FINAL

Plan Of Operations Addendum

TNT Area B and Pentolite Road Redwater Pond Area
Bioremediation of Contaminated Soil
Plum Brook Ordnance Works
Sandusky, Ohio

Contract No. DACW69-03-D-0007
Work Order No. 0004

Prepared for:

Department of the Army
Huntington District, Corps of Engineers
Huntington, WV

Contract Number: DACW69-03-D-0007 WO0004

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△ FX Receipt acknowledge does not complete as noted with Contract Requirements.

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Approval subject to provisions of the contract.

DEPARTMENT OF THE ARMY
HUNTINGTON DISTRICT CORPS OF ENGINEERS
CONSTRUCTION BRANCH

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Definitions and Acronyms

ARAR	Applicable or Relevant, and Appropriate Requirements
CFR	Code of Federal Regulations
COC	Constituents of Concern
CPR	Cardiopulmonary Resuscitation
DNT	Dinitrotoluene
EPA	Environmental Protection Agency
HAZWOPER	Hazardous Waste Operations and Emergency Response
HPDE	High Density Polyethylene
HSWA	Hazardous and Solid Waste Amendments
HTRW	Hazardous, Toxic, and Radioactive Waste
IQCT	Independent Quality Control Team
IDW	Investigation Derived Waste
NASA	National Aeronautic and Space Administration
NIOSH	National Institute for Occupational Safety and Health
PBOW	Plum Brook Ordnance Works
PBS	Plum Brook Station
POC	Point of Contact – technical point of contact for the U.S. Army Corps of Engineers
PPE	Personal Protective Equipment
PRG	Preliminary Remedial Goals
QA	Quality Assurance
QC	Quality Control

QCP	Quality Control Plan
REIC	Research Environmental and Industrial Consultants
ROD	Record of Decision
SOW	Scope of Work
SSHO	Site-specific Safety and Health Officer
SSHP	Site-specific Safety and Health Plan
USACE	United States Army Corps of Engineers
TCLP	Toxicity Characteristic Leaching Procedure
TNT	Trinitrotoluene
WVOW	West Virginia Ordnance Works

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1.0 PROJECT DESCRIPTION

1.1 Introduction

In Spring 2003, stockpiles from TNT B pits 463 and 452 were sampled for waste characterization purposes for subsequent disposal. Analytical results revealed that both stockpiles were hazardous. Stockpile 463 had elevated levels of 2,4-dinitrotoluene (DNT) above the regulatory value of 0.13 mg/l for the toxicity characteristic leaching procedure (TCLP) analysis. Stockpile 452 had elevated levels for both 2,4-DNT and lead (lead regulatory value is 5.0 mg/l). Additionally, the concentrations of the contaminants not only made the material characteristically hazardous but the concentrations also exceeded the land disposal restrictions; therefore, preventing land filling of this material without prior treatment. Currently there are approximately 750 tons of soil in each stockpile, combined for a total of 1,500 tons of soil from pits 452 and 463. Additionally there is approximately 225 tons of nitroaromatic-contaminated soil at the Pentolite Redwater Pond Area that requires treatment. A total of approximately 1,725 tons of nitroaromatic-contaminated soil requires treatment prior to disposal.

In accordance with the previous contract (DACW69-00-D-0021, Work Order No. 020), stockpile 452 was treated with MAECTITE® to chemically fixate the lead. The soil was treated on August 6th, 2003 and six samples were collected of the treated soil on August 7, 2003 to confirm the effectiveness of the treatment. Analytical results from the six composite soil samples were all "not detected" for TCLP lead. Therefore, the stockpiles now only require treatment to lower the concentration of 2,4-DNT.

The pit excavations (452 and 463) are currently open and filled with water. The accumulated water in the pits has been analyzed and found to be non-hazardous; therefore, Ohio Environmental Protection Agency (EPA) and National Aeronautic Space Administration (NASA) have given permission for the water to be disposed of in the West Area Redwater Ponds. The water will be discharged at a rate that will not disturb or erode existing sediment or vegetation. The excavation pits require backfill with either clean borrow material or treated soil. The use of treated soil will be dependent upon meeting the current site remedial goals or alternative remedial goals approved by Ohio EPA.

1.2 Objectives

United States Army Corps of Engineers (USACE) has received approval from Ohio EPA to perform ex situ treatment in the form of bioremediation for the stockpiled soil currently located at the site (total volume is approximately 1,725 tons). The bioremediation will be accomplished through windrow composting. Pursuant to the Scope of Work (SOW), addendums will be prepared to the final plans submitted and approved under the previous Contract No. DACW69-00-D-0021, Work Order No. 020. The addendums will address all new work activities. Pursuant to the SOW issued under Contract DACW69-03-D-007, Work Order 0004, the tasks shown in the previous contract shall be revised as shown in Section 4 of this addendum.

2.0 PROJECT ORGANIZATION

A project that is properly organized with personnel responsibilities well-delineated results in a successful project conclusion. A listing of functional areas and qualified personnel are given for this project.

A. **Government Technical POC** —This is the technical point of contact (POC) representing the USACE who will serve as a liaison between the USACE and the contractor.

USACE POC		Phone Number
Lisa Humphreys		(304) 529-5953
	(cellular phone)	(304) 617-1461

B. **NASA POC**— This is the technical point of contact (POC) representing NASA.

NASA POC	Phone Number
Amy Bower	(419) 621-3233
Robert Lallier	(419) 621-3234

C. **Contractor's Project Manager** – The WTI Project Manager provides technical insight and provides supervision for the project. The Project Manager has overall responsibility to see that the project is completed in accordance with the Scope of Work.

WTI Project Manager		Phone Number
Steve Arbogast		(304) 755-8448
	(cellular phone)	(304) 389-9580

D. **On-site Supervisor**—The on-site Supervisor will be in charge of field activities when the Project Manager is away from the site. Due to the fact that composting requires personnel on-site 7-days a week, WTI will utilize two on-site supervisors to perform the work. The on-site supervisors will be rotated at the site.

On-site Supervisor		Phone Number
Zatto Hager		(304) 755-8448
	(cellular phone)	(304) 544-5840
Ronald Evans		(304) 755-8448
	(cellular phone)	(304) 542-0505

E. **Site Safety and Health Officers (SSHO)** – The SSHO will be responsible for safety on site. Andrea Thomas from Pinnacle Environmental, a company specializing in safety and health issues, will serve as the safety officer. At a later date and with the approval of the USACE and NASA, Pinnacle Environmental may add another SSHO on a rotating basis.

SSHO	Phone Number
Andrea Thomas	(304) 757-5204
Mindy L. Tilly	

F. **QC Officer**—This person is responsible for quality control (QC) at the site. This person has the authority to stop the work if QC is not being met. The QC Officer shall be responsible for sampling activities and field screening of samples. Due to the nature of the project, WTI shall utilize two QC officers who will serve on a rotational basis.

WTI QC Officer	Phone Number
Senah Gussler	(304) 755-8448
Rodney Roberts	(304) 755-8448

G. **Field Personnel** – These personnel are responsible for assisting the Project Manager in completing the tasks required under this contract.

WTI Field Personnel	Phone Number
Eddie Anderson	(304) 755-8448
Gary Henry	
Lynn Moles	
Chester Porter	
Malcolm Slone	
Dwayne James	
Keith Meeks	
David John Walker	

H. **WTI's Independent Quality Control Team--** An internal quality control team will independently review the work plans and reports to ensure that they meet requirements of the Scope of Work. The IQCT may perform on-site QC audits.

WTI Independent Quality Control Team	Phone Number
Joseph Wheeler	(304) 755-8448
Julie Glockner	(740) 574-6144

I. **REIC Laboratory**–Samples will be sent to the following USACE certified laboratory. REIC Laboratory is located in Beaver, West Virginia.

REIC Contact	Phone Number
Grant Wilton	(800) 999-0105

J. **Disposal Facility for Contaminated Soil**— Non-hazardous soil removed from the site may be disposed of at the Erie County Landfill and at the BFI Ottawa County Landfill.

Landfills	Phone Number
Fred Dobbert (Erie County)	(419) 433-3624
Rosana Marinchick (Ottawa County)	(440) 774-4808

K. **Barnes Nursery**—This company may be used for the transportation of any non-hazardous materials removed from the site and may be used to transport clean backfill material to the site.

Barnes Nursery Contact	Phone Number
Leslie Morgan	(800) 421-8722

L. **EQ Environmental**—The hazardous disposal facility for hazardous soil and/or IDW is EQ Environmental located in Michigan.

EQ Environmental Contact	Phone Number
Debbie Chamberlain	(800) 592-5489

M. **Enviro-Clean Inc.**—Non-hazardous investigation derived waste (IDW) containing liquids will be transported to Enviro-Clean Inc. located in Wooster, Ohio for ultimate disposal.

Enviro-Clean Inc.	Phone Number
Robert Jarrett	(330) 264-8080

N. **Eco First**—This company will be responsible for the transportation of any hazardous liquid IDW to EQ Environmental for disposal.

Eco First Contact	Phone Number
Dana Tomes	(304) 736-7303

O. **Meyers Dairy Farm**- This company will provide and deliver all of the amendments used in the ex situ composting.

Meyers Dairy Farm Contact	Phone Number
Dewey Meyers	419-945-2651

3.0 APPLICABLE OR RELEVANT, AND APPROPRIATE REQUIREMENTS (ARARs)

3.1 Site Remedial Action Levels

Remedial Investigation (RI) fieldwork was conducted in 1998 in order to provide a basis for taking an action at the site. As part of the RI, a human health risk assessment was conducted for TNTB. Thirteen constituents of concern (COC) were identified in surface and subsurface soil. Based on the results of the human health risk assessment, it was determined that remedial actions were to be taken to prevent human exposure via any exposure route (ingestion, inhalation, or dermal contact) to soil that exceeds the preliminary remediation goals (PRGs). These remedial goals are applicable to soil removal activities at the site and pending approval of OhioEPA, NASA PBS, and USACE could be used as cleanup goals for placing the composted material in place at the site.

