FINAL
EXPLOSIVE SAFETY SUBMISSION
FOR REMOVAL OF
ORDNANCE AND EXPLOSIVES (OE) AT THE LAKE ONTARIO ORDNANCE WORKS (LOOW) SITE

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July 2, 2001

Attachments

EXPLOSIVE SAFETY SUBMISSION FOR REMOVAL OF ORDNANCE AND EXPLOSIVES (OE)

1. Reason for OE Contamination

The Former Lake Ontario Ordnance Works site is located in the towns of Lewiston and Porter in Niagara County, New York. The site originally encompassed approximately 7,500 acres with actual U.S. Department of Defense site activities having occurred on 2,500 acres. During the early 1940s, the LOOW site was used as a manufacturing plant producing TNT for use during WWII. Once completed, the complex contained a power plant, hospital, fire department, a water supply system adequate for a population of 100,000, and water supply and wastewater treatment system of underground water, sewage, acid, and TNT pipelines.

The manufacturing portion of the plant was situated in the central southwestern section of the LOOW site, south of Balmer Road. Wastewater from the TNT manufacturing operation, as well as storm water and sanitary sewage, was transferred through an underground sewer network to a wastewater treatment plant located in the western portion of the TNT plant. The TNT pipelines ran as one pair of east-west trending lines across the TNT production area before being routed south to the water treatment plant at the west end of the production line.

An overestimation of the need for TNT during WWII resulted in the closure of the TNT plant in July 1943, after only 9 months of operation. Following the decontamination of the TNT plant, the majority of the LOOW facility was sold to private citizens, with the government retaining the former active 2,500-acre portion of the site.

Several branches of DOD and the U.S. Department of Energy (DOE) have used portions of the LOOW site for various manufacturing and storage activities, including the pilot production of high-energy fuels. In 1955, the Navy and Air Force acquired 360 and 200 acres, respectively, of the former TNT plant. The acquisition of the properties by the Navy and the Air Force was for the joint development of a boron and lithium-based high-energy rocket fuel production plant. The Air Force subsequently assumed responsibility for the project, which was identified as Air Force Plant 68 (AFP-68). Part of the construction of AFP-68 involved tying in the AFP-68 sanitary, stormwater, and chemical Waste Sewer systems into the former TNT wastewater treatment plant located approximately 1,000 feet southwest of AFP-68. AFP-68 was decommissioned in 1959 while still in pilot-plant status.

In 1972, Chem-Trol Pollution Services, Inc. (Chem-Trol) acquired portions of LOOW for the development of a hazardous waste treatment, storage, and disposal (TSD) facility. Chem-Trol was acquired by SCA Chemical Services, Inc. (SCA) in 1973 and was subsequently acquired by Chemical Waste Management (CWM) in the early 1980s. In 1969, the Somerset Group (Somerset) obtained an approximately 100-acre section of the former LOOW property that contained AFB-68. Around 1979, the southern half of the former AFP-68 (about 50 acres) was sold to SCA. This section is currently owned by CWM. The portions of the former TNT and AFB-68 site relevant to this project are situated on property currently owned by CWM and the

Town of Lewiston. CWM operates the site as a Resource Conservation and Recovery Act (RCRA) TSDF. Due to the proximity and size of the parcel, the portion of the site owned by the Town of Lewiston has no future plans for use.

The US Army Corps of Engineers, Buffalo District, is the lead federal agency for the CERCLA investigations and remedial actions on this site. In the summer of 2000, asbestos was removed from the site under an Interim Removal Action (IRA). The next interim action will be in the summer of 2001, which includes the removal of buried drums and a trash/burn pit, which contains three drums, old batteries and other debris. Both areas are located on CWM property.

Currently the Corps of Engineers is working on an Engineering Evaluation/Cost Analysis (EE/CA) to address interim removal actions for the following areas at the LOOW site:

- **Area-A Drum Trench:** This site was delineated during Remedial Investigations (RI) conducted in 1988 and 1989. It consists of approximately 30 buried drums that may contain chemical wastes.

- **Area-B Former Burn Pit:** This site, also investigated in 1988 and 1989, consists of a bermed pond area and a former surface depression that may contain debris and chemical contamination.

Both areas are located on CWM's property.

The Phase 1 Component 1 of this Interim Removal Action has required flushing and removal of the TNT pipeline. Test site excavations to date have indicated that the pipelines comprising the LOOW TNT pipeline waste sewer system are concrete encased with approximate outside dimensions of 2-ft wide by 3-ft high (including the concrete encasement). The pipelines encased within the concrete are vitreous clay pipe and range in diameter from 10 to 18 inches.

Initial remediation of the TNT pipeline was performed by Radian International from April 1999 until December 1999. Work stopped and the contract was terminated due to funding constraints. During this time, Radian removed approximately 1600 feet of pipe, and powerwashed and grouted the ends of approximately 1900 feet of pipe.

A new contract was awarded to Sevenson Environmental Services, Inc. in the spring of 2000 to complete the remediation of the TNT pipeline. From the previous years work, it had been determined that it was more cost effective to powerwash, video and grout the entire line rather than remove and dispose of the pipeline.

To date, 4,500 feet of pipe has been powerwashed, videotaped and grouted. Since all our preliminary testing of the overburden soils, subsurface soils and test pit samples of the pipe came back with levels of TNT well below the 10% limit, an Explosive Safety Submission (ESS) report was not required for this work.

There is one section of pipe, 100 feet long, that has a concentration of 16.5% TNT. Due to the high concentration, an ESS Report is required for this pipeline.

This operation is an Interim Removal Action (IRA) to clean up TNT residue inside a 100-ft section of pipe. Currently, a Remedial Investigation (RI) is being conducted on the entire LOOW site. Then a Risk Assessment (RA), Feasibility Study (FS), Proposed Plan (PP) and a Record of Decision (ROD) will be prepared. The TNT pipeline will be addressed in these documents and a final course of action will be selected. This will be coordinated with the regulators and stakeholders. An explosive safety submission detailing plans for the pipeline and any other explosives hazards will also be prepared after these decisions are made.

Note: The TNT pipeline in question is entirely within the boundaries of the CWM property. This property is a RCRA landfill site with numerous closed and active RCRA compliant landfills and will remain a RCRA site for the known future.

2. Maps

a. Regional Map – LOOW is located in Western New York in Niagara County. The installation lies approximately 10 miles north of Niagara Falls, New York. Refer to Figure 1.

b. Site Map - A map showing details of the project site is illustrated in Figure 2. The site map reflects the area of concern that will be involved in the remediation. Figure 2 also illustrates the location of the holding tank that will be used for the temporary storage of recovered TNT waiting for disposal.

