
FIRE FIGHTING TRAINING UNIT

**WORKPLAN
EXCAVATION OF BURIED FUEL
AND WATER PIPING,
DEMOLITION OF AUXILIARY STRUCTURES
AND TRAINING COMPARTMENTS
EXCLUDING REMOVAL OF USTS**

**NAVAL FACILITIES ENGINEERING
SERVICES CENTER
GREAT LAKES, ILLINOIS**

September 1996

Prepared by:

**BELING CONSULTANTS
UNDER CONTRACT #N68950-95-D-9021**

BELING CONSULTANTS

Professional Engineering and Environmental Services

May 23, 1996

REVISED & REISSUED JUNE 19, 1996

Department of the Navy
Engineering Field Activities
Midwest Code 930
Naval Facilities Engineering Command, Bldg. 1-A
2703 Sheridan Road, Suite #120
Great Lakes, Illinois 60088-5600

Attn: Tony Andrews, Engineer in Charge

**SUBJECT: WORK PLAN FOR EXCAVATION OF BURIED PIPING
ANCILLARY STRUCTURES AND TRAINING COMPARTMENTS,
EXCLUDING REMOVAL OF USTS
FFTU FACILITY - GREAT LAKES NAVAL TRAINING CENTER**

Dear Mr. Tony:

In accordance with our discussions between May 8, 1996 and June 14, 1996, a work plan has been developed for demolition and removal of the underground fuel piping, ancillary structures, and the concrete training compartment at the FFTU facility. We understand that recyclable iron and steel materials are to be stockpiled on site prior to sale.

The attached workplan may be revised if results of preliminary testing indicate hazardous constituents in the fuel piping or training compartments.

Sincerely,

BELING CONSULTANTS, INC.



Molly E. Arp, Geologist, CHMM
Manager - Environmental Compliance

kjy

cc: File #29645 - chrono
IEPA - Donald Harrison/Patricia Wells (alternate)
USEPA - Laura Ripley

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**WORK PLAN FOR EXCAVATION OF
BURIED PIPING, ANCILLARY STRUCTURES AND TRAINING COMPARTMENTS
EXCLUDING REMOVAL OF USTS**

June 19, 1996

Guidelines are provided below for PWC to remove underground fuel lines associated with the UST system at the FFTU facility. Ancillary structures such as burn pans, christmas trees, the metal oil/water separator and items listed on the attachments must also be removed, as indicated below. The demolition of the four (4) concrete compartment will be incidental to the removal of the fuel lines.

1. The PWC will attend an AEF project kick-off meeting held by Tony Andrews, the Engineer in Charge, to review site safety requirements, plan view drawings, and general requirements for demolition and recycling of scrap materials at the site.
2. PWC personnel are required to hold current certification for OSHA HAZWOPER training. Due to the history of the site, the PWC will supply its own site safety plan. The site safety plan will include decontamination procedures for personnel and equipment as indicated following evaluation of potential contaminants at the site. The PWC should be aware that residual flammable materials may be present on-site and precaution shall be taken by PWC to prevent potential fire or explosion.
3. The PWC will be responsible for utility location, and lock out tag out procedures.
4. PWC will be responsible for draining all piping and tanks. All piping left in place will be cut (no open flame to be used) and capped off at the outer edge of the backfill area to minimize the potential for releases. The USTs are not to be disturbed during the removal of the underground piping. Note: Piping and drain tile associated with the surface water discharge to the lagoons and water drains and discharges from the buildings are not to be removed, if possible. The specific areas of concern include the areas of the site where a water line crosses over or under a fuel line; note also the south central area of the property where the piping plan indicates numerous parallel fuel lines together with what appears to be a water discharge line. Special care should be taken to minimize disturbance of all water lines.

Specifically, each point where a water drainage line intersects a fuel line or water supply line should be carefully evaluated to determine the proximity of the pipes to each other. If a drain line is below a fuel line, removal of the fuel line may be completed without disturbing the drainage line. Where necessary, the drain tile or drain line (perpendicular to the fuel/water supply pipe) will be severed and capped within the trench.