Table 1--Chemicals of Concern

Chemical of Concern	PRGs (mg/kg)[1]
Nitroaromatics	
2-amino-4,6-DNT	0.40
4-amino-2,6-DNT	0.40
2,4-DNT	7.50
2,6-DNT	2.75
2-nitrotoluene	74
2,4,6-TNT	3.36
PCBs	
Aroclor 1254	0.16
Aroclor 1260	2.87
PAHs	
Benzo (a) anthracene	5.43
Benzo (a) pyrene	0.54
Benzo (a) fluoranthene	5.43
Dibenz (a,h) anthracene	0.65
Indeno (1,2,3-cd) pyrene	5.43

[1] mg/kg is equal to parts per million (ppm)

3.2 Resource Conservation And Recovery Act (RCRA)

Subtitle C of the federal Resource Conservation and Recovery Act (RCRA), as amended by the Hazardous and Solid Waste Amendments (HSWA) of 1984, authorizes EPA to regulate the management of hazardous wastes. The designation of a waste as hazardous subjects all those charged with managing that waste to the stringent "cradle-to-grave" requirements of RCRA Subtitle C. It is crucial, therefore, for all those managing wastes to properly identify them and determine whether or not those wastes are in fact "hazardous". There are four kinds of hazardous wastes as defined by Subtitle C of RCRA:

- Solid wastes, which exhibit hazardous characteristics (i.e., ignitability, corrosivity, reactivity, or toxicity).
- Solid wastes specifically listed by the Agency as being hazardous.
- A waste that is considered a declared waste.
- A waste mixed with a known hazardous waste.

The toxicity characteristic identifies wastes that are likely to leach hazardous concentrations of certain toxic contaminants into groundwater under improper storage conditions. The toxicity of a waste can be determined by applying the toxicity characteristic leaching procedure (TCLP), a test designed to simulate the leaching of toxic constituents. Full TCLP analysis (volatiles, semi-volatiles, metals, herbicides, and pesticides) will be performed on all soil and investigation derived waste (IDW) that is to be removed from the project site. Analytical data from the TCLP analysis will be compared to the RCRA regulatory levels for TCLP constituents.

All of the stockpiled soil that is awaiting composting has been analyzed for full TCLP analysis, pH flashpoint, total petroleum hydrocarbons (TPH)/ gasoline range organics (GRO)/diesel range organics (DRO)/oil range organics (ORO), total nitroaromatics, and paint filter. Stockpiled material from pit 452 was treated with MAECTITE to chemically fixate the lead. The MAECTITE treatment was successful and now all of the stockpiled soil is characteristically hazard for 2,4-dinitrotoluene only. All other analytical data from the stockpiled materials was within regulatory limits. If composted material is sent to a non-hazardous landfill for disposal, at a minimum, TCLP semi-volatiles will be re-analyzed prior to disposal to ensure that the regulatory level of less than 0.13 mg/l has been met for 2,4-Dinitrotoluene. Additional analysis, such as full TCLP analysis, will be ran on the composted material, if required, by the landfill, OhioEPA, NASA PBS, or USACE. Additionally, the landfill may require analysis for pH, flashpoint, reactivity, benzene, toluene, ethylbenzene, and xylene (BTEX), and total petroleum hydrocarbons - gasoline range organics/diesel range organics/oil range organics (TPH-GRO/DRO/ORO).

4.0 PROJECT ACTIVITIES

All work shall be coordinated with the USACE POC and the NASA PBS POC. WTI shall notify both parties prior to mobilizing to the site. Furthermore, WTI shall obtain a digging permit from NASA prior to performing any intrusive activities. Pursuant to the SOW issued under Contract DACW69-03-D-007, Work Order 0004, the tasks shown in the previous contract (DACW69-00-D-0021, Work Order No. 020) shall be revised as shown in Sections 4.2 through 4.5.14 that follow.

4.1 On-site Equipment

WTI may use the following equipment on-site to perform the activities associated with this project:

- Tracked excavators (PC-220 or comparable)
- Vacuum truck (3000-gallon CUSCO or comparable)
- Bulldozer (D5C or comparable)
- Enloader (rubber tired)
- Windrow turner (ALLU AS 38 or comparable)
- Vibratory screen (sized to remove materials larger than 1.5 inches in diameter)
- Vibratory roller to compact clay
- Dump trailers
- Dump trucks (articulated)
- Tractor and trailer used for mobilization of equipment
- Tractor used to move tank trunks from asphalt pad
- Hand tools (rakes, shovels, etc.)
- Minimum of two 20,000 gallon frac tanks
- Water pump (4") and hoses

4.2 Preparation and Submission of an Addendum to the Plan of Operations (Task 3)

Pursuant to the SOW, an addendum to the Plan of Operations will be prepared to describe composting related activities. This addendum to the Plan of Operations is a supplement to the original Final Plan of Operations prepared by WTI and submitted in September 2002. This plan is to be used in conjunction with the previously approved Final Plan of Operations (WTI, September 2002).

4.3 Field Activities and Utilities (Task 4)

WTI shall coordinate with the Plum Brook Station (PBS) personnel in a timely manner for all utility clearance (digging permit) prior to performing site intrusive activities (i.e., constructing a sump for water collection and so forth). Also, WTI shall coordinate with PBS personnel for relocation of the tank trailers (approximately 40) currently in the proposed composting area. The tanks must be relocated prior to the placement of the clay layer and geotextile liner on the asphalt. WTI has been instructed by NASA to relocate these tanks to the warehouse area once plans are approved. WTI shall use a tractor truck to move the tanks.

4.4 Excavation of Contaminated Material (Task 6)

Due to the expense of the ex situ treatment and associated disposal/use for the existing stockpiled soils from pits 452 and 463, no further excavation shall be conduct at this time. If additional funding becomes available, a modification may be awarded for additional excavation activities.

4.5 Stabilization and Ex Situ Treatment (Task 7)

The stockpiled soil (approximately 750 tons) from pit 452 was treated with MAECTITE® to chemically fixate the lead in the soil. Six samples of the treated soil were collected and analyzed for toxicity characteristic leaching procedure (TCLP) lead analysis. All sample results were non-detect for TCLP lead.

According to the manufacturer, chemical fixation of the lead using MAECTITE® will not interfere with the subsequent treatment of the soil by windrow composting to degrade the nitroaromatics. The chemical fixation of the lead was performed prior to the composting because the composting process will substantially increase the volume of soil due to the addition of amendments.

Ex situ treatment of the nitroaromatic contaminated soil at the site will be achieved through windrow composting. Currently there is approximately 1,725 tons of soil requiring composting (approximately 750 tons from pit 452 stockpile, 750 tons from pit 463 stockpile, and 225 tons from the Pentolite Road Redwater Pond Area stockpile). Due to the low levels of remedial goals set in the approved Feasibility Study, it appears that composting operations will not be able to reach those levels in a timely manner (i.e., before cold weather sets in) to be able to use the composted material for backfill. Therefore, unless notified otherwise by USACE, WTI shall assume that the goal of composting is decrease nitroaromatic concentrations to a level that would allow for disposal at a non-hazardous landfill.

Discussion with Ohio EPA, USACE and NASA are scheduled for mid-September 2003 to address the issue of the site remedial goals. If a variance is allowed on the remedial goals and composting proceeds at a rate, which would allow attainment of the remedial goals prior to winter then the composted material may be placed into the excavation areas at the site from which the soil originated.

4.5.1 Amendment Test Plan (Task 7A)

In order to expedite the project, amendment testing was not performed. Amendment types and ratios of amendments used were based upon previous amendment testing and bench scale data from the West Virginia Ordnance Works (WVOW) project currently being performed in Point Pleasant, West Virginia under Contract No. DACW69-02-D-0004, Work Order 0006.

4.5.2 Bench Scale Test Plan (Task 7B)

WTI shall submit a Bench Scale Test Plan detailing the bench scale testing to be performed. The bench scale testing shall consist of two self heating tests for each of the three recipes to be tested. The volume of material (including soil and amendments) will be approximately 15 gallons. Pursuant to the SOW, the testing will be performed for a minimum of 14 days. Refer to the Draft Bench Scale Test Plan (WTI, August 2003) for details of the bench scale testing procedures.

4.5.3 Treatment of Contaminated Stockpile Soil (Task 7C)

Treatment shall be performed using ex situ composting in order to reduce nitroaromatic levels in all soil (approximately 1725 tons) to non-hazardous levels that would allow disposal to a non-hazardous landfill. Refer to Section 4.5.11 of this Plan of Operations Addendum for a description of the composting process.

4.5.4 Transportation (Task 7D)

WTI shall transport the stockpiled material to the designated treatment area along the Pentolite Road (west of the Reactor Facility). It is anticipated that dump trucks will be used to transport the material to the treatment pad area. If necessary, sealed roll off boxes will be utilized to transport soils that contain water in sufficient quantities that it would leak from a bed of a dump truck.

4.5.5 Screening (Task 7E)

All stockpiled material shall be screened to remove materials larger than 1.5 inches in diameter, prior to placement in the treatment area. Pursuant to the SOW, WTI shall attempt to reduce the size of any degradable materials larger than 1.5 inches in diameter prior to including them with the soil to be treated. After consultation with the USACE POC, it was determined that due to difficulties in the screening process, personnel may physically pick thru (by hand or equipment) the soil and remove the unwanted rocks, stubs and those items larger than 1.5 inches that will damage the composter or prohibit the composting process or cause a safety concern while composting (projectiles). All soil that is able to go thru the screener, should be put through the screener. Personnel must wear the appropriate PPE when doing the physical actions.

4.5.6 Clearing and Grubbing (Task 7F)

The treatment area is an asphalt pad that is approximately 180 feet wide and 270 feet long. WTI will need to clear and grub an area around the perimeter of the treatment pad for installation of the berms and sump. An excavator and hand tools may be used in the clearing and grubbing activities at the site.

