptoms of heat stress must have reductions in heat loads, and be prevented from encountering additional heat loads. Prevention of heat stress is also important because a person who has suffered from heat exhaustion or a heat stroke is already primed for heat-related sickness. The following are typical effects of heat stress:

- **HEAT RASH**
- **HEAT CRAMPS**
- **HEAT EXHAUSTION**
- **HEATSTROKE**

Heat Rash is characterized by profuse raised red vesicles (blister-like) on affected area or pricking sensations during heat exposure.

Heat cramps are characterized by muscle spasms and pain in the feet, abdomen, and hands. These symptoms are caused by inadequate electrolyte (salt) replacement when sweating is heavy, even when drinking large quantities of water.

Heat Exhaustion is a state of collapse brought about by an insufficient blood supply to the cerebral cortex of the brain. This is caused by stress on body organs and includes poor blood circulation from insufficient cardiovascular function and widespread expansion of the blood vessels or dehydration.

Heatstroke is heat stress in its most extreme and serious form. Heatstroke indicates that the body's temperature regulation mechanism has failed and that the victim's temperature is rising to critically high levels. To prevent serious injury or death, act immediately to cool the victim's body, if not more serious symptoms can follow, such as delirium, unconsciousness, convulsions, possibly ending in death. To reduce the potential for heat stress:

- Keep drinking water cool (50° to 60°F). Drink at least 16 ounces of water before work starts. Drink one to two cups of water every 15 minutes and/or during monitoring breaks. Consume 1 gallon of water or more per day.
- Wear cotton undergarments to act as a wick to absorb moisture.
- Provide adequate shade or shelter for taking rest breaks and cooling off.

- Limit physically demanding activities.
- Adjust work and rest times to prevent workers from overheating. Shift working hours to early morning or early evening to avoid the hottest time of the day.
- Wear cooling devices to aid in ventilation. (Note: The additional weight of the cooling devices may impair efficiency).
- Install portable showers or hose-down facilities to cool clothing and body.
- Frequently rotate crews wearing the protective clothing (if required).
- Conducting labor-intensive tasks at the coolest times of the day.

4.3.2 Exposure to Cold Weather

People working outdoors in temperatures at or below freezing may experience frostbite or hypothermia. Extreme cold for a short time may severely injure the body. Areas with high surface area-to-volume ratio, such as fingers, toes, and, ears, are the most susceptible.

Frostbite is a condition in which the cold forms ice crystals in the cells and tissues, dehydrating protoplasm and killing tissues

Hypothermia occurs when the body loses heat faster than it can produce it. After the initial reaction, involuntary shivering begins in an attempt to produce more heat.

When this happens, the affected person becomes exhausted and begins to behave irrationally, move more slowly, stumble, and fall. To reduce effects of cold exposure:

- **Stay Dry**
- **Wear wool**
- **Beware of the wind**
- **Have shelter available**
- **Provide warm drinks.**
- **Never ignore shivering**

4.4 Biological Hazards

4.4.1 Poisonous Insects

Poisonous insects may be encountered (i.e., ticks, spiders, and bees). Black widow spiders in numerous numbers have been seen in early 1998 nesting under the entrance hatches to the pump rooms. Inspection and spraying may be required to eliminate these spiders. Snakes may also be present, not only in vegetation and marshy areas, but also under and around debris, lumber, and in enclosed areas. Care should be taken to visually inspect work areas prior to the start of work, so that potential exposure can be identified. If bitten, seek medical attention, even if the bite appears minor

4.4.2 Sewage

Sewage exposure (e.g. standing sewage liquid, e.g. from broken sewer pipes), will require the use of workers who are in the Naval Hospital Charleston C5 medical surveillance program. These workers shall avoid skin exposure by using appropriate protective equipment such as aprons, tyvek suits, boots and latex or plastic gloves worn under heavier protective gloves. If splashing is a hazard, wear face shields over goggles. Sewage wetted clothing should be removed promptly and the person should then wash with soap and water. Wet clothing should be bagged and then washed separately with hot soap and water and one cup of bleach per washload. Sewage contaminated equipment should be washed with soap, water, and bleach. Wash hands and face after any contact or sewage work and prior to eating, smoking, or going home. Sewage work also has a risk of fire, explosion, and oxygen deficiency due to the possibility of gases. Cutting of sewer pipes, or any other work such as the repair of accidentally damaged pipes, shall be done only after an assessment of the work risk by the project manager. Gas testing and the use of a confined space entry permit may be required.

4.5 Electrical Hazards

Exposed power lines and underground cables may present a potential for electrocution. Personnel should be aware of utilities and keep a minimum of 10 feet away from overhead power lines. Any electrical line must be considered energized until positively determined

otherwise by a qualified person. Electrical feed lines to CTF have been removed, but due to the possibility of underground multiple sources, electrical devices or wiring must be checked by a qualified person to ensure it is safe prior to working around it. The Detachment Lockout/Tagout Instruction is applicable and includes precautions for digging. All power tools will be supplied with electricity through ground fault circuit interrupters.

4.6 Fire/Explosion

Personnel performing work will be briefed on potential causes of fires and explosions. Possible causes include refueling of equipment (should be done with engine off), temporary electrical equipment e.g. lighting, operation of equipment engines, and explosive vapors in confined spaces. Portable fire extinguishers shall be readily accessible. All motor driven equipment (excluding vehicles) must have a fire extinguisher.

Hot work is prohibited in the tanks or pump rooms.

A method of calling the Fire Department will be available for immediate use when employees are on site. The method of calling the Fire Department, and Police, will be conspicuously posted.

Free access from the street to the work site must be maintained. Access roads shall be at least 15 feet wide and free of accumulation of debris, rubbish, or other equipment that would block access. The Fire Department must be notified of the planned work, and requested to inspect the access roads. The Fire department must be told that confined spaces are involved as only certain fire trucks in the city will respond for confined space rescue.

The Fire Plan for this site:

For a small fire use a fire extinguisher, sound the alarm, and notify the Fire Department. For a large fire, evacuate, sound the chosen alarm (an air horn is suggested), and call the Fire Department. Key Person in case of a fire is the site supervisor, who will oversee the evacuation, and conduct a count of employees.

4.7 Noise

Many pieces of construction equipment generate noise levels in excess of 84 dBA. They must be labeled as noise producing, and Navy personnel must wear hearing protection when exposed to this noise. Typical noise sources above 84 dBA are combustion engines and compressors, air operated pumps, needle guns, cement saws, and jack hammers.

4.8 Public Access

The tank area is surrounded by homes and a school. It is fenced with signs posted on the fence. The fence should be inspected initially, and then weekly to detect entrance by the public, e.g. on back shifts. At the end of each work day, access opening (hatches) should be closed or covered, and construction fencing placed around the work danger area (open tank top).

4.9 Heavy Equipment Operation

Over and above the usual precautions needed for the safe operation of heavy equipment to prevent injury or property damage, extra care and judgement is needed for work, and operation on soft or unstable ground, especially near building walls, which may be unstable. At Chicora, the side slopes of the tanks can cause equipment to tip over, both when moving up and down the slope and when moving across the slope. Spotters or stop logs may be needed to prevent the equipment from overturning or falling into the tank or excavation.

Specific access roads should be selected and used. For vehicle parking, a designated area away from the sloped tank sides should be used. If necessary to park on an incline, the wheels shall be chocked.

4.10 Toilets/Showers/Sanitation

4.10.1 Toilets

Toilets shall be provided as follows: 20 or fewer employees-1 toilet; more than 20, less than 200 - one toilet seat and one urinal per 40 employees..

4.10.2 Showers

When operations on a remote site last longer than 6 months of continuous work, provide showers and change rooms.

4.10.3 Sanitation

Lavatories or a water source should be available to allow washing of face and hands before eating or smoking, and to allow removal of hazardous substances.

4.11 Excavations

Excavations over 5 feet deep must be constructed and inspected iaw 29 CFR 1926.650. A Competent Person must be present for employee entrance.

4.12 Drilling Operations

All drilling operations, if needed, will comply with the Detachment Drilling Safety Guide. This guide will be on the worksite for all drilling operations.

5.0 PERSONNEL PROTECTION

Employee protection includes: work limitations, PPE, and standard safe work practices.

5.1 Work Limitations and Requirements

Outside activities should be conducted during daylight only, unless adequate lighting is provided. Personnel scheduled for site activities shall meet the training requirements specified in 29 CFR 1910.120(e); this includes initial health and safety training, annual refresher training, and supplemental training required for on-site supervisors.

Personnel with medical restrictions, whether suggested by their personal physician or the NAVHOSP physician, shall abide by those restrictions.

5.2 Selection of Personal Protective

Table 5-1 outlines the criteria for selecting the appropriate level of protection and lists the PPE associated with each level of protection. Equipment listed as optional may in fact be required for a particular work evolution. PPE should be inspected before each use to ensure that it is in satisfactory condition, and suitable for the use intended. Level D is the standard PPE.

For any entry into cleaning of the tanks and pump rooms, if power washing is used, face shields must be worn with tyvek coveralls and boots to avoid contact with the petroleum.

Special Note: Entry into the pump rooms or tanks will require a confined space entry permit. This permit will require gas testing, forced mechanical exhaust ventilation, attendants, and emergency communications. When breaking into the pump room piping for equipment removal, provisions must be made to gas test, contain and capture leaking fluids, and to provide close capture ventilation at the point of system opening. For final pump room cleaning, if power washers are used, face shields must be worn, and the equipment must be depressurized before maintenance or disassembly.

If lead based paint must be removed, suggested methods are shrouded power tools w/vacuum attachment. Wear a half mask respirator with P-100 (HEPA) filters when using a power tool with a dust collector. Wear a full-face respirator with P-100 (HEPA) filters when using a power tool without a dust collector. Add a head cover during paint/coating removal.

**Table 5-1
Level of Protection and Criteria**

Level of Protection	Criteria for Use	Equipment
Level C	<p>When respiratory protection is warranted and a cartridge respirator or supplied air without an escape bottle is appropriate. When air monitoring indicates airborne concentration of a chemical is 50 percent or more of the PEL or TLV. And the work area contains at least 19.5 percent oxygen.</p>	<p>Chemical-resistant coveralls Full-face (or half-face if levels permit), air-purifying respirator equipped with suitable cartridges or supplied air without escape bottles. Hard hat. Chemical-resistant outer and inner gloves. Steel-toe shoes/boots. Disposable chemical-resistant outer boots.</p>
Modified Level D	<p>When chemical contamination is known or expected to be present, yet inhalation risk is low and respiratory protection is not required. Site contaminants may be absorbed through the skin. The work area has at least 19.5 percent oxygen.</p>	<p>Chemical-resistant coveralls. Chemical-resistant outer gloves; inner gloves or glove liners, optional. Steel-toe shoes/boots. Safety glasses with side shields or safety goggles. Optional: disposable chemical-resistant outer boots.</p>
Level D	<p>When minimal or no chemical contamination is expected. And the work area has at least 19.5 percent oxygen.</p>	<p>Inner gloves or chemical-resistant gloves needed to handle soil or water samples. Steel-toe boots/shoes. Hard hat. Safety glasses with side shields or safety goggles. Work clothes. Optional: coveralls and disposable outer boots.</p>

5.3 Reassessment of Protection Program

The level of protection provided by PPE selection shall be upgraded or downgraded based upon a change in site conditions. PPE requirements may be modified for visitors, depending on the situation. The decision to change PPE requirements shall only be made by the Project Safety and Health Officer.

5.4 Safe Work Practices

- All persons working on projects shall read and sign this plan prior to starting work. The master copy (with signature sheet) of this plan will be held by the PHSO or site supervisor on-site.
- There will be no smoking, eating, chewing gum, drinking etc. in the Exclusion or Contamination Reduction Zone.
- All personnel shall bring to the attention of the PHSO any unsafe condition. If doubt exists, stop work and seek resolution of the problem.
- Hands, face and all other potentially contaminated areas shall be thoroughly cleaned prior to smoking, eating or leaving the site.
- Personnel must avoid unnecessary contamination (i.e., walking through known or suspected "hot" zones or contaminated puddles, kneeling or sitting on the ground, leaning against potentially contaminated barrels or equipment).
- All project personnel who will wear respirators must meet the training and medical requirements for the Detachment Respiratory Program.
- All accidents and/or injuries shall be immediately reported to the PHSO.
- Daily safety meeting will be held at the start of each site operation to discuss current site conditions, work being performed, and plan modifications.
- No matches or lighters may be brought into the Exclusion Zones.
- Medicine and alcohol can intensify the effects from exposure to toxic chemicals. Prescribed drugs shall not be taken by personnel on cleanup or response operations where potential for absorption, inhalation, or ingestion of toxic substances exists unless specifically approved by a qualified physician.

6.0 AIR MONITORING

Air will be monitored using the appropriate direct reading test equipment (e.g., combustible gas meter, two or four gas monitor, detector tubes) and as required by a Confined Space Entry Permit during confined space and petroleum related work (equipment removal in the pump rooms, or cleaning of the pump room.

6.1 Action Level

The Action level for exposure to petroleum hydrocarbons is 100 PPM. If this level is reached, its source must be investigated and either stopped, or controlled by ventilation, or employees must wear respirators: 3M 6000 with organic vapor cartridges.

6.2 Combustible Gas Indicator

Combustible gas indicator (CGI) readings will be collected when conditions lend themselves to combustible, flammable, explosive, or oxygen deficient atmospheres. Activities will cease if readings exceed 10 percent of the lower explosive limit (LEL). If CGI readings do not subside, the area will be carefully investigated and made safe e.g. by ventilation. Operations may not proceed until readings are below 10 percent LEL. Less than 4 percent is preferred.

6.3 Equipment Calibration

Electronic measuring equipment shall be maintained in calibrated status per the Navy Metcal program. CGIs, gas test meters, and other monitoring equipment shall be calibrated daily or their proper function verified before being used. Equipment responding more than 10 percent plus or minus from known standards shall be considered malfunctioning.

7.0 PERSONNEL AND EQUIPMENT DECONTAMINATION

If needed, e.g. in the case of a petroleum spill, a CRZ will be established adjacent to the EZ, and will include stations for decontaminating personnel, PPE, and hand tools. Typically, it will have sheets of 6 millimeter (mm) polyethylene (generally, an area 20 feet by 20 feet is sufficient) with specific stations to accommodate removing and disposing of protective clothing, boot covers, gloves, and respiratory protection.

Table 7-1

Equipment Recommended for Decontaminating Personnel and PPE

- Plastic drop cloths for storing heavily contaminated equipment and outer protective clothing.
- Drums or suitably lined trash cans for storing disposable clothing and heavily contaminated PPE that must be discarded, and for storing contaminated solutions.
- Lined boxes with absorbents to collect water when rinsing off solid or liquid contaminants.
- Washing and rinsing solutions selected to reduce contamination and the hazards associated with contaminants.
- Large galvanized tubs, stock tanks, or children's wading pools to hold wash and rinse solutions. These should be at least large enough for a worker to place a booted foot in, and should have either no drain or be connected to a collection tank or appropriate treatment system.
- Plastic sheeting, sealed pads with drains, or other appropriate methods for containing and collecting contaminated wash and rinse solutions spilled during decontamination.
- Long-handled, soft-bristled brushes to help wash and rinse off contaminants.
- Paper or cloth towels for drying protective clothing and equipment.
- Lockers and cabinets for storage of decontaminated clothing and equipment.
- Shower facilities for full body wash or at a minimum, personal wash sinks (with drains connected to a collection tank or appropriate treatment system).

