



REPLY TO  
ATTENTION OF

## DEPARTMENT OF THE ARMY

BUFFALO DISTRICT, CORPS OF ENGINEERS  
1776 NIAGARA STREET  
BUFFALO, NEW YORK 14207-3199

Superintendent  
Lewiston-Porter School District  
4061 Creek Road  
Youngstown, NY 14174

16 March 2006

Mr. Don Rappold:

In response to your 06 September 2005 letter and school board resolution requesting additional radon air monitoring equipment and sampling frequency, I offer the following.

First, let me assure you that after years of analysis and monitoring which continue to this day, we remain confident that the school population and faculty are not at risk from radon gas originating from the former Lake Ontario Ordnance Works (LOOW) which includes the Niagara Falls Storage Site (NFSS). The air monitoring station located on the school property was intentionally sited to provide background data on ambient air quality – not as a precaution to detect radon gas from the NFSS. Our team of scientists and engineers continually monitor and evaluate factual data collected on the NFSS and are unanimous in their recommendation that there is no need for additional air monitoring mentioned in your letter.

To address the school board's resolution, I offer you the attached facts sheet explaining our risk management approach for the NFSS and our federal environmental activities at the former LOOW site. The air quality issue has been researched by independent technical experts both inside and outside the federal government who concluded our NFSS air monitoring program is technically sound and protective of human health and the environment.

We share your concern for the health and safety of the student body and faculty, as well as the entire community surrounding the former LOOW site and our own staff and contractors working on the site. We remain actively engaged with the local community and health and environmental regulators to address public concerns, ensure our operations are protective of human health and the environment, and reinforce understanding and confidence in our program.

We would be happy to visit the school board to discuss these activities, our findings, and our conclusions regarding the safety of the school property. We work hand-in-hand with local and state environmental and health regulators who we welcome to participate in these discussions with you.

SUPP\_008255

If you have any questions or would like to discuss this issue with our project team, please contact our project manager for the LOOW site, Mr. Bill Kowalewski at 716-879-4418.

  
JAMES KARSTEN  
Special Projects Branch

Attachments:

1. Lewiston-Porter Central School District Letter 06 September 2005
2. USACE Responses to Resolution, 16 August 2005
3. LOOW Project Fact Sheet
4. NFSS Project Fact Sheet
5. Vicinity Property-G Fact Sheet

Cc:

Niagara County Department of Health  
New York State Department of Health  
New York State Department of Environmental Conservation



2005 SEP -8 PM 4:20

## *Lewiston-Porter Central School District*

*Aiming Higher*

September 6, 2005

US Army Corps of Engineers  
1776 Niagara Street  
Buffalo, NY 14207

Dear Sir or Madam:

Enclosed please find a resolution approved and signed by the Lewiston-Porter Central School District's Board of Education on August 16, 2005.

Please note that the resolution requests that the Army Corps of Engineers upgrade the radon air monitoring system on the Lewiston-Porter campus by increasing the number of monitoring stations and the frequency the information at the stations is reviewed.

We would ask that the District be informed of the various readings taken from the monitoring stations.

You may contact the Superintendent's office at 716-286-7266. Thank you.

Sincerely,

Debra Sherman, District Clerk

cc: F. Warren Kahn, Esq.  
Don Rappold, Assistant Superintendent for Administrative Services

Debra L. Sherman  
District Clerk/Records Retention, Disposition & Access Officer  
4061 Creek Road, Youngstown, NY 14174  
Phone: 716-286-7266 Fax: 716-754-2755 Email: [shermamd@lew-port.com](mailto:shermamd@lew-port.com)  
[www.lew-port.com](http://www.lew-port.com)

NA-1

RESOLUTION

WHEREAS, the various buildings of the Lewiston-Porter Central School District are situated about a mile from the former site of the Lake Ontario Ordinance Work (LOOW), and

WHEREAS, there has recently been discovered that plutonium was buried on the LOOW site and could be disturbed by any plans of Chemical Waste Management to expand its dump site, and

WHEREAS, there currently is located one radon monitoring station on the Lewiston-Porter premises which is reviewed on a semi-annual basis, once in January and once in July, and

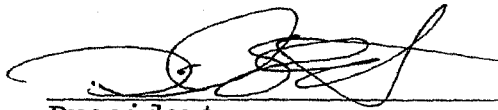
WHEREAS, the Board of Education believes the existing monitoring program is inadequate to protect the school children attending school and present in the various school buildings,

THEREFORE, BE IT

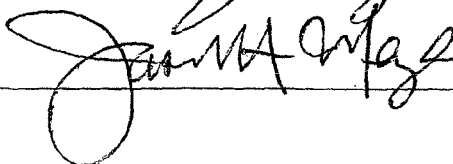
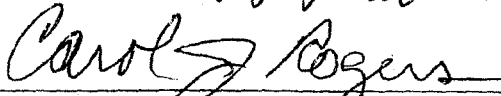
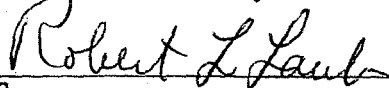
RESOLVED, that the Lewiston-Porter Board of Education hereby requests The Army Corps of Engineers upgrade the radon air monitoring system on the Lewiston-Porter campus by increasing the number of monitoring stations and the frequency the information at the stations is reviewed.