4.5.7 Construction of the Treatment Pad (Task 7G)

NASA has granted the USACE permission to use the asphalt pad located west of the Reactor Facility along Pentolite Road. Currently there are tank trucks (approximately 40) located on this pad; however, they are not in use and are empty. WTI shall coordinate with NASA to relocate the tanks to another site. WTI has been instructed by NASA to relocate these tanks to the warehouse area once plans are approved.

The size of the treatment pad shall be maximized to fit within the existing asphalt pad (approximately 180' x 270'). WTI shall place and compact (with a vibratory roller) a minimum of eight inches of clay material on the asphalt pad in the areas where the windrows will be constructed. In the area between the windrow locations, 2" of crusher run stone will be placed for the windrow turner to run on. The 8" clay layer will be sloped (1% or greater) to a sump at the northeastern corner of the treatment pad. Refer to Section 4.5.9 of this plan for a description

of the water management system for the treatment pad. WTI shall place a 60-mil high density polyethylene (HDPE) liner under the edge of the clay layer approximately 15 to 20 feet before the sump area. The liner will be extended from the end of the pad such that the entire sump area is covered so that run-off and drainage to the collection systems does not contaminate the soil adjacent to the asphalt pad. WTI shall store amendments on the treatment pad where they can drain into the sump.

WTI shall place a 2-3" layer of straw, hay, or sawdust under each individual windrow (every time a new windrow is placed) to keep the compost equipment from "eating into" the clay layer as well as helping to keep the clay layer clean for future use as either backfill or in additional composting operations.

4.5.8 Air Monitoring (Task 7H)

Air monitoring shall be performed to ensure the safety of personnel and/or determine if the level of personal protective equipment (PPE) should be upgraded. At this time, it is anticipated that air monitoring will be performed during composting activities for ammonia, methane, hydrogen sulfide, carbon monoxide, and carbon dioxide. The SSHO on-site from Pinnacle Environmental will be responsible for performing air monitoring. Ammonia and carbon dioxide samples will be collected using a Drager® pump and the appropriate Drager® tubes. Methane, hydrogen sulfide, and carbon monoxide samples will be collected using a GasTech 402. The instrument will be calibrated at least weekly and it will be operated in conformance with the manufacturer's requirements.

4.5.9 Construction of Water Management System (Task 7I)

A sump shall be installed to collect run-off water and berms shall be constructed around the perimeter of the treatment pad as part of the treatment area's water management system. The sump will be approximately 150' wide, 15' long, and 3' deep. The sump will be constructed with a 1 to 1 slope thus having an approximate capacity of 62,000 gallons. The sump will be lined with geotextile liner (60-mil thickness). The berms (approximately 18" high) shall be constructed along three sides of the perimeter of the asphalt pad. At this time, WTI does not anticipate building a berm on the southern side of the pad because it already has a small asphalt berm. The asphalt berm itself would not be sufficient to contain run-off except that this end of the pad is sloped such that any water will run toward the northeastern end of the asphalt pad where the sump will be located.

The water management system shall be designed such that water collected in the sump can be re-used as contact water during the composting process. Additional water can be obtained from the West Area Redwater Pond, if needed. Frac tanks (20,000 gallons) will be on-site for storage of the sump water if appears that the sump may overflow. The water in the frac tanks will be analyzed prior to its disposal. Excess water in the sumps may be disposed at the West Area Redwater Pond depending upon sampling results of the water to be discharged. NASA and Ohio EPA will have to review analytical data from water sampling of the sump prior to allowing discharge in to the West Area Redwater Pond. Furthermore, any discharge to the pond must be done slowly to ensure that no erosion occurs or that pond sediment is disturbed.

4.5.10 Fencing (Task 7J)

The NASA site is a secure site with its own security force. WTI shall install plastic construction fencing around the treatment area and storage area.

4.5.11 Composting Process (Task 7K)

Based upon the bench scale testing, Recipe #2 will be used at the PBOW site. Recipe #2 consists of 25% contaminated soil, 72.1% straw, and 2.9% chicken manure. Contaminated soil shall be mixed at the site in the proportions described for Recipe #2.

Prior to mixing the soil and amendments, WTI shall place a 2-3" layer of straw, hay, or sawdust in the area where each windrow will be constructed. Contaminated soil and amendments will then be placed into windrows. Each windrow shall be approximately 24 feet wide and 9 feet high. The windrows shall not end any closer than 15 feet from the ends of the treatment pad to allow for the maneuvering of the windrow turner. The spacing (minimum of 15 feet width) between the parallel windrows shall be sufficient to prevent impeding windrow turning and materials handling equipment. It is expected that each windrow will be turned at least once daily using an ALLU® AS 38 (24' x 9' tunnel) or similar device; however, when temperatures drop near the end of the composting processing the windrow turning may be performed every other day. Refer to Section 5.1 of this plan for analytical requirements for the composting process.

4.5.12 Ultimate Disposal of the Treated Soil (Task 7L)

Upon completion of the soil treatment, the composted soil shall be disposed of in a non-hazardous landfill licensed to accept special waste. It is anticipated that the non-hazardous soil will be transported and disposed of at Erie County Landfill and BFI Ottawa County Landfill. Two landfills will be used since Erie County Landfill has legal right of first refusal but they are also restricted to 200-ton per day. WTI shall seek a variance to take material to the BFI Ottawa County Landfill after meeting the 200-ton per day criteria at Erie County Landfill. The clay layer shall be either used as backfill of the existing excavations or stockpiled for future use. Alternatively, the composted material may be used for backfill at the site if nitroaromatic concentrations are reduced sufficiently to meet remedial goals, or if Ohio EPA grants a variance on the current remedial goals. Composted material will not be used on-site for any purpose without the approval of Ohio EPA, NASA and USACE.

4.5.13 Weekly Treatment Report (Task 7M)

During the operation of the ex situ bioremediation process, weekly reports shall be submitted to the USACE POC via e-mail. These reports shall include all data and observations that pertain to the effectiveness of treatment and shall include representative photos of that week's operation.

4.5.14 Guard Services and Composting Schedule (Task 7N)

Composting is a 7-day a week operation and NASA employees usually do not work on the weekends or holidays. WTI shall coordinate with NASA's security services to ensure site access to accomplish the composting efforts as well as to pay for additional guard services required for deliveries (i.e. straw, sawdust, hay, manure, and backfill) through gates other than the main gate.

5.0 SAMPLING AND ANALYTICAL REQUIREMENTS

Analytical parameters for the bench scale testing are described in the Bench Scale Test Plan (WTI, August 2003) and will not be reiterated in this plan. Analytical requirements for the composting and disposal of the treated soil will be discussed in this section.

5.1 Sampling and Analytical Requirements for Windrow Sampling

It is anticipated based on the bench scale testing in progress that five to six weeks will be required for composting to be completed; however, the batch may be completed faster or slower. Laboratory analytical will be used to determine when the batch is completed. Field test kits (TNT EnSys® Soil Test System) for nitroaromatics shall be used to determine progress of the composting process, and verified at least once weekly by analyzing samples by Method 8330. At least two composite samples per windrow will be analyzed weekly using field test kits and 1 composite sample per windrow will by analyzed by Method 8330. A minimum total of 53 TNT EnSys® screening samples (48 field and 5 quality control samples) for nitroaromatics and 27 samples (24 field and 3 quality control samples) for total nitroaromatics are expected to be collected and analyzed during the operation period assuming that 4 windrows are constructed and that composting is completed in six weeks.

Prior to the windrow being turned (i.e. aerated), temperature and moisture data will be collected daily from each windrow at several points (10 equal distant points) along each windrow. Moisture data will be collected using a soil moisture meter equipped with a two-foot solid probe that can be pushed into the windrows. Temperature data shall be collected using a stainless steel probe equipped with a thermocouple attached to a digital thermometer. The probe is approximately 8 feet long and should be easy to insert deeply into the windrows.

For field testing purposes, personnel shall collect composted material (after turning) at roughly 10 equally distanced points along each windrow. The first five grab samples will be placed in a 1-gallon zip-lock bag to constitute composite sample #1 from that windrow. The second five grab samples will also be placed in a 1-gallon zip-lock bag to constitute composite sample #2 from that windrow. (For example, in a 200-foot windrow, grab samples would be collected every 20 feet, the first five would be placed in a plastic bag to make sample #1 and the second five placed in a plastic bag to make sample #2). After field testing results are obtained, the two field test samples (#1 and #2) will then be composited to form the sample that will be sent to the

laboratory for analysis. Since personnel are collecting the composted material after turning (which mixes the material), they can collect grab samples from about 0 to 6" inches deep while walking along the windrow. Sample gloves must be worn while collecting samples but no other sampling equipment (i.e. trowels, shovels, so forth) should be required. It will only be necessary to change gloves between the composite samples (i.e. you can wear the same gloves for the first five locations which makes composite sample #1 then you must change before sampling the next five that makes composite sample #2).

The composting process will conclude when nitroaromatic levels in all soils have been reduced to levels suitable for off-site disposal at a non-hazardous landfill. Completion of composting shall be determined by laboratory analysis. Refer to Table 2 for analytical parameters for windrow sampling.

Table 2—Analytical Requirements for Windrow Sampling

Analytical Parameter	Number of Samples	Number of QC[1] Samples	Method	Size & Container Type	Preservative	Maximum Holding Time
Nitroaromatics	48	5	Field Testing using TNT EnSys® Soil Test System	Not applicable	Not applicable	Not applicable
Nitroaromatics	24	3	SW-846/8330 (standard extraction)	1 9-ounce glass	Cool to 4°C	Extract 7 days Analyze 40 days

[1] Duplicate Samples

5.1.1 Nitroaromatics Field Test Method

Field screening for nitroaromatics will be performed on samples from the windrows. WTI proposes to use the TNT EnSys® Soil Test System for field screening of nitroaromatics to determine if degradation of the nitroaromatics is occurring. The EnSys® system is a colorimetric test kit system that detects various nitroaromatic compounds, but it has a greater sensitivity to TNT, DNT, and TNB than it does to other nitroaromatic compounds. The least detectable concentration that the system can reach is 0.7 ppm but its range is generally reported as from 1 to 30 ppm.