Table 7-2

Equipment Recommended for Decontaminating Heavy Equipment and Vehicles

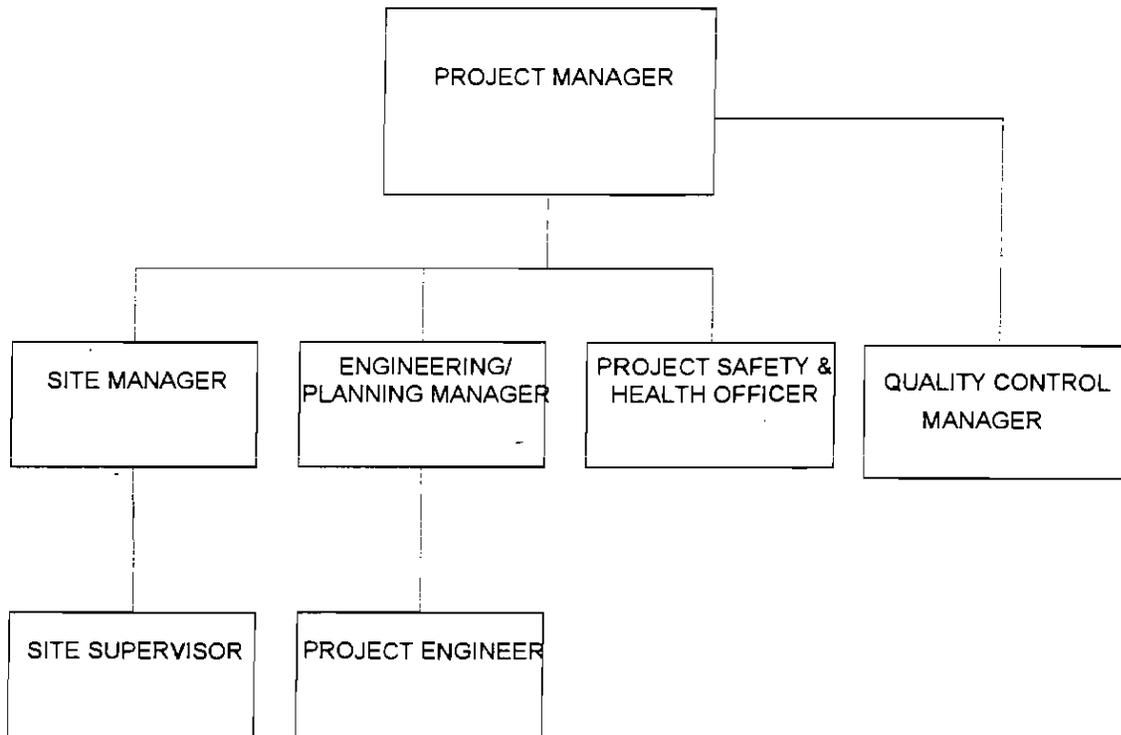
- Tanks or drums to be used for storing collected wash and rinse solutions, alternatively, equipment to treat collected wash and rinse solutions may be substituted.
- Pumps and filters, as needed, to collect wash and rinse solutions.
- Pressurized steam sprayers for steam-cleaning equipment.
- Long-handled brushes for general cleaning of exterior surfaces. Also shovels and other equipment may be used to dislodge caked-on contaminated mud on the undercarriage or in the tires.
- Wash solutions, selected for their ability to remove (dissolve, etc.) contaminants.
- Rinse solutions, selected for their ability to remove contaminants and wash solutions.
- Pressurized sprayers for washing and rinsing, particularly hard-to-reach areas.
- Clean buckets that can contain cleaning and rinsing solutions.
- Brooms and brushes that can be used to clean the interior, operator areas of vehicles and equipment.

8.0 TRAINING AND MEDICAL MONITORING PROGRAM

Training requirements are: Hazwoper training, and depending upon work performed, heavy equipment operator, crane operator, scaffold construction, fall protection, respirators, confined space entry qualified person, and excavation competent person.

All Detachment personnel at this site must be in a medical surveillance program as required by the current revision to NAVHOSPINST 6120.2. The following medical examinations will be required depending on the work performed: respirator-A10; forklift drivers-A1; motor vehicle operators-A13; crane, railroad, and weight handling equipment operators-A2; waste water (sewer) exposure-C5; lead-B4, all employees-B27 "HAZWOPER"; and asbestos workers-B1.

9.0 PROJECT MANAGEMENT



9.1 Responsibilities of Site Management/Chain of Command

PROJECT MANAGER - Jack Amey

- Coordinate all aspects of project to ensure a safe and successful completion.
- Has ultimate authority/responsibility for all aspects of project.
- Single point of contact for SOUTHDIV.

SITE MANAGER (APS) - Bruce Bell

- Ensure that personnel have current HAZWOPER training.
- Ensure that personnel participate in applicable medical surveillance programs.
- Ensure that there is an adequate on-site supply of health and safety equipment.
- Reports to the Project Manager.
- Has responsibility for verifying a consistent high level of quality for project.
- Coordinates all aspects of project to ensure a safe and successful completion.

SITE SUPERVISOR - Sam Huggins

The site supervisor is responsible for direct work supervision, and relative to health and safety, is responsible for assuring that:

- Personnel follow the Health and Safety Plan. Personnel who repeatedly do not comply shall be instructed to leave the site and not allowed to return.
- Personnel attend health and safety "kick-off" orientation and other site safety briefings.
- Personnel who may be exposed to unique or special hazards have training or experience necessary to safely conduct their work.
- A copy of this plan is maintained on-site during operations.
- Emergency notifications are made:
- The Site Supervisor can designate a work leader to carry out his duties in his absence.

PROJECT HEALTH AND SAFETY OFFICER- Connie Drum

- Has ultimate authority on health and safety matters, including decisions concerning PPE - initial level, changes, upgrades, or downgrades.
- Audit field operations. Providing the site manager and supervisor input on site health and safety issues.
- Observing personnel and reporting to the site supervisor on the effectiveness of this safety plan and whether personnel are using proper work practices.

- Reporting safety violations and unsafe conditions to the site manager.
- Conducting site specific safety briefings as he/she deems appropriate.
- Ensures compliance with this plan.
- Stops work when necessary to ensure the safety of personnel and to prevent damage to the environment.
- Provides on-site waste management.

PROJECT ENGINEER - Copes Wannamaker

- Provides input to the Site Manager/Site Supervisor and reports to the Engineering & Planning Manager.
- Prepares the work plans, costs estimates, and final reports.
- Provides site interface/coordination with regulatory agencies.
- Provides engineering field support to remedial efforts.
- Responsible for all technical aspects of work.
- Manages and evaluates chemical data obtained during remedial action activities.

QUALITY CONTROL MANAGER - Mike Wheeler

- Reports to the Project Manager and has the primary responsibility for verifying a consistently high level of quality for the project.
- Provides periodic reviews of program plans.
- Audits quality assurance system and performance.

9.2 Responsibilities of On-Site Personnel

The health and safety responsibilities of personnel include:

- Being familiar with and complying with this plan.
- Attending site health and safety briefings and being aware of anticipated chemical, physical, and biological hazards and knowing what to do when these hazards are encountered.
- Being trained on PPE use, safe work practices, decon and emergency procedures, and communications.
- Properly using PPE, including respiratory protective equipment.
- Having up-to-date HAZWOPER training and providing documentation of that training.
- Being an up-to-date participant in the medical monitoring program.

- Using the buddy system when wearing respiratory protective equipment.
- Being fit-tested and physically capable of using respirators (if/when required).

10.0 EMERGENCY INFORMATION

10.1 Emergency Notification

If any situation or unplanned occurrence requires outside emergency assistance, the Site Supervisor or acting supervisor is responsible for contacting the appropriate personnel from Table 10-1.

10.2 Site Resources

A telephone or radio will be available in the SZ. First-aid and eye wash equipment will be available at the work area.

10.3 Pre-emergency Planning

During the site briefing held daily, all employees will be reminded of the emergency response plan, communication systems, and evacuation routes. All emergency response organizations shall be notified of work commencement.

10.4 Emergency Procedures

In the event of an emergency, the following emergency procedure should be followed:

- In the event of an oil or hazardous substance spill, follow the response procedures in Table 10-2.
- Activate alarms as designated by this plan.
- If it is necessary to evacuate the area, immediately proceed to a pre-determined assembly area (if safe, the area outside the main gate) and remain there until instructed otherwise.

- Wind indicators will be used to continuously indicate upwind, preferred escape routes, from downwind routes.
- If an accident occurs, the site supervisor is to complete an Injury/Property Damage Investigation Report (see Appendix B) for submittal to Detachment personnel.
- If an individual suffers personal injury, if the situation dictates, the PHSO or supervisor will call the ambulance; see Table 10-1 for telephone numbers. Next, alert appropriate emergency response agencies if the situation dictates.
- If a member of the closure team suffers chemical exposure, the affected areas should be flushed immediately with copious amounts of clean water and, if the situation dictates, the PHSO should alert appropriate emergency response agencies, or personally ensure the exposed individual is transported to the nearest medical treatment facility for prompt treatment.

If available, additional information will be provided through the Material Safety Data Sheets (MSDSs) in an Appendix C of this plan. Detachment MSDSs are available in the Detachment OSH office.

10.5 Medical Emergencies

Any person who becomes ill or injured at a site must be decontaminated in a manner and degree consistent with the nature of the possible contamination and the nature of the illness or injury. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket).

First aid may be administered by trained personnel while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to the Project Manager. Any vehicle used to transport contaminated personnel will be decontaminated and cleaned as necessary.

**TABLE 10-1
EMERGENCY/TECHNICAL CONTACTS**

Organization	Agency	Telephone
Paramedics/Ambulance	County EMS	911
Police	North Charleston Police	911, 554-5700 (Admin.)
Fire	N. Charleston Fire Dept.	911, 554-5700
Hospital 1*	Roper North	(843) 745-2787
Hospital 2*	Navy Hospital	(843) 743-7000
Navy Hospital Code 024.21	Industrial Hygiene	(843) 743-7746
SOUTHNAVFACENGCOM	Gabe Magwood	(843) 820-7307

* Call 911 for life-threatening situations. For medical needs that are less urgent Roper North is the closest hospital. The Navy Hospital provides medical surveillance.

TABLE 10-2

RESPONSE PROCEDURES FOR OIL AND HAZARDOUS SUBSTANCE SPILLS

If imminent danger to life or property, or if fire threatens or starts, activate fire alarm and evacuate upwind to a safe distance.

Rescue any injured persons, **if safe to do so**.

Report spill immediately,

Pass the word to people in any adjacent spaces.

Stop source of spill or leak if possible and **if safe to do so**.

Restrict all ignition sources if flammable vapors are present or expected.

If properly trained and authorized, initiate available onsite measures to minimize the spread of contaminants. Otherwise, standby until emergency response personnel arrive on scene. Provide known details of spill when assistance arrives.

11.0 FORMS

A Plan Acceptance Form (Appendix A) will be filled out by all personnel working on the site before activities begin. Note: when an employee briefing is held, a standard Detachment Sign-in sheet may be used to collect employee signatures vice use of individual Plan Acceptance Forms. Completed forms must be filed and maintained with the official work folder. The route to the nearest medical facility is shown in Appendix B.

**APPENDIX A
PLAN ACCEPTANCE FORM**

INSTRUCTIONS: This form is to be completed by each person working on the work site and returned to the PHSO

Subject: Health and Safety Plan

I represent that I have read and understand the contents of the above plan and agree to perform my work in accordance with it.

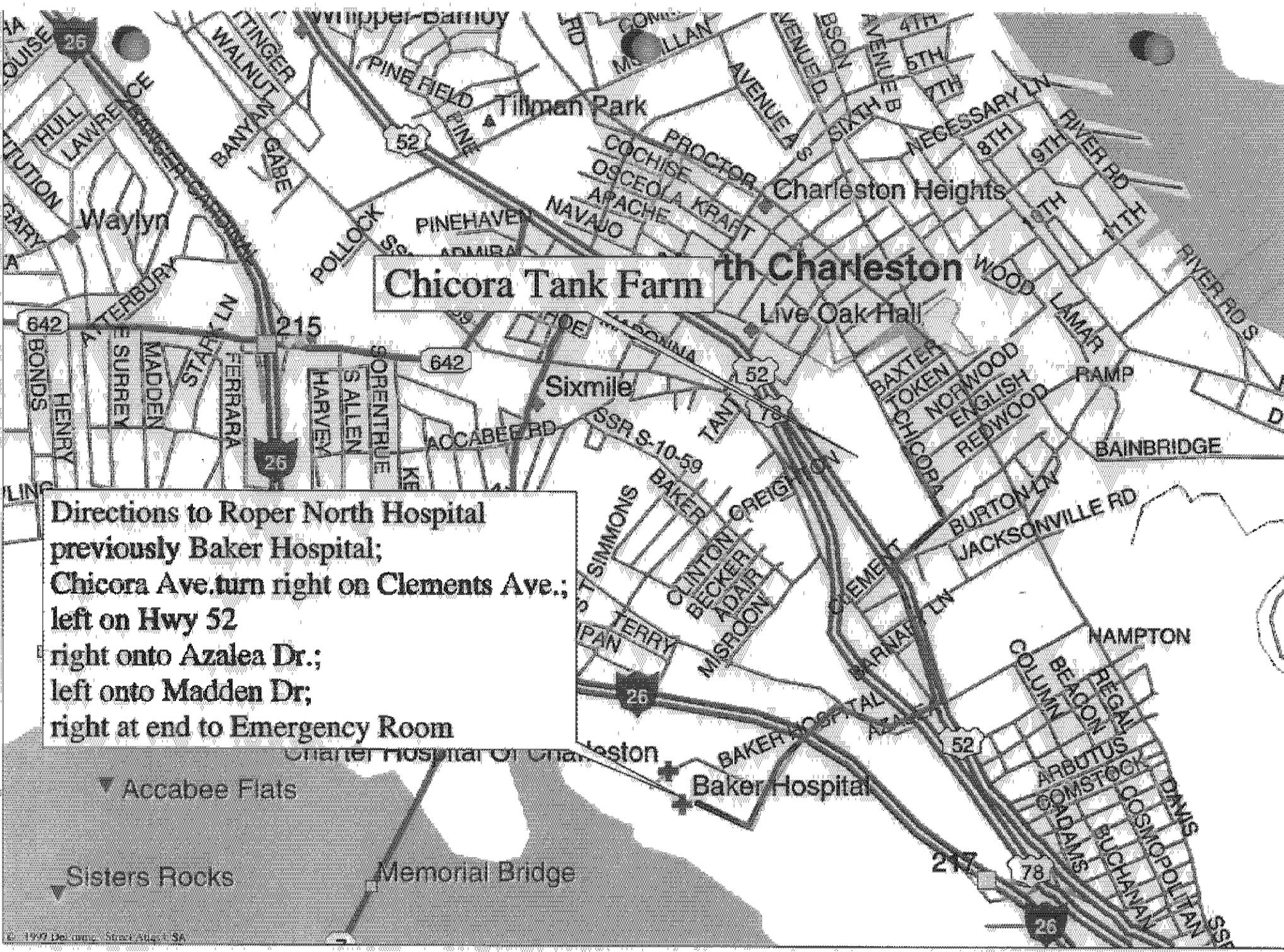
Signed

Printed Name

Code/Organization

Date

APPENDIX B
ROUTE TO NEAREST MEDICAL FACILITY



Chicora Tank Farm 4th Charleston

**Directions to Roper North Hospital
previously Baker Hospital;**
Chicora Ave. turn right on Clements Ave.;
left on Hwy 52
right onto Azalea Dr.;
left onto Madden Dr;
right at end to Emergency Room

▼ Accabee Flats
▼ Sisters Rocks
Memorial Bridge

APPENDIX C

MATERIAL SAFETY DATA SHEET #2 FUEL OIL



Amerada Hess Corporation
1 Hess Plaza Woodbridge, NJ 07095

From: Corporate S/H/F (908)750-7051 (phone)
(908)750-6799 or -6105 or -6745 (fax)

Re: MATERIAL SAFETY DATA SHEET TRANSMITTAL

To: HECTOR ALVAREZ

Date: 3-13-95

From: PAUL BUCKNAM

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AMERADA HESS CORPORATION

Material Safety Data Sheet

#2 FUEL OIL

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION (Rev. 09/94)

Amerada Hess Corporation
 1 Hess Plaza
 Woodbridge, NJ 07095

COMPANY CONTACT: Corporate Safety
 TELEPHONE NUMBER: (908)750-6000

EMERGENCY TELEPHONE NUMBER
 CHEMTREC (800)424-9300 24 hrs

PRODUCT NAME: #2 Fuel Oil
 CHEMICAL NAME: N/A
 CHEMICAL FAMILY: Petroleum Hydrocarbons
 CHEMICAL FORMULA: N/A - complex mixture of hydrocarbons
 MSDS IDENTIFICATION CODE/NUMBER: 0088

SYNONYMS: #2 Heating Oil
 Off-road Diesel Fuel

See Section 16 for Glossary of terms and acronyms.