(1) The following is a description of the known area of OE concern covered by this submission:

(a) TEST PIT #11 – The initial sampling of the pipelines indicated that at Test Pit (TP) #11 @ Station 17+50 the 10" North pipeline contained 16.5% TNT. This segment of pipe is approximately 100' long and does not connect to any other segments of the TNT pipeline. The constituents of the pipeline at this point are water, silt, sludge, pea gravel and stained soil. The TNT test results for the overburden soils and the soils under the pipe at this location showed no contaminants including TNT.

(2) Removal Depth- The TNT is located in an underground pipe approximately fifteen (15) under ground. Once power washing, sludge and water removal is completed, the pipeline will be excavated and removed. The process is documented in detail in paragraph 6 Clearance Techniques.

(3) Location of Magazines – Not Applicable

(4) Detonation Area – Not Applicable

(5) Existing or Planned Use- Not applicable.

c. **Q-D Maps** –The area to be cleared under this submission is illustrated in Figure 3.

(1) Location of Magazines- Not Applicable

(2) Area of Detonation – Non Applicable

d. Soils Sampling Maps – Not Applicable, see paragraph 6 for details of soil sampling to be preformed.

3. **Amount and Type of OE** – The MCE for this project is 115.5 pounds of TNT. The MCE was calculated as follows: Based on data from sampling, the contents of the pipe (water, silt, sludge, pea gravel and stained soil) at TP #11 contain TNT contamination of 16.5%. Since the 10" pipe is ¼ full with a length of 100', the estimated weight of the contents is 700 pounds. Seven Hundred pounds of contents x 16.5% = 115.5 pounds of TNT.

4. **Start Date** - The intrusive phase of this remediation project is scheduled to commence during the summer/fall of 2001.

5. **Frost Line** –Not Applicable

6. **Clearance Techniques**

a. **Flushing And Excavation of the TNT Pipeline.** The work to be completed includes removal of accumulated liquids and sludges at TP #11 of the TNT Pipeline utilizing power washing techniques, video inspection of the cleaned pipeline, collection and temporary storage of liquid and solid (sludges) removed from the TNT Pipeline, disposal of liquid from the pipeline and all solids generated during the work, the excavation and removal of the pipeline, and sampling of the soil adjacent to and under the excavated pipeline. The entire pipe length will be powerwashed as one complete unit if possible. Treatment/disposal of pipeline sludges containing explosive compounds exceeding the remediation goals of 10% explosive content shall be performed by the Contractor using a professional Explosives Expert Team (Senior UXO Supervisor and UXO Technician) (as defined in the Site, Safety, and Health Plan as necessary for potentially detonable materials). The main objective of this operation is to mitigate the explosive hazard with the minimum exposure to explosive risk to the CWM site and to the contractor personnel performing this operation.

All work shall be coordinated with the site owner (CWM) and notification shall be given to neighboring properties prior to remediation. All precautions will be taken to ensure that the Q-D of 744 feet will be maintained by roadblocks, working off hours etc.

Initial Excavation

The 10" TNT pipeline consists of vitreous clay pipe. The clay pipe is concrete encased with approximate outside dimensions of 2 ft wide by 3 ft high.

Excavation at upgradient and downgradient segment locations to expose pipeline, and construction of temporary containment sumps to capture and contain pipeline liquids shall be performed in accordance with the following:

1. The Contractor shall power wash the pipeline in accordance with the procedures listed below. Access to the pipeline must be gained for removal of liquids and power washing operations. The Contractor shall uncover the pipeline at each end of the total run by excavation of surrounding soils. The Contractor shall create a temporary lined sump for removal activities at the points the pipeline is uncovered. The sump shall be lined with a 40-mil minimum geomembrane to prevent the release of materials (primarily water) to the surrounding environment during removal and power washing activities.

2. The excavated soils removed during sump creation shall be staged for use as backfill on constructed 40 mil soil stockpile areas. Sampling of the excavated soils will be performed by the Contractor and the concentrations that are below cleanup criteria will be stockpiled and be used as backfill material.

3. Excavation of side slopes is the sole responsibility of the excavation Contractor. The working area slopes of the temporary sumps shall be cut inclinations in accordance with OSHA requirements of 20 CFR Part 1926 and EM 385-1-1 (September 1996) for safe working conditions. Cut slope inclinations in these instances must be designed by a qualified civil or geotechnical engineer. Sheeting and shoring of excavation sidewalls, if needed to protect construction personnel or existing nearby structures (e.g. utilities or roadways), shall be designed and constructed and must conform to OSHA requirements.

Power Washing Techniques

This consists of a Myers Sewer Jet System, capable of 2,000 psi at flow rates (varying from 10 gpm to 50 gpm) to flush the pipes with cold water. The jet will be placed in the pipe downstream opening in the pipe. It has a mushroom shaped spray-head that propels itself down the pipe. Typically, the flow rates of 30 gpm at 100 psi are anticipated and will clean moderately filled pipe sediments. For pipes containing sediments filled more than half way, a flow rate of 50 gpm at 2000 psi is required to clean the pipe.

Removal of TNT Pipeline Liquids

After creation of the temporary sumps, the pipeline shall be accessed at the upgradient location if a pressure head due to the pipeline liquids is anticipated. The pipeline can be accessed at a downgradient location if an excessive pressure head does not exist. The liquids contained in the pipeline shall be removed from the accessed location to the extent possible and transferred into a temporary storage vessel (i.e.Baker Tanks), field sampled, and analyzed to determine specific treatment/disposal requirements. Any liquid entering the sump will be pumped to a temporary storage tank (Baker Tank) for analysis. The liquids will be stored temporarily until the results of the analysis are available.

Removal of TNT Pipeline Sludges

Removal of pipeline sludges from the pipeline segment, using a high-pressure power nozzle system, shall be performed in accordance with the following procedures:

1. The Contractor shall power wash the TNT pipelines with a high-pressure jetting nozzle system, as described above. The power wash system shall be capable of effectively removing sludges from the pipeline and cleaning the inner surfaces of the pipe without causing damage to the pipeline. The power wash system shall also be capable of removing debris that may stop the forward travel of the wash system.

2. Access to the TNT pipeline for insertion of the power wash system shall be gained through the temporary sump. The sump shall be lined and used to collect the wash water and sludges as they are removed.

3. Removal of the pipeline sludges shall be conducted using a truck-mounted system with power washing and vacuum equipment. A hose with a high-pressure power washer nozzle shall be inserted into the downstream end of the exposed pipeline interval at the temporary sump. The power washer nozzle will be extended into the pipeline interval then withdrawn to flush loosened materials from the line. This method shall be followed until it reaches the upstream temporary sump.

4. The Contractor shall place the vacuum hose at the downgradient access point and pump water from the sump as it is generated from the power washing operation. The vacuum pump shall have a minimum pumping capacity of 125 gallons per minute. The vacuum hose shall pump sludges and water from the pipeline into a tank truck or a portable tank mounted on a truck or trailer. The water and solids shall then be pumped into an onsite tank to allow the solids to settle. The final wash water shall be sampled and analyzed for disposal.