A brief summary of the EnSys® system is as follows. A 10 gram sample of soil is placed in an extraction jar to which 50 milliliters (ml) of acetone is added. The soil and acetone are shaken for 3 minutes to extract the nitroaromatics. After shaking, the mixture is allowed to settle for five minutes and then a syringe equipped with a filter is used to transfer 25 ml of the solution to a sample cuvette. The extract is analyzed to obtain an initial absorbance and then one drop of a developer solution is added to the cuvette. The cuvette is then capped and shaken vigorously for 3 seconds. The resulting solution is analyzed using a spectrophotometer to read the absorbance of the solution. The absorbance value is then calculated using a formula provided by Ensys® to determine concentration.

During pilot scale composting activities at the WVOW in Point Pleasant, WV it was discovered that an interference with the test is evident in the early few weeks of the composting process. The urine from the manure and possibly some material from the straw cause the acetone solution to have a yellowish-brown color, which gives a high initial absorbance reading on the instrument. When following the Ensys® methodology, the initial absorbance is multiplied by 4 (factor during by the manufacturer) and then subtracted from the absorbance of the test solution after addition of the developer solution. The interference appears to bias the resulting test value on the low side. Comparison with laboratory analytical data revealed that the field screening data more closely correlated (especially in the latter weeks of composting) if the multiplication step was not performed. Therefore, WTI proposes that the multiplication step portion of the testing be suspended when dealing with composted material.

5.2 Sampling and Analytical Requirements for Disposal of Treated Soil

Upon completion of the soil treatment, the composted soil shall be disposed of in a non-hazardous landfill licensed to accept special waste. Alternatively, the composted material may be used for backfill at the site if nitroaromatic concentrations are reduced sufficiently to meet remedial goals, or if Ohio EPA grants a variance on the current remedial goals. At this time it is anticipated that the composted material will require off-site disposal. The anticipated disposal facilities for the treated soil are Erie County Landfill and BFI Ottawa County Landfill. Due to solid waste flow control regulations, the Erie County Landfill has the right of first refusal on waste generated within their jurisdiction. Eric County Landfill indicated that they would receive the treated soil from PBOW but indicated there would be a 200-ton per day restriction. WTI shall seek a waiver from the Erie County Solid Waste District to dispose of the soil at the BFI Ottawa County Landfill.

Erie County Landfill has requested that 12 grab samples be collected from a windrow and composited to make one composite sample. This is to be done for each windrow. A total of four composite samples will be collected (1 from each of the four windrows). One QC sample will be collected and analyzed. When contacted the BFI Ottawa County Landfill indicated that the analytical requested from Erie County would be sufficient for disposal in to the BFI Ottawa County Landfill.

Since personnel are collecting the composted material after turning (which mixes the material), they can collect grab samples from about 0 to 6" inches deep while walking along the windrow. Sample gloves must be worn while collecting samples but no other sampling equipment (i.e. trowels, shovels, so forth) should be required. It will only be necessary to change gloves between the composite samples (i.e. you can wear the same gloves for the 12 grab samples collected from a windrow and then change gloves prior to sampling the second and third windrows).

Table 3—Chemical Analysis for Disposal of Treated Soil

Analytical Parameter	Number of Samples	Number of QC Samples	Method	Size & Container Type[1]	Preservative	Maximum Holding Time
Contaminated Soil						
Toxicity Characteristic Leaching Procedure (TCLP) metals	4	1	SW846/1311, 6010B, 7471A	250 grams/glass	Ice 4°C	28 days for mercury, 6 months for other metals
TCLP volatiles	4	1	SW846/1311, 8260B	250 grams/glass	Ice 4°C, no headspace	14 days
TCLP semi-volatiles	4	1	SW846/1311, 8270C	250 grams/glass	Ice 4°C	7 days until extraction, analyze within 40 days of extraction
TCLP herbicides and pesticides	4	1	SW846/1311, 8081, 8151	250 grams/glass	Ice 4°C	7 days until extraction, analyze within 40 days of extraction
TPH-DRO/GRO/ORO	4	1	SW846/8015B	100 grams/glass	cool to 4°C	14 days
Flashpoint	4	1	SW846/1030	250 grams/glass	Ice 4°C	7 days

[1] Several analyses may be taken from one container, the laboratory will provide and mark all containers

6.0 EQUIPMENT DECONTAMINATION

The steps of the decontamination process for heavy equipment (backhoe, windrow turner, so forth) will be as follows:

- Brush off the equipment to remove gross contamination
- Wash equipment with soap and water using a pressure washer
- Rinse equipment with uncontaminated water

Heavy equipment will not be decontaminated until it is ready to be removed from the site or it is going to be used in an uncontaminated area. A decontamination pad will be constructed for collection of the decontamination fluids. Unless approved by the USACE and NASA, equipment should not be decontaminated into the on-site sumps because of the use of soap in the decontamination process.

Laboratory equipment (pipets, cuvettes, beakers, and so forth), as appropriate, associated with the field screening will be decontaminated. Disposable pipets may be used. Cleaning of laboratory equipment shall be as follows:

- Wash lab equipment with soap and water
- Rinse lab equipment with a triple distilled water rinse
- Rinse lab equipment with acetone (solvent used in the field test kits)

All rinsates will be collected and properly disposed. Drums, buckets, water, detergent, and brushes will be located in the work area. Drums will be available for containerizing the decontamination waste.

7.0 INVESTIGATION DERIVED WASTE (IDW)

The disposition of investigation derived waste (IDW) was addressed in Section 6.1 of the Final Plan of Operations (WTI, September 2002) and requires only minor modification in this addendum to address the sampling and analysis of the IDW. Refer to Table 4 for the analytical parameters for IDW.

Table 4—Chemical Analysis for Waste Characterization Purposes

Analytical Parameter	Number of Samples	Number of QC Samples	Method	Size & Container Type	Preservative	Maximum Holding Time
Investigation Derived Waste						
Toxicity Characteristic Leaching Procedure (TCLP) metals	2	0	SW846/1311, 6010B, 7471A	250 grams/glass	Ice 4°C	28 days for mercury, 6 months for other metals
TCLP volatiles	2	0	SW846/1311, 8260B	250 grams/glass	Ice 4°C, no headspace	14 days
TCLP semi-volatiles	2	0	SW846/1311, 8270C	250 grams/glass	Ice 4°C	7 days until extraction, analyze within 40 days of extraction
TCLP herbicides and pesticides	2	0	SW846/1311, 8081, 8151	250 grams/glass	Ice 4°C	7 days until extraction, analyze within 40 days of extraction
Flashpoint	2	0	SW846/1030	250 grams/glass	Ice 4°C	7 days
PH	2	0	SW846/9045C	250 grams/glass	None required	7 days

8. 0 FIELD DOCUMENTATION PROCEDURES

Field documentation procedures were described in Section 7.0 of the Final Plan of Operations (WTI, September 2002) and do not require modification or addition in this addendum to address the additional tasks to be performed at the site.

9.0 SAMPLE PACKING AND TRANSPORTATION

Sample packing and transportation procedures were described in Section 8.0 of the Final Plan of Operations (WTI, September 2002) and do not require modification or addition in this addendum to address the additional tasks to be performed at the site.

10.0 CONTRACTOR CHEMICAL QUALITY CONTROL

Contractor chemical quality control, which includes lab quality control procedures, were described in Section 9.0 of the Final Plan of Operations (WTI, September 2002) and do not require modification or addition in this addendum to address the additional tasks to be performed at the site.

11.0 DAILY QUALITY CONTROL REPORTS (QCR)

Daily quality control reports were described in Section 10.0 of the Final Plan of Operations (WTI, September 2002) and do not require modification or addition in this addendum to address the additional tasks to be performed at the site.

12.0 CORRECTIVE ACTION

Corrective action procedures were described in Section 11.0 of the Final Plan of Operations (WTI, September 2002) and do not require modification or addition in this addendum to address the additional tasks to be performed at the site.

13.0 SPILL PREVENTION, CONTAINMENT, AND COUNTERMEASURE PLAN

Spill prevention, containment, and countermeasures procedures were described in Section 12.0 of the Final Plan of Operations (WTI, September 2002) and requires only minor modification to the Sections on Potential Spills (12.1), Spill Prevention (12.2), and Spill Containment (12.4).

13.1 Potential Spills

Potential spills from site activities were addressed in Section 12.1 of the Final Plan of Operations (WTI, September 2002) and only require minor modification. Potential spills may occur from the handling of the amendments (manure and straw), overflowing of the sump, and spills/leaks from the frac tanks that may be used to store sump water. Amendments will be stored on the treatment pad so that a spill from these materials will drain to the sump and be captured. Site personnel will monitor the sump to ensure that it does not overflow. A vacuum truck or pump will be used to remove water from the sump to prevent overflowing. If analytical data of the sump water is available and meets discharge requirements, it may be discharged into the West Area Redwater Pond with USACE, NASA, and Ohio EPA approval. If analytical data is not available or if it does not meet discharge criteria then the water will be stored on-site in 20,000 gallon frac tanks until analytical data is available or until the water can be used at a later date as contact water for the windrows or can be transported off-site for disposal to an approved facility. Secondary containment will be provided for the frac tanks. Personnel must ensure that discharge of any water into the pond is done slowly so as not to cause erosion or disturb pond sediments.

13.2 Spill Prevention

The following are additional spill prevention procedures that will be implemented at the site:

- If frac tanks are utilized to store the sump water, it shall be visually inspected weekly for leaks. The Project Manager or On-site Supervisor will be responsible for inspections. Secondary containment will be provided for the frac tanks.

- The sump shall be inspected weekly to ensure that no damage has occurred to the liner that would allow contaminated water to leak into the surrounding soil.
- The berm around the treatment area shall be inspected weekly to ensure that there are no breaks or low spots that will allow run-off water to leak into the surrounding soil.

13.3 Spill Response

Spill response procedures were described in Section 12.3 of the Final Plan of Operations (WTI, September 2002) and do not require modification or addition in this addendum to address the additional tasks to be performed at the site.