2. COMPOSITION/INFORMATION ON INGREDIENTS (Rev. 09/94)

INGREDIENT NAME	EXPOSURE LIMITS	CONCENTRATION PERCENT BY WEIGHT
#2 Fuel Oil CAS NUMBER: 68476-30-2	ACGIH TLV-TWA: 5 mg/m ³ * OSHA PEL-TWA: 5 mg/m ³ * OSHA PEL-TWA: 400 ppm*P	100.0
Hexachlorene CAS NUMBER: 91-20-3	ACGIH TLV-TWA: 10 ppm ACGIH TLV-STEL: 15 ppm OSHA PEL-TWA: 10 ppm	< 0.1 to 2.0

* - as Mineral Oil Misc. Severely Refined
 ** - as Petroleum Distillate (napthen)

#2 Fuel Oil is a petroleum fraction consisting of a complex mixture of petroleum hydrocarbons (C9 and higher).

3. HAZARDS IDENTIFICATION (Rev. 09/94)

***** EMERGENCY OVERVIEW *****
 * CAUTION *
 * OSHA/NIHA COMBUSTIBLE LIQUID - SLIGHT TO MODERATE IRRITANT - EFFECTS THE *
 * CENTRAL NERVOUS SYSTEM - HARMFUL OR FATAL IF SWALLOWED - ASPIRATION *
 * HAZARD *
 *
 * Moderate fire hazard. Avoid breathing vapors or mists. May cause *
 * dizziness and drowsiness. May cause moderate eye irritation, skin *
 * irritation, defatting and/or dermatitis (rash). Long-term, repeated *
 * exposure may cause skin cancer. *
 *
 * If ingested, do NOT induce vomiting as this may cause chemical pneumonia *
 * (fluid in the lungs). *

POTENTIAL HEALTH EFFECTS

PRIMARY ROUTE(S) OF ENTRY

Eyes: No Skin: Yes Inhalation: Yes Ingestion: Yes

EYES

SLIGHT TO MODERATE IRRITANT. Exposure to vapors, mists or fumes may cause slight to moderate eye irritation, redness, tearing and blurred vision.



Material Safety Data Sheet

#2 FUEL OIL

3. HAZARDS IDENTIFICATION - Continued

SKIN

SLIGHT TO MODERATELY IRRITATING. This product is not considered to be more than a slight irritant under normal conditions of use. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are exposed. Prolonged or repeated contact with the skin may cause defatting of the skin leading to redness, itching, inflammation, cracking, dermatitis (rash), and possible secondary infection.

High pressure skin injections are serious medical emergencies. The appearance of injury may be delayed for a few hours, but may cause tissue to become swollen, discolored and extremely painful; permanent damage or death may result without adequate medical treatment.

INGESTION

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in bacterial pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

Ingestion may cause gastrointestinal disturbances, such as irritation, nausea, vomiting and diarrhea, and central nervous system effects similar to intoxication by ethyl alcohol. Acute symptoms of intoxication are most common, including excitation, restlessness, incoordination, euphoria, headache, dizziness, drowsiness, blurred vision, and fatigue. In more severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

INHALATION

Vapors may cause nose and throat irritation, anesthetic effects and central nervous system (CNS) depression. Inhalation may result in dizziness, drowsiness, headache, and other symptoms similar to those listed under "Ingestion".

Inhalation of high concentrations can cause rapid CNS depression, cardiac arrhythmia, unconsciousness, coma, and possibly death resulting from respiratory failure. Systemic effects to the liver, kidneys, central nervous system, and blood have been reported from large and/or repeated or prolonged exposures.

WARNING: The burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC EFFECTS/CARCINOGENICITY

This product is not expected to be a cancer hazard under normal conditions of use. Similar products produced skin cancer and skin tumors in laboratory animals following repeated applications. The significance to human exposure has not been determined - see Section 11, Toxicological Information.

This product is similar to DIESEL Fuel. IARC classifies whole diesel exhaust as probably carcinogenic (Group 2A) and NIOSH regards it as a potential cause of occupational lung cancer (tumorigen) based on animal studies and limited evidence in humans.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE

Irritation from skin exposure may aggravate existing dermatitis (skin) conditions.

4. FIRST AID MEASURES (Rev. 02/94)

EYES

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.



M A T E R I A L S A F E T Y D A T A S H E E T

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4. FIRST AID MEASURES - Continued

SKIN
 Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or waterless hand cleanser. Obtain medical attention if irritation or redness develops. High pressure injections are serious medical emergencies - seek immediate medical attention.

INGESTION
 DO NOT INDUCE VOMITING BECAUSE OF DANGER OF BREATHING LIQUID INTO LUNGS. Seek immediate medical attention. Rinse mouth with water. Administer 1 to 2 glasses of water or milk to drink. Never administer liquids to an unconscious person.

If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Seek medical attention. Monitor for breathing difficulty.

INHALATION
 Remove person to fresh air. If person is not breathing, ensure an open airway and administer CPR. If necessary, provide additional air or oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES (Rev. 09/94)

FLAMMABLE PROPERTIES
 FLASH POINT: 100°F PMCC (minimum)
 AUTOIGNITION: 495°F 257°C
 FLAMMABILITY CLASS: II
 LOWER EXPLOSIVE LIMIT (L): 0.6
 UPPER EXPLOSIVE LIMIT (U): 7.5

FIRE AND EXPLOSION HAZARDS
 OSHA and NFPA Class II COMBUSTIBLE LIQUID (see Section 14 for transportation classification). When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
SMALL FIRES: Any extinguisher suitable for Class B fires - dry chemical, CO2, water spray, fire fighting foam, or halon.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may not achieve extinguishment, but may be used to disperse vapors, control the magnitude of the fire, and/or to cool fire-exposed containers.

FIRE FIGHTING INSTRUCTIONS
 Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment.

Fire fighting activities that may result in potential exposure to high heat, smoke or toxic byproducts of combustion should require positive pressure-demand NIOSH/MSHA-approved self-contained breathing apparatus (SCBA) with full-facepiece and full protective firefighting clothing.

Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water.

For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

See Section 16 for NFPA 704 Hazard Rating.



Material Safety Data Sheet

92 FUEL OIL

6. ACCIDENTAL RELEASE MEASURES (Rev. 09/94)

ACTIVATE YOUR FACILITY'S SPILL CONTINGENCY PLAN (e.g. SPOC, RCRA, OPA, or EMERGENCY plan), if available.

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to contain spill areas.

Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless the system is designed and permitted to handle such materials. The use of fire fighting foam may be useful in certain situations to reduce vapors.

SMALL SPILLS: Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal. Cleanup crews must be properly trained and must utilize proper protective equipment.

LARGE SPILLS: Dike far ahead of the spill. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection as well as protect personnel attempting to stop leak. Consideration should be given to environmental clean-up and waste material generation when determining if the use of large volumes of water is appropriate for non-fire emergency situations. Cleanup crews must be properly trained and must utilize proper protective equipment.

7. HANDLING AND STORAGE (Rev. 09/94)

HANDLING PRECAUTIONS

Handle as a combustible liquid. Keep away from heat, sparks, and open flame. No smoking or open flame in storage, use or handling areas. Keep containers closed and clearly labeled. Ground all drums and transfer vessels when handling. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition. Use only with adequate ventilation. Avoid breathing vapors. Do not use as a cleaning agent. Wash thoroughly after handling.

STORAGE PRECAUTIONS

Keep away from flame, sparks, excessive temperatures and open flame. Use approved vented containers. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Store in a well-ventilated area. This storage area should comply with NFPA 30 ("Flammable and Combustible Liquid Code"). Avoid storage near incompatible materials.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when this material is loaded into tanks previously containing low flash point products (such as gasoline) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents". The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".

WORK/HANDLING PRACTICES

Emergency eye wash capability should be available in the vicinity of any potential exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective.

Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could



Material Safety Data Sheet
#2 FUEL OIL

7. HANDLING AND STORAGE - Continued

WORK/HYGIENE PRACTICES - Continued
ignite via wiper or dryer. Consider the need to discard contaminated leather shoes and gloves.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION (Rev. 09/94)

ENGINEERING CONTROLS
Use adequate ventilation to keep vapor and mist concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces. Use explosion-proof equipment and lighting in classified/controlled areas.

EYE/FACE PROTECTION
Safety glasses and faceshield or chemical splash goggles are recommended where there is a possibility of splashing or spraying.

SKIN PROTECTION
Avoid repeated or prolonged skin contact. Gloves constructed of nitrile, neoprene, or PVC are recommended. Chemical protective clothing such as of Saranex(R) or equivalent recommended based on degree of exposure.

(R) - Saranex is a registered trademark of E. I. DuPont.

Note: The resistance of specific materials may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

RESPIRATORY PROTECTION
A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited. Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Refer to OSHA 29 CFR 1910.134, ANSI Z88.2-1992, and NIOSH Respirator Decision Logic for additional guidance on respiratory protection.

9. PHYSICAL AND CHEMICAL PROPERTIES (Rev. 09/94)

APPEARANCE
Red or reddish/orange colored (dyed) liquid.

ODOR
A mild, petroleum distillate odor.

BASIC PHYSICAL PROPERTIES
BOILING RANGE: 140-700°F
VAPOR PRESSURE: 0.009 psia @ 70°F
VAPOR DENSITY (AIR=1): >1.0
SPECIFIC GRAVITY: 0.86 @ 60°F
SOLUBILITY (H₂O): negligible in water
PERCENT VOLATILES: 100%
EVAPORATION RATE: slow; AP 7% in 14 hrs @76°F; will vary with conditions
VISCOSITY: 12.6 - 37.9 SUS @ 100°F



Material Safety Data Sheet

#2 FUEL OIL

10. STABILITY AND REACTIVITY

STABILITY: Stable

CONDITIONS TO AVOID (STABILITY)

Material is stable under normal conditions. Avoid high temperatures, open flames, welding, smoking and ignitions sources.

INCOMPATIBLE MATERIALS

Keep away from strong oxidizers, ignition sources and heat; Viton(R); Fluorel(R).

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide, carbon dioxide and reactive hydrocarbons (smoke).

HAZARDOUS POLYMERIZATION: Will Not Occur

11. TOXICOLOGICAL INFORMATION (Rev. 09/94)

SKIN EFFECTS

Practically non-toxic. Rabbit Dermal LD50 = 5 ml/kg; 500 mg/24 hours

ACUTE ORAL EFFECTS

Oral-rac LD50: 14 ml/kg

CHRONIC EFFECTS/CARCINOGENICITY

Carcinogenicity - NTP: No IARC: No OSHA: No ACGIH: No

Studies by API and others have shown that similar products produce skin cancer or skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation. Potential risks to humans can be minimized by observing good work practices and personal hygiene procedures.

MUTAGENICITY (GENETIC EFFECTS)

Products of similar composition have been positive in mutagenicity tests.

MISCELLANEOUS TOXICOLOGICAL INFORMATION

The naphthalene component of this product in its pure form has been demonstrated to cause flushing, headache, ocular effects, neurological effects, gastrointestinal effects, rare hepatocellular injury, blood effects, erythema, dermatitis, injury to offspring with prenatal exposure, and laryngeal and intestinal carcinoma in test animals. There is no data that this product as a whole will exhibit the health effect characteristics of naphthalene.

12. ECOLOGICAL INFORMATION

Keep out of sewage, drainage and waterways. Report spills and releases, as applicable, under Federal and State regulations.

13. DISPOSAL CONSIDERATIONS (Rev. 09/94)

Maximize product recovery for reuse or recycling. Contaminated materials may be classified as RCRA Hazardous Waste due to the low flash point. Also consult state regulations. Waste may be incinerated, with approval of EPA, at approved disposal site.



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#2 FUEL OIL

14. TRANSPORT INFORMATION (Rev. 02/94)

PROPER SHIPPING NAME: Fuel Oil, No. 2
HAZARD CLASS: 3
DOT IDENTIFICATION NUMBER: NA1992
DOT SHIPPING LABEL: Flammable Liquid
May be reclassified for transportation as a **COMBUSTIBLE LIQUID** under conditions of DOT 49 CFR 173.122(b) (2).

15. REGULATORY INFORMATION (Rev. 09/94)

U.S. FEDERAL REGULATORY INFORMATION
Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal reporting requirements. Consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS):
Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion must be reported immediately to the National Response Center (1-800-424-8802) or, if not practical, the U.S. Coast Guard with follow-up to the National Response Center, as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

This product and its constituents listed herein are on the EPA TSCA Inventory.

SARA TITLE III NOTIFICATIONS AND INFORMATION

SARA TITLE III - HAZARD CLASSES: Acute Health Hazard
Chronic Health Hazard
Fire Hazard

SARA TITLE III - SECTION 113 SUPPLYING NOTIFICATION

This product contains the following toxic chemicals subject to the reporting requirements of section 113 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

CAS NUMBER	INGREDIENT NAME	PERCENT BY WEIGHT
91-20-3	Naphthalene	< 0.1 to 2.0

This information must be included on all MSDSs that are copied and distributed for this material.

U.S. STATE REGULATORY INFORMATION

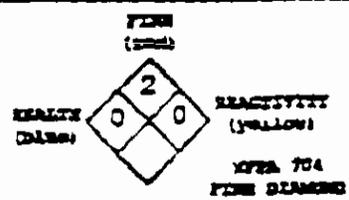
Any spill or uncontrolled release of this product may be subject to state and/or local reporting requirements. This product and/or its constituents may also be subject to other regulations at the state and/or local level. Consult those regulations applicable to your facility/operation.

CANADIAN REGULATORY INFORMATION

HMIS: Class 3, Division 2 (Flammable Liquid)
Class 3, Division 2, Subdivision 3 (Toxic by other means)

16. OTHER INFORMATION (Rev. 09/94)

NFPA HAZARD RATING - **HEALTH:** 0 Negligible
- **FLAMMABILITY:** 2 Moderate
- **REACTIVITY:** 0 Negligible





Material Safety Data Sheet

#2 FUEL OIL

16. OTHER INFORMATION - continued

HMIS HAZARD RATING - HEALTH: 2 Moderate
 - FIRE: 2 Moderate
 - REACTIVITY: 1 Slight

HMIS IDENTIFICATION CODE/NUMBER: 0088

SUPersedes MSDS DATE: 09/07/93

Glossary:

AP = Approximately < = Less than > = Greater than
 N/A = Not Applicable N/E = Not Established N/D = Not Determined
 ppm = parts per million

Acronyms:

- ACGIH = American Conference of Governmental Industrial Hygienists
- AIEHA = American Industrial Hygiene Association
- ANSI = American National Standards Institute (212)642-4900
- API = American Petroleum Institute (202)682-8000
- CERCLA = Comprehensive Emergency Response, Compensation, and Liability Act
- DOT = U.S. Department of Transportation
- EPA = U.S. Environmental Protection Agency
- HMIS = Hazardous Materials Information System
- IARC = International Agency For Research On Cancer
- MSHA = Mine Safety and Health Administration
- NFPA = National Fire Protection Association (617)770-3000
- NOIC = Notice of Intended Change (proposed change to ACGIH TLV)
- NIOSH = National Institute of Occupational Safety and Health
- NTP = National Toxicology Program
- OFA = Oil Pollution Act of 1990
- OSHA = U.S. Occupational Safety & Health Administration
- PEL = Permissible Exposure Limit (OSHA)
- RCRA = Resource Conservation and Recovery Act
- RFL = Recommended Exposure Limit (NIOSH)
- SARA = Superfund Amendments and Reauthorization Act of 1986 Title III
- SCBA = Self-Contained Breathing Apparatus
- SPCC = Spill Prevention, Control, and Countermeasures
- STEL = Short-Term Exposure Limit (generally 15 minutes)
- TLV = Threshold Limit Value (ACGIH)
- TSCA = Toxic Substances Control Act
- TWA = Time weighted Average (8 hr.)
- WEEL = Workplace Environmental Exposure Level (AIEHA)
- WHMIS = Canadian Workplace Hazardous Materials Information System

