TA21

Los Alamos National Laboratory

UNIVERSITY OF CALIFORNIA

Environmental Restoration

Environmental Restoration Project, MS M992
Los Alamos, New Mexico 87545
505-667-0808/FAX 505-665-4747

Date: April 21, 1999
Refer to: EM/ER:99-099

Dear Interested Neighbor:

SUBJECT: TA-21 NTISV COLD DEMONSTRATION

The Environmental Restoration (ER) Project of the Los Alamos National Laboratory would like to inform you of the activities at the end of DP road, (immediately west of Technical Area 21), where Material Disposal Area (MDA) V is located.

For your information, a team of personnel from the Department of Energy (DOE), the Laboratory, and other subcontractors have started fieldwork on an area north of MDA V for demonstrating a Non Traditional In-Situ Vitrification (NTISV) technology. The NTISV technology uses heat from electricity to convert earth into an inert, glass-like monolith. The conversion occurs below the ground surface, and all the activities will take place within the fence area.

This demonstration project is a team effort between the Laboratory's Environmental Management Division, the ER Project, the DOE Los Alamos Area Office, the DOE's Environmental Management Office of Science and Technology, MSE Technology Applications Inc. of Butte, Montana, and Geosafe Corporation of Richland, Washington.

As part of the demonstration, the team will "melt" a simulated absorption bed that contains soil, cobble and gravel similar to material found at MDA V. The simulated bed will contain non-hazardous chemicals that should behave like actual contaminants during the vitrification process (surrogates) and low levels of petroleum hydrocarbons. The "cold" demonstration, so named because it doesn't include any radioactive constituents, will melt an area of buried soil north of MDA V having approximate dimensions of 15 feet long, 10 feet wide, and 22 feet deep.

To vitrify the mass of cobble, gravel, soil, and surrogates, four giant electrodes were inserted into the demonstration plot. On April 15, 1999, electricity will be applied slowly over an eight-day period, increasing the power until they reach a peak current of more than 3 thousand kilowatts. Over the course of the eight-day demonstration period, material around the electrodes will reach temperatures ranging between 1,200 and 1,400 degrees Celsius, roughly the same temperature as lava.

As the cobble, gravel and soil melt, virtually all organic chemical contaminants will become volatile. Volatilized contaminants, if present in the melt, will be captured by the offgas filtration system and thermal oxidizer. Only filtered air will be discharged from the demonstration site.

Contaminants that do not become volatile at the extremely high temperatures will remain contained underground in the melt. After the molten material cools, contaminants will remain entombed in a huge, solid, glass-like chunk formed from the process. The glass-like chunks are likely to resemble obsidian, an inert volcanic glass. After completion of this demonstration, the project team will sample the glassy material to determine the quality of the melt and to determine whether the glass successfully immobilized the surrogate contaminants.

The NTISV team powered up the eight-day demonstration on April 15, 1999. If this cold demonstration is deemed a success, the technology will be used sometime in the near future for a demonstration on a slightly larger-sized area of MDA V Absorption Bed 1 which contains very low amounts of radionuclides.

The LANL ER Project has regularly scheduled public tours of the Non Traditional In Situ Vitrification Cold Test Demonstration project every Thursday from 10:00 a.m. to 12:00 noon through June 30, 1999.

If you have any questions or issues, you may contact Carmen M. Rodriguez of the ER Project Communications and Outreach Team at (505) 665-6770 or send her a note by email at carmenr@lanl.gov. Information on this project can be found at http://erproject.lanl.gov/, the ER Project website.