RESOLVED, that the Lewiston-Porter School District be informed of the various readings taken from the monitoring stations.

Dated: August 16, 2005



President



## **Attachment-2**

### **US Army Corps of Engineers Response to Lewiston-Porter School Board Resolution, 16 August 2005**

The following information is provided in response to each statement in the Lewiston Porter School Board Resolution passed 16 August 2005.

**WHEREAS, the various buildings of the Lewiston-Porter Central School District are situated about a mile from the former site of the Lake Ontario Ordnance Works (LOOW), and**

- USACE Response: The Lewiston-Porter Central School District facilities are located within the boundary of the original 7,500 acre former LOOW site. The property on which the school facilities are sited was part of the 5,000 acre "buffer zone" for the original ordnance works. This buffer zone was primarily farmland and private residences that were never developed or used for defense activities. Because the current school property was not used for defense activities and is situated upwind for the prevailing wind conditions from the portion of the former LOOW used to store radioactive wastes, we believe the location of the air monitoring equipment on the school property represents an ideal location for background information on the local environment.

**WHEREAS, there has recently been discovered that plutonium was buried on the LOOW site and could be disturbed by any plans of Chemical Waste Management to expand its dump site, and**

- USACE Response Regarding Presence of Plutonium on the Former LOOW: During our recent investigations of the 2,500 acre developed portion of the LOOW site, we identified the presence of small traces of plutonium on the former LOOW site. We offer the following:

-- During our investigation of the former LOOW, we took samples of buried debris on what is known as Vicinity Property-G on the former LOOW. This property and our sampling efforts are described in more detail in Attachment-5 (Fact Sheet: Former University of Rochester Burial Area Investigation). A total of eight samples out of 41 samples sent for laboratory analysis resulted in positive detections for plutonium. These samples included a small animal bone (1 sample), laboratory debris (2 samples), and subsurface soils (5 samples).

-- During the Manhattan Engineer District Project in the 1940s, the University of Rochester was assigned the task of performing research to learn more about radiation safety. Some of this research involved testing of radiation effects (such as from plutonium) on animals. In 1951, the University of Rochester established the burial site on what is now Vicinity Property-G for the burial of test animal carcasses and other contaminated debris from their research laboratory. This portion of the former LOOW is now owned by CWM. Plutonium does not produce radon gas during its natural decay. It decays through another series of elements, eventually becoming the element lead (Pb).

-- Based upon the scientific data, we know there is a very small volume of buried debris that tested positive for very low concentrations of plutonium. We estimate the entire amount of plutonium in all wastes sent to the former LOOW is less than 10 grams (approximately 3.5 ounces).

We conclude there is negligible risk to workers on or visitors to Vicinity Property-G and no increased risk to the school population due to the presence of these small, localized concentrations of buried plutonium. The small quantities of materials with very low concentrations of plutonium present on the former LOOW site are not a significant source of radioactivity. The alpha-radiation emitted from plutonium travels less than one inch in air.

**- USACE Response Regarding the Risk of Plutonium Being Disturbed by Chemical Waste Management Expansion Activities:**

-- Our understanding is that potential human health risks and environmental risks resulting from Chemical Waste Management's current or future operations are regulated by the New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (NYSDOH). USACE coordinates regularly with both agencies to ensure we have provided them our scientific data and keep them updated on current and planned USACE activities. We remain confident that these agencies have a thorough understanding of private and federal activities on the former LOOW and will take the appropriate actions to ensure the protection of human health and the environment. Our agency contacts are as follows:

NYSDEC	Mr. John Mitchell	(518) 402-8594
NYSDOH	Mr. Matt Forcucci	(716) 847-4385

**WHEREAS, there currently is located one radon monitoring station on the Lewiston-Porter premises which is reviewed on a semi-annual basis, once in January and once in July, and**

- USACE Response: The purpose of this radon monitoring device is to collect background air quality samples.

-- We have radon detection devices on the grounds of the NFSS and off-site in areas considered to be unaffected by NFSS activities. There is one background radon detector on the former LOOW wastewater treatment plant and one on the Lewiston-Porter school property. The school property location is a logical choice for a background monitor since the school is situated approximately one mile upwind (for the predominant wind direction) of the NFSS and the school property is part of the 5,000 acre buffer zone which was not developed for defense activities.

-- The background radon detection devices contribute to our objective of gaining a historical understanding of air quality in the local area. This device is left exposed to the outdoor air and entraps radon inside the canister. The canister is sent to a laboratory after six months of exposure to the outdoor air. The laboratory analyzes the canister and provides a report on the amount of radon collected over the six month exposure period and the average daily concentration of radon in the outdoor air.

**WHEREAS, the Board of Education believes the existing monitoring program is inadequate to protect the school children attending school and present in the various school buildings,**

- USACE Response: Based upon years of scientific evidence and ongoing monitoring and analysis by our technical team, we conclude that the student and faculty population are not at risk from radon gas from the former LOOW or the NFSS. The results from our air monitoring program consistently show that the levels of radon in the outdoor air on the NFSS and at both background sampling locations are consistent with the average radon concentrations for the local area. We offer the following to reassure you:

-- If a risk to the school population existed, we would take action to ensure public safety. The existing background sampling locations are being used to collect air samples we believe to be representative of the natural environment and free from any contaminants linked to the former LOOW site and the NFSS. It was not installed as a warning or protective device. The scientific data generated over many years indicate there have not been any elevated radon levels on the school property or directly on the NFSS site.

