AFTER ACTION REPORT

TRINITROTOLUENE RESIZING OPERATION

FORMER LAKE ONTARIO ORDNANCE PLANT

MODEL CITY, NEW YORK

22 - 26 JANUARY 2001

PREPARED FOR

SEVENSON ENVIRONMENTAL SERVICES, INC.

PREPARED BY

ISSI UNEXPLODED ORDNANCE INC.

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March 30, 2001

1.0 INTRODUCTION:

In response to a request from Sevenson Environmental Services, Inc. ISSI Unexploded Ordnance Inc. (ISSI UXO) was tasked to preform a Trinitrotoluene (TNT) Lump/Noddle Resizing Operation at the Former Lake Ontario Ordnance Works (LOOP) located in Model City, New York. The purpose this project was three fold; one, To prepare an Addendum to the existing Work and Safety Plan; two, To resize the TNT Lumps/Noddles to allow safe combining with inert material to allow burial in a landfill; third, to prepare a After Action Report detailing the results of the operation.

2.0 REFERENCES:

1. Procedures for preparing fragile TNT nodules for treatment. : See Enclosure One
2. Photographs: See Enclosure Two
3. EnSy TNT Soil Test System. See Enclosure Three
4. Activity Hazard Analysis.: Resizing and Blending TNT Nodules.: See Enclosure Four
5. Map of Lake Ontario Ordnance Works Quantity Distances. See Enclosure Five

2.0 SCOPE OF WORK:

ISSI Unexploded Ordnance, Inc. (ISSI, UXO) was contracted by Sevenson Environmental Services, Inc. (Sevenson) to provide ordnance and explosives (OE) services under their contract with the Buffalo District, U.S. Army Corps of Engineers. ISSI UXO provided two Senior UXO Supervisor/Explosives Analysts to support treatment for fragile TNT nodules stored in a 32 gallon drum.

3.0 SUMMARY OF SITE ACTIVITIES:

The TNT treatment operation began on 22 Jan and was completed on 25 Jan 2001. TNT nodules had been removed from a section of the TNT pipeline during the pressure washing operation of the pipeline removal project. The TNT nodules were tested at the CRREL Labratories and contained 19.1 to 21.1% Trinitrotoluone (TNT). In addition, it was noted that some of the TNT nodules were extremely brittle. The TNT nodules removed from the pressure washing operation were placed in a plastic 32 gallon container filled with mineral oil/water. The TNT treated ranged from yellow, brown, orange and dark read in color. Several nodules (large) measuring 7" long x 5" wide x 3" thick and weighing 7 pounds were pure crystalline TNT product. The procedures developed to bring the content to aproximately 5% or less were used throughout the treatment operation (See attachment). This was accomplished by preparing a composite mixture of sand/soil and TNT. The operation was completed in three phases:

- Resizing:

TNT nodules/lumps measuring ½" or less in diameter were placed in a plastic holding container filled with #10 mineral oil. TNT nodules/lumps measuring over ½" in diameter were gently broken by

hand into smaller pieces and placed into the holding container.

- Blending:

Composite Plastic containers filled with resized TNT nodules/lumps were weighed to ensure that the one (1 lb) to one and one half (1½ lb) gross weight limit was not exceeded. Mixing of the TNT and Sand/Soil mexture was accomplished with non-sparking tools and doene with indicvoiual comntainners to lessen exploive weight exposure. The containers were then hand carried to the soil/sand storage area and carefully blended into the soil/sand by hand to ensure maximum dispersion.

- Testing:

Testing was accomplished utlizing the EnSys TNT Soil Test System provided by sStrategic dianostics Inc., Newark, Delaware. This test kit dtects Tnt and provides quantitative results. In accordnce with EPA SW-846 Method # 8515. A HACH Dir/200 Spectrophotometer was employed to analyze ther samples. Results are shown in the table below.