Sincerely,

Julie A. Canepa, Program Manager
Environmental Restoration Project

JC/PS/CMR/gt

Enclosure: 1) Information Sheet on the NTISV Demonstration and Deployment at Technical Area 21
2) LANL ER Project Information Sheet

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TARGET TECHNOLOGIES

The Non Traditional In Situ Vitrification Demonstration and Deployment Technical Area 21 Material Disposal Area V At Los Alamos National Laboratory

Technology Background

The non-traditional in situ vitrification (NTSIV) demonstration at Los Alamos National Laboratory is sponsored by the Department of Energy's Environmental Office of Science and Technology (DOE-EM-OST) Subsurface Contamination Focus Area. A partnership has been established between MSE-Technology Associates of Butte, Montana, Geosafe Corporation of Richland, WA, and Los Alamos National Laboratory as the host site, to demonstrate a non-traditional approach to in-situ vitrification.

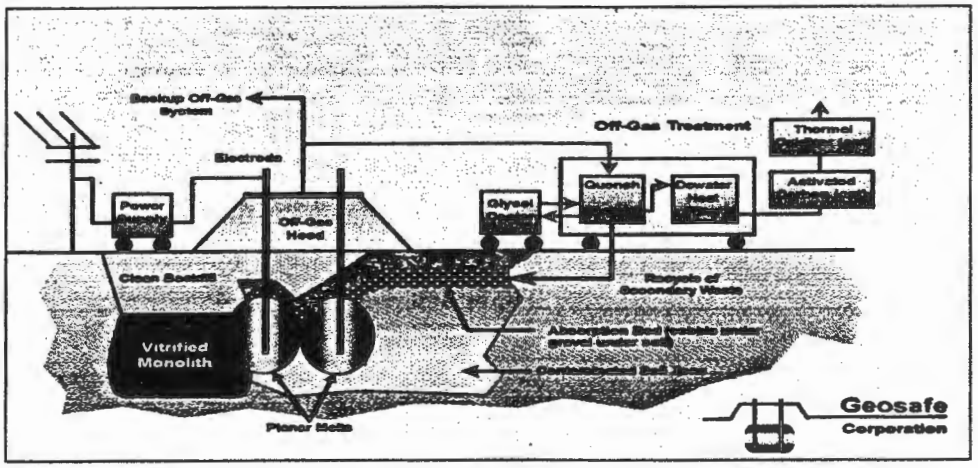
Geosafe Corporation developed a different approach to traditional in situ vitrification, called planar geomelting, which is to be demonstrated at Technical Area 21, Material Disposal Area V in the Spring of 1999.

The conventional method of top-down melting typically produces a melt as wide or wider than its depth. Planar melting, however, a method of creating tall and thin planar melts in the subsurface, creates formation of melts much narrower than the melt depth. This has several advantages over traditional melts:

- It can be used for narrow treatment zones (i.e. trenches)
- Greater depths can be reached
- Melting can be focused sideways for buried waste and underground tanks.

This technology also promises to be suitable for forming rock-like subsurface barrier walls.

Planar melting in a "bottom-up" configuration allows safe and quick treatment of wastes that generate high gas volumes upon treatment. Top down melting is limited with such wastes because of the need to avoid excessive gas movement through the melt. In planar melting, such gases may be expected to move to the surface rather than the melt. The "bottom-up" planar melting approach presents an attractive, permanent solution for some of the buried waste sites because:



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- Organic contaminants are destroyed;
- Metals and radionuclides are permanently immobilized
- Processing capabilities: in situ, ex situ and staged below grade;
- Product is non-hazardous, delistable residual, (similar to obsidian) with superior chemical durability;
- Waste volume reduction at LANL is expected to be 50% or more;
- It can be applied to mixtures of contaminants including organic, inorganic,
- metals and radioactive waste;
- It offers maximum public and occupational safety, and
- The economics are competitive.

Site Information

Technical Area 21 was the first post-Manhattan Project plutonium and uranium processing facility at Los Alamos. The facility produced weapons-grade metal for use in weapons production. Many of the chemical and physical processes to purify and produce the materials were developed at TA-21 and used later in the larger weapons complex. In addition, TA-21 was the site of many different research activities related to the space nuclear program, plutonium heat sources, and other weapons and non weapons programs.