-- We continually sample the air for radon gas on the NFSS property which is approximately one mile downwind from the school property. We take samples directly on the site because any release of radon gas would be at its highest concentration nearest the site. Air pollutants, especially gases, are quickly diluted by wind and decrease in concentration the farther you get from the source.

-- Radon gas is a naturally occurring inert gas produced by the decay of uranium – a naturally occurring element. The NFSS containment cell was designed and built in the 1980s to safely store mining and processing wastes containing uranium. The materials are buried 30 feet underground and covered with an earthen and clay cap to isolate the wastes and prevent release of radioactive materials or radon gas to the environment.

-- We have a rigorous maintenance and monitoring program at the NFSS to ensure the integrity of the structure. Our maintenance crew is on site five days per week and closely monitors the condition of the containment cell for any changes.

-- Additionally, as part of a "checks and balance" system, the New York State Department of Environmental Conservation (NYSDEC) monitors our sampling program and takes its own samples, at the same locations, to verify our findings.

We publish our findings annually to the public. They are available online at <https://web.ead.anl.gov/NFSSteam/secure/login.cfm> (username = nafssrab, password = Nfrab;06 ).

-- To address public questions on our air monitoring program we conducted a technical review in April 2005. This meeting was attended by local concerned citizens; a representative from CWM; health physicists from the University of Rochester, Niagara University, the USEPA Region 2, and the NYSDEC; other technical experts from the University of Buffalo, the NY State Department of Health, and the Niagara County Department of Health; and local and national technical experts, including health physicists, from the USACE. The consensus of the technical experts attending this meeting was that the air surveillance program currently in place for the NFSS, including the background radon and gamma radiation detectors at the Lewiston-Porter schools, is adequate to protect human health and the environment. The USACE is preparing a formal summary report of this independent technical review and will furnish a copy to the school board when complete. This is tentatively scheduled for the Summer of 2006.

#### **THEREFORE, BE IT**

**RESOLVED, that the Lewiston-Porter Board of Education hereby requests The Army Corps of Engineers upgrade the radon air monitoring system on the Lewiston-Porter campus by increasing the number of monitoring stations and the frequency the information at the stations is reviewed.**

- USACE Response: We respect and share your concern for the health and safety of the students and faculty. Our team of scientists, engineers, health physicists, and risk assessors has revisited this issue specifically in response to your request. Their position remains consistent with past USACE evaluations - that air quality at the school is not impacted by radon gas from the former LOOW or the NFSS. The solution proposed in this resolution is not warranted to address the risks addressed in the resolution.

-- First, we have analyzed over 20 years worth of data from the monitoring stations around the NFSS waste containment cell and confirmed that radon gas is not present at the NFSS site boundary which is nearly a mile from the school facilities. The analysis of data from the monitoring station on the school property has shown that radon gas is not present. Therefore we conclude radon gas is not migrating off site.

-- Second, to address the school board's specific concern over air quality at the school site with respect to radon escaping from the NFSS containment cell we conducted an analysis of a theoretical worst-case scenario to model the potential radon concentrations in the air.

We defined the worst-case scenario as a catastrophic failure of the NFSS containment cell whereby the uranium wastes buried 30 feet underground would be exposed to the air and 100% of the potential radon present was immediately released in a "gust" to the outdoor air. The likelihood of this worst-case scenario

is extraordinarily low – bordering on impossible. The only potential event capable of causing such a failure would be a massive earthquake of a magnitude never recorded in this area.

We then modeled the potential concentration of radon in the air under two meteorological conditions – the typical conditions for Niagara County and non-typical conditions which would cause the highest possible concentration of radon in the air.

For the typical meteorological conditions and a catastrophic failure of the containment cell, the model shows the expected radon dose to a person at the schools is a small fraction (approximately 3.33 %) of the average annual dose a person receives from the naturally occurring radon expected for this area.

For the non-typical meteorological conditions and a catastrophic failure of the containment cell, the model shows the worst-case dose to a person at the schools is approximately 2.5 times the average annual dose a person receives from the naturally occurring radon expected for this area. However, the potential worst-case dose is still below the level recommended by the United States Environmental Protection Agency and Federal Emergency Management Agency for implementing emergency response actions.

Based on this modeling effort, we conclude there is no reasonable scenario for radon release at the former LOOW or NFSS requiring a greater volume or frequency of data.

**RESOLVED, that the Lewiston-Porter School District be informed of the various readings taken from the monitoring stations.**

- USACE Response: We continue to make public all data from our radon sampling and air monitoring activities throughout the former LOOW site. We understand there is a large volume of highly technical documents about the former LOOW site. We would be happy to visit the school board to discuss these activities, our findings, and our conclusions regarding the safety of the school property. We work hand-in-hand with local and state environmental and health regulators. These regulators may be able to offer additional information to address your concerns. We welcome their input.