5. Each pipeline segment shall be flushed once and then effective removal of the contents verified by pipeline video camera techniques, (see below for Video Procedures) and field tested for TNT prior to the Contractor excavating and removing the pipeline. Approval to remove the pipeline section shall be provided by the COR or his/her designee based on the visual verification by video techniques, and completion of the sampling tests.

6. There may be roots, material plugs, or other obstructions in the lines to stop the progress of the power wash system. If the situation is encountered, the Contractor shall try to loosen the blockage by working the power wash system from both the sides of the blockage. If removal of the blockage is unsuccessful using the power wash system, the contractor shall access the pipe near the point of blockage by excavation and remove the obstruction. If any chunks of TNT are encountered during power washing operations, they will be submerged in mineral oil to await further processing. They shall be processed at the site into ½" or smaller nuggets disposed of by mixing with soil, using non sparking tools, to below explosive levels. At all stages, where practicable, of this process the explosive material will be kept wet using water or mineral oil as needed. The mixed material will be kept wet and will be tested and shipped to an approved permitted facility for materials, which contain TNT below the 10% explosive level. (See Handling, Storage and Transporting Pipeline Sludges below).

Video Procedures

After the TNT lines have been power washed (and clean water is observed), then video taping the insides of the TNT lines will commence. The camera system that will be used is a "PierPoint". The camera is approximately 23"in length, 6¼" tall and 5 5/8" wide. The camera travels through the pipe on (6)-3¾" diameter wheels. The camera travels through every linear foot of the pipe that has been power washed. An operator in the "Television Van" sends computer commands to the camera through a cable mounted on the camera. The camera lens can be rotated 360 degrees and the camera can move forward and reverse. The lens can be rotated to focus on any cracks or suspect areas, location of any discovered cracks or suspect areas will be recorded for subsequent visual inspection. A remote video recorder mounted inside the van shows in real time the results of the power washing effort. All results are recorded on a standard VHS VCR tape. If any residue, crystals, etc. are found, the pipe is cleaned and inspected again. (Wipe tests will be performed after the pipe is determined to be clean. Although the pipe cannot be certified as completely free of TNT residue, it is unlikely there will be sufficient

residue left to present an explosives hazard, even if the TNT crystallizes. To insure that none exist a visual inspect of all joints and cracks, and suspect areas will be accomplished upon removal of the pipeline. Particular attention will be given to any areas where the pipe has been breached or broken; these areas will be noted during video review and checked visually upon pipeline removal.

Final Excavation and Pipeline Removal

Once power washing, sludge collection, and video inspection have been completed, final excavation will begin. A discussion of the pipeline containing the 16.5% TNT is helpful to understand the removal plan. The 10" line consists of ceramic pipe, 3' long sections encased in concrete. The clay pipe has a joint every 3 lineal feet. The weight of each section is calculated as follows: 3'x 3'x 3'x 150 #/ft^3 = 4050 pounds. That fact limits the ability to remove the pipe to one bucket or approximately one to two sections at a time. The soil over the pipeline will be removed as the sections are being worked.

A PC 300 Komatsu Excavator with an attachment breaker will be used to uncover the pipeline and then fracture the encased pipe in one to two foot manageable lengths. Since the clay pipe has a joint every 3 feet the midpoint of the pipe is 1.5 feet from the joint. Although we will try to cut through the pipe neatly, in many cases this is not possible. The pipe will often fracture and possibly break away at the joint. We will attempt to break the pipe between joints in order to insure inspection of the joints. We will excavate all pieces out of the trench, with particular attention to removal of all portions of the fractured/broken pipe. The pipe material will then be carefully transferred to the staging area which is located in the Project Area. The pipe material will be placed on visqueen plastic sheets and visually inspected by UXO explosive experts. Utilizing mirrors and high intensity flash lights all of the pipe material will be checked. Each joint, uncovered crack or suspect area will be checked. Emphasis of the inspection will be on joints, potential cracks and any areas that were noted as broken or voids during the video inspection. This will insure no TNT crystals or deposits exist. Any bulk or TNT solid material encountered will be separated carefully, from the pipe material, after soaking with mineral oil. It will be processed as described below in Handling, Storage and Transporting Pipeline Sludges. After inspection, the pipeline material will be disposed of at an approved permitted facility for material that contains TNT below the cleanup criteria of 10%.

Soil Sampling

Soil sampling will be conducted along the length of the excavated pipeline to insure no TNT has leached into the area. Special attention will be given to areas adjacent to pipeline joints and at any section/area where the pipe is breached or broken. Once tests confirming this have been received then refilling of the excavation with the stockpiles

clean soil will be accomplished. Any areas of soil, contaminated greater then 10% explosive level, will be removed and mixed with uncontaminated soil to lower the explosive percentage to a safe level, then shipped to the appropriate disposal area.

Handling, Storage and Transporting Pipeline Sludges

Sludges removed from the pipeline by power washing will be initially in the form of slurry. The slurry shall be contained and stored to allow the sludges to settle out and the liquids to be decanted and transported for treatment/disposal. The Contractor shall provide for transport to and disposal at an approved permitted facility for sludges that are below the cleanup criteria. If field-testing determines that the TNT in the sludges exceeds the 10% clean up criteria, soils will be added to the sludges to reduce the concentration to 5% or less. A composite sample shall be taken of the blended soils prior to disposal.

Any suspected TNT contaminated material will be kept wet with water or mineral oil until it has been processed or confirmed that no explosive hazard exists. This applies to sludges, pipe components, and other possible TNT contaminated material.

The Contractor shall coordinate all work at the remediation area to ensure that the activities will not interfere with site activities, and do not present an explosive hazard to CWM's RCRA TSD facility operation.

Required Reports

A Daily Operations Journal will be completed by the OE person at the close of business each day and turned over to the Contractor Project Manager.

OE Closeout Report

An OE closeout report will be compiled at the end of OE operations. This report include as a minimum the following data:

- Summary of Operations;
- Quantities of sludge removed from pipe;
- Results of Pipeline removal;
- Results of Pipeline inspection;
- Summary of methods implemented for blending of sludges;
- Disposal of Pipeline debris;
- Problems/Corrective Actions employed;
- Lessons learned; and
- Photographs of TNT remediation activities.

b. Detection Methods- Not Applicable

c. Quality Assurance / Quality Control (QA/QC)- The following describes the management structure and controls incorporated to provide a safe and quality product.

This Quality Control Plan (QCP) provides procedures for controlling and measuring quality of all work performed during this remediation activity at the LOOW site. This site specific QCP was designed to provide procedures for:

- Testing and calibrating equipment used to perform work
- Determining the effectiveness of work performed
- Inspecting the maintenance and accuracy of site records
- Determining compliance with site safety, environmental, and operational plans

All QA/QC activities will be performed and documented in accordance with applicable professional and technical standards, and USEPA and USACE requirements.