TNT RECOVERED AND TREATED
JANUARY 2001

22 JAN	23 JAN	24 JAN	25 JAN
40 lbs	96 lbs	60 lbs	60 lb
Remarks: A total of 256 lbs (gross weight) of material was processed during this period. The TNT concentration was determined to be approximately 45%. [Based on the quantity of pure product, it is estimated that approximately 115 lbs Net Explosive Weight (NEW)].			
Analytical Results: **Two composite samples.**		**(1)<0.157 TNT in soil**	**(2)<0.159 TNT in soil**

Note: 4 cubic yards of sand was used to blend product.

4.0 CONCLUSIONS:

Based on the knowledge gained from the TNT treatment operation, including the analytical results, it must be assumed that the remaining TNT pipeline section will contain high concentrations of crystalline TNT product. A visual inspection of the TNT lumps/nodules removed from the 32 gallon plastic container revealed crystalline TNT product in various stages of decomposition and color. Pre-planing and the support provided by Sevenson personnel resulting a highly successful and safe operation.

ENCLOSURE ONE

PROCEDURES FOR PREPARING FRAGILE TNT NODULES FOR TREATMENT.

PROCEDURES FOR PREPARING FRAGILE TNT NODULES FOR TREATMENT

TNT nodules were removed from a section of the TNT pipeline during the pressure washing operation of the TNT Pipeline removal project. The TNT nodules were found to be in various sizes. The TNT nodules were tested at the CRREL lab and contained from 19.4% to 21.1% trinitrotoluene (TNT). In addition, it was noted that the TNT nodules were extremely brittle. All TNT nodules/lumps were placed in a plastic lined 30 gallon container filled with mineral oil/water. The following procedures have been developed to bring the explosives' content to approximately 5%, in order to prepare a composite mixture of sand/soil and TNT.

Equipment needed:

1 Scale (measures 0-10 oz)

4 Plastic Containers (large)

2 Plastic/wooden Scoops

2 Plastic/wooden Spoons/ spatular (heavy duty)

2 Plastic /wooden cutting Boards

Rubber Gloves (as needed)

Aprons (2)

Face Shields (2)

Mineral Oil No. #10

2 Plastic 5 gallon pails

Ruler & Measuring Spoon set - Plastic

Procedures:

Resizing Operation:

Remove TNT nodules/lumps one at a time and measure their diameters. If the diameter is ½" or less, place them in the Plastic holding container filled with mineral oil. If the TNT nodule measures over ½" in diameter, the lump/nodule will be gently broken by hand into smaller pieces. When the pieces are found to be hard and cannot be broken by hand, it will be placed in a mineral oil soak bath until it softens. All granular TNT nodules will be removed from the storage container and weighted out to equal the approximate weight of a ½" square piece of TNT.

Composite Operation:

When the resized TNT Modules in an individual Plastic Container reaches a point that equals one pound (1 lb.) to one and one half (1 ½ Lb.) pounds gross weight. The container will be carried by hand to the Soil/Sand storage adjacent to the resizing operation. The resized TNT will be carefully distributed through the soil to insure maximum dispersion and to reach a ratio of 5 per cent or less based on volume. Upon completion of all mixing operations an EnSys TNT Soil Test System Kit will be utilized to insure that mixture is less then 5% per cent explosive. Procedures for this test are listed below.

TNT Test Kit Procedure:

A composite sample of at least 5-7 points will be under taken of the mixed soil to insure the mixing process was successful. This test will be repeated to verify the first test results. All Tests will utilized the EnSys TNT Soil Test System Kit and be read by the using the TNT EnSys Accessory Kit with the HAC DR/200 or2010 Spectrophotometer. All procedures will be in accordance with the SDI TNT EnSys Soil Test System Users Guide, P.N. 30985 Rev. 7, 8/21/97. A record of each test result will be generated and provided to Sevenson Environmental Services, Inc.

ENCLOSURE TWO

PHOTOGRAPHS

Figure 1 Mineral Oil Saked TNT Nodule

Figure 2 Granular TNT after resizing.