13.4 Spill Containment

Spill containment procedures were described in Section 12.4 of the Final Plan of Operations (WTI, September 2002) and require only minor modification in this addendum to address the additional tasks to be performed at the site. Damage to the sump liner can result in potentially large spills/leakage of contaminated water from the sump. Therefore, care shall be taken not to damage the liner and any damage to the liner shall be repaired immediately even if the damage is above the water line. As much as is feasible, personnel shall not use equipment on or near the liner which may result in tears or cuts to the liner. Personnel shall not throw objects into the sump that might damage the liner. The liner shall be inspected at least once weekly to ensure its integrity.

13.5 Spill Reporting

Spill reporting procedures were described in Section 12.5 of the Final Plan of Operations (WTI, September 2002) and do not require modification or addition in this addendum to address the additional tasks to be performed at the site.

It should be reiterated that the Project Manager/On-site Supervisor must immediately inform the USACE and NASA POCs of any spills, regardless of the spill location. Additionally, it may be appropriate to contact the Ohio EPA, Northeast District Office (330-963-1200) after contacting the USACE and NASA POCs.

13.6 Contingency

Contingency procedures were described in Section 12.6 of the Final Plan of Operations (WTI, September 2002) and do not require modification or addition in this addendum to address the additional tasks to be performed at the site.

14.0 PROTECTION OF RIVERS, STREAMS, AND IMPOUNDMENTS

Protection of rivers, streams, and impoundments were described in Section 13.0 of the Final Plan of Operations (WTI, September 2002) and requires only the additional discussion concerning the discharge of sump and pit water into the West Area Redwater Pond. NASA and Ohio EPA will have to review analytical data from water sampling of the sumps prior to allowing discharge in to the West Area Redwater Pond. Furthermore, any discharge to the pond must be done slowly to ensure that no erosion occurs or that no pond sediment is disturbed. Analytical data from the water in the pits has been reviewed by Ohio EPA and NASA and the pit water has been approved for discharge to the pond.

15.0 AIR EMISSION CONTROLS

Air emission controls for dust were described in Section 14.0 of the Final Plan of Operations (WTI, September 2002) and do not require modification or addition in this addendum; however, air control emissions of pollutants from the composting process must be addressed in this addendum.

Odor emissions are not uncommon during the composting process. Odors are generated by the natural decomposition of the organic material inherent to any compost pile. The use of manure adds to the odor emissions from composting activities. Additionally, if the compost process is allowed to become anaerobic, significant odors may be emitted. WTI proposes the following management practices to reduce air emissions from composting activities:

- Stockpiled amendments (straw and chicken manure) will be covered when not in use.
- Every attempt will be made not to overstock amendments.
- Amendments will be thoroughly mixed with the contaminated soil. This is necessary for proper bioremediation but it will also decrease odor emissions.
- The windrows will be turned at least once daily to ensure an appropriate supply of oxygen is provided within the windrows. This will serve to keep the decomposition process aerobic; thus, limiting the odor emissions. As the composting process progresses, the windrow turning may be decreased to once every two days.

16.0 PROJECT SCHEDULE

The proposed project schedule is as follows:

Submission of 10 copies of the Draft Site-Specific Safety and Health Plan (SSHP) Addendum, Draft Plan of Operations Addendum, and the Draft Bench Scale Test Plan	September 1, 2003

Submission of six copies of the Final SSHP Addendum, and the Plan of Operations Addendum, and the Bench Scale Test Plan	5 days after receipt of comments
Field Work	Within 1 week of approval of the plans

17.0 REFERENCES

The following reference materials were used in compiling the information contained in this Plan of Operations Addendum and/or will be used in other documents associated with this project.

EM-200-1-6, "*Chemical Quality Assurance for Hazardous, Toxic and Radioactive Waste Projects (HTRW),*" U.S. Army Corps of Engineers, October 1997

ER-1110-1-263, "*Chemical Data Quality Management for Hazardous Waste Remedial Activities,*" U.S. Army Corps of Engineers, April 1998

CELRHR 5-2-7, "*Quality Management Plan,*" U.S. Army Corps of Engineers, May, 1999

EM 200-1-2, "*Technical Project Planning Process,*" U.S. Army Corps of Engineers, August 1998

ER 1165-2-132, "*HTRW Guidance for Civil Works Projects,*" U.S. Army Corps of Engineers, June 1992

UFGS 02191A, "Unified Facilities Guide Specification," United States Army Corps of Engineers

40 CFR Part 261, "Identification and Listing of Hazardous Waste," United States Environmental Protection Agency

Cornell University Composting Science and Engineering web site at http://www.cfe.cornell.edu/compost/Composting_Homepage.html

University of Missouri-Columbia, Department of Horticulture web site at http://muextension.missouri.edu/xplor/agguides/hort/g06956.htm

Irishearthworm Company, "Windrow Composting, an Introduction," web site at http://www.irishearthworm.com/windrow.html

Full-Scale Operations, Bioremediation Of Explosives-Contaminated Soil at NSWC Crane, Indiana, Southern Division Naval Facilities Engineering Command, July 1998

APPENDIX A Modified Scope of Work

SCOPE OF WORK – MODIFICATION 1
TNT B AREA B AND PENTOLITE ROAD REDWATER POND AREA
BIOREMEDIATION OF CONTAMINATED SOIL
PLUM BROOK ORDNANCE WORKS
SANDUSKY, OHIO
CONTRACT NO. DACW69-03-D-007, WORK ORDER NO. 4
13 AUGUST 2003

The following is provided as a modification to the SOW. All other sections not identified as a modification are to remain active as part of the SOW and complied with by the Contractor.

Section 1.0 Introduction. Please replace the following paragraph with the one shown in the original SOW.

In Spring 2003, stock piles from TNT B pits 463 and 452 were sampled for disposal. Analytical results showed that these stockpiles were not only at hazardous limits, but at limits that would require treatment of the soil prior to disposal (based on land ban restriction rules). Disposal of the soil would be to either a hazardous or non-hazardous landfill or use as backfill of the excavated pit (depending on the success of the treatment used). To date, there are approximately 750 tons in each stockpile, combined for a total of 1,500 tons requiring treatment prior to disposal. The pit excavations are currently open and will require backfill, either of treated soil or clean borrow material. The water that has accumulated in the pits has been analyzed, resulting in non-hazardous levels, therefore approval by Ohio EPA and NASA to dispose of this water in the West Area Redwater Ponds at a rate that won't disturb/erode existing sediment or vegetation. As outlined in previous SOWs and modifications for this project, treatment for lead in these 2 stockpiles has already been contracted and therefore no further treatment options for this contaminant will be required under this SOW.

Section 1.2 Proposed Action Description. TNT B Area and Pentolite road Red Water Pond Area

Please add the following paragraph to the end of each section.

If soil containing contaminants at hazardous levels above land ban restrictions are found, then an *ex situ* treatment (i.e., bioremediation) prior to disposal or use will be required.

Section 2.0 Objectives.

Please include the following paragraphs to the end of the 1st paragraph.

As mentioned in Section 1.0, to date, analytical results showed that the 2 stockpiles currently on site are not only at hazardous limits, but at limits that require treatment of the soil prior to disposal (based on land ban restriction rules). Disposal of the soil would be to either a hazardous or non-hazardous landfill or use as backfill of the excavated pit (depending on the success of the treatment used). To date, there are approximately 750 tons in each stockpile, combined for a total of 1,500 tons requiring treatment prior to disposal. The pit excavations are

currently open and will require backfill, either of treated soil or clean borrow material. Based on this scenario, *ex situ* treatment is required prior to disposal or use as backfill.

USACE has received approval from Ohio EPA and NASA to pursue *ex situ* treatment in the form of bioremediation for the stockpiles currently at the site. Prior to performing actual bioremediation activities (i.e., mixing and turning of soil), the Contractor shall provide addendums to the Work Plans (i.e., SSHP, QCP and Plan of Operations) for regulator review and approval. These plans will address the necessary work changes required to perform the *ex situ* treatment.

Section 3.0 Tasks

Please revise the following tasks as shown.

Section 3.3 (Task 3) Preparation and Submission of an Addendum to the Plan of Operations, if required. Remove last sentence (which would then require the Contractor to prepare an addendum for the *ex situ* composting operations) and add the following to the end of the pharagraph.

Due to the low levels of RGOs set in the approved Feasibility Study, it appears that composting operations will not be able to reach those levels in a timely manner (i.e., before cold weather sets in) to be able to use the composted material as backfill. Therefore, at this time, the Contractor shall assume that composting to levels for non-haz disposal shall be the goal. Discussions with Ohio EPA, USACE and NASA are scheduled mid-September 2003 to address this issue. Should the bench-scale testing results and the time required to reach RGO variance levels (if granted) be favorable, then this SOW would be modified to reflect disposal of composted material back into the excavated pits. Rather than have the Contractor submit a separate Composting Work Plan, the Contractor shall submit an addendum to the Plan of Operations that include a separate section for the composting information. This section will detail how composting will be performed. It shall include, but not be limited to the following: permits and certifications required; schedule; project organization and personnel; selection of amendments; emissions, dust, and odor control, including a potential odor control plan that may be implemented at the discretion of the Government's technical representative; operations and process monitoring; protocol for compliance testing; protocol for determining if compost meets criteria for on-site or non-haz disposal; non-composting treatment processes; equipment and servicing; drawings, process material, tracking schedule; and disposal and resuse of water. For more information on these elements, refer to UFGS-0219a Section 1.7(a) through (m). The addendum should also include sections that describe preparation of the composting area as well as drainage, containment and water disposal issues, rain and cold weather problems, Sampling and Analysis/Field Sampling Plan that would address the compost pile sampling requirements, analytical levels required for placement back in ground or disposal to non-hazardous landfill, decon of equipment, confirmation sampling prior to site closeout and any other pertinent activities occurring during and upon completion of the *ex situ* treatment.

Section 3.4 (Task 4) Field Activities/Utilities. Please add this sentence to end of paragraph.

The Contractor shall coordinate with PBS in a timely manner for all clearance/relocation of tanks currently in the proposed composting area so as to accommodate the construction activities for the ex-site treatment.