Also, in locations where water drain tiles or drain lines run parallel with a fuel line trench, the trench will be evaluated to determine whether the drain line is above or below the fuel/water supply line(s) and how best to avoid disturbing the drain

- tile. The Engineer in Charge of the project will be consulted for a decision prior to excavating around drain tile areas.
5. Overburden asphalt will be cut and stockpiled to be recycled later. Overburden and disturbed soils will be stockpiled on 6 mn. plastic sheeting adjacent to pipe trench cuts, with an overlap area of 2 to 3 feet where necessary to extend the plastic alongside of trenches. The disturbed soil, will be backfilled in to trenches pending remedial operations.
 6. Fuel and water distribution piping is to be cut in place, removed and stockpiled in roll-off boxes for disposal as scrap through DRMO. Remove all burn pans, christmas trees, aboveground tanks and recyclable items as listed on attachment. Demolish concrete building as necessary.
 7. PWC will be responsible for the demolition of the four concrete carrier compartments to accomplish demolition of underground fuel lines. The contractor will reduce the size of concrete debris material to an average size not to exceed 500 pounds. Note: Further crushing and screening operations may be conducted under an air permit to be obtained from Illinois EPA.
 8. PWC will file a Notice of Intent (NOI) to Illinois EPA under the NPDES Stormwater Discharge Program for construction sites and subsequently implement a Stormwater Pollution Prevention Plan SWP3 for construction sites. Beling Consultants will complete the NOI form on behalf of PWC and develop the SWP3 for use by the PWC.
 9. PWC will restore excavation surfaces roughly to their original conditions, and leave the site with the underground storage tanks still in place.
 10. PWC will provide a receipt for the total tonnage of scrap metal removed from the site.
 11. Underground storage tanks will be removed by a qualified contractor to be determined by competition bidding.

Attached:

List of aboveground structures to be removed

Plan view map of items to be removed including list of the trenches to be cut and anticipated pipes in each trench

Plan view map of items to be left in place

ATTACHMENT 1
FFTU WORKPLAN - PWC
5/23/96

DRAFT

ABOVEGROUND STRUCTURES TO BE REMOVED

- BURN PITS 6 ea. Concrete slab and metal base and walls of circular fixture as well as interior ribs, brackets and attached pipes. Burn pits include attached metal baffle boxes and baffle box pipes.
- CHRISTMAS TREE ENCLOSURE WITH ROOF 1 ea. Entire structure to include walls, doors, windows, roof, storage racks and concrete slab.
- CHRISTMAS TREE ENCLOSURE 3 ea. Concrete slab and metal walls.
- CONTROL TOWER 5 ea. Metal ladder and platform with railings, control panel, valves and 8 water lines per tower.
- DRYING RACK 1 ea. 36' long pipe structure, free-standing near south burn area.
- WATER STATIONS/SUMP 6 ea. Water cannon/hose, railing and concrete sump.
- WATER STATIONS 2 ea. Water cannon/hose.
- STEEL RODS 15 ea. Stored near christmas tree enclosure at south burn area.
- MOVEABLE RAMP 1 ea. Moveable ramp of pipe and wood construction near sumps.
- SCRAP METAL BANDS 1 pile On ground near carrier compartment C.
- METAL CART 1 ea. In north burn area.
- FORMER SMOTHERING PIT 1 ea. Reinforced subsurface concrete structure with manhole.
- FORMER SEPARATOR PIT 1 ea. Reinforced subsurface concrete structure with metal cover.
- DUPLEX OIL/WATER SEPARATOR 1 ea. Surface machinery to include piping, motors, base and concrete slab as well as metal structure over the duplex.