US Army Corps  
of Engineers®  
Buffalo District

November 2005

## FACT SHEET

**Title/Name:** Former Lake Ontario Ordnance Works (LOOW); Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS)

**Location:** Within the Towns of Lewiston and Porter in Niagara County, New York

**Project Description:** The property is about 10 miles north of the City of Niagara Falls. The original site encompassed 7,500 acres, however only 2,500 acres were developed. During World War II, the Army manufactured TNT for about 9 months at a facility on the site. The TNT plant was decommissioned in 1943. In 1945, 5,000 acres outside the production areas were declared excess and transferred to General Service Administration for disposal to private landowners. The remaining acres were used for various Department of Defense (DoD) activities through the 1960s. As DoD operations decreased, additional property was sold. The Buffalo District is conducting an environmental investigation on the LOOW site in accordance with the phased processes required by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Investigations to date have confirmed DoD related chemical contamination at the LOOW.

Within the original footprint of the LOOW site lies the Niagara Falls Storage Site (NFSS). The NFSS is a federally owned repository for radioactive residues and wastes originating from the Manhattan Engineer District's (MED) development of the nation's early atomic weapons program. The Buffalo District is conducting a separate but related CERCLA investigation on the NFSS for radiological contamination. This project is being conducted under the Formerly Utilized Sites Remedial Action Program (FUSRAP).

**Appropriation Category:** Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS)

**Funding:** Total project estimated cost to complete: \$26,750,000. The total cost will depend upon the specific risk-based cleanup standards established for this site, taking into account input from federal, state, and local regulators, the general public, and other stakeholders. Once a final cleanup plan for the site has been approved in a Record of Decision, a revised cost estimate will be completed.

**Project Sponsor/Customer:** Congress, site owners (the Lewiston-Porter Schools, local and federal governments, general residential areas, and private corporations), and community action groups.

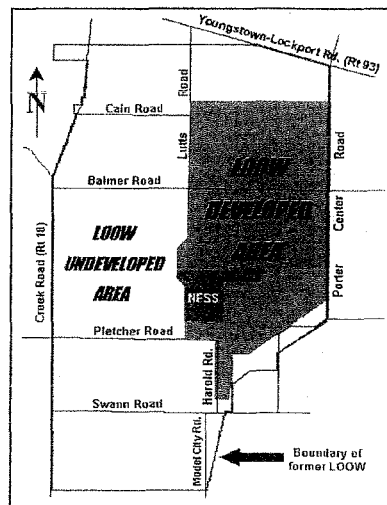
### Congressional Interests:

Representative Louise Slaughter D-NY-28  
Senator Hillary Clinton D-NY  
Senator Charles Schumer D-NY

**Current Status:** Current activities include completing remedial investigations of underground utility pipelines and developing risk assessments (scheduled completion in Fall 2006). We continue to support concerned local stakeholders representatives of the LOOW Restoration Advisory Board.

**Issues:** None

**Project Manager:** Bill Kowalewski, PE (716) 879-4418.





US Army Corps  
of Engineers®  
Buffalo District

February 2006

## FACT SHEET

**Title/Name:** Niagara Falls Storage Site (NFSS)

**Location:** The site is located at 1397 Pletcher Road in Lewiston, NY, approximately 19 miles northwest of Buffalo, NY.

**Project Description:** NFSS is a Federally owned 191-acre site with a 10-acre subgrade interim repository for radioactive residues and waste, two buildings, one of which contains isolated areas of fixed, low-level radioactive contamination and three active vicinity properties. Material stored in the repository includes approximately 250,000 cubic yards of residual radioactive material resulting from the processing of ores before the enactment of Uranium Mill Tailings Radiation Control Act (UMTRCA). Primary constituents of concern are radium, thorium and smaller amounts of uranium. This material has activity ranging from 30 pico Curies per gram (pCi/g) to 574,000 pico Curies per gram (pCi/g) on a dry weight basis. The repository is covered with an interim cap designed to retard radon emissions and rainwater infiltration. There is also known radiological contamination of soil throughout the site, all at activity levels considerably below those of the materials stored in the secure repository. The USACE has initially been tasked with performing a Remedial Investigation (RI) and Feasibility Study (FS) and a Proposed Plan (PP) under CERCLA.

**Appropriation Category:** Formerly Utilized Sites Remedial Action Program (FUSRAP).

**Total Estimated Cost:** Total project cost is estimated to be \$354.6M. The actual cost will be highly dependent on the final selected remedy for the site.

**Project Sponsor/Customer:** Vicinity residents, local, state and Federal agencies; and Congress.

### Congressional Interests:

Representative Louise Slaughter D-NY-28

Senator Charles Schumer D-NY

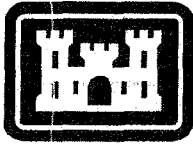
Senator Hillary Rodham Clinton D-NY

**Current Status:** A remedial investigation is 93% complete at the site and has been expanded three times due to discovery of new radiological contamination in areas previously considered remediated by Department of Energy standards. A feasibility study was initiated in September of 2000 to determine the safety of the secure repository and to study potentially viable remediation technologies for application to the secure repository as well as to other on-site contaminated areas. Building 403, originally a laboratory and office building, was decontaminated and demolished in August of 2000. Building 401, a building used for boron-10 manufacture and radiological waste storage, underwent asbestos abatement in the fall of 2000 in preparation for radiological decontamination and demolition. Sediment, air, surface water and groundwater are monitored on a yearly basis to assure that contaminants are not migrating from the cell into the environment. Status and accomplishments are presented to the public as each segment of the work is completed. Based on the current schedule, the Remedial Investigation will conclude in July of 2007 and the Feasibility Study will conclude in June of 2008, assuming that treatability studies will not be required.