Quality Management Structure

Site QC Specialist

The Site QC Specialist, Mr. Jerry Castiglione, has the responsibility and authority to enforce the QCP. His responsibilities include:

- Coordinating with the facility representative to ensure that QC objectives appropriate to the project are set and that all personnel are aware of these objectives.
- Coordinating to ensure that QC procedures are being followed and are appropriate for achieving data validity sufficient to meet QC objectives.
- Conducting daily QC audits of all site activities and recording them in the QC Activity Log.
- Recommending and implementing actions to be taken in the event of a QC failure.
- Reporting noncompliance with QC criteria to the Project Manager, Senior UXO Supervisor and Corporate QC Manager.
    - **Daily QC Audits**: All Instruments and equipment that require calibrations will be checked prior to the start of each workday. Batteries will be replaced as needed and the instruments will be checked against a known source. The QC Specialist is responsible for ensuring that personnel accomplish all QC checks and that the appropriate log entries are made. The QC Specialist will perform random, unscheduled checks of the various sites to ensure that personnel accomplish all work specified in the Work Plan and submit a report of findings to the Senior UXO Supervisor.

Maintenance and Accuracy of Reports and Records

For all site work, bound logbooks with consecutively numbered pages will be used by field personnel. The field logbooks will be used to record the daily activities of the field team, provide sketch maps and locations of OE and other pertinent items, and to note any observations, which might affect the quality of data. The field log books and site records are utilized to record the following:

- **Field Log Books:** The UXO Supervisors will maintain field logbooks. They will use these books to record site activities and field data. The logbooks will be maintained in a neat and legible manner and will provide a record of site activities.
- **Daily Journal:** The Site Superintendent will maintain the Daily Journal. This journal will provide a summary of all operations conducted to include information on weather conditions, problem areas, work plan modifications, injuries, start/stop times, tail gate safety briefings, equipment discrepancies, OE locations, training conducted, visitors, and any additional items deemed appropriate.
- **OE Records:** The UXO team leader will prepare individual records for each area of concern. This record will consist of a series of sheets that will be used to record data on live OE items encountered.
- **Site Safety Log:** The SSO will maintain this log. The log will be used to record all safety matters associated with the specific project such as: safety briefings/meetings, including items covered and attendees, safety training, safety audits, near-misses/accidents/incidents, cause and corrective action taken, weather conditions and any other matters encompassing safety.
- **Quality Control Log:** The QC Specialist will maintain this log. The QC Specialist will use the log to record the performance and results of QC checks and audits.
- **Visitors Documentation:** The Site Superintendent will maintain this information in the daily journal. Personnel that are not directly involved with on-site activities will be identified by name, company, date, time in/out and a contact phone number. Safety briefings and training for visiting personnel will also be recorded on this log.
- **Site Maps:** The PM will maintain a current working map of the operating areas, in the field office, throughout execution of this project. These maps will be used to document OE finds, locations of sampling and other activities.

Log Books and records will be periodically inspected by the QC Specialist. These inspections will focus on the completeness, accuracy, and legibility of the entries and records. Results of these inspections will be forwarded to the PM.

Note: The logbooks are utilized to formulate the final report and as an "Official Document" in the event of any problem area is addressed after the completion of the Project. All logbooks will be maintained permanently in the project files.

d. The post IRA sampling tests along with pipeline videotaping shall determine that there is no explosion hazard present.

7. Alternate Techniques –Not Applicable

8. Quantity – Distance

This paragraph describes the various OE removal actions at the LOOW site

a. OE Area – The project site is designated TP #11. This area includes the pipeline to be powerwashed, sump, Baker Tank, Vacuum Truck etc. (Figure 2).

(1) Inhabited Building Distance (IBD). 744 ft.

(2) Preliminary site work such as surveying, laying search lanes and detecting anomalies do not require an exclusion zone for QD purposes.

b. Magazines – Not Applicable

c. Planned Demolition Area – Not Applicable

d. "Footprint" Areas –Not Applicable

9. Off-site Disposal – All material recovered to include sludges, water, soil, solids to include pipe/concrete will be tested and processed to insure acceptable levels of TNT have been achieved. Once all tests are received they will be disposed of at an approved permitted facility for materials, which contain TNT below the cleanup criteria.

10. Technical Support- Continuous onsite USO technical support is provided by ISSI Unexploded Ordnance, Inc. UXO Team consisting of a Senior UXO Supervisor and a UXO Technician.

11. Land Use Restrictions –Not Applicable

12. Public Involvement Not Applicable

13. After Action Report -Upon completion of the clearance project a report will be generated and provided to all agencies concerned.