ATTACHMENT 1 (con't)
FFTU WORKPLAN - PWC
5/23/96
PAGE 2

DRAFT

SCRAP METAL PIP	1 ea.	All scrap metal accumulated in the vicinity of the Duplex and the former sludge pit.
1500 GALLON OVER FILL TANK	1 ea.	Reinforced concrete subsurface structure with 3 manholes.
VAULT	1 ea.	Concrete and block vault with metal cover.
DECANT PONDS	2 ea.	Filling of ponds and removal of associated piping.
LOOP CONTROL VALVE PIPES	4 ea.	10' loop of pipe.
CONCRETE CARRIER COMPARTMENTS	4 ea.	Includes concrete walls and slab, metal window, doors, roof grating, ladder and 3 baffle boxes per compartment. Also includes interior metal walls, floors and burning compartments with all associated fuel pipes and the sprinkler system. Demolition will include removal of the sprinkler system pipes outside of the compartments and the sprinkler system control panels and removal of all drains, catch basins and drain pipes.
STORAGE BUILDING	1 ea.	Block construction.
ABOVE GROUND STORAGE TANK	2 ea.	5' diameter tanks and common concrete containment structure.
FORMER FILL BOX	1 ea.	Concrete box with pipes and metal lid.
GATE VALVES	24 ea.	Metal non-rising gate valves at each burn station.
METAL VESSEL	1 ea.	Near decant ponds.
ABOVE GROUND STORAGE TANK WITH DISPENSER	1 ea.	4' diameter tank with dispenser and concrete containment structure.

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I. INTRODUCTION

As part of basic training, seaman recruits at the Great Lakes Naval Training Center, Illinois conducted fire fighting exercises at the Fire Fighting Training Unit (FFTU). Conditions of open and confined fires aboard a ship were simulated. The FFTU, an eight (8) acre site, consisted of a series of open burn pans and ship compartment training buildings that were set ablaze with fuel oil; then extinguished with water and fire-fighting chemicals. As a result of past practices, the site has been contaminated with petroleum products from leaking tanks and lines, and spills.

The FFTU, in operation since World War II, was taken out of service in 1989. the site of the FFTU has since been designated as a CERCLA site and requires restoration. Both Illinois and Federal environmental regulations are applicable. The Navy is obligated to restore the site to residential environmental standards.

To complete restoration, the Navy must remove all buried piping and tanks, demolish above ground structures, conduct a remedial investigation, prepare a remedial design, and conduct site restoration.

This document was prepared as an Addendum to the "Plan of Action and Milestones Contract #N62472-86-C-1498", January 1989, Groundwater Technology, Inc. previously approved by Illinois Environmental Protection Agency (IEPA). Previous references to the

potential disposal of chlorinated solvents, burning solvents, and landfilling are not addressed in this Work Plan because they are not believed to be a factor in the areas currently targeted for subsurface pipe removal.

This Work Plan has been prepared by Beling Consultants (Beling) under Navy contract #N68950-95-D-9021. It was developed for implementation by the Navy's Public Works Center (PWC). The Plan specifically excludes the removal of underground storage tanks (USTs) and the removal of drainageway piping, believed to be made of cast iron or vitreous tile.

During implementation of this Work Plan, PWC will follow its own site safety plan which is to be reviewed and approved by IEPA representative, Donald Harrison. Representatives from Beling will follow its Site Safety Plan previously provided to the Navy and to IEPA.

The "Plan of Action and Milestones" document dated January 1989 provides a relevant history of the potential problems at the site, background documentation on local soils, geology, groundwater conditions and underground tank history, and indicates that two or more of the USTs (noted on various drawings) may have been aboveground tanks. This "Revised" Work Plan is intended to provide guidance and direction for removal of surface structures, specific subsurface pipes (oil, gas, and water distribution piping), and guidance for implementation of a pilot test for remediation of petroleum-contaminated soil.