Section 3.6 (Task 6) Excavation of Contaminated Material.

Replace Section 3.6 (Task 6) with this paragraph.

Due to the expense of *ex situ* treatment and associated disposal/use for the existing stockpiles from pits 452 and 463, no further excavation shall be conducted at this time unless additional funding becomes available and a mod is awarded against this SOW.

Section 3.7 (Task 7) Stabilization

Revise Title to "Section 3.7 (Task 7) Stabilization and *Ex Situ* Treatment" and revise flow of section to reflect the following:

3.7.1 Stabilization
3.7.2 *Ex Situ* Treatment

Section 3.7.2 *Ex Situ* Treatment. Add the following paragraphs/sub-sections under this heading.

3.7.2.1 Task 7A : Amendment Test Plan

Amendments are those substances added to the contaminated soil during composting to facilitate remediation. These include, but are not limited to, manure, wood chips, and potato waste. This plan shall include, but not be limited to, the source of each amendment, testing parameters, and the number of samples. Proposed procedures for shipping amendments to the laboratory shall also be provided, including type of containers and hold times. Factors influencing selection of amendments should include seasonal availability, proximity of sources to the site, costs, amenability to storage and handling, moisture content, odor potential, texture and porosity, carbon-to-nitrogen (C:N) ratio, previous experience with using an amendment, and cariability in the quality of an amendment. Amendment mixtures that have been successfully used for previous projects involving treatment of nitroaromatic-contaminated soil should be given primary consideration. The Contractor shall refer to Unified Facilities Guide Specification (UFGS, formerly CEGS) 02191A, Section 2.2 for further guidance on amendment selection and mixture. If the Contractor proposes an amendment for which there is no previous experience, the following tests should be performed on that amendment: bulk density, moisture content, field capacity (or water holding capacity), free carbonate, organic matter content (or colatile solids), ash content, pH, conductivity, and total Kjeldahl nitrogen.

3.7.2.2 Task 7B: Bench Scale Test Plan

After completion of amendment testing, the Contractor shall review the test results, and shall submit the proposed recipe of soil and amendments to be included in the bench-scale testing. At

least three self-heating tests shall be performed simultaneously for each selected recipe. Prior to testing, each recipe shall be homogenized and divided into replicate volumes. The volume of material (including soil and amendments) included in each container for the self-heating tests shall be not less than one gallon. Self-heating tests shall be performed for a period of not less than 14 days, during which temperature monitoring shall be performed daily. This plan shall address but not be limited to, the location of the testing facility; amendment selection rationale; the source of each amendment; test parameters, number of samples; and sampling locations that will be used to determine the source of soil; the proposed proportions of amendments and soil in each recipe; the number of replicate tests for each selected recipe; procedure for mixing soil and amendments; types of containers that will be used; frequency of mixing; testing and monitoring parameters; number of samples; monitoring frequency; length of monitoring period; and laboratory turn-around time. Based on test results, the Contractor shall make recommendations for the composting process under field conditions and submit them for approval by the Government's technical representative.

3.7.2.3 Task 7C: Treatment of Contaminated Stockpile Soil

Treatment shall be performed using *ex situ* composting in order to reduce nitroaromatic levels in all soil to non-hazardous levels that would allow disposal to non-hazardous landfill. The Contractor shall be responsible for the design of this bioremediation system and shall submit this information in the Composting Work Plan section of the Plan or Operations Addendum for USACE approval.

3.7.2.4 Task 7D: Transportation

The Contractor shall arrange for transportation of the stockpiled material to the designated treatment area along Pentolite Road (west of the Reactor facility). All material shall be transported such that any water in it is contained during transportation and no soil excapes from the truck/box.

3.7.2.5 Task 7E: Screening

All excavated material must be screened to remove materials larger than 1.5 inches in diameter, prior to placement in the treatment area. The Contractor should attempt to reduce the size of any degradable materials larger than 1.5 inches in diameter and then include them with the soil to be treated.

3.7.2.6 Task 7F: Clearing and Grubbing

Depending on the designated treatment area, the Contractor may need to clear and grub the north, west and eastern portions of the area for drainage purposes. This area is currently an asphault pad, however, unless the Contractor can construct the drainage features on this pad, minimal clearing will be required. The asphalt pad is approximately 180 wide and 270 feet long and is located along Pentolite Road, west of the Reactor facility.

3.7.2.7 Task 7G: Construction of Treatment Pad

NASA has granted USACE permission to use the asphalt pad located west of the Reactor facility. Currently, there are tank trucks located on this pad, however, they are not in use and are empty. The Contractor shall coordinate with NASA to either relocate these tanks to another site or to re-arrange them along the perimeter of the asphalt pad so that composting and associated drainage requirements can be conducted/met. The Contractor shall be responsible for coordinating with NASA in the timing and relocation of these tanks. The size of the pad shall be maximized to fit within the existing asphalt pad (not including the drainage features). The bottom layer of the pad shall be the existing asphalt pad. Next, the Contractor shall place and compact eight inches of clay material. All clay shall be compacted by the vibratory roller. The slope of the surface of the treatment pad shall not be less than two percent and shall slope to a drain that is connected to a sump outside the pad. The Contractor shall place 60-mil HDPE under the edge of the clay layer (approximately 10' under the clay layer around the perimeter of the pad where drainage needs to occur, not over the entire asphalt pad) to ensure run-off and drainage to the collection system. Sloping and placement of the drain shall be sufficient to prevent ponding in the treatment pad area. The Contractor shall also construct pads for short-term storage of amendments and mixing, with drainage and a runoff collection system. The Contractor shall also place a 2-3" layer of straw, sawdust or hay under the each individual windrow (every time a new windrow is placed) to keep the compost equipment from "eating into" the clay layer as well as helping to keep the clay layer clean for future use as either backfill or additional composting operations.

3.7.2.8 Task 7H: Air Monitoring

Air monitoring shall be performed to ensure the safety of personnel and/or determine if the level of personal protective equipment should be upgraded.

3.7.2.9 Task 7I: Construction of Water Management System

Berms shall be constructed around the perimeter of the treatment area as part of the treatment area's water management system. The berms shall be sized to prevent flood water run-on and to contain runoff. The water management system shall be designed such that water collected in the sump(s) can be re-used as contact water during the composting process. Additional water can be obtained from the West Area Redwater Ponds if needed. Also, depending on sampling results, any additional water left after composting operations are complete may be disposed of in the West Area Redwater Ponds. NASA and Ohio EPA approval are required prior to doing this.

3.7.2.10 Task 7J: Fencing

Since this is already a secure site with only NASA and PBOSG employees, only the standard safety fencing shall be used around the treatment area.

3.7.2.11 Task 7K: Composting Process

The composting process will be based on results of the bench-scale test, and the following is provided only for planning purposes. Compost shall be mixed with amendments, as

determined through bench-scale testing or as directed by the Government's technical representative, on the treatment pad. The Contractor shall then place the material into windrows. Contaminated soil from each area shall be kept separate and not be mingled. Each windrow shall be approximately 14 feet wide and 6 feet high. The windrows shall not end any closer than 20 feet from the open ends of the pad, to allow for turning of equipment. The spacing between the parallel windrows and between the windrows and the berms shall be sufficient to prevent impeding windrow turning and materials handling equipment. Each windrow will be turned daily using a KW614 (6' x 14' tunnel) or similar. Approximately three (3) weeks is the anticipated time period during which each batch of windrows will be turned daily. It is anticipated all composting operations will be complete before cold weather sets in (approximately eight (8) weeks is expected for treatment of all of the soil. Field test kits for nitroaromatics shall be used to determine progress of the composting process, and verified at least once weekly by analyzing samples by Method 8330. The Contractor shall detail the sampling requirements in the Plan of Operations. The composting process will conclude when nitroaromatic levels in all soils have been reduced to levels suitable for off-site disposal to a non-hazardous landfill. Completion of composting shall be determined by laboratory analysis.

3.7.2.12 Task 7L: Ultimate Disposal of Treated Soil

Upon completion of soil treatment, the composted soil shall be disposed of in a non-haz landfill liscensed to accept this waste. The clay layer shall be either used as backfill of the existing excavations or stockpiled for future use.

3.7.2.13 Task 7M: Weekly Treatment Reports

During the operation of the *ex situ* bioremediation process, weekly reports shall be submitted to the Government's technical representative via email. These reports shall include all data and observations that pertain to the effectiveness of treatment and shall include representative photos of that week's operations.

3.7.2.14 Task 7N Guard Services and Composting Schedule

Composting is a 7-day/week operation, and NASA employees usually do not work on the weekends or holidays, therefore, the Contractor is required to coordinate with NASA's guard services to ensure site access to accomplish their composting efforts as well as pay for additional guard services required for deliveries (i.e., straw, sawdust, hay, manure, backfill) through gates other than the main gate.

APPENDIX B Field Activity Forms

CONTRACTOR'S QUALITY CONTROL REPORT (QCR) (ER 1180-1-6)	DATE:	REPORT NO.