Figure 3 Soaking TNT Nodules prior to resizing.

gure 4 Weighing Pure TNT Nodules

Figure 5 Pure TNT after resizing

Figure 6 Weighing Mixed content TNT Nodules

Figure 7 Mixing resized TNT in sand

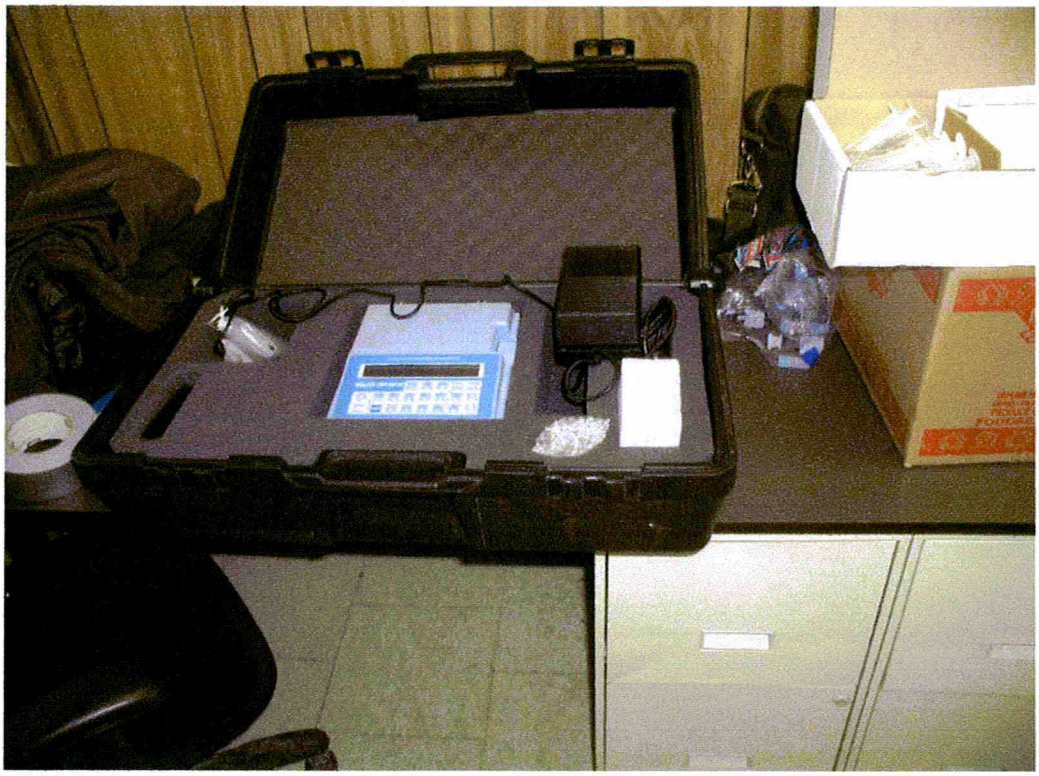
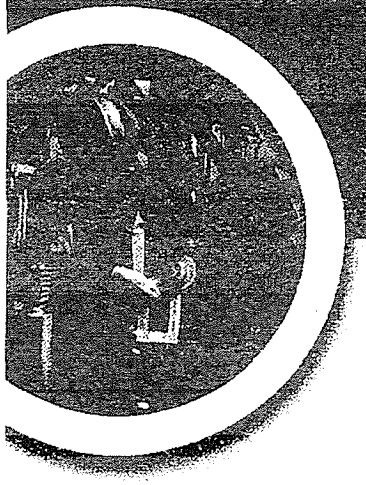


Figure 8 Explosive Test Kit Setup

ENCLOSURE THREE

EnSy TNT SOIL TEST SYSTEM



EnSys

EnSys TNT Soil Test System

Features

- detects TNT, DNT and related explosives compounds in soil samples
- provides quantitative results
- convenient and rapid testing in the field or lab, with results in 10 minutes
- sample extractions may be performed simultaneously, with analysis in singlicate
- based on method developed by Dr. Thomas Jenkins at USACE - CRREL (non-immunoassay method)
- TNT extracts can be used with SDI's EnSys RDX test
- training recommended
- EPA SW-846 Method # 8515

Test Result Type

- Quantitative.