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

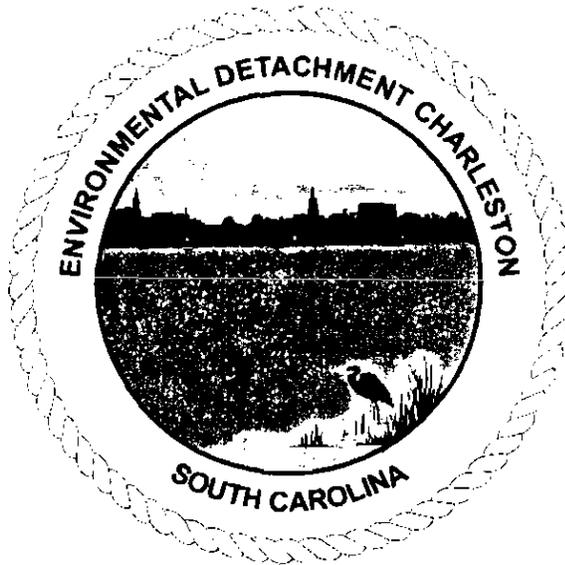
Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgement.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

APPENDIX C

QA/QC PLAN

**QUALITY ASSURANCE/QUALITY CONTROL PLAN
FOR CLEANING TANKS AND PUMP ROOMS AND
CLOSURE OF PIPELINES AT CHICORA TANK FARM**



Cog Engineer

C. Wannamaker Date 7/21/98

**Cog Technical
Authority**

T. L. Ladd Date 7/21/98
(Approval)

Site Manager

Bruce A. Beel Date 7/21/98
(Concur)

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Enclosure (1)

Sampling Plan

ACRONYM LIST

DET	Environmental Detachment Charleston
CFR	Code of Federal Regulations
CGI	Combustible Gas Indicator
CRZ	Contamination Reduction Zone
CVS	Cardiovascular System
EPA	U.S. Environmental Protection Agency
EZ	Exclusion Zone
HAZWOPER	Hazardous Waste Operations and Emergency Response
HSP	Health and Safety Plan
IDLH	Immediately Dangerous to Life and Health
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheet
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
OVA	Organic Vapor Analyzer
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PPE	Personal Protective Equipment
PPM	Parts Per Million
PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
SHSO	Site Health and Safety Officer
SOUTHDIV	Southern Division Naval Facilities Engineering Command
SZ	Support Zone

**QUALITY ASSURANCE AND QUALITY CONTROL PLAN
FOR CLEANING AND CLOSURE OPERATIONS OF THE TANKS,
PUMP ROOMS, AND PIPELINES AT CHICORA TANK FARM**

1. GENERAL

This plan provides the Quality Assurance/Quality Control requirements for cleaning tanks and pump rooms “K, L, M, N, and O” and pigging/grouting the pipelines and related work at the Chicora Tank Farm.

2. REFERENCES

The Publications listed below were used in the development of this work procedure.

CODE OF FEDERAL REGULATIONS (CFR)

40 CFR 261	Criteria for Identifying the Characteristics of Hazardous Waste and for Listing Hazardous Wastes
40 CFR 279	Standards For the Management of Used Oil
40 CFR 280	Standards for Owners and Operators of Underground Storage Tanks

ENVIRONMENTAL PROTECTION AGENCY (EPA)

REGION VI	Environmental Compliance Branch Standard
SOPQAM	Operating Procedures and Quality Assurance Manual.

3. QC PROGRAM

The QC program shall cover both on-site work, and off-site reporting/documentation; and shall be keyed to the Work Plan sequence. The QC program consists of:

- A QC Manager
- The QC Plan
- A QC briefing

- On site QC work control
- QC certifications, Sampling QC, Chain of Custody, Certified Laboratory, and Sampling
- Records and Logs
- A Closure/Site Assessment Report

4. QC ORGANIZATION

a. QC Manager Duties

The project QC Manager will be at the work site, as needed to ensure that work is performed in accordance with the work plan. The QC Manager will conduct the QC briefings, provide on site QC surveillance, perform sampling, and prepare required QC certifications and documentation. In addition to on site QC, the QC Manager may perform other duties, such as project engineer or Site Safety Officer. The QC Manager has the authority to stop work based on quality or safety concerns. The QC Manager shall report directly to the Director, Environmental Detachment Charleston (DET), on all QC matters.

b. Qualifications

The QC Manager shall have a minimum of five years experience as an engineer, technician, inspector, quality/safety specialist, supervisor, or project manager. Additionally, the QC manager must be familiar with the QA/QC requirements involved in Petroleum tank cleaning and pipeline cleaning, and trained or experienced in environmental sampling. An alternate QC Manager may be designated to serve at the work site in the event of the designated QC Manager's absence.

5. QUALITY CONTROL PLAN

a. Requirements

The QC Plan depends not only on the QC Manager, but also on workers involved in the project. The QC Plan covers both on-site and office work.

b. Changes

Changes to the Quality Control Plan may be made by the QC Manager. These changes will be site specific and in the form of a clarification or in response to an unknown or unexpected work site condition and documented on the QC Plan Amendment Form.

6. QC BRIEFINGS

Prior to the start of site work, the QC Manager shall conduct an initial QC briefing. The purpose of the briefing is to familiarize the workers with the QC aspects of the work. The briefing may be held in conjunction with the initial Safety Briefing. After the start of work, weekly QC briefings will be conducted until the site work is completed.

7. THREE PHASES OF CONTROL

The QC Manager shall examine the work using the "Three Phases of Control" format to ensure that work complies with all requirements. The Three Phases of Control are:

Preparatory QC Phase	The Preparatory phase is performed prior to the start of work to ensure that preparations for work are complete.
Initial QC Phase	This phase of control centers on observation of the work performance as it relates to the Work Plan and the HSP.
Follow-Up Phase	This phase involves examining completed tasks to ensure that the work was properly done.

a. Preparatory QC Phase

Conduct the preparatory phase surveillance/inspection/review with the Site Supervisor responsible for the work.

1. Review the Work Plan.
2. Check staged materials and equipment to ensure that they are on hand, ready for use, and conform to the Work Plan.
3. Review the sampling plan to ensure that sampling equipment has been staged for the required samples.
4. Examine the work site to ensure that the area is satisfactory and ready for work to begin.

5. Ensure that training requirements are met, documented, and on file.
6. Discuss work/construction methods.
7. Review the Safety Plan to ensure that applicable safety requirements are met and that required Material Safety Data Sheets (MSDS) are included with the HSP.

b. Initial QC Phase

The QC Manager and Site Supervisor shall observe the initial segment of each new Work Phase to ensure that the work complies with the work plan. Perform the following for each Work Phase:

1. Establish that the quality of workmanship is satisfactory.
2. Resolve work conflicts (act as a liaison between the workers and engineering).
3. Ensure that applicable safety requirements are met.

c. Follow-Up Phase

Perform the following for ongoing work daily, as necessary.

1. Ensure the work is in compliance with all requirements.
2. Maintain the quality of workmanship required.
3. Ensure that sampling and field analysis is performed and properly recorded, as required.
4. Coordinate Production and Engineering activities to ensure that rework items are being corrected.

8. QA/QC WORK PRACTICES AND NOTIFICATIONS

- DET personnel will walk and inspect the transfer pipeline route from the NAVBASE to CTF during pigging/grouting operations to monitor for ruptures/leaks in the piping.
- DET will notify SOUTHDIV and Caretaker Site Office prior to pigging and grouting the pipelines running outside of Navy property. SOUTHDIV and

Caretaker Site Office will communicate with residents and North Charleston city officials concerning the location and nature of DET work and plans in case of a pipeline rupture.

- Due to the hazards on site the DET shall walk the fence perimeter weekly as a minimum to verify the secure integrity of the fencing or report any problem areas noted.
- Inspect fall protection equipment on a daily basis and remove defective/damaged equipment immediately from service.
- DET notify the North Charleston Police Department and Fire Department of the work planned, hazards involved, and phone numbers of DET and CSO personnel in case of emergency.

10. WORK LOG

The Work Log shall be kept in a bound field logbook by the Site Supervisor and or the QC Manager. The log should cover a chronology of the tank work recorded in brief statements. Examples of information entered in the Supervisor's Work Log are:

- Log of work performed based on Definable Work Tasks
- PPE, PPE changes and reasons for the change
- Improvements that could be made on tasks in the future
- The substance of any discussions with authorities from outside the project team
- Notes on required information needed for the completion report
- Sketchs of excavations including length and distances of piping, tank, excavation, and depth to groundwater if encountered

The QC/Supervisor's Work Log will be signed and dated each day and be maintained with the Work Procedures after completion of the work.

11. QUALITY CONTROL PLAN AMENDMENT

Amendment # _____ Date: _____

Site Name: _____

Work Assignment: _____

Type of Amendment: _____

Reason For Amendment: _____

Required Change: _____

QC Manager

Date

13. CONFINED SPACE ENTRY PERMIT

(To be duplicated as needed)

R)

CONFINED SPACE ENTRY PERMIT

DATE OF PERMIT:			EXPIRATION DATE/TIME:		
LOCATION:			DESCRIPTION:		
PURPOSE OF ENTRY: (Operations to be conducted):					
AUTHORIZED ENTRY PERSONNEL:			AUTHORIZED ATTENDANTS:		
ATMOSPHERIC TEST DATA					
TEST	PRE-ENTRY		FOLLOW-UP		
Oxygen Content					
Excessive Heat					
Toxins (Specify)					
Issued by: _____					
Date/Time: _____					
INSTRUMENT	MODEL	SERIAL NO.	CALIBRATION DATE	COMMENTS (nature of Permit Space)	
REQUIRED SAFETY PRECAUTIONS					
REQUIREMENT	YES	NO	SPECIFICS		
Attendant					
Respiratory Protection					
Protective Clothing					
Protective Equipment					
Fire Extinguisher					
Rescue Equipment					
Lockout/Tagout					
Ventilation					
Follow-up Testing			(Equipment to be provided)		
Other Controls (specify)					
Communication Practices					
EMERGENCY CONTACT:			PHONE:		
OTHER COMMENTS					
ENTRY SUPERVISOR'S SIGNATURE:			CONFINED SPACE PROGRAM MANAGER'S (OR QUALIFIED PERSON) SIGNATURE:		



**ENVIRONMENTAL
DETACHMENT CHARLESTON
SAMPLING PLAN**



Prepared by:

Supervisor of Shipbuilding, Conversion and Repair,
USN, (SUPSHIP) Portsmouth Va.,
Environmental Detachment Charleston S.C.
1899 North Hobson Ave.
North Charleston, SC 29405-2106

June 16, 1997

SUPSHIP PORTSMOUTH, VA, ENVIRONMENTAL DETACHMENT
CHARLESTON

DETACHMENT SAMPLING PLAN

Approval Signatures

Prepared by: <u>Michael P. Wheeler</u>	<u>5/8/97</u>
QA/QC Branch	Date
Prepared by: <u>Math W. Jackson</u>	<u>5/8/97</u>
QA/QC Branch	Date
Approved by: <u>[Signature]</u>	<u>5/23/97</u>
QA/QC Manager	Date
Approved by: <u>[Signature]</u>	<u>6-16-97</u>
Engineering & Planning Manager	Date
Approved by: <u>[Signature]</u>	<u>6-16-97</u>
for E.R. Dearhart, Director	Date

Change Synopsis

<u>Change</u> <u>Date</u>	<u>Change</u> <u>Summary</u>	<u>Affected</u> <u>Pages</u>	<u>Approval</u> <u>Signatures</u>
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DETACHMENT SAMPLING PLAN

1. SCOPE

This Standard operating procedure applies to field sampling performed by the Supervisor of Shipbuilding, Conversion & Repair Portsmouth, VA, Environmental Detachment Charleston.

2. PURPOSE

This document has been prepared for use by Environmental Detachment Charleston. The information contained in this procedure shall be used to determine the requirements, responsibilities, and procedures for performing field sampling.

3. REFERENCES

- A. United States Environmental Protection Agency's Environmental Investigations Standard Operating Procedures and Quality Assurance Manual, dated May 1996.

4. RESPONSIBILITIES

Environmental Detachment Charleston personnel shall ensure that all field sampling meets the requirements of this plan.

4.1 Audits

The QA/QC Branch will perform audits to ensure the requirements of this procedure are met.

5. DEFINITIONS

5.1 Sample- Part of a larger lot, usually an area, volume, or a period of time.

5.2 Representative Sample- A sample that reflects one or more characteristics of a population.

5.3 Variability- The range or "distribution" of results around the mean value obtained from samples within a population.

5.4 Grab Sample- An individual sample collected from a single location at a specific time or period of time. Grab samples are generally authoritative in nature.

5.5 Composite Sample- A sample collected over a range that typically consists of a series of discrete, equal samples (or "aliquots") which are combined. The four types of composite samples are time, flow proportioned, areal, and vertical.

5.6 Quality Control Samples- Collected during field studies for various purposes which include the isolation of site effects (control samples) and/or evaluate field/laboratory variability (spikes and blanks, trip blanks, duplicate, split samples).

5.7 Control Sample- A discrete grab sample collected to isolate a source of contamination. It is used to isolate possible contaminants migrating onto the site from other locations.

5.8 Split Sample- A sample which has been portioned into two or more containers from a single sample container or sample mixing container. The primary purpose of a split sample is to measure handling variability.

5.9 Duplicate Sample- Two or more samples collected from a common source. The purpose of a duplicate sample is to estimate the variability of a contaminant.

5.10 Trip Blank- A sample prepared prior to the sampling event and stored with the investigative samples throughout the sampling event. Trip blanks are used for volatile organic analysis (VOA) to determine if samples were contaminated during storage and/or transportation to the laboratory.

5.11 Spike Sample- A sample with known concentration of contaminants. Spiked samples are used to measure negative bias due to sample handling or analytical procedures, or to assess the performance of a laboratory.

5.12 Equipment Rinse Blanks- A sample collected using organic-free water which has been run over/through sample collection equipment. Equipment field blanks are often associated with collecting rinse blanks of equipment that has been field cleaned.

5.13 Field Blanks- A sample prepared in the field to evaluate the potential for contamination of a sample by site contaminants from a source not associated with the sample collected. Field blanks should be collected in dusty environments and/or from areas where volatile organic contamination is present in the atmosphere and originating from a source other than the source being sampled.

5.14 Preservative Blanks- Used to ensure the preservative medium is free of contaminants of concern.

6. REQUIREMENTS

Quality Assurance/Quality Control (QA/QC) specifies the QA/QC requirements intended to achieve the goals of the facility investigation to be performed. Requirements specified assure data obtained is suitable for its intended use.

6.1 Investigations

At a minimum, soil, surface water, sediment, groundwater, and contaminant quantification investigations will be conducted at Naval Energy and Environmental Support Activity (NEESA) Data Quality Objective (DQO) protocol (United States Environmental Protection Agency (USEPA) Level II or Level III).

6.2 Quality Control Samples

Contact the Detachment's chemist prior to sampling events to obtain scheduled QA/QC samples. Collect quality control samples at the following frequencies:

Duplicates	1 per 20 samples
Splits	1 per 20 samples
Field blanks	1 per week for field decontamination, or 1 per quarter for the decon station
Trip blanks	1 per shipping container for VOA samples
Equipment rinsate blanks	1 per week for field decontamination, or 1 per quarter for the decon station
Preservative blanks	1 per quarter

- 6.2.1 Duplicate samples are collected in the field from the exact location as another sample and sent to the laboratory for analysis with the original sample.
- 6.2.2 Split samples are taken from a single location. After thoroughly mixing the sample, it is portioned into two or more containers.
- 6.2.3 Field blanks consist of sample containers filled in the field with water from each source used for field decontamination.
- 6.2.4 Trip blanks consist of a volatile organic analysis (VOA) sample vial that travels unopened with the sample bottles/jars to the field. The trip blank is analyzed with the field samples. Trip blanks will not contain air bubbles (pinhead size or larger).
- 6.2.5 Equipment rinsate blanks consist of taking DI water and placing it in contact with field sampling equipment after equipment decontamination.