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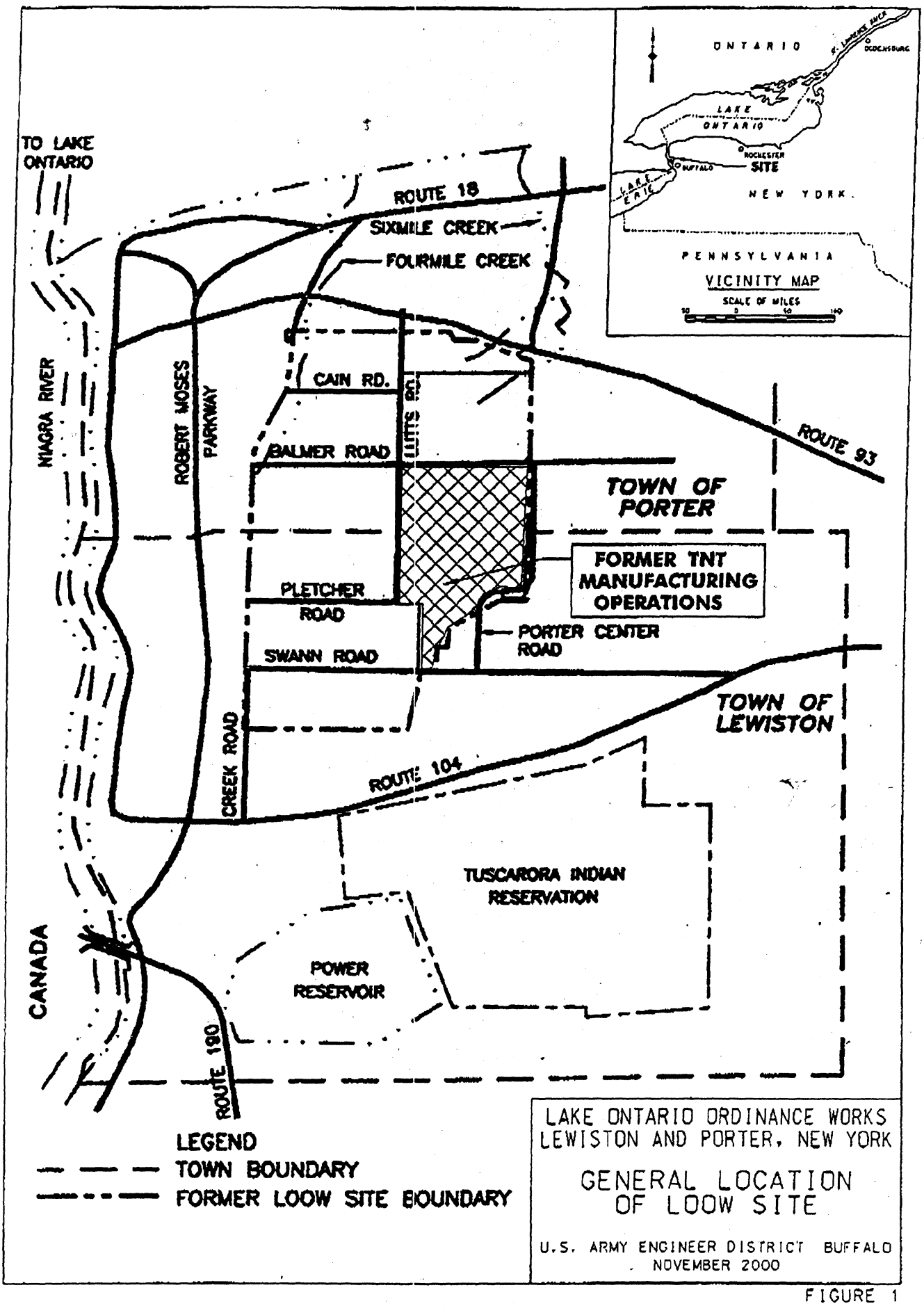
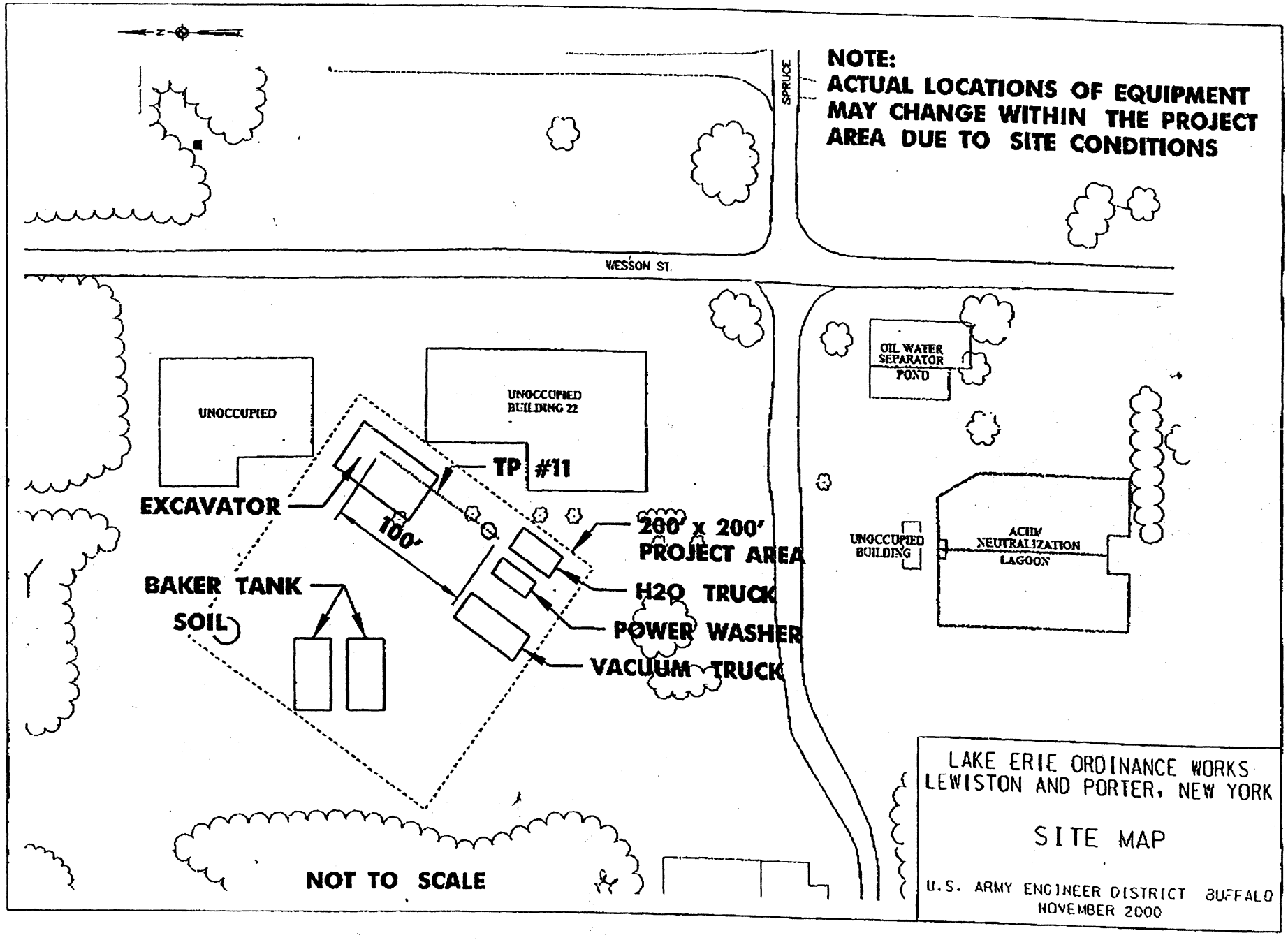