II. EMERGENCY TELEPHONE NUMBERS

Following are the names and telephone numbers of key personnel to be contacted in case of an emergency:

Tony Andrews	Navy Engineer in Charge	(847) 657-1152
Jenny Ross	Program Manager/Alternate for	(847) 688-5998
5998	Tony Andrews	
Ed Bickel	Navy NTC-ENC/Engineer Technician	(847) 688-4295
Michael A. Hanson	Navy EFA-MW/Environ Engineer	(847) 688-5997
Kelly Devereaux	Navy Sr. Environmental Coordinator	(847) 688-2628
	Waste Disposal	
Molly Arp	Beling Consultants/Project Manager	(309) 757-9800
Medical Emergency	Fire/Police	(847) 688-3333
Mike Uqolini	PWC Coordinator	(847) 688-5396

III. SEQUENCE OF ACTIVITIES

The first objective of this Work Plan is to remove aboveground metal structures, and subsurface fuel and water distribution piping under the Illinois Administrative Code 732 Rules. Four types of underground piping are present at the site: oil/gas distribution piping, water distribution piping, cast iron drainage piping, and vitreous tile drainage piping. The cast iron and vitreous tile are not to be disturbed. The attached map labeled "Demolition and Trench Excavation" provides the anticipated locations of piping and the areas proposed for excavation under this Work Plan. The second map attached to this Work Plan entitled "Drainageway Piping" provides a schematic of all the pipes to be left in place.

The second objective of this Work Plan is to implement a pilot field test for remediation of the petroleum-contaminated soil at the site using bio-remediation.

A. ABOVE AND UNDERGROUND STRUCTURES DEMOLITION

All work, unless otherwise identified, will be accomplished by Naval Training Center (NTC) Great Lakes PWC. A list of structures and piping to be removed is provided below in Paragraph B. The anticipated sequence of events is provided below.

1. Aboveground metal structures will be removed first. All piping and drain lines will be capped to prevent infiltration of surface water.
2. The subsurface oil/water separator tanks will be removed according to the following procedure:
 - Accumulated sludge and water will be pumped to a temporary storage tank for disposal as special or hazardous waste.
 - Drain lines to and from the concrete tanks will be plugged to prevent infiltration of water.
 - The tanks then will be pressure washed and prepared for removal. If practicable, the tanks will be lifted and placed on 6-mil. plastic, further cleaned, if necessary, and staged for disposal as concrete rubble or special waste. Disposal will be coordinated by PWC's Environmental Department.
3. As a separate Navy procurement action, a contractor will be selected to demolish the four training compartments and classroom building. The Training compartments must be demolished before underlying piping can be removed. Due to the length of time required to procure a contractor to perform the demolition, the compartments may remain after this pipe removal work plan is implemented.
4. The gravel and asphalt surfaces will be scraped and stockpiled for future recycling. Water will be applied to the gravel areas to minimize a dust hazard. Separate

- stockpiles will be maintained for gravel and asphalt. The stockpiles will be maintained on an existing asphalt paved area or on plastic sheeting within the perimeter of the FFTU.
5. Removal of underground fuel and water distribution piping will be pursued on the basis of existing drawings. A 3-foot wide excavation will be opened to reveal piping. Piping will be cut in place, capped or crimped, removed, then placed in roll-off containers. Free product remaining in piping will be blown out with high pressure air, and recovered by placing a suitable container at the downstream end. Any free product spills will be immediately recovered by using sorbent pads.
 6. Care will be taken during excavation to minimize disturbance of drain tile. Any drain tile overlying fuel/water piping will be left in place. Underlying fuel/water piping will be cut, capped and pulled out from beneath the drain tile, if feasible. Vitreous and cast iron drain tile, which is damaged or disturbed by the fuel line removal project, will be repaired as described in Section E of this Work Plan. The locations of drain lines will be field-identified as described in Section E of this Work Plan using the field map for reference.
 7. Excavated soil will be stockpiled adjacent to the trench excavation and covered with 6-mil. plastic sheeting until backfilling can be conducted as described in Section C, Backfilling and Preparation for Biotreatment.

STEEL RODS 15ea. Stored near christmas tree enclosure at south burn area.

MOVEABLE RAMP 1 ea. Moveable ramp of pipe and wood construction near sumps.

SCRAP METAL 1 pile On ground near carrier compartment C.