- 6.2.6 Preservative blanks consist of mixing the preservative used for metals and general inorganics with DI water to ensure the preservative does not interfere with analysis.
- 6.2.7 All QA/QC samples will be reviewed by the Internal Audit Branch. A log will be maintained to document the results of QA/QC sampling.

6.3 General Requirements

Sampling will be performed using the following general requirements:

- 1) All sampling activities will proceed from the area of least contamination to greatest contamination, if possible. If free product is encountered, collect grab samples of the product.
- 2) The preferred order of sample collection will be volatile organic analysis (VOA), total organic carbon (TOC), semivolatile organic analysis (SVOA), pesticides, herbicides, polychlorinated biphenyls (PCB), total metals, dissolved metals, cyanide, inorganics, and turbidity.
- 3) The sampler will don a clean pair of gloves before collecting each sample.
- 4) Samples will be collected with either disposable sampling devices, or decontaminated, stainless-steel or Teflon devices. All sampling equipment must be decontaminated.
- 5) Fill all sample bottles, except for VOA bottles, to the shoulder to compensate for temperature and pressure changes. VOA bottles will be filled until there is zero headspace.
- 6) VOA samples will not be homogenized. Other samples will be homogenized.
- 7) Preservation will be added to samples, if required.
- 8) After collection, samples exhibiting obvious visual or olfactory contamination will be separated from the samples not exhibiting such evidence of contamination.
- 9) Sampling documentation will be documented in the field logbook.
- 10) With the exception of analysis for metals, chill the samples to 4 degrees Celsius immediately after collection and during shipment to the laboratory.
- 11) If possible, samples from different sites will not be placed in the same cooler.
- 12) Use sealable plastic bags to protect samples from cross-contamination.
- 13) A trip blank will be used with each set of investigative or confirmatory samples analyzed for VOA. Discard any trip blanks with bubbles larger than a pinhead.
- 14) Identify and fully document all samples in the field logbook, on the chain of custody form, and on the sample label.
- 15) Follow chain of custody procedures.

7. CHAIN OF CUSTODY RECORDS

The chain of custody (COC) record documents the contents of the shipment, date, times, sample numbers, and number of sample containers. The purpose of the record

is to document transfer of sample custody. The COC record must be completed in the field at the time of sample collection.

7.1 Sample Custody

Sample custody will be traceable from the time of sample collection until its delivery at the laboratory. The COC is used to document this custody. Record the necessary information in non-erasable, waterproof, black ink. Correct errors by marking through with a single line. Initial the error and then record the correct information.

7.2 Sample Label and Custody Seal

Complete and attach the sample label and custody seal. Enter the appropriate information on the label and the seal using the same requirements as the information on the COC. After collecting the sample, attach the label and the custody seal on the jar. Attach the custody seal so the container cannot be opened without disturbing the seal.

7.3 Document Transfer Of Custody

Document transfer of custody by using the following guidelines:

- 1) When transferring custody to the Detachment's chemist, complete the first "Relinquished by:" block followed by the date and time of transfer. The chemist will accept custody of the samples by completing the "Received by:" block. This transfer will be documented at the time the chemist receives the samples from the field.
- 2) The chemist will transfer custody of the samples to the laboratory by completing the second "Relinquished by:" block on the COC followed by the date and time of transfer.

8.0 SHIPPING

8.1 Transporting Samples From The Field To A Local Laboratory

The following guidelines should be followed for transporting samples from the field to a local laboratory:

- 1) Select a clean cooler in good condition. Seal the drain plug with tape to prevent leakage.
- 2) Line the cooler with a large plastic bag.
- 3) Double bag the ice used to preserve the samples. Ensure no leakage of water occurs from the ice into the cooler.

- 4) Ensure all the sample jar lids are tight to prevent leakage.
- 5) Wipe the outside of the sample jar to ensure the sample medium does not contaminate other sample jars.
- 6) Place each sample jar in a sealable plastic bag to prevent leakage.
- 7) Place each sample jar into the cooler in an upright position to prevent leakage.

8.2 Transporting Samples To The Laboratory Via Air Shipment

The following should be used as guidelines for transporting samples to the laboratory via air shipment:

- 1) Allow sufficient headspace in all bottles (except volatile organic compound (VOC) containers with a septum seal) to compensate for any pressure and temperature changes (approximately 10 percent of the volume of the container).
- 2) Ensure sample jar lids are tight to prevent leakage.
- 3) Wipe the outside of the sample jar to ensure the sample medium does not contaminate other sample jars.
- 4) Place each sample jar in a sealable plastic bag to prevent leakage.
- 5) Select a sturdy cooler in good repair. Secure and tape the drain plug with duct tape. Line the cooler with a large heavy duty plastic bag.
- 6) Place two to four inches of padding in the bottom of the cooler and then place the sample jars in the cooler with sufficient space to allow for the addition of additional padding between the jars.
- 7) Put ice that has been double bagged and properly sealed on top of and/or between the samples. Fill all remaining space between the bottles with padding.
- 8) Securely fasten the top of the large garbage bag with tape (preferable plastic electrical tape).
- 9) Place the COC record in a plastic bag and tape the bag to the inner side of the cooler lid.
- 10) Close the cooler and securely tape (preferably with fiber tape) the cooler shut. Custody seals should be affixed to the top and sides of the cooler so the cooler cannot be opened without breaking the seal.
- 11) Shipping containers must be marked "THIS END UP" and arrows which indicate the proper upward position of the container. A label containing the name and address of the Detachment shall be placed on the outside of the container.

9. DECONTAMINATION

Cleaning procedures in this section are intended for use by field personnel for cleaning sampling equipment and other equipment utilized in the field.

9.1 Specifications For Cleaning Materials

- Soap shall be a standard brand of phosphate-free laboratory detergent (Liquinox). If any other detergent is used, it should be justified and documented in the field logbook.
- Solvent shall be pesticide-grade isopropanol. Use of a solvent other than pesticide-grade isopropanol must be documented in the field logbook.
- Tap water may be used from any municipal water system. When available, hot water should be utilized. Use of untreated potable water is not an acceptable substitute for tap water.
- Analyte free water (deionized water) is tap water that has passed through a standard deionizing resin column. The water should not contain any heavy metals or other inorganic compounds at or above analytical detection limits.
- Organic/analyte free water is defined as tap water that has been treated with activated carbon and deionizing units. The water should meet the requirements of ASTM Type III water.

Note: The decontamination room at Building 25 provides American Society of Testing and Materials (ASTM) Type III water at the decon sink.

- Other solvents (e.g., pesticide-grade hexane or petroleum ether) may be used if required to remove waste contamination from sampling equipment. After use, the equipment will be recleaned with the standard cleaning protocol. Equipment must be completely air dried prior to use.

Note: Once solvents, laboratory detergent, or rinse water has been used, it shall not be reused.

9.2 Cleaning Solutions And Container Handling

- Soap must be kept in clean plastic, metal, or glass containers and poured directly from the container during use.
- Solvent must be stored in the original unopened container. The solvent can be applied with a Teflon squeeze bottle.
- Tap water may be kept in clean tanks, hand sprayers, squeeze bottles, or applied directly from a hose.
- Organic/analyte free water must be stored in clean glass, Teflon, or stainless steel containers prior to use. It should be applied from the water purification system or a Teflon squeeze bottle.

9.3 Decontamination Area Setup

Building 25 (Horse Shoe) has a permanent decontamination area established and should be utilized when practicable (i.e., performing work on the Charleston Naval Complex).

When it is necessary to perform decontamination in the field, the following guidelines should be used:

- 1) Setup decon area upwind from sources of contaminants (i.e., the site, running vehicles etc.).
- 2) Place plastic sheeting on ground to catch/contain any spilled liquid.
- 3) Contain spent investigation-derived waste (IDW) liquids in suitable containers (buckets) and containerize in designated drums for proper disposal.
- 4) QA/QC samples shall be taken, if required.

9.4 Decontamination Of Sampling Equipment

Sampling equipment includes any downhole equipment (e.g., augers drill pipe, split barrel samplers, bailers etc.) and sampling utensils (e.g., stainless steel spoons, bowls, etc.).

9.4.1 Precautions

- No eating, smoking, drinking, chewing, or hand to mouth contact is allowed during cleaning operations.
- Don splash shields or goggles during cleaning. Wear a full apron and/or rubber boots if the nature of the waste contamination or cleaning method warrants the added protection.
- Don clean protective gloves before decontaminating equipment.

9.4.2 Deconning Sequence for Sampling Equipment:

- 1) Don protective gloves.
- 2) Wash and scrub with laboratory-grade detergent and tap water to remove particulate matter and surface films. Equipment may be steam cleaned (soap and high pressure hot water) as an alternative to brushing. Polyvinyl Chloride (PVC) or plastic items should not be steam cleaned.
- 3) Rinse thoroughly with tap water.
- 4) Rinse with ASTM III Type water.
- 5) Rinse with solvent. Do not solvent rinse PVC or plastic items.
- 6) Rinse with ASTM III Type III water. If ASTM Type III water is not available, equipment should be allowed to dry completely.

- 7) Wrap equipment with aluminum foil. Additionally, equipment that may be exposed to possible contaminants in route to or at the site should be wrapped with plastic.

9.5 Deconning of Non-Sampling Equipment

Non-sampling equipment includes drill rigs and backhoes or other heavy equipment. Paint or coatings like rust that will potentially touch the sample area should be removed through sand blasting or wire brush before it is brought to the site. Whenever possible, the decon pad located adjacent to Building 1656 shall be used to decon this type of equipment.

The following method of cleaning should be implemented prior to use:

- 1) The pad should be constructed in an area known or believed to be free of surface contamination.
- 2) The pad should facilitate the removal of wastewater and collection of the wastewater.
- 3) Remove large portions of solid debris from equipment at the site prior to transporting equipment to the decon pad.
- 4) Safety glasses with splash shields, neoprene aprons, rubber boots, and neoprene gloves will be worn during cleaning operations. Note: Additional protective clothing and respiratory equipment may be required.
- 5) Decontaminate with high pressure steam (soap and high pressure hot water) if available, or scrub with laboratory-grade detergent. Rinse with clean water as necessary.
- 6) Drill rigs and backhoe buckets, etc., should be cleaned between boreholes or excavations.
- 7) Cleaning operations should be documented in the field logbook.
- 8) QA/QC samples shall be taken, if required.
- 9) Contain spent liquids (IDW) in suitable containers and containerize in designated drums for proper disposal.

9.6 Deconning Well Sounders Or Tapes

Well sounders and tapes require cleaning. The following guidelines should be followed:

- 1) Don protective gloves.
- 2) Wash with soap and tap water.
- 3) Rinse with tap water.
- 4) Rinse with ASTM Type III water.

9.7 Pump Decontamination

The pump exterior and interior both require cleaning. The following guidelines should be used:

- 1) Don protective gloves prior to cleaning.
- 2) Immerse pump head in a detergent solution with the effluent hose prepared to discharge into a liquid IDW drum. A stainless-steel bucket of closed 4-inch pipe can be used to contain the pump head and pump solutions. All pump effluent will be containerized as IDW.
- 3) Clean exterior of pump and hose with detergent and rinse with tap water followed by ASTM Type III water.
- 4) Pump ASTM Type III water through the hose to purge the clean water rinse solution. Run pump in reverse to purge additional water.
Note: Do not run pump dry and never switch directly from the forward to the reverse mode with out pausing in the "OFF" position.
- 5) Rinse outside of pump with ASTM III Type water.
- 6) Wrap pump in plastic sheeting for transport.

9.8 Personnel Decontamination

Personnel decontamination procedures are outlined in the Comprehensive Health and Safety Plan (CHASP).

9.9 Decontamination Methods for Specific Sampling Equipment And Containers

The United States Environmental Protection Agency (USEPA) Standard Operating Procedures and Quality Assurance Manual (SOP/QAM) Appendix C, provides specific methods for cleaning miscellaneous equipment and containers (e.g., vehicles, ice chest, field equipment, pump varieties, tubing, sample containers etc.) should it be necessary to clean such items.

10. INVESTIGATION-DERIVED WASTE

10.1 Management

Investigation-derived waste (IDW) will be managed to comply with all applicable requirements. IDW will likely include soil, soil borings and monitoring wells, groundwater from purging monitoring wells, disposal personal protective equipment (PPE), decontamination fluids, sampling and drilling equipment. Activities that may generate IDW during operations include site investigations, removal actions, and underground storage tank investigations. Federal, state, and local environmental laws and regulations apply to IDW.

The Resource Conservation and Recovery Act (RCRA) is the most important federal statute for managing IDW because it specifically regulates disposal of solid waste and all aspects of transportation, treatment, storage, and disposal of hazardous waste. Wastes are defined as hazardous based on their source or method of generation or their chemical constituents or characteristics. Determining whether a waste is hazardous may be based on knowledge of the IDW and associated suspected or known contamination, rather than by direct testing. The IDW generator may choose to characterize the waste based on corporate knowledge of the history of the site and environmental data for the surrounding area, provided that knowledge or data are specific enough to enable waste characterization, without actually collecting a sample of the waste and testing it for hazardous waste parameters.

10.2 Land Disposal Restrictions

With respect to IDW management, the land disposal restrictions (LDR) program is one of the most significant provisions of RCRA. The LDR program establishes standards that must be met before placing hazardous waste into land disposal units which include landfills, surface impoundments, waste piles, and other land-based units. Hazardous waste generators must notify the receiving hazardous waste facilities that a waste is restricted from land disposal. For the purpose of managing IDW, land disposal occurs when any of the following activities take place:

- Waste from different SWMUs or AOCs are consolidated and disposed of in one AOC.
- Wastes are moved outside of a SWMU/AOC for storage or treatment and are returned to the same or a different SWMU/AOC.
- Wastes are excavated from a SWMU/AOC, removed to a separate unit such as a tank, surface impoundment, or incinerator that is within the SWMU/AOC, and then are redeposited into the SWMU/AOC.

Waste that does not contain hazardous constituents and is not mixed with other contaminated IDW does not trigger LDR and may be replaced at the site from which it originated, provided the surface conditions permit (i.e., unimproved surfaces).

10.3 Waste Management Units

The United States Environmental Protection Agency has developed two new types of waste management units, the Corrective Action Management Unit (CAMU) and the Temporary Unit (TU), as a mechanism for providing more regulatory flexibility at remediation sites while maintaining a standard of environmental protection.

10.3.1 CAMUs

CAMUs are land-based units that can be used to manage wastes during a site remediation. They provide the following two advantages:

- 1) Placing remediation wastes into or within a CAMU does not constitute land disposal of hazardous wastes, so LDR requirements are not triggered.
- 2) Consolidating or placing remediation wastes into or within a CAMU does not constitute creating a unit subject to minimum technical requirements.

10.3.2 TUs

TUs are for short-term operation of tanks and container storage units used for treating or storing remediation wastes. These units may only be used for remediation wastes, and they must be located at the facility where the remediation is occurring. The corrective action regulations for temporary units provide that an alternative design, operating, or closure standard may be applied rather than the standards that normally apply to permitted facilities. Wastes can be stored in a TU for up to one year, with extensions available case-by-case.

10.4 Toxic Substances Control Act

The Toxic Substances Control Act (TSCA) states regulations for chemical manufacturing and for the management and disposal of wastes containing asbestos and Polychlorinated Biphenyls (PCB). This regulation potentially affects IDW management in at least two ways:

- 1) Non-hazardous IDW under RCRA that contains PCBs at concentrations greater than specified limits must be managed at facilities permitted under TSCA. Incineration is the most common option for wastes containing 50 parts per million (ppm) PCBs or greater.
- 2) Non-hazardous IDW with PCB concentrations less than 50 ppm are generally not regulated under TSCA, although some states regulate these wastes as hazardous. At the former Charleston Naval Base Complex, waste that contains any concentration of PCBs or asbestos will be managed and disposed of as special waste.

10.5 Characterizing IDW

The process of identifying and characterizing IDW will be started when planning field activities. Characterizing IDW is a multi-step process that involves determining the origin of the waste and then considering the chemical contaminants and their concentration in the waste. Typically, sampling data obtained from site characterization or investigation activities will provide an initial determination of

whether a waste is hazardous. IDW will be sampled and analyzed to provide additional information and to determine specific hazardous waste characteristics. Environmental samples relevant to IDW are soil samples (for soil cuttings and excavated soil) and groundwater samples (for purge water and development water).