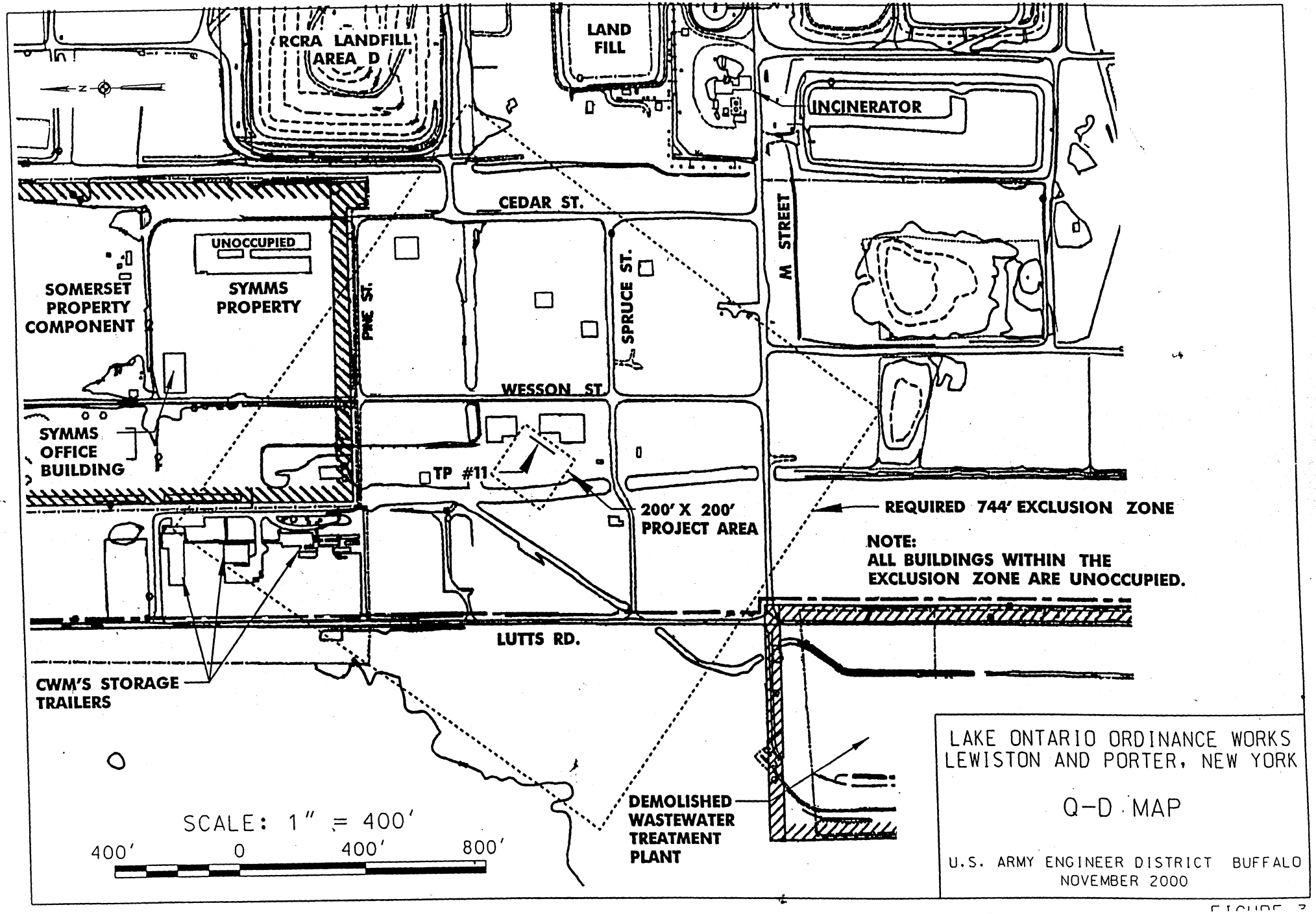
LAKE ONTARIO ORDINANCE WORKS
LEWISTON AND PORTER, NEW YORK

GENERAL LOCATION OF LOOW SITE

U.S. ARMY ENGINEER DISTRICT BUFFALO
NOVEMBER 2000

FIGURE 1





LAKE ONTARIO ORDINANCE WORKS
LEWISTON AND PORTER, NEW YORK

Q-D MAP

U.S. ARMY ENGINEER DISTRICT BUFFALO
NOVEMBER 2000

FIGURE 3

TABLE 7-1
ACTIVITY-HAZARD ANALYSIS

Activity: **Mobilization, Decontamination Pad Setup, Site Restoration, and Demobilization**

Analyzed By/Date: **Dana Draper – 5/00**

Reviewed By/Date: **Paul J. Hitcho, PhD, CIH – 5/00**

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
Mobilization and Pad Setup 1. Establish storage area for equipment, supplies, and flammable liquids. 2. Establish office area for administrative support. 3. Accept equipment/supply delivery. 4. Secure materials in storage. 5. Determine requirements for personnel and vehicles access to the site, including needs for security. 6. Coordinate with USACE representatives to identify existing utility locations. 7. Lay out heavy reinforced plastic material for the decontamination pad. 8. Berm plastic perimeter with abutting straw bales/oil adsorbent booms. Secure berm with wire/stakes. Demobilization/Site Restoration 1. Grade each disturbed area. 2. Remove structures/supplies. 3. Load unused material for transport. 4. Seed/sod, as necessary.	1. Muscle strain from improper lifting. 2. Physical impacts/injury from heavy equipment or moving loads. 3. Physical injury from use of hand or power tools. 4. Slips, trips, falls. 5. Vehicular accidents/collisions. 6. Excessive noise exposure due to heavy equipment or power tool use.	1. Wear Level D PPE. 2. Monitor work for good housekeeping practices. 3. Provide hearing protection. 4. Arrange traffic flow to prevent foot traffic cross the routes of heavy equipment and moving loads. 5. Keep walking surfaces free from slip/trip hazards. 6. Keep unnecessary personnel away from the work area. 7. Follow proper lifting techniques. 8. Be aware of and keep hands out of potential pinch/nip points. Wear heavy work gloves. 9. Separate flammable/combustible materials from other materials. Post "No Smoking" or "Open Flames" signs. Fire extinguishers must be nearby and readily available. 10. Proper hazardous material labeling is required. 11. Equipment operators should look in the direction of travel; look before backing up. 12. Personnel will not stand, walk, or work beneath loads being handled by heavy equipment.
EQUIPMENT TO BE USED	**TRAINING REQUIREMENTS**	**INSPECTION REQUIREMENTS**
1. Power tools and hand tools 2. Hazard communication signs/labels 3. Heavy equipment, motor vehicles 4. Plastic liner 5. Straw bales or absorbent booms	1. Heavy equipment operation 2. Hearing Conservation Program 3. Hazard Communication Program	1. Inspect heavy equipment daily for function of safety features (e.g., horn, back-up alarm, etc.) and general assembly (e.g., missing bolts, loose hoses, etc.). 2. Inspect power tools for function of safety features (e.g., shut-off, GFCI, etc.) and general assembly (e.g., frayed wires, loose connections, etc.) 3. Inspect hand tools for excessive wear and loose parts. 4. Ensure that stored flammable and combustible materials do not present a fire hazard.