BANDS

METAL CART 1 ea. In north burn area.

FORMER 1 ea. Reinforced subsurface concrete structure with manhole.

SMOTHERING PIT

FORMER 1 ea. Reinforced subsurface concrete structure with metal cover.

SEPARATOR PIT

DUPLEX OIL/
SEPARATOR 1 ea. Surface machinery to include piping, motors, base and WATER
concrete slab as well as metal structure over the duplex.

SCRAP METAL 1 ea. All scrap metal accumulated in the vicinity of the former sludge
PIP pit.

1500 GALLON OVER FILL TANK 1 ea. Reinforced concrete subsurface structure with 3 manholes.

LOOP CONTROL VALVE PIPES 4 ea. 10' loop of pipe.

CONCRETE CARRIER COMPARTMENTS 4 ea. Includes concrete walls and slab, metal window, doors, roof grating, ladder and 3 baffle boxes per compartment. Also includes interior metal walls, floors and burning compartments with all associated fuel pipes and the sprinkler system. Demolition will include removal of the sprinkler system pipes outside of the compartments and the sprinkler system control panels. All drains must be covered pending further investigation of hazardous constituents in drain and drainage piping.

STORAGE BUILDING 1 ea. Block construction.

ABOVE GROUND STORAGE TANK 2 ea. 5' diameter tanks and common concrete containment structure.

2. Just prior to backfilling, accumulated water will be pumped from excavations. Twin 5,000 gallon ASTs will serve as temporary holding tanks. Waste water disposal will be coordinated by the PWC Environmental Department. As an alternative to disposal, waste water may be treated on site by a bioreactor and re-introduced as inoculant onto the biopiles. Carbon filtration or other suitable means for disposal through the North Shore Sanitary District remains an option.

3. Excavated soil will be loosely replaced into the excavation in one-foot lifts as specified in Section E below. Bacterial cultures and nutrients will be applied to each lift, and mixed into the lift with excavator bucket. If determined necessary, perforated piping and nutrient inoculation points will be placed in the excavation's backfill. Groundwater may be used in the inoculation mix; subsurface evacuation of groundwater will activate a biovent system to assist with remediation of petroleum contaminated soil. Soaker hoses may be used on top of the biopiles to re-introduce moisture and apply inoculant. Plastic sheeting should be used to cover the biopiles for stormwater runoff.

4. NESC will determine requirements and schedule for monitoring the backfilled excavations to evaluate the progress of biodegradation.

D. ADDITIONAL REQUIREMENTS FOR THE PIPE REMOVAL PROGRAM ARE PROVIDED BELOW:

1. A pre-work meeting between PWC, EFA-MW and Beling will be conducted, to review site safety requirements, plan view drawings, the Stormwater Pollution Prevention Plan, the Environmental Protection Plan, and other general requirements for coordination of the demolition and recycling of scrap materials from the FFTU site.
2. PWC personnel are required to hold current certification for OSHA Hazwoper training. Due to the history of the site, the PWC Safety Plan will include decontamination procedures for personnel and equipment for petroleum constituents and hazardous contaminants known to be present at the site. PWC should be aware that residual flammable materials may be present on-site and precaution shall be taken by PWC to prevent potential fire or explosion.
3. PWC will be responsible for lock-out/tag-out procedures. Field verification of lines and tanks has been attempted using utility locate equipment; most pipes are apparently discontinuous due to rupture or rust, therefore pipes which have been broken, decommissioned, or are below the fuel lines have not been field verified.