The RCRA program recognizes two general classes of solid waste at the federal level: hazardous and non-hazardous. Hazardous wastes are defined by either being a listed waste or by contaminant concentrations in the waste. A characteristic waste exhibits properties of ignitability, corrosivity, reactivity, or toxicity. In order for a waste to be considered a characteristic hazardous waste, it must exhibit one or more of the following properties:

Ignitability

Corrosivity

Reactivity

Toxicity

–Heavy Metals

–VOAs

–SVOAs

–Pesticides and herbicides

The characteristic for toxicity is based on the leaching characteristics of the waste. The Toxicity Characteristic Leaching Procedure (TCLP) simulates the effect of hazardous constituents leaching from a waste and regulatory limits to protect human health and the environment are set by USEPA. If a total analysis demonstrates that individual constituents are not present in the waste, or that they are present but at such low concentrations that the appropriate regulatory levels could not possibly be exceeded, the TCLP need not be run.

10.6 Sampling IDW

IDW will be sampled and analyzed when corresponding environmental sample data are not available or when additional information is needed about the waste. All samples collected for waste analysis should be representative of the waste being sampled.

IDW is characterized through knowledge of the waste, review of environmental data that correlate to the waste, or sampling and analyzing the waste itself. This characterization leads to a waste profile summarizing all the information available on the IDW.

10.7 Disposal of PPE

Disposable PPE and disposal equipment (DE) will be managed according to the type of activity and level of contamination encountered with the equipment. Non-hazardous

IDW will be appropriately labeled and placed in plastic bags to be transferred to an on-site industrial dumpster whose contents are disposed of in an municipal landfill.

PPE and DE contaminated with hazardous waste will be managed as hazardous waste and will be characterized in a manner consistent with the media being sampled.

10.8 IDW Storage Requirements

Specific storage requirements for IDW depend on a number of factors, including the location of the storage area and the length of storage and the regulatory status of the storage unit. Storing non-hazardous waste and designated waste in drums and portable tanks is not regulated by USEPA. Storage of hazardous waste is regulated on the federal and state levels with three available options:

- 1) Storage in a TU.
- 2) Storage for up to 90 days from the date of characterization.
- 3) Storage in a unit that meets permitted facility standards.

10.9 TUs and CAMUs

Storing waste in a TU provides the greatest flexibility for the design and operation of the storage unit. A temporary storage unit may be established for containers or tanks and may be located either within or outside an SWMU/AOC or CAMU. A major advantage of the TU is that IDW may be stored for up to one year, and waste may be removed from the TU and returned to the SWMU/AOC or CAMU for treatment or disposal without triggering LDRs or minimum technical requirements (MTRs). TUs must be administratively created with regulatory agency input. Specific design and operating requirements for accumulation storage areas and permitted storage units may be used as guidelines in developing TUs.

10.10 Less Than 90 Day Areas

Generators may accumulate hazardous waste in container storage areas or storage tanks for up to 90 days before shipment to an off-site treatment, storage, and disposal facility (TSDF). These storage areas and tanks are commonly called less-than-90-day storage facilities.

10.11 Storage Area Inspections

All storage areas (TU and 90-day accumulation) will be inspected at least weekly. This inspection will cover the condition of containers, adequacy and completeness of labels, evidence of leaks and spills, adequate aisle space, loading and unloading areas, and emergency equipment.

10.12 Portable Storage Tanks

Portable storage tanks often are used to accumulate and store liquid IDW. USEPA regulates these portable tanks as containers for storage on-site. These tanks should be labeled in the same manner as containers.

10.13 Labels

All waste containers shall be labeled. A completed label should include the following: date contents were placed in the container, the sample identification number(s), IDW type, and the source site number. The following guidelines will be used:

- 1) An empty container shall be labeled "EMPTY".
- 2) Before placing any waste into a container/drum, remove the "EMPTY" label.
- 3) Prior to any material being placed into a container/drum, it must be marked appropriately.
- 4) Mark the container/drum to indicate the type of waste.
- 5) When dealing with hazardous waste, identify the area as such (use signs and barriers) and place hazardous waste labels on the container/drum. **BEFORE PLACING HAZARDOUS WASTE INTO ANY CONTAINER, ATTACH A HAZARDOUS WASTE LABEL.**
- 6) Remove the containers/drums from the work site when they are no longer needed.
- 7) Ensure the facility has a generator identification number.

If the IDW type is unknown, label the container "ANALYTICAL RESULTS ARE PENDING ON THE CONTENTS IN THIS CONTAINER."

All labeling information for each drum will be entered into the field logbook. After the container contents are characterized, the labels will be replaced to reflect the appropriate classification of wastes and the logbook will be updated.

Containers/drums containing hazardous IDW will be labeled "HAZARDOUS WASTE – South Carolina (or applicable state for off-site work) Law Prohibits Improper Storage or Disposal. If found, contact nearest police or public safety authority or the S.C. (or applicable state for off-site work) Department of Health and Environmental Control".

Containers/drums containing non-hazardous IDW will be labeled "NON-HAZARDOUS WASTE". Drum labels will be placed on the side of the drum, not on the lid, to reduce weathering and to prevent the possibility of interchanging labels if the lids are reused.

10.14 Treatment and Disposal Options

Once the waste characterization process has been completed for IDW, treatment and disposal options may be considered that provide for appropriate waste management. The options available at a particular installation depend on:

- Availability of on-site management facilities, such as wastewater treatment plants, bioremediation facilities, and other treatment technologies that may have been developed for other cleanup sites.
- Availability of municipal publicly owned treatment works (POTW) with the capability to treat wastewaters generated at the installation.
- Site conditions and regulatory approval for disposal of non-hazardous soil back onto the site where generated. Soil that does not contain chemicals of potential concern above background concentrations will be recommended to be placed back on the site where generated.
- Any soil or sediment that contains chemicals of potential concern at concentrations that may pose a risk to human health and the environment, but is not determined to be a hazardous waste will be handled as a hazardous waste.

The off-site waste management options addressed in this include management of aqueous liquids at installation wastewater treatment plants, management of aqueous liquids at publicly owned treatment works (POTWs), and management of off-site facilities using the waste management subcontract.

11. SOIL SAMPLING

Soil sampling locations will be positioned in accordance with the site-specific sampling and analysis plan (SAP), if applicable. Investigative sampling may be authoritative in nature. Techniques for sample collection depend on the soil type and depth of the sample.

Surface samples are defined as 0 to 1 foot below land surface (BLS) exclusive of rocks, twigs, leaves, and vegetation. Surface soil samples may be collected manually with hand augers. Power devices such as drill rigs or backhoes frequently are used for deeper subsurface samples, depending on the depth of the sample to be collected and the soil type. All samples except for VOA will be homogenized.

11.1 Soil Sample Requirements

Each soil sampling team will have at least two members. One person will collect the sample as the other documents information in the field logbook regarding adherence to sampling procedures, difficulties encountered, and other pertinent information. Soil boring, surface soil sample collection locations, and test trenches will be designated in

compliance with the sample identification system outlined to facilitate sample data management.

11.1.1 Soil descriptions

Document soil descriptions in the field logbook and include color, texture, grain size, staining, and odor.

11.2 Immunoassay Screening

Immunoassay screening is effective for petroleum hydrocarbon, polyaromatic hydrocarbons (PAH), pentachlorophenol (PCP), pesticides and PCB screening and is useful for establishing soil sampling locations. This survey may require establishing a grid system across the site. Soil samples may be collected from the designated intervals. Procedures for using immunoassay screening equipment varies between manufacturers and are provided in each test kit.

11.3 Sample Collection

The following guidelines should be followed during sample collection:

11.3.1 Before Surface Soil Sampling:

- 1) Don personal protective clothing and equipment.
- 2) Clear vegetation and other debris from the surface around the boring location.
- 3) Place clean plastic sheeting on the surface near the sample collection location to hold decontaminated sampling equipment.
- 4) Set up a decontamination area for sampling equipment, if required.

11.3.2 During Surface Soil Sampling:

- 1) Remove surface debris from the sample location.
- 2) With a stainless-steel device, scrape the sample collection location to obtain a previously unexposed surface.
- 3) Use a decontaminated stainless-steel or Teflon lined sampling device (e.g., spoon, spatula) to collect the volume needed to fill the sample container(s).
- 4) For Grab samples:
 - Completely fill the sample containers directly from the sampling device, avoiding twigs, large rocks, and grass. Collect the VOA samples first.
 - Be sure to have zero head space in the VOA sample container. Non-VOA samples will be filled to the container shoulder.
 - Place the remainder of the sample in the mixing bowl and thoroughly homogenize. Place the homogenized mixture into the appropriate sample containers.

5) For Composite samples:

- Empty contents of the sampling device into a decontaminated stainless-steel or Teflon lined bowl. Collect enough to fill all the containers.
- Homogenize the sample by thoroughly mixing using a decontaminated stainless-steel or Teflon-lined spoon or spatula. Do not homogenize samples for VOA analysis.
- Place the homogenized mixture into the appropriate sample containers.

6) For Toxicity samples:

- Empty contents of sampling device into appropriate sample container.
- Toxicity samples will not be composited.

7) Secure container with the lid.

8) Label each sample container and preserve to 4 degrees Celsius.

11.3.3 After Surface Soil Sampling:

- 1) Backfill the borehole with any excess soil.
- 2) Record pertinent information in the field logbook.
- 3) Clean site. Place contaminated disposable materials in a suitable container for disposal.

11.4 Hand-Augering

The following guidelines should be followed for hand-augering sample collection:

11.4.1 Before Augering:

- 1) Don personal protective clothing and equipment as required.
- 2) Clear vegetation and other debris from the surface around the boring location.
- 3) Place clean plastic sheeting on the surface near the sample collection location to hold decontaminated sampling equipment.
- 4) Set up a decontamination area for sampling equipment, if required.

11.4.2 During Augering:

- 1) Begin augering to the depth required for sampling.
- 2) Make detailed notes about geologic features of the soil or sediments in the field logbook.
- 3) Stop drilling at the top of the specified or selected sampling depth. Remove the contaminated auger bucket and replace with a decontaminated bucket.

- 4) Collect sample. Without homogenizing, collect VOA samples from auger bucket and immediately place into the appropriate container. Fill the container so there is zero head space.
- 5) Place the remaining sample volume into a stainless-steel bowl. Homogenize the sample and place into the appropriate containers. Label the samples and preserve to 4 degrees Celsius. Record the sample identification number, sample collection depth, and analyses required in the field logbook and/or on the appropriate field forms.
- 6) Proceed with additional sampling.

11.4.3 After Augering:

- 1) Backfill the borehole.
- 2) Decontaminate all equipment.
- 3) Place used plastic sheeting and other disposable sampling equipment in the designated drum for disposal.
- 4) Complete the field logbook entry.

11.5 Sample Collection By Drill Rig/Backhoe

Soil borings advanced by a drill rig will use hollow-stem augers. During borehole advancement, monitor the breathing zone for volatile organic vapors. The augers will be advanced without a center plug to facilitate split-barrel or Shelby tube sample collection. After soil samples are obtained to the proper depth, the borings will be abandoned with neat cement grout or completed with monitoring wells.

Soil samples also may be collected from backhoe buckets. Take the soil sample from the middle of the backhoe bucket. It is important to take the sample from the soil that has not been in contact with the bucket.

11.6 Trenches

Test pits and trenches are open excavations used to determine the shallow subsurface conditions at the site. Test pits and trenches can be excavated manually or mechanically with a backhoe or bulldozer. The following guidelines should be followed:

11.6.1 Before Trenching:

- 1) Don personal protective equipment.
- 2) Collect surface soil samples if the site-specific work plan requires.

11.6.2 During Trenching:

- 1) Carefully excavate soil in 1-foot increments.
- 2) Collect subsurface soil samples as required in the site-specific work plan. Avoid entering the test trenches. Use sampling device, such as a hand auger with extension handles/rods, to collect samples after removing smeared materials with a decontaminated spoon or other scraping device. If necessary, collect samples from the center of the decontaminated backhoe from a previously unexposed surface.
- 3) If the test trench is deeper than 4 feet and personnel entry is required, comply with 29 Code of Federal Regulations Parts 1926.650, 651, and 652.
- 4) Water or other liquids removed from the excavation must be considered contaminated. Contain the liquid until it can be returned to the excavation or properly disposed.

11.6.3 After Trenching:

- 1) As required, collect samples of the stockpiled soil.
- 2) Backfill the trench with clean material or stockpiled soil to the surface after all samples have been collected in accordance with the zone-specific work plan.
- 3) Place all used plastic sheeting and other disposable equipment in the designated drum for disposal.
- 4) If stockpiled soil is contaminated, dispose of it in accordance with applicable state and federal regulations.

12. GROUNDWATER SAMPLING

12.1 Groundwater Sampling General Guidelines

The following general guidelines should be followed during groundwater sampling:

- 1) Monitoring wells will be purged to remove the stagnant water from the casing and borehole space prior to sampling.
- 2) All purging and sampling of monitoring wells will be conducted by using a peristaltic pump. If the peristaltic pump is ineffective or impractical, it is permissible to use a Teflon bailer with a stainless-steel leader attached.
- 3) When using a bailer, secure the bitter end of the rope so that the bailer cannot be lost in the well.
- 4) All pump tubing that will come into contact with the well water will be constructed of tygon or a Teflon lined material.
- 5) All equipment that could affect the integrity of the well or the quality of the sample shall be deconned prior to use.
- 6) All well purging and sampling data will be recorded in a field logbook and/or a groundwater sampling form.

- 7) Purge up gradient and background wells before down gradient wells to reduce cross contamination risks.
- 8) Contain purge water in a dedicated, properly labeled drum.
- 9) Newly installed wells will be allowed to recover for a period of two weeks before sampling.

12.2 Purging

Monitoring wells should be purged using the following guidelines:

- 1) Monitoring wells will be purged between 3 and 5 well casing volumes. Indicator parameters (i.e. temperature, specific conductivity, pH, and turbidity) will be measured at 1/2 well casing volume intervals during purging. If the indicator parameters for temperature, specific conductivity, and pH have stabilized (the final 3 data recordings are within 10% of each other) and the turbidity is less than 10 NTUs after 3 well casing volumes have been removed, sampling may proceed. If the parameters have not stabilized or if the turbidity is not 10 NTU or less by the third well casing volume, purging will continue until a maximum of 5 well casing volumes have been purged. At that point, sampling will proceed. Wells pumped dry while purging or bailed dry (based on well recovery rate history) will be sampled when sufficient volume has re-entered the well or within 24 hours. Note: Every effort should be made to avoid purging the well dry.
- 2) If a bailer is to be used to purge the well, allow the water level to recover enough to completely submerge the bailer without touching the bottom of the well. Note: This requirement does not apply to bailing a well dry.
- 3) If the sample parameters dictate that a free chlorine or sulfide spot test be performed, test the purge water with the appropriate test papers at the beginning, middle, and end of the purge evolution.
- 4) Wells that retain a high turbidity reading after the removal of 3 well casing volumes may need redeveloping.

12.3 Well Purging

Monitoring wells should be purged using the following guidelines:

- 1) Don PPE as required by the Site Safety and Health Plan.
- 2) Cover the surface around the well with clean a plastic sheet to contain any water spilled during purging or sampling.
- 3) Inspect the wellhead, protective casing, and lock. Record any deficiencies.
- 4) Open the well cover and monitor the head space and breathing zone using a Photoionization Detector (PID) or Flame Ionization Detector (FID) to measure ionizable organic vapors.

- 5) Using an interface probe, check for the presence of any free product. If free product is present, determine the thickness of the layer. If free product is to be sampled, sample and remove the free product before continuing. Either a disposable bailer or Teflon tubing will be used to obtain the sample.
- 6) Measure static water level to the nearest 0.01 foot.
- 7) Calculate static volume using the formula [$V=0.041D^2H$, V=volume of water in gallons, D=Diameter of well in inches, and H=Depth of water in feet (total well depth - static water level)] or by multiplying the static water level by 0.17 for a 2" well casing.
- 8) Insert tubing into the well and begin purging. Tubing should not be inserted into the well any further than necessary to obtain sample (within 1 foot of the water level).