The site selected for the demonstration/deployment of the NTISV is located at the extreme southwest of TA-21, across from the townsite. Material Disposal Area V consists of three absorption beds that were used to disperse effluent from a "nuclear" laundry facility located nearby, which operated from 1945-1961. The absorption beds consists of cobbles, gravel and sand. Site characterization activities were conducted in 1994 and 1996. Results from the sampling during these field activities indicate contamination with both radiological and RCRA constituents.

Because of the characterization results and relative uniformity of the absorption beds, MDA V was deemed a prime candidate for this technology demonstration/deployment.

The demonstration/deployment will occur in two phases: a "cold" demonstration in a mockup of the absorption bed, during the Spring of 1999; and a "hot" deployment on a 25x30 by 22ft depth area of the northwest absorption bed - at this time, scheduled for late Summer 1999.

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Los Alamos National Laboratory
Environmental Restoration Project

Mission Statement and Goals

The mission of the ER Project is to bring together multidisicplinary, world-class science, engineering, and state-of-the-art management practices to remedy environmental problems resulting from 50 years of Laboratory operations in Los Alamos.

The Project's specific goals are to

- protect human health and the environment from exposure to releases of hazardous, radioactive, and mixed wastes from historical treatment, storage, and disposal practices at the Laboratory and
- meet the environmental cleanup requirements of the Hazardous and Solid Waste Amendments portion of the Laboratory's permit to operate under the Resource Conservation and Recovery Act.

Los Alamos National Laboratory's Environmental Restoration (ER) Project is part of a national effort by the Department of Energy (DOE) to clean up the facilities involved in its weapons production program. The goal of this effort is to ensure that DOE's past operations do not threaten human or environmental health and safety. The program is governed primarily by the corrective action process prescribed in the Resource Conservation and Recovery Act (RCRA) but is also subject to other applicable laws and regulations. The ER Project is investigating all sites that may have been contaminated by past operations to determine the nature and extent of any contamination. It is also exploring possible measures for cleaning up contamination and selecting and implementing remedies at these sites.

At Los Alamos, the number of potentially contaminated sites is approximately 2,100. Much of the investigation phase has been completed, and, as a result, many sites have been found not to be contaminated and are being removed from the total list of sites without further action. Accelerated cleanup (an abbreviated version of the full corrective action process that regulators authorize for sites where levels of contamination are known and cleanup processes are obvious) has been completed or has begun at many of the remaining sites. A small percentage of sites, currently estimated at less than 10%, will need to go through the entire corrective action process, a task that is expected to take until 2006 to complete.

Environmental Monitoring and Past Cleanup Efforts at the Laboratory

Since 1970, the Laboratory has conducted a comprehensive environmental monitoring and surveillance program designed to identify releases from Laboratory operations that could pose a health risk to individuals living in the communities surrounding the Laboratory. Data gathered under this program indicate that no contamination that threatens the health or safety of local residents is known to exist on private property.

How the Environmental Restoration Project Works

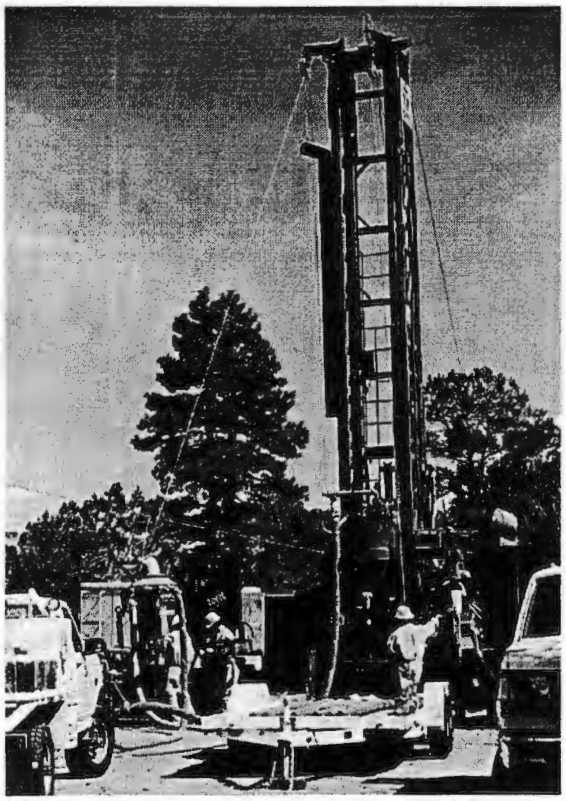
Environmental restoration projects at DOE facilities around the country, including the one at Los Alamos, are exploring and adopting approaches that speed up the remediation process, when appropriate, and reduce costs. This approach permits a site-specific, customized remediation to be planned, designed, and implemented without proceeding through the entire corrective action process, while still safeguarding human health, safety, and the environment.