4. PWC Environmental Department will be responsible for coordinating disposal using a licensed special or hazardous waste hauler, as appropriate, for all special and hazardous wastes generated during this project.
 - a. The 5,000 gallon underground diesel tank close to the entry on the west-southwest side of the fenced area currently contains several inches of water and several inches of diesel fuel, which should be pumped to minimize the possibility for drainage through connecting pipes.
 - b. Based on information provided by PWC Environmental Department, Beling now believes that the 5,000 gallon UST for gasoline that was previously located in the south-south-west area of the FFTU site, was removed in 1988, and therefore is not a concern at this time.
 - c. The 1989 "Plan of Action and Milestones Report" indicates that two of the six previously identified underground oil storage tanks in the center of the FFTU were probably aboveground storage tanks (ASTs), rather than USTs.
 - d. Four USTs may remain, but as of yet have not been field verified. They include the cluster of two USTs of 2,500 gallons of oil each and two USTs of 1,500 gallons of gasoline each (refer to the demolition and trench excavation map attached).
5. Excavation to remove fuel and water distribution piping will start at the north of the site and work toward the south.

6. Instructions to field locate lines is provided below. Some drainage pipes intersect or run parallel to the pipes to be removed. Guidance is also provided in the event a drainage line accidentally breaks.
7. Trench by trench excavation - activities will be conducted with reference to the Demolition and Trench Excavation Map, and with a representative from Beling on site. Hand augers and/or probing rods will be utilized to confirm the presence of drain tiles in areas where they are believed to intersect or parallel the lines to be removed.
8. If a drainage line is encountered and accidently ruptured, spill containment will be attempted using sorbent pads, if indicated, prior to capping or repairing the ruptured line. Broken or ruptured lines which require repair will have PVC replacements as necessary. PWC is to expose the broken pipe at the nearest joints and insert dissimilar connections to accommodate insertion of the PVC joint.
9. The level of personal protective equipment (PPE) will be elevated to require rubber boots near the trenches, chemical resistant gloves such as nitrile gloves, goggles and tyvek if hazardous constituents are believed to be a component of backfill material. PPE which cannot be fully decontaminated, will be stored on site prior to disposal by PWC.

10. Stockpile areas - have been identified for asphalt, piping, and concrete. Materials which could adversely impact stormwater runoff will be containerized or covered in accordance with the SWP3. Refer also to the Demolition and Trench Excavation Map.

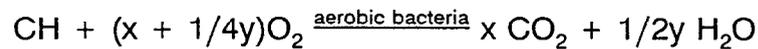
E. BIOREMEDIATION ACTIVITIES

1. Remediation Technology

The bioremediation process is analogous to the conventional aerobic process, which has been used to treat domestic wastewater for decades. In this case, soil and groundwater is the substrate rather than wastewater. The addition of nutrients and oxygen accelerates the natural biodegradation process. In the case of the site's soil and groundwater impacted by petroleum hydrocarbons without aeration or nutrients, the natural biodegradation process is slow because diffusion of oxygen from the ground surface is the only mechanism for oxygen replenishment and the sand backfill contains little to no nutrients. The use of slotted piping within the trench will enhance the rate of oxygen transfer, and therefore, the rate of biodegradation.

When oxygen is ventilated through the areas of contamination, metabolization occurs. Indigenous aerobic bacteria use hydrocarbon-containing compounds as an electron source and oxygen as an electron acceptor. Hydrocarbon compounds

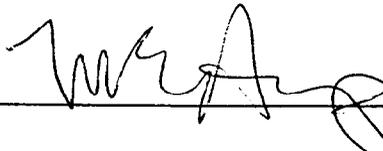
are converted to carbon dioxide and water by a reaction generally described by the following equation.



This bioremediation process is economically attractive. Hydrocarbons are destroyed in the subsurface and CO₂ and water are produced. In summary, the bio-enhancement process involves adding oxygen, maintaining soil moisture, adding bio-nutrients to augment the indigenous populations of micro-organisms and allowing the process proceed.

2. Materials, logistics of mixing materials next to the trenches, and baseline and closure sampling from trenches will be provided separately as an addendum to this Work Plan pending results of biotreatability study conducted by NESC, Port Hueneme, California.

Prepared By:



Molly E. Arp, CHMM, Project Manager

9-16-96
Date

Beling Consultants

Acknowledged By:

Anthony Andrews, Engineer in Charge
NAVFAC Midwest Facilities Activity

Date

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