**Issues:** The current national program funding level is insufficient to execute any repository-associated removal alternative.

**Project Manager:** Dr. Judith Leithner (716) 879-4234.





**US Army Corps  
of Engineers®**

# **FUSRAP Fact Sheet**

## **Niagara Falls Storage Site (NFSS)**

**Former University of Rochester Burial Area Investigation**

**Vicinity Property G (VPG)**

**U.S. Army Corps of Engineers • Buffalo District • June 2004**

### **History of "Rochester Burial Area"**

During the Manhattan Engineer District Project in the 1940s, the University of Rochester was assigned the task of performing research in support of radiation safety (Aerospace Corporation, 1982)<sup>1</sup>. Some of this research involved testing of radiation effects on animals. In 1951, the University of Rochester (U of R) established the burial site on what is now Vicinity Property G (VPG) of the NFSS for the burial of test animal carcasses and other contaminated debris from their research laboratory.

In 1972, the Department of Energy (DOE) excavated the U of R Burial Area to a depth of 10 feet and removed 512 cubic yards of soil, drums and debris. The DOE placed the material "onsite" on the spoils pile (Aerospace Corporation, 1982)<sup>1</sup>. It is unknown whether or not this excavated material was originally placed on the NFSS or if it eventually was placed into the interim waste containment structure at the NFSS.

The Corps' NFSS investigative team continues to research historic reports and files to determine where the "onsite" location is and where the material excavated was ultimately disposed.


### **Background**


Since 1999, the U.S. Army Corps of Engineers has been conducting a Remedial Investigation (RI) of the Niagara Falls Storage Site (NFSS) to verify the presence and location of existing contamination. The Corps' RI work focuses on areas on the NFSS not addressed by the Department of Energy (DOE) during previous clean up activities at the site. Areas not thoroughly addressed in the vicinity outside of NFSS are Vicinity Property G (VPG), VPE and VPE'. Characterization of these three properties, located to the north of NFSS on the former Lake Ontario Ordnance Works (LOOW), was performed, but not completed, by the United States Department of Energy (DOE) since small portions of interest on each property were not accessible. Accordingly, these properties remain as part of the Formerly Utilized Sites Remedial Action Program (FUSRAP).


### **Response to Community**

Based upon historical records and local community concern, the Lake Ontario Ordnance Works Restoration Advisory Board (LOOW RAB) requested that the Corps perform an investigation to confirm the presence or absence of animal carcasses associated with the University of Rochester (U of R) Burial area.

#### Legend:

 Vicinity Properties previously certified as closed (i.e. remediated) by DOE.

 Investigations at Vicinity Properties G, E and E were not completed by DOE and will be investigated as FUSRAP sites by the Corps of Engineers.

 The Niagara Falls Storage Site (NFSS); currently undergoing a Remedial Investigation/Feasibility Study conducted by the Corps of Engineers.

### Site Description

Vicinity Property G (see fig. 1) is almost 30 acres in size and privately owned. It is located north of the NFSS in the Lewiston and Porter Townships, New York. An old farmhouse that predates government activities (see figure 2 reference to 'red roof house') is located on the site, as well as an active liquid waste treatment pond. A chain link fence restricts access to the site by the general public.

The VPG property, currently owned by CWM Chemical Services, is one of three open (or incompletely investigated) vicinity properties associated with the Niagara Falls Storage Site.

### Site Location

The location of the U of R burial area is marked on Figure 2, the 1957 Hooker Electrochemical Company Chart A-D353, Rev 2 (Aerospace Corporation, 1982)<sup>1</sup>. The map showed the U of R burial area as an approximately 21-foot (6.5 meter) by 21-foot (6.5 meter) area located 88 feet (27 meters) east of the Red Roof House and about 37 feet (11 meters) south of the trail in the central to southeastern portion of VPG.