TABLE 7-5
ACTIVITY-HAZARD ANALYSIS

Activity: **Excavation of Access Points Or Pipeline Segments along TNT Pipelines and Sewer Lines**

Analyzed By/Date: **Dana Draper – 5/00**

Reviewed By/Date: **Paul J. Hitcho, PhD, CIH – 5/00**

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
1. Identify access point via historical diagrams or from video analysis of piping system. 2. Excavate trench to specified depth. (Note: Excavations greater than 4 feet will require confined space entry (CSE) per Table 7-3.) 3. Stage spoil pile away from work area. 4. Avoid contact with pipeline and sewer lines to the extent possible. 5. Inspect excavation upon completion. 6. Install erosion and sediment controls.	1. Slips, trips, falls. 2. Vehicle accidents or collisions. 3. Physical impact/injury from heavy equipment or hand tools. 4. Contact with overhead or underground utilities. 5. Exposure to site contaminants, explosive, or oxygen-deficient atmospheres. 6. Heavy equipment slides/falls into excavation. 7. Personnel fall into excavation. 8. Excavation cave-in. 9. Muscle strain from improper lifting. 10. Excessive noise exposure. 11. Exposure to explosive residues.	1. Survey work area for slip/trip/fall hazards. 2. Monitor work area for good housekeeping. 3. Ensure that equipment operator acknowledges a pedestrian's presence before walking near heavy equipment in operation. 4. Equipment operators should look in the direction of travel; look before backing up. 5. Survey work area for overhead and underground utilities prior to start of work. 6. Work upwind and perform air monitoring for VOCs, oxygen levels, and combustible gases. 7. Wear modified Level D PPE. Upgrade as necessary. 8. Provide hearing protection. 9. A competent person must supervise the excavation and inspect it daily prior to work. Check excavation for signs of instability. 10. Do not stand, work, or travel beneath loads. 11. Utilize a warning system if equipment is operated in or adjacent an excavation. 12. Any trench deeper than 4 feet will also be considered a confined space. 13. Cease work upon discovery of crystalline material. Work area will be subsequently clean by subcontracted explosives expert.
EQUIPMENT TO BE USED	**TRAINING REQUIREMENTS**	**INSPECTION REQUIREMENTS**
1. OVM 2. CGI/Oxygen Level Meter 3. Excavator 4. Silt fence 5. Hay bales	1. HAZWOPER 2. Heavy equipment operation 3. Monitoring equipment operation 4. Excavation safety 5. PPE Program 6. Hearing Conservation Program 7. Respiratory Protection Program 8. Confined Space Entry Program 9. Explosive Safety Program	1. Calibrate monitoring equipment. 2. Inspect heavy equipment for function of safety features and general assembly. 3. Inspect excavation each day in accordance with OSHA 1926, Part P. 4. If required, perform confined space entry in accordance with OSHA 1910.146 and Division Confined Space Entry Program.

TABLE 7-6
ACTIVITY-HAZARD ANALYSIS

Activity: **Removal of TNT/CWS Pipelines** **Analyzed By/Date:** **Dana Draper – 5/00**
Reviewed By/Date: **Paul J. Hitcho, PhD, CIH – 5/00**

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
1. Remove soil overburden (TNT line). 2. Hoe ram concrete (TNT line) 3. Remove concrete plus clay TNT line. 4. Transport to staging area. 5. Remove clay CWS lines. 6. Transport to staging area.-	1. Exposure to volatilizing site contaminants or explosive atmospheres. 2. Slips, trips, falls. 3. Contact with contaminated materials. 4. Flying debris. 5. Explosion from crystallized TNT or other explosive materials. 6. Excessive noise exposure. 7. Heavy equipment operation. 8. Traffic.	1. Perform air monitoring for VOCs and combustible gases. 2. Wear modified D PPE. 3. Avoid contact with potentially contaminated materials. 4. Practice good housekeeping. 5. Keep walking surface free from tripping and slipping hazards. 6. Hearing conservation program. 7. Stop work when encounter crystalline material. 8. Keep out of swing radius. 9. Back up alarms. 10. Follow traffic regulations. 11. Restrict personnel in are of operation. 12. Personnel wear high visibility vests.
EQUIPMENT TO BE USED	**TRAINING REQUIREMENTS**	**INSPECTION REQUIREMENTS**
1. OVM 2. CGI 3. Backhoe 4. Hoe Ram 5. Dump Truck	1. HAZWOPER 2. Monitoring equipment operation 3. PPE Program 4. Hearing Conservation Program 5. Respiratory Protection Program 6. Confined Space Entry Program 7. Explosives Safety Program 8. Monitoring Equipment Operator	1. Calibrate monitoring equipment. 2. Inspect tools for function of safety features (e.g., shut-off, GFCI, etc.) and general assembly (e.g., frayed wires, loose connections, etc.) 3. Inspect heavy equipment for function of safety features and general assembly.

TABLE 7-7
ACTIVITY-HAZARD ANALYSIS

Activity:	**Power Washing of Sewer Lift Stations, Sewer Lines, and TNT Pipelines**	**Analyzed By/Date:**	**Dana Draper – 5/00**
		Reviewed By/Date:	**Paul J. Hitcho, PhD, CIH – 5/00**

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
1. Open covers to lift stations or access pipelines via excavated openings. 2. Monitor atmospheric conditions within openings. 3. Don appropriate PPE. 4. If entry is required, follow confined space entry procedures. 5. Power wash interior of lift stations and trunk lines with a high-pressure water system capable of removing sediments from the line without damaging the walls of the lift station or pipeline. Perform washing at preset intervals to maximize effectiveness of power wash system. 6. Use bottom of lift stations as a sump to trap wash water, or create a lined sump where excavation is necessary. 7. Pump accumulated wash water into a temporary truck or tank.	1. Exposure to volatilizing site contaminants or explosive atmospheres. 2. Slips, trips, falls. 3. Contact with contaminated materials. 4. Electric shock from pumps or generators. 5. Vehicular accidents/collisions. 6. Excessive noise exposure due to pump/generator use. 7. Cutting hazards from use of high-pressure wand.	1. Perform air monitoring for VOCs and combustible gases. 2. Wear Modified Level D PPE, at a minimum. Tape wrist, ankle, and zipper openings shut. Upgrade to Level C or B, if needed, during confined space entry. 3. Avoid contact with potentially contaminated materials. 4. Monitor work for good housekeeping practices. 5. Provide hearing protection. 6. Keep walking surfaces free from tripping and slipping hazards. 7. Avoid contact with high-pressure water stream. 8. Do not plug/unplug energized equipment with wet hands. 9. Keep plugs, receptacles, or other energized equipment out of water unless they are approved for submersion.
EQUIPMENT TO BE USED	**TRAINING REQUIREMENTS**	**INSPECTION REQUIREMENTS**
1. OVM 2. CGI 3. Pump and generator 4. Pressure washer 5. Storage tanks 6. Ladders 7. Lights	1. HAZWOPER 2. Monitoring equipment operation 3. PPE Program 4. Hearing Conservation Program 5. Respiratory Protection Program 6. Confined Space Entry Program	1. Calibrate monitoring equipment. 2. Inspect power tools for function of safety features (e.g., shut-off, GFCI, etc.) and general assembly (e.g., frayed wires, loose connections, etc.) 3. Inspect electrical equipment for approved use in a wet environment.