Samples per Kit

- 20 soil samples

Assay Range

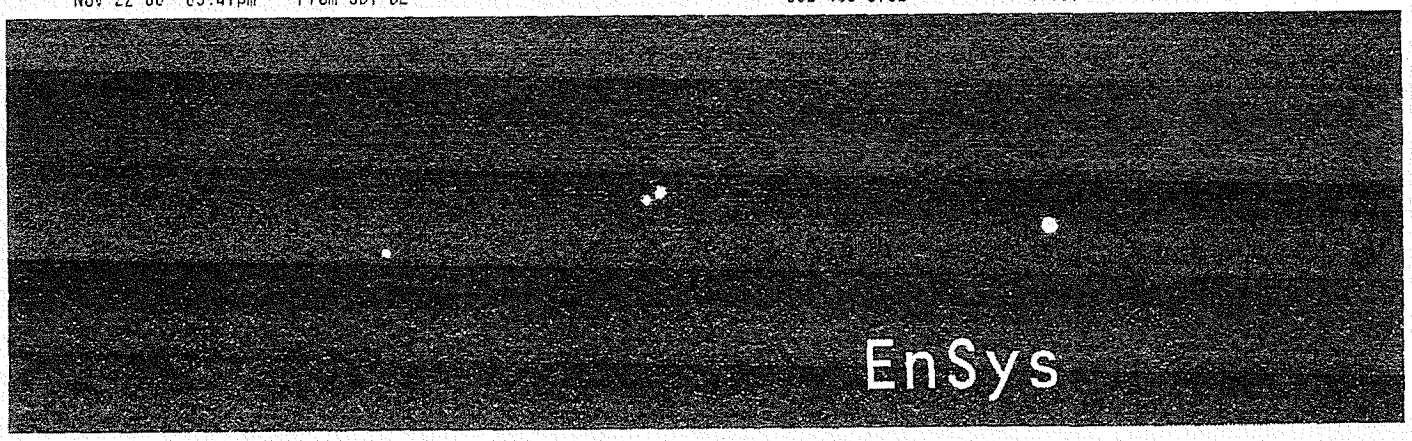
- 1 ppm to 30 ppm Total TNT in soil.
- Higher sample concentrations can be quantified by sample extract dilution.

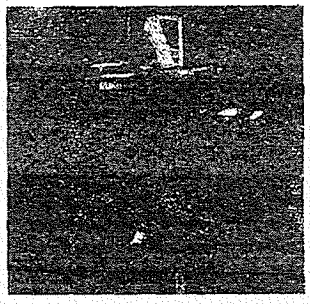
Sample Preparation

- Soil samples require extraction using the included extraction components and user supplied acetone.
- Soil samples should be dried prior to analysis.
- Soil samples extracts may be saved for use with SDI's RDX Soil Test Kit.

Sampling Time

- "Dirt-to-Data" in approximately 10 minutes
- Typically, about 10 samples can be run in about 40 minutes.
- Soil extraction time is typically 2-10 minutes per sample plus test run time of approximately 2 minutes.





Basic Test Procedures

- Clean cuvettes and set spectrophotometer.
- Extract soil sample:
  - weigh 10 grams of soil sample in weigh boat
  - measure 50 mL acetone into 50 mL tube
  - add soil into extraction jar
  - pour acetone into extraction jar
  - add acetone and shake for 3 minutes
  - allow to settle for 5 minutes
- Draw into a syringe 25 mL of liquid above the sediment layer in extraction jar.
- Attach filter tip to syringe and transfer 25 mL of sample extract into cuvette.
- Place cuvette in spectophotometer and record initial absorbance.
- Add 1 drop of Developer Solution, cap and shake for 3 seconds.
- Remove stopper and place the "sample" cuvette in cell holder and read sample absorbance.
- Note: For analysis of samples containing DNT, and/or where DNT concentration is of concern, samples must be allowed to develop for 10 minutes before reading sample absorbance. This will not effect color development for other nitroaromatics.
- Record data and calculate results.