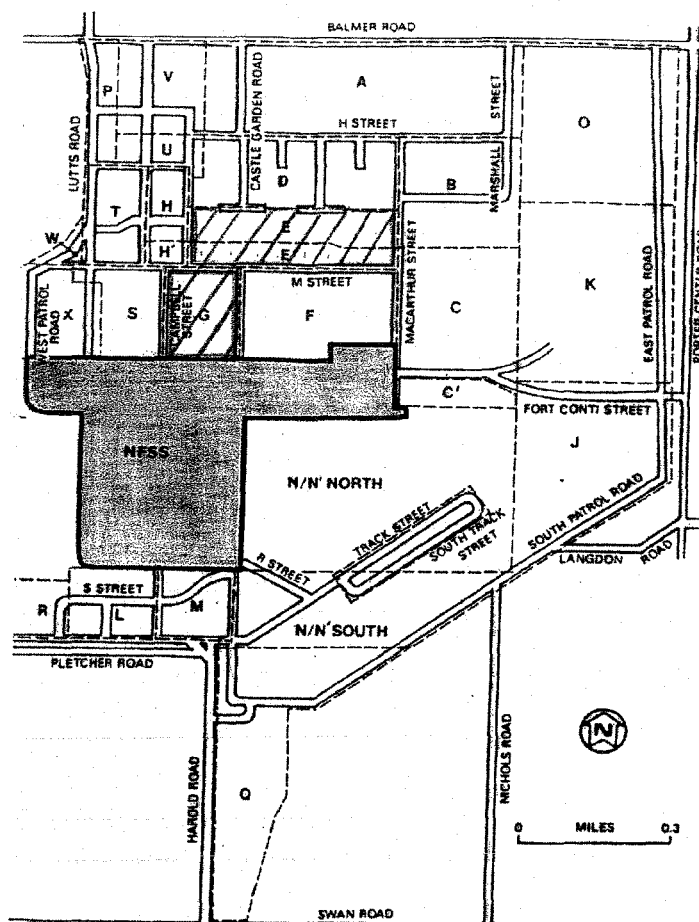


Figure-1: Letter-Designated Vicinity Properties (Bechtel, 1989)<sup>2</sup>

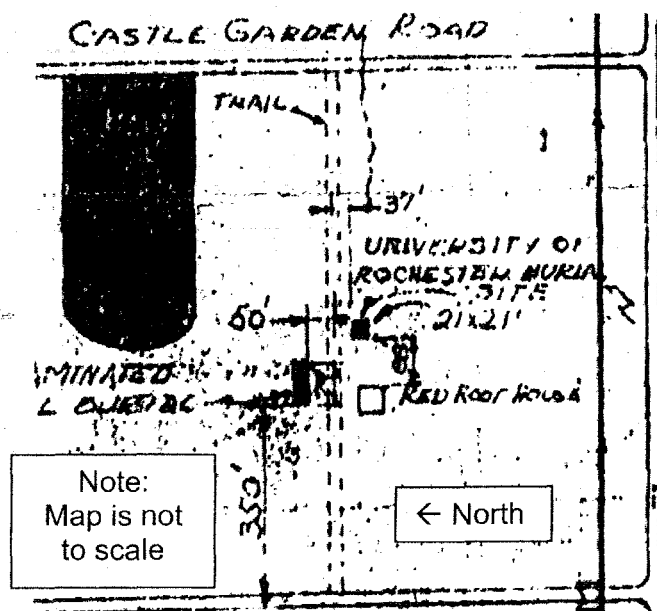


Figure 2: 1957 Map of U of R burial area 2 (Aerospace Corporation, 1982)<sup>1</sup>

## Geophysical Investigation

In November 2001, the Corps' investigative team conducted a focused frequency domain electromagnetic (EM-31) survey over the entire southern portion of Vicinity Property G south of the gravel road (see Figure 7) to locate the former U of R Burial Area.



**Figure 3: EM-31 Survey of VPG  
(Red Roof House in background)**

Using the EM-31 survey approach, the Corps' investigative team looked specifically for buried metal or changes in soil properties—signs that may indicate a burial area (Figure 3).

The Corps' team identified one near-surface area of interest (where electrical conductivity readings were higher than background) within the vicinity of the former U of R burial area, indicating possible buried metallic debris.

The Corps targeted this area for trenching activities. The excavation of soil was selected to investigate the suspect burial area since it allowed for better physical identification and investigation of a larger amount of soils than standard drilling techniques.

## Trenching Objectives

The Corps conducted soil excavation activities on VPG to:

1. Confirm the presence or absence of debris associated with the former U of R Burial Area based upon historical information, visual evidence, and geophysical results.
2. Collect samples to characterize debris and soils surrounding debris for future characterization efforts.

No formal surface gamma radiation walkover was conducted since deeper gamma readings were needed to investigate subsurface features. However, the Corps' team scanned each bucket of excavated soil for volatile organic compounds and gamma radiation using real-time reading instrumentation in the field. The Corps team also used test kits to inspect the excavated soil for evidence of nitroaromatic compounds. A magnetometer (iron-seeking metal detector) survey of the trench bottom was conducted after each foot of soil was excavated.



**Figure 4: Trench on VPG. This picture shows the start of the 65 foot-long, 12-foot deep trench began on May 22, 2002.**

## May 22, 2002 Trenching Activities

On 22 May 2002, excavation of a 65-foot long and 12-foot deep maximum trench was started to:

- ❑ Confirm the 1972 excavation of the former Rochester Burial Area,
- ❑ Evaluate the suspected buried area (identified in the geophysical survey),
- ❑ Measure gamma radiation levels, and
- ❑ Collect samples to support future investigations.

The location of the burial area was taken from the 1957 hand-drawn map (Figure 2). Trench TBG01 is located 88 feet from the red roofed farmhouse mentioned earlier, which was aligned with the centerline of the disposal area. The length of the trench accounted for the fact that the trail is no longer straight (as shown in Figure 7).



**Figure 5: Unearthed Metal Trashcan**

A small pit near TBG01, designated as TBG02, was investigated due to a gamma reading greater than background. A rusted, corrugated metal trashcan containing laboratory debris was unearthed between 6 inches and 3.5 feet below ground surface in TBG02. The container contents included standard laboratory debris, such as tubing, syringes, syringe needles, microscope slides, petri dishes, glass reagent bottles, pipettes, emesis basin, test tubes, and laboratory gloves.