TABLE 7-8
ACTIVITY-HAZARD ANALYSIS

Activity: **Collect Water Samples**

Analyzed By/Date: **Dana Draper – 5/00**
Reviewed By/Date: **Paul J. Hitcho, PhD, CIH – 5/00**

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
1. Mobilize sampling equipment and containers. 2. Extract sample from holding tank. 3. Transfer to laboratory container. 4. Package for transport to lab. 5. Decontaminate or dispose of sampling equipment (Table 7-16).	1. Exposure to volatilizing site contaminants. 2. Slips, trips, falls. 3. Dermal contact with contaminated materials. 4. Muscle strain when extracting sampling equipment or lifting loaded coolers. 5. Impacts or lacerations from tools or glassware.	1. Keep walking surfaces free from tripping and slipping hazards. 2. Check load weights and use correct lifting procedures. 3. Wear Level D PPE and chemical resistant gloves. If contact with contaminated material is likely, also wear latex overboots and tyvek. 4. Perform air monitoring with OVM. 5. Use vermiculite inside cooler to secure containers and contain spills.
EQUIPMENT TO BE USED	**TRAINING REQUIREMENTS**	**INSPECTION REQUIREMENTS**
1. Sample bottles 2. OVM	1. HAZWOPER 2. Monitoring equipment operation 3. PPE Program 4. US DOT training for shipment of environmental samples 5. Hazard communication program	1. Calibrate monitoring equipment. 2. Inspect hand tools, sampling containers, and container storage.

TABLE 7-9
ACTIVITY-HAZARD ANALYSIS

Activity: **Collect Soil Samples**

Analyzed By/Date: **Dana Draper – 5/00**
Reviewed By/Date: **Paul J. Hitcho, PhD, CIH – 5/00**

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
1. Obtain an underground utility clearance. 2. Using hand tools, shovels, or hand auger, dig hole to appropriate sample depth. 3. Collect soil sample. 4. Field screen each sample using OVM. 5. Record soil characteristics. 6. Fill appropriate sampling bottles. 7. Decontaminate or dispose of sampling equipment (Table 7-16).	1. Exposure to volatilizing site contaminants. 2. Slips, trips, falls. 3. Dermal contact with contaminated materials. 4. Muscle strain during digging activities. 5. Contact with underground utilities.	1. Keep walking surfaces free from tripping and slipping hazards. 2. Work upwind; perform monitoring for VOCs. 3. Wear Level D PPE and chemical resistant gloves. If contact with contaminated material is likely, also wear latex overboots and tyvek. 4. Use hand tools and hand auger properly; avoid twisting your back and overexertion. Take turns digging. 5. Underground utility clearance must be confirmed prior to start of sampling activities.
EQUIPMENT TO BE USED	**TRAINING REQUIREMENTS**	**INSPECTION REQUIREMENTS**
1. Hand auger, shovels, trowels 2. Sample bottles 3. OVM	1. HAZWOPER 2. Monitoring equipment operation 3. PPE Program 4. US DOT training for shipment of environmental samples	1. Calibrate monitoring equipment. 2. Inspect hand tools for excessive wear and loose parts

TABLE 7-13
ACTIVITY-HAZARD ANALYSIS

Activity: **Backfill and Compaction of Excavations** **Analyzed By/Date:** **Dana Draper – 5/00**
Reviewed By/Date: **Paul J. Hitcho, PhD, CIH – 5/00**

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
1. Ensure that fill material has been tested and is adequate to meet site-specific requirements. 2. Have dump truck leave fill material in or near excavation. 3. Place or distribute backfill in excavation in 8 to 10 inch lifts. 4. Compact lifts as required by project specifications.	1. Inhalation of nuisance dust. 2. Exposure to site contaminants. 3. Slips, trips, falls. 4. Struck by falling loads. 5. Physical impact/struck by heavy equipment or moving vehicles. 6. Muscle strain from improper use of compaction equipment. 7. Vehicular accidents/collisions. 8. Excessive noise exposure. 9. Metatarsal foot protectors to prevent injuries to feet during compaction.	1. Arrange traffic to avoid personnel having to cross the route of heavy equipment or moving loads. 2. Equipment operators should look in the direction of travel; look before backing up. 3. Personnel are not permitted to walk, work, or travel beneath loads. 4. Wear Level D PPE. 5. Provide hearing protection and sound level monitoring. 6. Monitoring for dust levels; utilize dust suppression or modify work practices if action levels are exceeded. 7. Personnel shall wear high visibility vests when working adjacent to moving equipment.
EQUIPMENT TO BE USED	**TRAINING REQUIREMENTS**	**INSPECTION REQUIREMENTS**
1. Dump trucks 2. Heavy equipment 3. Vibrating or hand operated rolling compactors 4. Dust monitor 5. SLM	1. HAZWOPER 2. Hazard communication 3. Monitoring equipment operation 4. PPE Program 5. Hearing Conservation Program 6. Heavy equipment operation 7. CDL for dump truck drivers	1. Calibrate monitoring equipment. 2. Inspect heavy equipment and compactors for function of safety features and general assembly.

TABLE 7-14
ACTIVITY-HAZARD ANALYSIS

Activity: **Decontaminate Sampling and Heavy Equipment**

Analyzed By/Date: **Dana Draper – 5/00**

Reviewed By/Date: **Paul J. Hitcho, PhD, CIH – 5/00**

PRINCIPLE STEPS	POTENTIAL HAZARDS	RECOMMENDED CONTROLS
1. Move equipment to be washed onto decontamination pad. 2. Wash affected areas of heavy equipment (e.g., tires) with pressurized steam spray; brush off loose debris. 3. Hand wash sampling equipment with non-phosphate soap solution and scrub brush; rinse with tap water and deionized water. 4. Allow equipment to dry. Wrap sampling equipment and store in clean location. 5. Shovel collected sediments into 55-gallon drum. 6. Pump wastewater into holding tank.	1. Exposure to site contaminants or contaminated water. 2. Slips, trips, falls. 3. Muscle strains from lifting/cleaning. 4. Heat burns from contact with high-pressure steam. 5. Excessive noise exposure due to generator use.	1. Heavy Equipment: Wear modified Level D PPE (including poly-coated tyvek or PVC rain suit, chemical resistant over-boots and gloves) and a face shield. 2. Sampling equipment: Wear Level D PPE and chemical resistant gloves. If contact with contaminated material is likely, also wear a poly-coated tyvek. 3. If equipment is excessively contaminated, Level C respiratory protection may be required. 4. Site workers designated to perform decontamination of equipment will be knowledgeable of proper steam cleaning methods. 5. Monitor work for good housekeeping practices. 6. Provide hearing protection. 7. Follow proper lifting techniques. 8. As much as possible, keep decontamination pad free from slipping hazards (e.g., mud, and water).
EQUIPMENT TO BE USED	**TRAINING REQUIREMENTS**	**INSPECTION REQUIREMENTS**
1. Pressurized steam cleaner 2. Hand tools, scrub brushes 3. Drums and/or holding tanks 4. Non-phosphate soap	1. HAZWOPER 2. PPE Program 3. Hearing Conservation Program 4. Hazard Communication Program	1. Inspect integrity of decontamination pad liner and berm. 2. Inspect steam cleaner for loose connections, frayed parts, etc. 3. Ensure that stored flammable materials do not present a fire hazard.