12.4 Sampling guidelines:

The following guidelines should be followed during groundwater sampling:

- 1) Wells will be purged prior to sampling. Note: In order to minimize waste generation, a well containing free product which has been previously sampled and identified may be sampled below the free product layer without purging the well.
- 2) Slowly insert the tubing or bailer into the well to minimize aeration, particularly when VOA or SVOA samples are being collected.
- 3) Unless the same tubing or bailer is used for both purging and sampling, discard the initial water. If using a bailer, discharge 2 bailer volumes prior to collecting samples.
- 4) When using a bailer, do not partially fill the sample containers. If the bailer volume is insufficient to fill a container, discard the water and refill the bailer.
- 5) If the free chlorine and sulfide spot checks are positive, preserve and filter the water prior to pouring the sample. If required, perform sample filtration with a 0.45 micron filter as soon as possible.
- 6) When collecting samples, fill all containers except VOAs leaving approximately 10% head space. VOAs will be filled with zero head space. After collecting samples, add preservative as required. Cap, seal, and properly label all containers. Immediately place the containers into the cooler and chill to 4 degrees Celsius.
- 7) Samples will be collected in the following order: VOA, Dissolved Gasses and Total Organic Carbon, SVOA, Metals and Cyanide, Major Water Quality Cations and Anions, and Radionuclides.

12.5 Well Sampling:

Monitoring wells should be sampled using the following guidelines:

- 1) If not already accomplished, don PPE as specified in the Site Safety and Health Plan.
- 2) If not already accomplished, cover the surface around the well head with plastic sheeting.
- 3) Arrange sample containers in order of sample collection.
- 4) If not already accomplished, insert tubing/bailer into well and sample.
- 5) After the sampling event is finished, clean the area and place disposable materials (plastic sheeting, gloves, tubing, etc.) into the proper waste facility.
- 6) Complete all documentation required to support the sampling event.
- 7) Ensure the well cap is installed/locked and that the well cover is installed.

13.0 SEDIMENT/SURFACE WATER SAMPLING

13.1 Designating Sediment/Surface Water Sample Collection Locations

Sediment and surface water sample collection locations will be designated to comply with the sample identification system to facilitate sample data management. Sediment and surface water collection locations will be designated according to SWMU (first three digits), media to be sampled (one matrix digit), and the unique well number (four digits). Proper attention must be given to ensure unique numbers are assigned to all sampling locations.

13.2 Sediment Sampling

Sediment sampling can be performed by several acceptable sampling techniques (dredging, scooping, coring) for collecting sediment samples from surface water bodies and dry land areas, depending upon sampling objectives. Sediment samples generally will be collected to a maximum depth of 6 inches. Several general precautions must be followed to provide a representative sediment sample and to minimize disturbance regardless of sampling technique.

13.3 General Sediment Sampling Precautions:

- 1) Avoid sediment plumes and density currents.
- 2) If sediment and surface water samples are to be collected at the same location, collect the surface water first.
- 3) Sediment sampling locations may be reached by wading or by boat, depending upon water depth and the substrate's nature. If wading to the sample location, approach from downstream to minimize disturbance.

13.4 Surface Water Sampling

Samples will be collected either by placing the sample bottle in the surface water body or by using a similar sampling device. After selecting sample locations, the number of samples to be collected will depend on the following criteria:

- 1) Water depth
- 2) Estuarine or fresh water
- 3) Tidal influence
- 4) Salinity profile
- 5) Type of water body (lake, stream, impoundment, or wetland)

Where the water depth is greater than 3 feet, surface water quality parameter measurements (e.g., dissolved oxygen, temperature, pH, conductivity, salinity, and depth) will be collected at the following depths: 1 foot below the water surface, mid-depth, and 1 foot above the bottom.

13.5 General Surface Water Sampling

General surface water should be sampled using the following guidelines:

- 1) Collect samples from areas of least to greatest contamination and from upstream to downstream.
- 2) Approach surface water sample locations from downstream to minimize sediment disturbance.
- 3) In tidal areas, sample collection should be made at slack tide, preferably low slack.
- 4) Collect samples so as to minimize agitation of underlying sediments.
- 5) If surface water samples and sediment samples are to be collected at the same location, collect the surface water sample first.
- 6) Determine the number of sample collection depth at the sample location:
 - a) If water is less than 1 foot deep, collect one sample at the surface.
 - b) If water is more than 1 foot and less than 10 feet deep, the sample shall be collected at mid-depth unless the salinity profile indicates the presence of a halocline (salinity stratification). If a halocline is present, a surface water sample shall be collected from each stratum.
 - c) If water is more than 10 feet deep, collect samples at 1 foot depth, mid-depth, and 1 foot above the bottom.

13.6 Surface water sample collection procedures for submerged bottle:

Submerging the laboratory bottle is feasible only for surface water sample locations accessible by wading. If samples are to be collected from more than one depth, or if the sample location is not accessible by wading, another method should be used.

14. MISCELLANEOUS SAMPLING TECHNIQUES

14.1 Wipe Sampling

Wipe sampling may be necessary to evaluate whether miscellaneous non-absorbent surfaces of walls, floors, equipment, etc., are contaminated. Ideally, the surface should be horizontal and facing upward since surfaces in this position generally are most susceptible to spills and settling dust, but this is not always the case. Wipe samples should be taken using the following guidelines:

- 1) Wipe samples will be collected by swabbing or wiping the material or surface with pre-prepared gauze pads that are saturated with either methylene chloride, certified pesticide-grade hexane, or deionized water, depending on the parameters to be analyzed. The wipes are to be removed from the sample jar using tweezers or gloves. The entire area to be sampled is wiped with firm strokes using only one side of the wipe. The wipe is then returned to the sample jar from which it was taken. Care should be taken to tightly reseal the jar to prevent evaporation of the solvent. Label the sample jar.
- 2) A new pair of disposable gloves shall be worn to collect each individual wipe sample. The area sampled shall be noted on the chain-of-custody form. The optimal area is 100 square centimeters. In order to ensure a consistent sampling area, a 100 square centimeter template will be used. However, due to the nature of the matrices to be sampled, the optimal area may not be available. In instances where a 100-square-centimeter sample area is not available, the actual sampled area will be measured and noted on the chain-of-custody form and the field logbook.

14.2 Waste Sampling

The waste sampling program's basic objective is to produce a set of samples representing the waste media under investigation and suitable for subsequent analysis. This section describes the methods and materials that will be used for sampling waste. Under many circumstances, the sampling and testing performed for the investigation will be sufficient to classify the waste and no additional sampling will be necessary.

Sampling accuracy usually is achieved by using a random sampling technique. Sampling precision is achieved by collecting the appropriate number of samples and by maximizing their physical size.

Prior to sampling waste, it is important to assess all available information such as previous sample results. To sample stockpiled soil, the following guidelines will be used:

1. Vertical composite samples will be used with 5 to 8 equal samples (or aliquots) which will be combined to make one sample.
2. One composite sample will be taken for every approximate 40 cubic yards of soil.
3. Grab samples will be taken if "hot spots" are suspected.

14.3 Random Sampling

A simple random sampling strategy will be employed for most solid waste cases where additional samples are required to characterize the waste. The rationale for using this type of sampling method is that typically little or no information is known about the distribution of the chemical contaminants within the waste. For most solid waste, distinct strata within the containers are not identified and variations in composition or stratification may have occurred at unknown and random depths.

Simple random sampling is a type of probability sampling that relies on mathematical and statistical theories. In simple random sampling, all locations or portions of the waste have an equal chance of being sampled. For simple random sampling, the appropriate number of samples to be collected is estimated by finding the regulatory threshold (RT) for the contaminants of concern (COC) and by estimating the sample mean (\bar{x}) and variance (s^2). Simple random sampling may be used for liquid waste that is thought to be homogeneous.

14.4 Stratified Random Sampling

Stratified random sampling may be used for liquid waste sampling where the COC are thought to stratify due to their density relative to the other liquids. Stratified random sampling is different from simple random sampling in that \bar{x} is calculated for each stratum in the population and then integrated into the overall estimates of those statistics. Systematic random sampling also may be used for instances where there are recognized trends or cycles associated with the contaminants in the waste. Cases where systematic random sampling may be used include drums with floating or sinking products.

14.5 Waste Characterization

It also is likely that if the waste is to be disposed of to a treatment, storage, or disposal facility (TSDF), its operators will want to perform their own waste characterization. Therefore, it is important to contact the potential TSDF before sampling and analyzing the waste to avoid duplicating efforts and costs. The potential TSDF for the waste

should be contacted following environmental sampling. Their requirements regarding acceptable laboratory analyses change as do the wastes they are accepting and the rates they charge. Transportation requirements and costs should be determined before shipping.

The sampling method chosen for each of the waste media will, in part, be dependent on the potential contaminants of concern as shown by site history or analytical results of the field sampling program. The generation of additional decontamination fluids through waste sampling should be minimized and should be a factor considered in the final choice of sampling technique. Care should be exercised to avoid the use of sampling devices plated with chrome or other materials that might contaminate the sample.

14.5.1 Soil and Sludge Sampling

Available options for sampling devices suitable for soil and sludge (or sediment) sampling include scoops, thin-walled tube samplers, hand augers, core samplers, and sampling triers. Using a scoop and a sampling trier 100 centimeters (cm) long is the recommended method for sampling containerized soil and sludge. However, site-specific conditions may necessitate a variety of sampling options. Therefore, all of these sampling methods will be discussed. The presence of rocks, debris, or other sampling-specific considerations may complicate sampling and preclude using or require modification some of these sampling devices.

When sampling a previously sealed vessel, the presence of a bottom sludge should be checked. This is easily accomplished by measuring the depth to apparent bottom and then comparing it to the known interior depth. Methods for sampling a bottom sludge are described in the following sections. Sludge that develop in 55-gallon drums also can be collected by employing glass tubes used for the liquid portion of the sample.

14.5.2 Thin-Walled Tube Sampler

The thin-walled tube sampler is a metal tube generally 2.5 to 7.5 cm in diameter and 30 to 60 cm long. The tube is forced into the soil or sludge and then extracted. Friction will usually hold the sample material in the tube during extraction. Interchangeable cutting tips facilitate penetration with reduced sample disturbance.

Soil or sludge also can be sampled with a hand corer. Hand-auguring devices can be used in conjunction with a thin-walled tube sampler. In this manner, a thin-walled tube sampler can be used to sample both from the surface or to the bottom of a 55-gallon drum. However, the presence of rocks or the collapse of the auger hole generally prohibits sampling at depth.

14.5.3 Aqueous Liquid Sampling

Beakers, glass tubes, bailers, and extended bottle samplers and composite liquid waste samplers (COLIWASA) are devices that may be used to sample containerized liquid media. Site-specific conditions may necessitate a variety of sampling options.

Therefore, all of these methods will be discussed below. Samples from drums also can be readily collected by merely submerging a sample bottle. Aqueous liquids should be sampled using the following guidelines:

- 1) Using a sampling device such as a beaker, either disposable or constructed of glass, Teflon or stainless steel, is the recommended method for sampling containerized liquids.
- 2) Liquid samples from open containers, such as 55-gallon drums, may be collected by using glass tubes. Bailers also may also be used to collect liquid samples from containers such as drums or tanks. The major disadvantages to using bailers are splash hazards, the need for decontamination of reusable bailers, and the generation of waste when using disposable bailers.
- 3) The COLIWASA is designed to permit representative sampling of the complete water column from drums or other containerized liquid media. This type of sampler is used when contaminants of different densities, such as oil and water, are potentially present in the containerized liquid.

15. MANAGING SAMPLES

Assign the sample identification according to the following requirements:

15.1 Sample Number

Assign the sample identification number according to the following format and guidelines:

Format *XXXX/1 2 3 4 5 6 7 8 9 0*

XXIXXI This is a prefix that correlates all samples within a specific project. The prefix is not part of the actual sample identification. All samples collected as part of the NAVBASE investigation will use the prefix "NBC/".

15.2 Field Samples

123 The first three digits are for the site where the sample was collected: sites, SWMU, AOC, plumes, buildings, background, etc.

4 This digit will represent the matrix of the sample. In order to keep the data consistent and facilitate data management, the following master list of abbreviations of common matrices will be used when applicable:

- S - soil (surface, borings, and trenches)
- C - soil duplicate sample
- M - sediment (settled, fluid-borne solid)
- N - sediment duplicate
- G - groundwater
- H - groundwater duplicate sample
- W - surface water
- R - surface water duplicate sample
- U - sludge
- Y - sludge duplicate
- A - air
- Z - liquid waste
- V - solid waste
- J - PCB wipe/swipe
- I - split sample

5678 These four digits designate the sampling location: boring or well number, sampling station, trench number, existing well identification, etc.

90 The final two digits represent the sample-specific identification: For example, depth to the nearest foot, depth interval, serial number for water samples, etc. If depth intervals are used, ensure to document the depth in feet in the field logbook (i.e. 2nd interval at 4 feet).

15.3 QC samples

123 The first three digits are for the site where the sample was collected. as above.

4 This digit will represent the type of QC sample. Again, in order to keep the data consistent and facilitate data management, the master list of abbreviations for commonly collected QC samples below will be used when applicable:

- K - MS sample
- X - MSD sample
- T - trip blank

E - equipment rinsate blank
D - deionized water system blank
P - potable water blank
F - field blank
L - filter blank
B - USEPA blank spike sample
2 - cement blank
3 - drilling mud
4 - grout blank
5 - bentonite blank
6 - sand blank
7 - PCB swipe blank

5 6 7 8 These four digits correlate the QC sample with the field samples associated with it. A simple way to accomplish this is to use the sampling location, for example the boring or well number, of a sample collected on the same day as the QC sample. This also will aid in keeping the QC samples blind to the laboratory.

9 0 The final two digits are the serial number for the QC samples. For example, the first rinsate blank collected at a particular site will have the serial number "01," the second rinsate will be "02," etc.

15.4 Sample Numbering Guidelines

This sample-numbering system uses 10 digits for each sample number. All 10 digits must be used. A master list of sample matrix and QC sample abbreviations is supplied above. Any abbreviations may be used for job site and sample locations, but they must fit into the sample number format. All spaces in the sample number format must be filled and no extra characters included. If all of the spaces are not necessary for a sample identification, zeroes will be used as space-fillers.

Even though the format for sample numbers is standardized, the system still requires planning on the part of the project or site manager to ensure that every sample has a unique number. For example, if multiple sampling events will take place at the same site, this information should be incorporated into the site or sample location abbreviations for samples collected there.

Define site and sampling location abbreviations as much as possible before starting the sampling event. When necessary, consult the well inventory and sample logbook before assigning new sample numbers. This will reduce the possibility of duplicating abbreviations as sample numbers.

15.6 Completing The Sample Label and Correcting Errors

Information will be recorded clearly on the label in non-erasable, waterproof black ink. Errors will be corrected on the sample label by marking through with a single line, initialing the error, and then recording the correct information.

15.7 Sample Custody

Sample custody or possession will be traceable from the time the sample is collected to its delivery at the analytical laboratory.

15.8 Maintaining Field Custody

Field custody should be maintained by using the following guidelines:

- 1) After collecting samples, label and seal the sample jar with a custody seal.
- 2) Affix the seal so samples cannot be opened without breaking.
- 3) The sampler must sign and date the seal.

15.9 Chain-of-Custody Record

The chain-of-custody form will be used to record custody of the samples. Record the necessary information on the chain-of-custody clearly in non-erasable, waterproof, black ink. Correct errors on the chain-of-custody by marking through with a single line. Initial the error and then record the correct information. The following information will be recorded in the appropriate spaces on the form.

15.10 Information About Transfer, Shipment and Disposal

Transfer, shipment, and disposal should be documented by using the following guidelines:

1. When sample custody is transferred, document it in the appropriate section of the form.
2. During shipment, the chain-of-custody form must be sealed in a plastic bag and secured inside the shipping cooler.
3. Note any special instructions (e.g., priority turnaround) or comments in the appropriate section of the chain-of-custody and discuss them with the laboratory before collection and shipment.
4. Note sample disposal or storage instructions after completing laboratory analysis.