**Figure 6: Unearthed Glass Bottle**

Average background gamma radiation levels in non-impacted subsurface soils (using a 2" x 2" sodium iodide (NaI) gamma radiation detector) were normally around 15,000 counts per minute (CPM). The corrugated metal container and contents exhibited gamma radiation levels up to 290,000 CPM, or approximately 20 times greater than background radiation levels to a depth of 3.5 feet, after which background radiation levels were encountered.

Due to the level of gamma radiation measured in this trench, the discovery of microscope slides (indicative of biological testing like the University of Rochester would have conducted), and the age of the glass reagent bottles (mid 1940s), the laboratory debris fit the profile of University of Rochester laboratory debris. However, burial is likely to have taken place between 1944 and 1953.

The Corps suspended trenching activities in May 2002 due to the discovery of laboratory debris. A more thorough trenching investigation was scoped and the Corps' Contractor's Site Safety and Health Plan was revised to include protocol for alerting the laboratory personnel receiving the samples that there may be sharps (such as glass), minimizing the number of personnel in the exclusion zone while trenching, perimeter air monitoring during trenching activities, and increasing the level of respiratory protection in the exclusion zone.

## September 11-16, 2002 Trenching Activities

The Corps continued trenching TBG01 on September 11-16, 2002. Four additional trenches (for a total of 6 trenches) were investigated (see Figure 7). The trench locations were based upon previous geophysical evidence, and visual depressions. Upon further trenching of TBG01, one pelvic bone from a small mammal (ACG01) was found one foot below ground surface with slightly above background surface gamma radiation levels. Also, a few items of laboratory debris were unearthed (LDG01, LDG02, LDG04). A soil sample containing a dime-size portion exhibiting an elevated gamma radiation reading (greater than 1,000,000 CPM) was collected within a foot of the surface in TBG03. The radioactive material associated with this sample, initially non-detectable at the surface, was later determined to be principally radium-226, with lesser amounts of thorium-230, strontium-90, actinium-227, uranium 233/234, uranium 235/236, and uranium-238.

Once this soil sample was collected (i.e. removed from the site), gamma readings below this sampled area were typical of background. No evidence of animal bones or lab debris was found in TBG03, TBG05, and TBG06.

The November 2001 electromagnetic (EM-31) geophysical survey was conducted over more than 8 acres of the southern portion of VPG (see Figure 7 for EM-31 survey tracks). A total of 45 soil samples, five laboratory debris samples, and the animal bone were collected from the six trench locations (Figure 7) and analyzed for various metals, radionuclides, pesticides, polychlorinated biphenyls (PCBs), semi volatiles, and volatile organics. The selection of sampled parameters for each sample was based upon historic review, measured gamma radiation (using a 2" x 2" NaI detector) and volatile organics (using a Photoionizing Detector). Deteriorated trash cans, miscellaneous lab debris, and other material generated from this investigation were contained in drums. These drums are temporarily stored on the NFSS with other remedial investigation-derived waste pending acceptance of ultimate bulk disposal at Waste Control Specialists (Andrews, TX).