Specificity

The EnSys TNT test is specific for TNT and related explosives compounds and exhibits the following sensitivities. The TNT test does not measure RDX or HMX.

Compound	MDL (ppm)
2,4,6-trinitrotoluene (TNT)	0.7
2,4-dinitrotoluene	0.5
2,6-dinitrotoluene	2.1
1,3,5-trinitrobenzene	0.5
1,3-dinitrobenzene	<0.5
tetryl	0.9
2-nitrotoluene	>100
3-nitrotoluene	>100
4-nitrotoluene	>100
4-amino-2,6-dinitrotoluene	>100
nitrobenzene	>100

Test Kit Components

- 20 Weigh boats.
- 20 Wooden spatulas.
- 20 Extraction jars.
- 1 - 50 mL Graduated tube.
- 20 - 30cc Syringes & syringe filters
- 1 Bulb pipet.
- 1 TNT control ampule.
- 1 Ampule cracker.
- 2 Curvette stopper plugs.
- 1 Developer Solution.
- Test Kit instructions.

Storage & Precautions

- Shelf life is typically two years from date of manufacture, with lot specific kit expiration date information provided on product packaging.
- Storage at ambient temperature 64° to 81°F (18° to 27°C) is acceptable.
- Operate kit at greater than 4°C/40°F and less than 39°C/100°F.

Other Required Materials

	SDI Part #
Ensys TNT Accessory Kit (Rental) (includes HACH DR/2000 or 2010)	69997
Acetone: hardware or laboratory grade (minimum of 50 mL per sample)	
Tap or laboratory grade water for cuvette rinsing	
Absorbent paper	
Liquid waste container	
Disposable gloves	
Eyewear	
Marking pen	
Calculator	

Ordering Information

	SDI Part #
EnSys TNT Explosives Soil Test Kit	7002000
EnSys RDX Explosives Soil Test Kit (with extraction jars)	7085000
EnSys RDX Explosives Soil Test Kit (without extraction jars)	7085100
TNT Ensys Accessory Kit (Rental) (with HACH DR/2000 or 2010)	6999700

SDI

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ENCLOSURE FOUR

ACTIVITY HAZARD ANALYSIS.

RESIZING AND BLENDING TNT NODULES

ACTIVITY HAZARD ANALYSIS RESIZING AND BLENDING TNT NODULES		
Principle Steps	**Potential Hazards**	**Recommended Controls**
- Resize TNT Nodules - Transport Resized TNT Nodules by hand to CMSA Soil Pile - Disperse Resized TNT Nodules throughout Soil Pile - Sample Blended Pile	- Pinch Points - Slip, Trips, Falls - Muscle Strain to Improper Lifting - Exposure to Explosive Residue - Potential Detonation	- Survey Area for Slip, Trips, Falls - Personnel not involved in resizing operation to keep a minimum distance of 740 ft.
Equipment to be Used	**Training Requirements**	**Inspection Requirements**
- Plastic Tools - Scale - PPE - Mineral Oil - Excavator	- Explosive Safety Program - HAZWIOPER - U.S. Naval Explosive Ordnance Disposal (EOD) Graduate	- Inspect area prior to resizing and distribution of TNT Nodules