CONTRACT NUMBER AND NAME OF CONTRACTOR	DESCRIPTION AND LOCATION OF THE WORK:

WEATHER CLASSIFICATION:	CLASSIFICATION:
CLASS A No interruptions of any kind from weather conditions occurring on this or previous shifts.	CLASS _____
CLASS B Weather occurred during this shift that caused a complete stoppage of all work.	TEMPERATURE:
CLASS C Weather occurred during this shift that caused a partial stoppage of work.	
CLASS D Weather overhead excellent or suitable during shift. Work completely stopped due to results of previous adverse weather.	MAX ___ MIN ___
CLASS E Weather overhead excellent or suitable during shift but work partially stopped due to previous adverse manner.	PRECIPITATION:
OTHER Explain.	INCHES _____

CONTRACTOR/SUBCONTRACTORS AND AREA OF RESPONSIBILITY FOR WORK PERFORMED TODAY: *(Attach list of items of equipment either idle or working as appropriate.)*

a._____

b._____

c._____

d._____

e._____

f._____

g._____

1. WORK PERFORMED TODAY: *(Indicate location and description of work performed. Refer to work performed by prime and /or subcontractors by letter in Table above.)*

2. TYPE AND RESULTS OF INSPECTION: *(Indicate whether: P-Preparatory, I-Initial, or F-Follow-up and include satisfactory work completed or deficiencies with action to be taken.)*

3. TESTS REQUIRED BY PLANS AND/OR SPECIFICATIONS PERFORMED AND RESULTS OF TESTS:

4. VERBAL INSTRUCTIONS RECEIVED: (*List any instructions given by Government personnel on construction deficiencies, retesting required, etc., with action to be taken.*)

5. REMARKS: *(Cover any conflicts in plans, specifications or instructions: acceptability of incoming materials; offsite surveillance activities; progress of work, delays, causes and extent thereof; days of no work with reasons for same.)*

6. SAFETY: *(Include any infractions of approved safety plan, safety manual or instructions from Government personnel. Specify corrective actions taken.)*

INSPECTOR

CONTRACTOR'S CERTIFICATION: I certify that the above report is complete and correct and that all material and equipment used, work performed and tests conducted during this reporting period were in strict compliance with the contract plans and specifications except as noted above.

CONTRACTOR'S APPROVED AUTHORIZED REPRESENTATIVE

For Safety Staff only)	REPORT NO.	EROC CODE	UNITED STATES ARMY CORPS OF ENGINEERS ACCIDENT INVESTIGATION REPORT (For Use of this Form See Help Menu and USACE Suppl to AR 385-40)	REQUIREMENT CONTROL SYMBOL: CEEC-S-8(R2)

1. ACCIDENT CLASSIFICATION

PERSONNEL CLASSIFICATION	INJURY/ILLNESS/FATAL	PROPERTY DAMAGE	MOTOR VEHICLE INVOLVED	DIVING
GOVERNMENT CIVILIAN ☐ MILITARY	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ CONTRACTOR	☐	☐ FIRE INVOLVED ☐ OTHER	☐	☐
☐ PUBLIC	☐ FATAL ☐ OTHER		☐	

2. PERSONAL DATA

a. Name (Last, First, MI)	b. AGE	c. SEX ☐ MALE ☐ FEMALE	d. SOCIAL SECURITY NUMBER	e. GRADE

f. JOB SERIES/TITLE	g. DUTY STATUS AT TIME OF ACCIDENT	h. EMPLOYMENT STATUS AT TIME OF ACCIDENT
	☐ ON DUTY ☐ TDY ☐ OFF DUTY	☐ ARMY ACTIVE ☐ ARMY RESERVE ☐ VOLUNTEER ☐ PERMANENT ☐ FOREIGN NATIONAL ☐ SEASONAL ☐ TEMPORARY ☐ STUDENT ☐ OTHER (Specify)

3. GENERAL INFORMATION

a. DATE OF ACCIDENT (month/day/year)	b. TIME OF ACCIDENT (Military time) hrs	c. EXACT LOCATION OF ACCIDENT	d. CONTRACTOR'S NAME (1) PRIME: (2) SUBCONTRACTOR:

e. CONTRACT NUMBER	f. TYPE OF CONTRACT	g. HAZARDOUS/TOXIC WASTE ACTIVITY
☐ CIVIL WORKS ☐ MILITARY ☐ OTHER (Specify)	☐ CONSTRUCTION ☐ SERVICE ☐ A/E ☐ DREDGE ☐ OTHER (Specify)	☐ SUPERFUND ☐ DERP ☐ IRP ☐ OTHER (Specify)

4. CONSTRUCTION ACTIVITIES ONLY (Fill in line and corresponding code number in box from list - see help menu)

a. CONSTRUCTION ACTIVITY	(CODE) #	b. TYPE OF CONSTRUCTION EQUIPMENT	(CODE) #

5. INJURY/ILLNESS INFORMATION (Include name on line and corresponding code number in box for items e, f & g - see help menu)

a. NATURE OF ILLNESS/INJURY	(CODE) #	B. ESTIMATED DAYS LOST	C. ESTIMATED DAYS HOSPITALIZED	D. ESTIMATED DAYS RESTRICTED DUTY

e. BODY PART AFFECTED	(CODE) #	g. TYPE AND SOURCE OF INJURY/ILLNESS	(CODE) #
PRIMARY		TYPE	
SECONDARY		SOURCE	
f. NATURE OF ILLNESS / INJURY			

6. PUBLIC FATALITY (Fill in line and correspondence code number in box - see help menu)

a. ACTIVITY AT TIME OF ACCIDENT	(CODE) #	b. PERSONAL FLOATATION DEVICE USED? ☐ YES ☐ NO ☐ N/A

7. MOTOR VEHICLE ACCIDENT

a. TYPE OF VEHICLE	b. TYPE OF COLLISION	c. SEAT BELTS	USED	NOT USED	NOT AVAILABLE
☐ PICKUP/VAN ☐ AUTOMOBILE ☐ TRUCK ☐ OTHER (Specify)	☐ SIDE SWIPE ☐ HEAD ON ☐ REAR END ☐ BROADSIDE ☐ ROLL OVER ☐ BACKING ☐ OTHER (Specify)	(1) FRONT SEAT			
		(2) REAR SEAT			

8. PROPERTY/MATERIAL INVOLVED

a. NAME OF ITEM	B. OWNERSHIP	C. $ AMOUNT OF DAMAGE
(1)		
(2)		
(3)		

9. VESSEL/FLOATING PLANT ACCIDENT (Fill in line and correspondence code number in box from list - see help menu)

a. TYPE OF VESSEL/FLOATING PLANT	(CODE) #	b. TYPE OF COLLISION/MISHAP	(CODE) #

ACCIDENT DESCRIPTION (Use additional paper, if necessary)

See attached page.

11. CAUSAL FACTOR(S) *(Read Instruction Before Completing)*

a. (Explain YES answers in item 13)	YES	NO
DESIGN: Was design of facility, workplace or equipment a factor?	☐	☐
ECTION/MAINTENANCE: Were inspection & maintenance procedures a factor?	☐	☐
PERSON'S PHYSICAL CONDITION: In your opinion, was the physical condition of the person a factor?	☐	☐
OPERATING PROCEDURES: Were operating procedures a factor?	☐	☐
JOB PRACTICES: Were any job safety/health practices not followed when the accident occurred?	☐	☐
HUMAN FACTORS: Did any human factors such as, size or strength of person, etc., contribute to accident?	☐	☐
ENVIRONMENTAL FACTORS: Did heat, cold, dust, sun, glare, etc., contribute to the accident?	☐	☐

a. *(CONTINUED)*	YES	NO
CHEMICAL AND PHYSICAL AGENT FACTORS: Did exposure to chemical agents, such as dust, fumes, mists, vapors or physical agents, such as, noise, radiation, etc., contribute to accident?	☐	☐
OFFICE FACTORS: Did office setting such as, lifting office furniture, carrying, stooping, etc., contribute to the accident?	☐	☐
SUPPORT FACTORS: Were inappropriate tools/resources provided to properly perform the activity/task?	☐	☐
PERSONAL PROTECTIVE EQUIPMENT: Did the improper selection, use or maintenance of personal protective equipment contribute to the accident?	☐	☐
DRUGS/ALCOHOL: In your opinion, was drugs or alcohol a factor to the accident	☐	☐

b. WAS A WRITTEN JOB/ACTIVITY HAZARD ANALYSIS COMPLETED FOR TASK BEING PERFORMED AT TIME OF ACCIDENT?

☐ YES *(If yes, attach a copy.)* ☐ NO

12. TRAINING

a. WAS PERSON TRAINED TO PERFORM ACTIVITY/TASK?	b. TYPE OF TRAINING.	c. DATE OF MOST RECENT FORMAL TRAINING.
☐ YES ☐ NO	☐ CLASSROOM ☐ ON JOB	(Month) (Day) (Year)

13. FULLY EXPLAIN WHAT ALLOWED OR CAUSED THE ACCIDENT; INCLUDE DIRECT AND INDIRECT CAUSES *(See instruction for definition of direct and indirect causes.) (Use additional paper, if necessary)*

a. DIRECT CAUSE

See attached page.

b. INDIRECT CAUSE(S)

See attached page.

14. ACTION(S) TAKEN, ANTICIPATED OR RECOMMENDED TO ELIMINATE CAUSE(S).

DESCRIBE FULLY:

See attached page.

DATES FOR ACTIONS IDENTIFIED IN BLOCK 14.

a. BEGINNING (Month/Day/Year)	b. ANTICIPATED COMPLETION (Month/Day/Year)

c. SIGNATURE AND TITLE OF SUPERVISOR COMPLETING REPORT	d. DATE *(Mo/Da/Yr)*	e. ORGANIZATION IDENTIFIER *(Div, Br, Sect)*	f. OFFICE SYMBOL
CORPS _____ CONTRACTOR _____			

16. MANAGEMENT REVIEW *(1st)*

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

17. MANAGEMENT REVIEW *(2nd - Chief Operations, Construction, Engineering, etc.)*

a. ☐ CONCUR b. ☐ NON CONCUR c. COMMENTS

SIGNATURE	TITLE	DATE

18. SAFETY AND OCCUPATIONAL HEALTH OFFICE REVIEW

a. ☐ CONCUR b. ☐ NON CONCUR c. ADDITIONAL ACTIONS/COMMENTS

SIGNATURE	TITLE	DATE

19. COMMAND APPROVAL

'ENTS

COMMANDER SIGNATURE	DATE

*U.S. GOVERNMENT PRINTING OFFICE 1993-0 791-757

10. ACCIDENT DESCRIPTION *(Continuation)*

DIRECT CAUSE *(Continuation)*

13b.	INDIRECT CAUSES *(Continuation)*

14.	ACTION(S) TAKEN, ANTICIPATED, OR RECOMMENDED TO ELIMINATE CAUSE(S) *(Continuation)*

DAILY PRE-OPERATIONAL CHECKLIST FOR CRAWLER TRACTORS, DOZERS, SCRAPERS, MOTOR GRADERS, BACKHOES, HEAVY HAULAGE UNITS
U.S. Army Engineer, Huntington District

INSTRUCTIONS

SECTION 1 – GENERAL INFORMATION:

a. Date – Enter month, day, and year of Safety Inspection.
b. Owner / User – Enter designated ownership of equipment (Corps, Corps leased or Contractor by name).
c. Contract Number – Contractors enter the respective contract number.
d. Type of Equipment – Enter Ford 515 Backhoe, JD 450 Bulldozer, etc.
e. Number – Enter equipment number Contractor has issued on large scale operations.
f. Inspected By – Enter signature and title of Corps or Contractor inspector (Corps inspector may be a maintenance leader, maintenance mechanic or operator and a Contractor inspector may be a mechanic, operator or service person).
g. Reviewed By – Enter signature and title of Corps or Contractor reviewer (Corps reviewer may be a maintenance leader, maintenance mechanic, manager or supervisor and a Contractor reviewer may be the mechanic, shift leader, foreman or superintendent). Before a signature and title of Corps or Contractor reviewer is entered the checklist must be reviewed and the equipment spot checked unannounced to ensure inspections are performed.