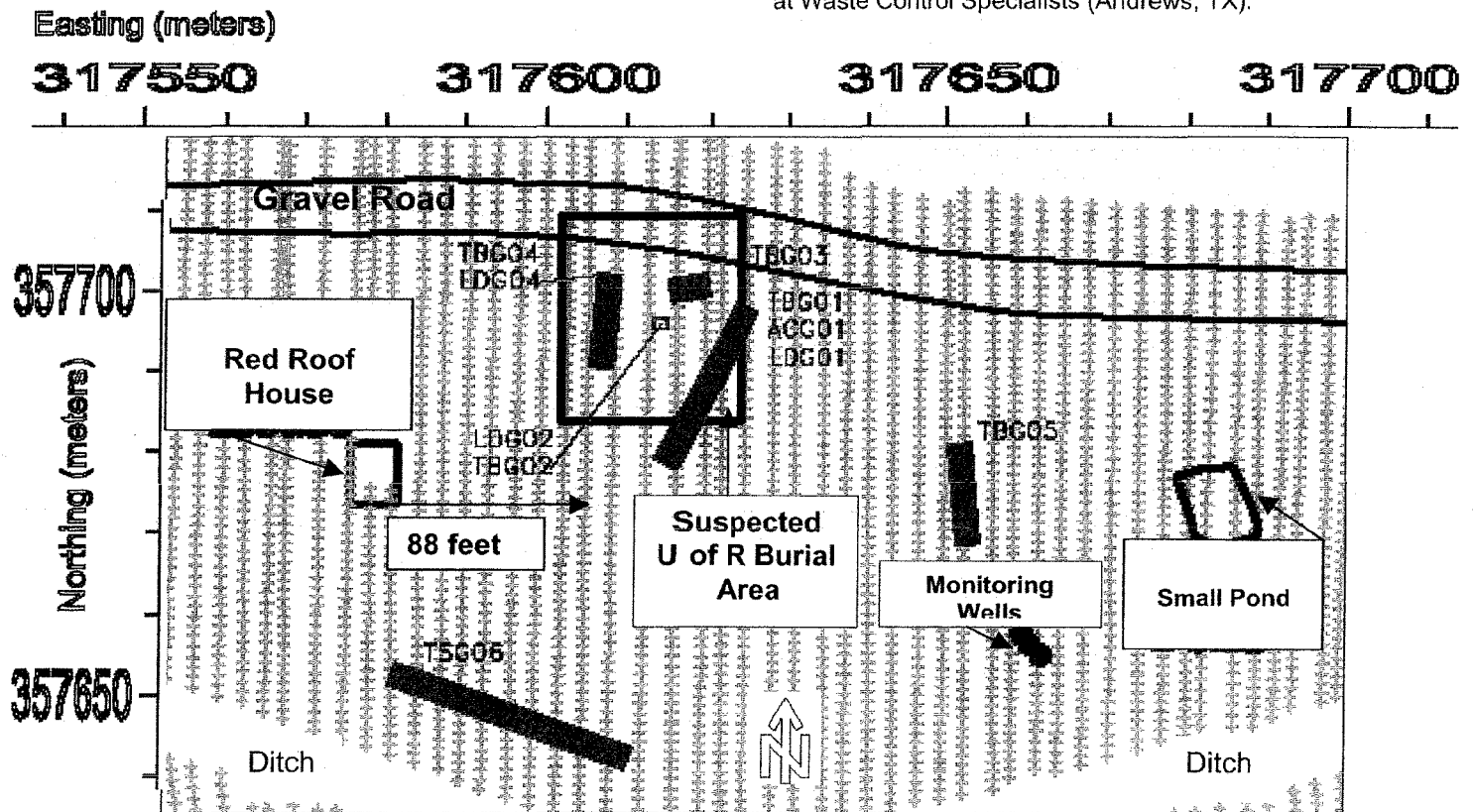


Figure 7: Trench Sample Locations and Geophysical (EM-31) Survey Lines

## Findings

- Detectable concentrations of plutonium-239/240 (Pu-239/240) and strontium-90 (Sr-90) were identified during the May and September 2002 sampling efforts. A total of eight Pu-239/240 detects were reported in the small animal bone (1), laboratory debris (2), and subsurface soils in TBG01 and TBG02 (5) with concentrations ranging from 0.409 to 17.6 pCi/g. Twelve Sr-90 detects were reported in the small animal bone (1), laboratory debris (3), and subsurface soils in TBG01, TBG02, and TBG03 (8) with concentrations ranging from 0.576 to 306 pCi/g. Two Sr-90 detects were co-located with Pu-239/240 detects and one was co-located with the dime-size sample exhibiting elevated gamma radiation in the field. These contaminants are not linked with historical activities at NFSS but are only linked to activities by the University of Rochester (U of R). There is no documentation available indicating that radiological wastes containing Pu-239/240 and/or Sr-90 were buried on VPG.
- One pelvic bone from a small mammal (ACG01), unearthed from the former U of R Burial Area, exhibited elevated Sr-90 (306 pCi/g) with a lesser degree of Pu-239/240 (8.08 pCi/g). The small animal bone may be a remnant from the former disposal of animal carcasses associated with testing at the U of R. There is no documentation available indicating that radiological wastes containing Pu-239/240 and/or Sr-90 were buried on VPG.
- One subsurface soil sample collected (i.e. removed from the site) during the September 2002 trenching activities containing a dime-size portion with elevated gamma radiation >1,000,000 CPM (in TBG03) exhibited radium-226 concentrations similar to K-65 residues according to laboratory results. Since historical information links VPG to K-65-related activities, it is likely that VPG was contaminated with the same K-65 residue currently stored in the interim waste containment structure at NFSS.

## Conclusions:

- The Corps confirmed the presence of a remnant animal bone and laboratory debris associated with the 1972 excavation of the U of R burial area. Therefore, the Corps concluded that VPG has isolated areas of buried radiologically contaminated materials through activities from two independent sources: Mallinckrodt K-65 and U of R animal testing, which was sent to the site as part of the Atomic Energy Commission operations. The available data and the historical information associated with these potential sources support the conclusion that the U of R is likely the source of the plutonium-239/240 and strontium-90 contamination and NFSS is the source of the radium-226 contamination.
- Based upon the findings of strontium-90 and plutonium-239/240 in debris and subsurface soils and K-65-like radium-226 concentrations in subsurface soils, further characterization of VPG is warranted. Note: A portion of VPG is inaccessible due to the presence of a water treatment pond (restricting full access to the site for characterization purposes).
- The findings of this investigation do not present any exposure or risk to the general population since the surface soil investigated exhibited near background radiation levels and VPG is inaccessible to the general public. In addition, no elevated gamma radiation, presence of lab debris, or animal bones was detected in 99% of the approximately 300 foot trenched area.
- The U.S. Army Corps of Engineers will request appropriations from Congress for funding to characterize all vicinity properties not certified closed by the DOE (VPG, VPE, and VPE'). Once funding is available, a thorough Remedial Investigation of the entirety of VPG, VPE, and VPE' will be conducted.

## ***References:***

<sup>1</sup>Aerospace Corporation, *Background and Resurvey Recommendations for the Atomic Energy Commission Portion of the Lake Ontario Ordnance Works*, November 1982. (Volume 5 in LOOW Administrative Record)

<sup>2</sup>Bechtel National, Inc., *Post-Remedial Action Report for the Niagara Falls Storage Site Vicinity Properties – 1985 and 1986*, January 1989. (NF-006 in NFSS Administrative Record)