16.0 DATA MANAGEMENT PLAN

This section describes the methods to be used throughout the investigation to document field work and manage collected data.

16.1 Field Documentation

The field project manager will be thoroughly familiar with appropriate documentation procedures. He or she will perform or directly oversee completion of the documents accompanying this investigation. Documentation tasks will be performed on a sample-by-sample or item-by-item basis throughout the day. Sample container labels and chain-of-custody forms will be prepared as completely as possible in advance.

16.2 General Field Documentation Procedures

Field documentation should be performed by using the following guidelines:

- 1) Complete all documentation in waterproof black ink.
- 2) Mark through corrections with a single line, then date and initial the correction.
- 3) Do not destroy or discard serialized documents, even if they are illegible or inaccurate.
- 4) Maintain voided entries within project files.

Field documentation consists of one or more site-specific field logbooks, field forms, photographs, sample labels, and chain-of-custody records.

16.3 Logbooks

Field logbooks provide a daily handwritten record of all field activities at an investigation site. All logbooks must be permanently bound and have a hard cover. Field logbooks must be waterproof. Field logbooks are detailed daily records kept in real time. A field logbook will be assigned to each site. Additionally, a sample logbook will be prepared detailing the samples collected each day, but in less detail than the chain-of-custody.

16.4 Field Logbooks

Entries in the field logbook must be made using a 24-hour clock and signed by the responsible person at the bottom of each page. Unused pages or portions of pages not used must be lined out to prevent later entry of additional information.

16.4.1 Field Logbook Contents

Document work in the field logbook by using the following guidelines:

- 1) Date and time task started and ended: weather conditions, and the names, titles, and organizations of personnel performing the tasks.
- 2) Description of level of PPE and any changes.
- 3) Description of site activities in specific detail or forms used.
- 4) Description of field tests performed and test results.
- 5) Detailed description of samples collected, and any quality control samples collected.
- 6) List of the time, equipment type, and procedures followed for decontamination.
- 7) Record of instrument calibration and any failures with a brief description of repairs and/or replacements.

16.4.2 Sample Logbook

A sample logbook will compile a record of samples collected and shipped (including QA/QC samples), analyses requested, and any pertinent information concerning sample status. This logbook is kept by the Detachment's chemist.

16.4.3 Field Data Record Forms

Forms to be used during this investigation include subsurface logs, monitoring well construction diagrams, monitoring well development forms, sample records, and additional data as appropriate. Do not leave blank spaces on completed forms. If information on a form does not apply, mark the space "N/A". Complete all forms in the field as the task is performed. Field forms to be used during this investigation are discussed below:

16.4.4 Sample Labels

Attach completed sample labels to each sample container immediately after sample collection. Sample label information (at least sample identification number and time of collection) will be recorded in the field logbook as a cross-reference at the time of collection.

16.4.5 Chain-of-Custody Records

The chain-of-custody record will summarize the contents of the shipment, dates, times, sample numbers, number and volume of sample containers.

16.4.6 Subsurface Boring Logs

Subsurface boring logs will be completed as the boring is advanced. Items to be recorded include materials encountered, depth to water, obvious contamination, and any other necessary information.

16.4.7 Monitoring Well Construction Diagrams

A monitoring well construction diagram will summarize the monitoring well construction. Data to be completed includes location, date drilled, drilling method, well depth, screen location, and general construction data. A general log will also be recorded in the field logbook as a cross-reference.

16.4.8 Photographs

Photographs will be taken of all pertinent field activities. The information listed below will be recorded in the field logbook:

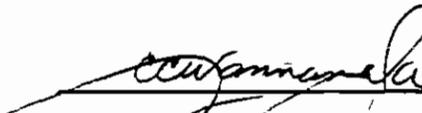
- 1) Date, time, and location.
- 2) Description of photograph and orientation.
- 3) Number of photographs taken.

After the film is developed, this information will be written to the back of each photograph.

APPENDIX D
ENVIRONMENTAL PROTECTION PLAN

**ENVIRONMENTAL PROTECTION PLAN
FOR FIELD CONSTRUCTED CUT-AND-COVER TANK
PARTIAL DEMOLITION WORK AT CHICORA TANK FARM**

Cog Engineer

 Date 7/1/98

Cog Tech Authority

 Date 7/1/98
(Approval)

Site Manager

Bruce A. Bee Date 7/01/98
(Concur)

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Appendix A ENVIRONMENTAL PROTECTION PLAN AMENDMENT

ACRONYM LIST

CFR	Code of Federal Regulations
CGI	Combustible Gas Indicator
CHASP	Comprehensive Health and Safety Plan
CRZ	Contamination Reduction Zone
CTF	Chicora Tank Farm
CVS	Cardiovascular System
DET	Environmental Detachment Charleston
DHEC	Department of Health and Environmental Control
EPA	U.S. Environmental Protection Agency
EZ	Exclusion Zone
HAZWOPER	Hazardous Waste Operations and Emergency Response
IDLH	Immediately Dangerous to Life and Health
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheet
NAVBASE	Naval Base Charleston
NIOSH	National Institute of Occupational Safety and Health
OSHA	Occupational Safety and Health Administration
OVA	Organic Vapor Analyzer
PEL	Permissible Exposure Limit
PID	Photoionization Detector
PPE	Personal Protective Equipment
PPM	Parts Per Million
QA	Quality Assurance
SP	Sampling Plan
SHSO	Site Health and Safety Officer
SOUTHDIV	Southern Division Naval Facilities Engineering Command
HSP	Health and Safety Plan
SZ	Support Zone

**ENVIRONMENTAL PROTECTION PLAN FOR CLEANING
FIELD CONSTRUCTED CUT-AND-COVER TANKS AND PIPELINE
CLEANING WORK AT CHICORA TANK FARM**

1.0 General

The purpose of the Environmental Protection Plan is to outline the methods and responsibilities for protecting natural resources and the environment during the work at Chicora Tank Farm (CTF). To accomplish this goal, the Environmental Detachment Charleston (DET) will comply with applicable Federal, State, local, and base environmental laws, properly control and dispose of all waste generated.

A. Amendments

Amendments and changes to this plan will be made using Appendix A.

2.0 PROTECTION OF NATURAL RESOURCES

DET workers will preserve natural resources within the project boundaries. Preservation of natural resources will be achieved through the use of work procedures designed to minimize environmental impacts and restore areas that must be disturbed during the course of remedial activities.

A. Land Resources

Except in areas to be cleared, DET will not remove or deface trees or shrubs without approval.

B. Protection

DET will protect existing trees that will remain after completion of work.

C. Replacement

DET will restore landscape features damaged by equipment operations, as required.

D. Stream Crossings

SOUTHDIV approval will be obtained before any equipment fords a stream. Temporary culverts or bridges will be utilized where necessary.

E. Fish and Wildlife Resources

Fish and wildlife will not be unnecessarily disturbed. Stream flows and other significant native habitats will be protected.

F. Temporary Construction

DET will remove traces of temporary construction facilities such as work areas, structures, foundations, and stockpiles of excess or waste materials, as required during the course of work and when completed.

G. Wetland Areas

DET will not disturb any wetland area without authorization. Approval may be required by an affected state or local agency, or the Army Corps of Engineers.

3.0 HISTORICAL AND ARCHAEOLOGICAL RESOURCES

DET will preserve and report to SOUTHDIV historical or archaeological items or human skeletal remains discovered in the course of work.

4.0 PROTECTION OF SURFACE SOIL, VEGETATION, AND SURFACE WATERS

A. Ground Cover

Burnoff of ground cover will not be permitted.

B. Erodible Soils

All earthwork will be brought to a final grade. Side slopes and back slopes will be protected immediately upon completion of rough grading. Protection against erosion will prevent any sedimentation of nearby creeks, ponds, or streams.

C. Temporary Measures

The following methods will be used to prevent erosion and control sedimentation:

1. Mechanical Retardation and Control of Runoff

DET will mechanically retard and control the rate of runoff from the site. This method includes building of diversion ditches, benches, plastic sheeting, and berms to retard and divert runoff to protected drainage courses.

2. Vegetation and Mulch

DET will provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection. Slopes will be protected by accelerated growth of permanent vegetation, mulching, or netting.

5.0 POLLUTION DERIVED FROM OPERATIONS

A. Control and Disposal of Solid and Sanitary Wastes

Solid wastes will be collected, placed in containers, and regularly emptied at intervals to prevent the attraction of rodents or disease vectors. Debris, garbage, and sewage will be disposed of in compliance with applicable laws and regulations.

Procedures for collecting and properly disposing of solid wastes are addressed in the Work Plan.

B. Manage and Dispose of Hazardous Waste

Procedures and requirements for the generation, management, transportation, and disposal of hazardous waste, as defined in the Resource Conservation and Recovery Act (RCRA), are described in the Work Plan.

6.0 OIL SPILL PREVENTION

Procedures and requirements for oil spill prevention are based on good work practices. Piping will be cut and drained using suitable means and absorbent material to contain any residue. Tank and pump room cleaning operations will be performed using good work practices to prevent any spread of oil contamination. Cleaning solutions and/or rinse water will be collected and tested to determine the correct disposal method.

APPENDIX A

ENVIRONMENTAL PROTECTION PLAN AMENDMENT

Amendment # _____ Date: _____

Site Name:

Work Assignment:

Type of Amendment:

Reason For Amendment:

Required Change:

Site Manager/ Cog Engineer

Date

APPENDIX E
CONFINED SPACE ENTRY PROGRAM

SUPSHIP PORTSMOUTH, VA ENVIRONMENTAL DETACHMENT CHARLESTON

Section 2C Rev 0
Revision Date: 8 April 96
Page 1 of 6

CONFINED SPACE ENTRY PROGRAM
(NON-MARITIME)

Approval Signatures

Prepared by:	<u>C. Drum</u>	<u>5/13/96</u> Date
Concurred by:	<u>W. Hordwicks, ASP</u>	<u>13 MAY 96</u> Date
Approved by:	<u>[Signature]</u> Engineering & Planning Manager	<u>5/13/96</u> Date
Approved by:	<u>[Signature]</u> E.R. Dearhart, Director	<u>5/13/96</u> Date

Change Synopsis

<u>Change Date</u>	<u>Change Summary</u>	<u>Affected Pages</u>	<u>Approval Signatures</u>
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Confined Space Entry Program (Non maritime)
Environmental Detachment Charleston

Reference: (a) OPNAVINST 5100.23D Navy Occupational Safety and Health Program Manual
(b) 29 CFR 1910.146 Permit Required Confined Spaces
(c) 29 CFR 1926. 21 Safety Training and Education
(d) NAVSEA S6470-AA-SAF-010 Gas Free Engineering Program

1. Scope. Navy policy as contained in Chapter 27 of Reference (a), and based on Reference (b), is that all confined spaces shall be considered dangerous, and that work on, and entry into such spaces is prohibited until the space has been evaluated by a qualified person to establish appropriate safety precautions. Most work of the Detachment will not involve entry into or work on confined spaces, however this instruction is applicable in the cases where this type work is performed.

2. Discussion: Confined spaces are enclosures not designed for routine occupancy, but are large enough and so configured that an employee can enter to perform work. Examples on Navy installations include tanks, pits, vats, boilers, sewers, underground utility vaults, tunnels, and manholes. Reference (c) adds open top spaces more than 4 feet in-depth such as pits, tubs, vaults and vessels. Personnel entering such spaces may encounter a variety of hazards including lack of oxygen to support life, excess oxygen, presence of a flammable, explosive or toxic atmosphere, physical hazards (slippery surfaces, conduits, obstructions, machinery, energy sources that may require energy isolation , and engulfment) and poor illumination.

3. Program Management. The Detachment Director will appoint in writing a qualified confined space program manager (CSPM).

4. Basic Program Elements.

a. Identification. The CSPM will identify all confined spaces on property assigned to and under the cognizance of the Detachment (buildings 25, 30, 420, 1601B, 1632, 1656 and 1824).

b. **Prevention of entry.** Responsible supervisors will brief all assigned employees as to entry restrictions and utilize, whenever practical, physical means, such as locks and barriers, to secure spaces under their control. Permit Required Confined Spaces will be posted with a sign as given in Reference (a).

c. **Hazard Evaluation.** If entry is required, the space shall first be evaluated by the CSPM or by a Qualified person (QP) as specified in Reference (a) paragraph 2704. c, and a permit issued per paragraph d. The Confined Space Entry Permit, Appendix 27-A of Reference (a) will be used. For most, work in confined spaces, unless minor, a specific written procedure will outline the work to be accomplished and will provide additional information in addition to the permit.

d. **Program Evaluation.** The Detachment Director shall require an evaluation of the Confined Space Entry Program at least annually, to ensure all aspects of the program are being properly conducted. Also, if any mishap or incident were to occur, an evaluation will be conducted.

e. **Training.** The CSPM and Qualified Persons will be trained and certified, and annually retrained, as specified in paragraph 2704.e of Reference (a).

5. Requirements for Confined Space Entry and Work. Where confined space entry or work is required, the requirements of paragraphs 2705 and 2706 of Reference (a) are applicable. These paragraphs give the requirements for work, including duties of authorized entry personnel and attendants, use of personal protective clothing, preparation of spaces, and specific restrictions..

6. Special Precautions for Hot Work. Hot work includes all flame heating, welding, torch cutting, brazing, carbon arc gouging, or any work which produces heat, by any means, of 400 degrees F. or more. Also hot work includes, in the presence of flammables or flammable atmospheres, use of ignition sources such as spark producing or arc producing tools or equipment, static discharges, friction, impact, open flames or embers, and non explosion proof lights, fixtures, motors or equipment. The provisions of Chapter 5 of Reference (d) apply to all hot work performed on closed structures or containers such as tanks, pipes, drums, ducts, tubes, jacketed vessels, and similar items.

7. Emergency Rescue Procedures. The CSPM, in coordination with cognizant line managers will prepare a written emergency plan to cover confined space entries under their control, as required by paragraph 2708 of Reference (a).

8. Contractor Operations. Navy personnel (military or civilian) cannot make an entry or perform hot work based on National Fire Protection Association Marine Chemist or competent person certifications which are written for contractor operations. Where Navy and contractor personnel both occupy the same space, separate permits will have to be issued.

APPENDIX F
CORRESPONDENCE



Commissioner: Douglas E. Bryant

Board: Richard E. Jabbour, DDS, Chairman
Robert J. Singling, Jr., Vice Chairman
Sandra J. Molander, Secretary

William E. Applegate, III
John H. Burnes
Tony Graham, Jr., MD
John B. Pate, MD

Promoting Health, Protecting the Environment

May 17, 1994

Commanding Officer
Attn: Mr. Daryl Fontenot (Code 1841)
Southern Division
Naval Facilities Engineering Command
2155 Eagle Dr., P.O. Box 190010
North Charleston, SC 29419-9101

RE: CNS - Chicora Tank Farm, GWPD Site #A-10-AA-13350
Fourth Quarter Monitoring Report received February 14, 1994
Assessment Report received April 26, 1994
Charleston County

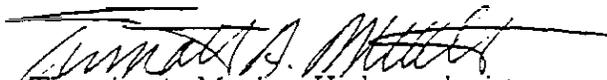
Dear Mr. Fontenot:

The Ground-Water Protection Division (GWPD) of the South Carolina Department of Health and Environmental Control has reviewed the referenced Monitoring Report and Assessment Report. The GWPD concurs with the request for "No Further Action" at the referenced Site. Therefore, this office will not require any further investigation at this site at this time. However, if any contamination is indicated in the future, additional assessment and/or remedial activities may be necessary.

The referenced assessment report indicates that the tanks are to be closed and that limited impact may be identified during the tanks closures. Upon completion of the tank closures, a closure report documenting the closure activities and containing sampling data, should be submitted to the GWPD.

On all future correspondence concerning the Chicora Tank Farm, please reference GWPD Site #A-10-AA-13350. If you have any questions, please contact me at (803) 734-5328.

Sincerely,


Timothy A. Mettlen, Hydrogeologist
Assessment and Development Section
Ground-Water Protection Division
Bureau of Drinking Water Protection

APPENDIX G

CONTRACTOR'S PIGGING AND GROUTING WORK PLAN