SECTION 2 – DAILY PRE-OPERATIONAL CHECKLIST: Check Yes, No or Not Applicable if question or statement does not apply.

SECTION 3 – RECEIPT OF ACKNOWLEDGMENT: Enter signature, title and date signed by personnel acknowledging receipt of the checklist. If Corps personnel was the inspector and reviewer a Corps manager, supervisor or responsible employee will sign the receipt of acknowledgment. If a Contractor personnel was the inspector and reviewer the checklist becomes a part of the official project file and a copy is furnished to the Contracting Officer Representative (COR), the COR will then sign the receipt of acknowledgment. The COR may request a copy of the checklist at any time. The COR or a representative may perform an unannounced spot check inspection to ensure compliance of safety inspection requirements. To determine if inspector and reviewer are Corps or Contractor personnel see SECTION 1, item f. and g.

SECTION 1	GENERAL INFORMATION	
a. Date	b. Owner/User	c. Contract Number
Type of Equipment		e. Number
f. Inspected By (Signature) (Title)	g. Reviewed By (Signature) (Title)	

SECTION 2	DAILY PRE-OPERATIONAL CHECKLIST		
NOTE: Reference U.S. Army Corps of Engineers Safety and Health Requirements Manual (EM 385-1-1, April 1981, as revised). (Equipment must be in full compliance with checklist and contract requirements.)	Yes	No	Not Appl
1. Are the rollover protection system and seat belts in good condition?			
2. Are all lights operable? Service, warning, signal and tail.			
3. If equipment is used on highways or streets are slow moving vehicle signs installed? (Must be installed prior to use on highways or streets.)			
4. Is safe 3-point access provided the operator to the operating compartment?			
5. Is proper protection provided the operator? Grills, screens, canopies, etc.			
6. Are brakes (service and parking) operable?			
7. Are the reverse alarm signals operable?			
8. Is cab glass free from breaks, cracks or distortion?			
9. Are shields, guards, and covers in place?			
10. Are air tanks drained and in good condition?			
11. Is there any physical damage evident to the unit?			
12. Are tracks in good condition and properly adjusted?			
13. Is there any evidence of damage to undercarriage and track mountings?			
14. Are the blade, C-frame, hydraulic lines and cylinders in good operating condition?			
15. Are all towing devices adequate and properly mounted?			
16. Are the winch unit and cables in good working condition?			
17. Are all tires and wheels in good condition and evenly matched?			

	Yes	No	Not Appl
Are tires properly inflated according to manufacturers recommendations?			
19. Is the unit equipped with the required fire extinguisher? (5:B.C. Rating minimum)			
20. Does the unit have an approved first aid kit? (16-unit minimum)			
21. Are all instruments operable? (Ammeters, pressure gauges, temperature gauges & tachometers.)			
22. Are operating levers, pedals, etc., operable?			
23. Are outriggers operable?			
24. Are oil levels as recommended?			

25. Remarks:

SECTION 3 **RECEIPT OF ACKNOWLEDGMENT**

Receipt Acknowledged by: *(Title)* *(Date)*
(Signature)

APPENDIX C QC Documentation

QUALITY ASSURANCE CERTIFICATION

TNT Area B and Pentolite Road Redwater Pond Area
Bioremediation of Contaminated Soil
Plum Brook Ordnance Works
Sandusky, Ohio

Contract No. DACW69-03-D-0007
Work Order No. 0004

This document is provided to certify that the Independent Quality Control Team (IQCT) have reviewed the Plan of Operations Addendum in accordance with the Quality Control Plan. All comments resulting from the various reviews have been resolved and/or incorporated.

Assignment	Name	Signature	Date
Senior Review			
	Joseph Wheeler		8-28-03
Peer Review			
	Julie Glockner		

QUALITY ASSURANCE CERTIFICATION

TNT Area B and Pentolite Road Redwater Pond Area
Bioremediation of Contaminated Soil
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Assignment	Name	Signature	Date
Senior Review			
	Joseph Wheeler	_____	_____
Peer Review			
	Julie Glockner	Julie Glockner	8/28/03

Comments on Plan of Operations Addendum
TNT Area B and Pentolite Road Redwater Pond Area
Bioremediation of Contaminated Soil
Plum Brook Ordnance Works
Sandusky, Ohio

Contract No. DACW69-03-D-0007
Work Order No. 0004

The following comments were provided by the WTI Independent Quality Control Team (IQCT). All comments resulting from this review has been resolved and/or incorporated.

Comment: Section 1.1, amount of material to be treated (1725 tons) is not the same amount listed in the Bench Scale Test Plan (Section 1.1) or the SSHP (Section 2.1) (1500 tons). Please revise in this plan or the others for consistency.

Response: The number was actually changed in the bench scale test plan, 1500 represented only the TNT B area and it should have represented the TNT B area and the Pentolite Red Area which is 1725

Comment: Page 5, please revise Dewey Meyers name (listed as Myers).

Response: Concur, revised name

Comment: Page 7, Section 4.3, and Page 9, Section 4.5.7, amount of tank trailers (appx 40) does not correspond to the amount listed in the Bench Scale Test Plan (Section 1.2.4.7) or the SSHP (Section 2.2.4.7) (appx 80). Please revise for consistency.

Response: The actual number is 40, the number 80 was originally reported but after a site visit the PM confirmed only 40 tankers. The bench scale and SSHP were revised to reflect these numbers

Comment: Section 4.5.2, third sentence on page 8: Suggest adding that the volume of material <u>for each test</u> is approximately 15 gallons.

Response: Do not concur, this section deals with the "USACE requirements listed in the SOW and there were no requirement for using 15 gallons.

Comment: Page 10, Section 4.5.9, the dimensions of the sump do not correspond to the dimensions listed in Section 2.2.4.7 of SSHP and Section 1.2.4.7 of Bench Scale Test Plan. Also the berm heights do not correspond to SSHP and Bench Scale Test Plan. Please revise for consistency.

Response: Concur, the values in the Bench Scale and the SSHP were changed after the PM made a site visit.

Comment: Page 11, Section 4.5.11, the windrow spacing and dimensions do not correspond to Section 2.2.4.11 of SSHP and Section 1.2.4.11 of Bench Scale Test Plan. Please revise for consistency.

Response: Concur, the values in the Bench Scale and the SSHP were changed after the PM made a site visit.

Comment: Page 12, Section 5.1, the amount of samples and time scale is not consistent with Section 2.2.4.11 of SSHP and Section 1.2.4.11 of Bench Scale Test Plan. Please revise for consistency.

Response: Concur, the values in the Bench Scale and the SSHP were changed after the landfill changed the requirements on the sampling and when decomposition of nitroaromatics was not progressing at the rate expected based upon the bench scale testing which is in progress.

Comment: Page 14, Section 5.2, second paragraph, if the landfill requires testing every 300 tons, why so many samples are slated to be run for disposal purposes?

Response: The original number used would have been correctly because of the 1725 tons of soil Plus the amendments which would have significantly raised the volume (perhaps 3 times as much); however, upon further discussion with the landfill, they have agreed to take less samples that originally proposed.

Comment: Table 3 on Page 15 and Table 4 on Page 16, the far right side of the table is missing the table enclosure line.

Response: Concur, table was corrected

Comment: Page 17, Section 13.0, first paragraph, suggest moving this paragraph to Section 13.5.

Response: Concur, the paragraph was moved

Comment: Page 19, Section 15.0, 4th bullet, may want to indicate that daily turning will occur until composting is almost complete, then every other day the windrow may be turned.

Response: Concur, change made

Comment: Section 4.1 – please add that the dump trucks will be articulated trucks

Response: Concur, change made

Comment; Section 4.5.9- What about the water storage until the analysis returns

Response: Concur, comments are added concerning the use of Frac tanks

Section 5.1 Shouldn't the highest of the two composite samples from the windrow testing be submitted to the lab instead of composting.

Response: Do not concur, based upon the sampling requirements of the landfill, which is to take 12 grab samples in each windrow and compositing it to make one sample, the described sampling procedure for the weekly lab analysis seems appropriate

Comment: add information in Section 5.1.1 cocnerning the initial absorbance reading that is required

Response: Concur, change made

Comments on Plan of Operations Addendum
TNT Area B and Pentolite Road Redwater Pond Area
Bioremediation of Contaminated Soil
Plum Brook Ordnance Works
Sandusky, Ohio

Contract No. DACW69-03-D-0007
Work Order No. 0004

The following comments were provided by the Huntington District of the USACE. All comments resulting from this review has been resolved and/or incorporated.

Due to difficulties in the screening process, personnel may physically pick thru (by hand or equipment) the soil and remove the unwanted rocks, stubs and those items larger than the diameter specified in the workplans that will not damage the composter or prohibit the composting process or cause a safety concern while composting (projectiles). All soil that is able to go thru the screener, should be put through the screener. Personnel must wear the appropriate PPE when doing the physical actions.

Response: Concur, this information was added to the section of screening