As sites are cleaned up, or it has been determined that no cleanup is required, they are removed from the ER Project's list of Potential Release Sites (PRSs). In the case of hazardous waste sites regulated under RCRA and the Hazardous and Solid Waste Amendments (HSWA), when all issues related to a particular PRS have been resolved with the New Mexico Environment Department (NMED), the PRS is removed from the list in the HSWA Module by means of a permit modification, described below.

Permit Modification

Whenever there is a need to change information in the HSWA Module, the Laboratory and the DOE prepare a proposal for one of three classes of permit modification: Class I modifications deal with minor changes in the HSWA Module; Class II modifications deal with changes such as those made necessary by changes in regulations. Class III modifications involve substantial changes, such as removing a PRS from the list in the HSWA Module.

When ER Project investigations indicate that a site is clean enough to meet regulatory standards, it prepares a list of the sites, their history, and the reasons for proposing their removal from the list. For sites listed on the HSWA modules, the project submits the list to the regulatory agency and arranges for public notification, a 60-day public comment period, and a formal public meeting in accordance with regulatory requirements for a Class III modification. The record of the comments, together with comments received during the 60-day comment period, is submitted to the regulatory agency, which is solely responsible for making decisions to remove sites from the list. Citizens' comments carry a great deal of weight in the regulator's decision. For sites not listed on the HSWA Module, DOE makes the determination that no further action is required.



For additional information on the Los Alamos National Laboratory Environmental Restoration Project:

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environmental restoration project

Public Tours

Los Alamos National Laboratory
Non-Traditional In Situ Vitrification
Cold Test Demonstration Project

Non-Traditional In Situ Vitrification Cold Test Demonstration Project

The LANL Environmental Restoration (ER) Project and a team of personnel from LANL, DOE, and other subcontractors are conducting a Non Traditional In Situ Vitrification (NTISV) cold test demonstration project that will run for eight days that started on April 15, 1999. The NTISV technology uses heat generated from electricity to melt subsurface material into a molten product. As the molten material cools, it turns into a solid glass material, similar to volcanic glass. This entire process will take place underground, and only the equipment used for this process is visible.

Scheduled Tours

Tours will be held every Thursday in May and June from 10:00 a.m. – noon.
These tours are dependent on the availability of Laboratory staff. Special requests will be accommodated only if accompanied by a written request and approved by the ER Project Leader. All tour participants must be age 16 or older.

Reservations

Anyone interested in a tour must make advance reservations by contacting Carmen M. Rodriguez at the Environmental Restoration Project Communications and Outreach Office at (505) 665-6770 or via email at carmenr@lanl.gov.

Tour Size

Minimum tour size will be five people. Maximum tour size will be limited by Site Specific Health and Safety Plan requirements. If there are not more than 5 people signed up for a tour at least 24 hours in advance, it will be cancelled and the people will be called to reschedule.

Directions

Tour participants will meet at the Community Relations Office, 1619 Central Avenue, Los Alamos, NM. After a brief orientation, participants will be bused to TA-21, view the NTISV Project site, and return to the Community Relations Office where their cars are located.

Additional Information

Please visit the "Project" link on the Environmental Restoration Project Website at:
http://erproject.lanl.gov/

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