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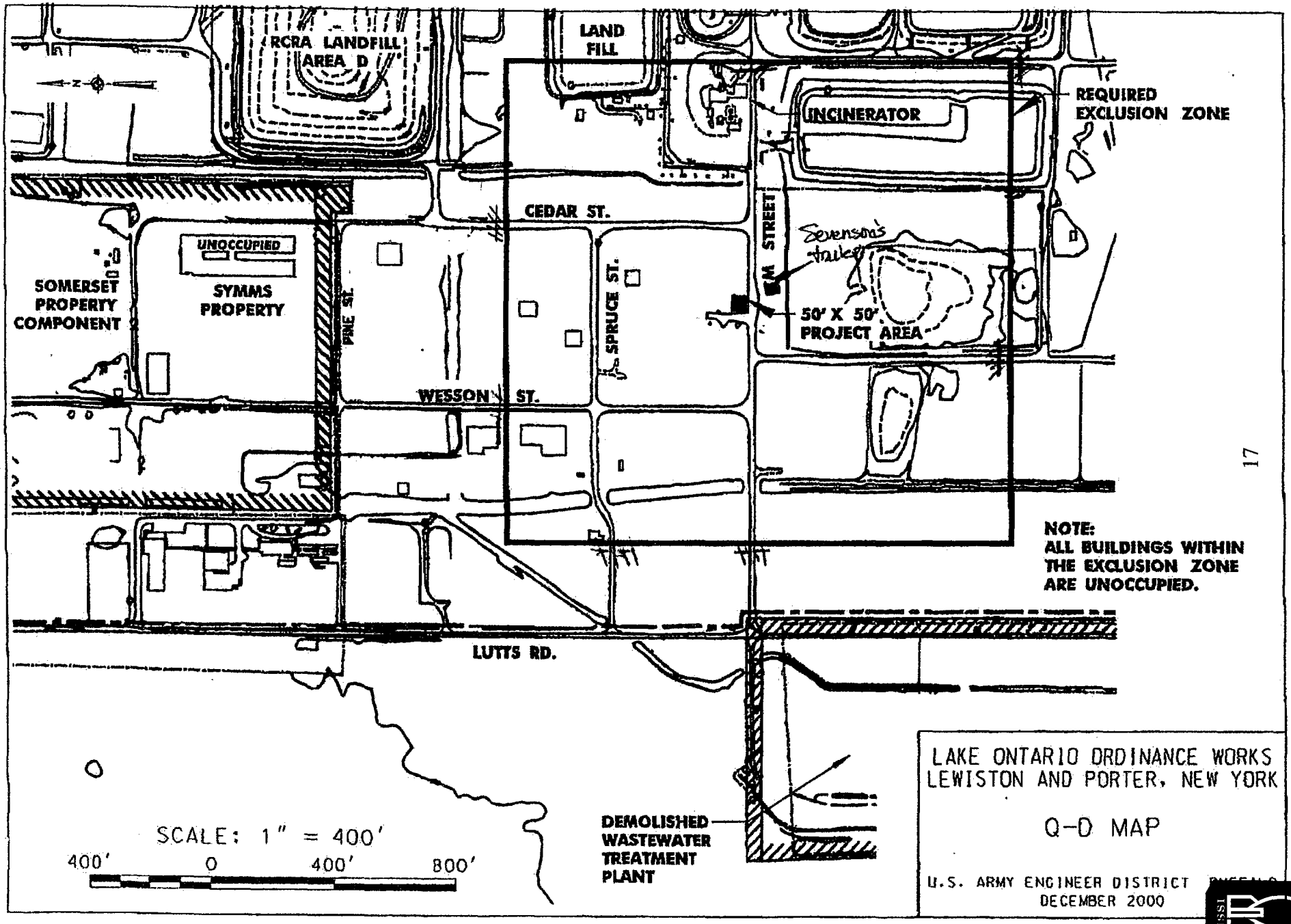
ENCLOSURE FIVE

MAP OF LAKE ONTARIO ORDNANCE WORKS

QUANTITY DISTANCES



LAKE ONTARIO ORDINANCE WORKS
LEWISTON AND PORTER, NEW YORK

Q-D MAP

U.S. ARMY ENGINEER DISTRICT
DECEMBER 2000