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Louis County Council
Rothman-Serot
an, Third District

October 29, 1991

Mr. Stephen McCracken
Project Manager
Weldon Springs Site Remedial Action Project
United States Department of Energy
7295 Highway 94 South
St. Charles, Missouri 63304

Re: Contaminated Water Treatment

Dear Mr. McCracken,

We were very disappointed that our tour of the Weldon Springs Quarry site had to be cancelled due to the severe storm last Wednesday. Because we feel that the treatment and disposal of contaminated water is a critical issue and because we are aware that the proposed treatment plan is to be put into effect in the y near future, we have decided that we must express our concerns to you in writing.

We want to commend you for your efforts to find a solution to the problem of contaminated water at the quarry. We know that your desire is to protect the drinking water of all residents. However, after reading the Department of Energy's five-year plan for Environmental Restoration and Waste Management, published in June 1990, we believe that the Department of Energy's own misgivings about the efficiency and safety of current treatment technologies echo our concerns and those of many citizens of this area.

The following are a few of the questions which we would ask you to address (quoted material and references to the DOE are from the above-referenced report, which we enclose):

1) DO YOU KNOW WHICH CONTAMINANTS ARE IN THE WATER?

Are you aware that the DOE considers traditional methods of characterization of groundwater to be "highly subjective and at times uncertain"? Do you have any evidence of the precision of your testing methods and instruments?

2) CURRENT GROUNDWATER TREATMENT -- IS IT EFFECTIVE?

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The DOE considers many of the standard techniques for treating contaminated groundwater (such as pumping) to be "burdened by uncertainties as to their overall effectiveness"? Have you verified the effectivness of your treatment for the contaminated groundwater surrounding the quarry?

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3) CONTAMINATION CAUSED BY BACKWASH

Are you aware that the standard practice of starting and stopping the treatment process can result in contaminated water backwashing into previously uncontaminated areas? Have you analyzed the volume and flow rate of the groundwater to determine the likelihood that this will occur?

4) IS THE WELDON SPRINGS QUARRY A GUINEA PIG?

The DOE has proposed the use of "test beds" for new and untried technologies. Is your site such a test bed? If so, what guarantees do you have of the effectiveness and safety of your technologies?

5) ARE YOU REALLY READY FOR FULL-SCALE IMPLEMENTATION?

The DOE has stated that "future development phases include pilot-scale demonstrations at contaminated sites to illustrate the need to thoroughly evaluate the proposed technology before full-scale implementation". Did you have a pilot-scale demonstration? If so, what were the results?

6) ARE YOU SURE THAT THE WATER RELEASED INTO THE RIVER WILL BE FREE OF CONTAMINANTS?

The DOE has asserted that insufficient emphasis has been placed on monitoring techniques, quality assurance and long-term effectiveness standards? What evidence do you have of the accuracy of the equipment which you plan to use to monitor the level of contamination in the water BEFORE you release it into the Missouri River? Which contaminants will you test for? What about the contaminants for which you have no testing capabilities?

7) IS THERE A PLANT FACILITY BEING BUILT?

Do you plan to build a structure to house and protect your treatment and monitoring equipment? If not, will this result in equipment that can be vandalized and not appropriately monitored?

We would appreciate answers to these questions at your earliest convenience.

Thank you for your attention to this important matter.

Sincerely,

Geri Rothman-Serot
Councilman, 3rd District

Geri

James E. O'Mara
Councilman, 4th District

James E O'Mara

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DOE/S-0078P

Environmental Restoration and Waste Management

Five-Year Plan
Fiscal Years 1992 - 1996

June 1990

United States Department of Energy

Washington, DC 20585

5.3.3 TECHNOLOGY NEEDS FOR WASTE STORAGE AND DISPOSAL

Waste storage and disposal need to be carried out using technologies that avoid the requirement for future environmental restoration programs.

Waste storage and disposal require advanced technologies to ensure continued compliance with evolving DOE Orders and Environmental Protection Agency (EPA) regulations and to ensure protection of the public and the environment without requiring massive environmental restoration.

Storage and disposal technologies fall into three principal areas: (1) improved waste disposal systems, (2) data and tools to predict performance of waste disposal units, and (3) systems for monitoring and conducting surveillance of wastes that are in storage or that have been disposed of.

Improved Waste Disposal Systems: It is recognized that, at many of the DOE disposal sites, geological, hydrological, and ecological conditions do not provide adequate isolation and prevention of radionuclide/chemical migration. The use of engineered structures that consist of natural and man-made barriers has been an area of extensive research and development. The applicability of these barriers, singly or in multiples, must be demonstrated, tested, and evaluated for implementation at specific sites. Long-term performance of barrier materials, especially synthetic materials, is a major uncertainty, and the means for accelerated testing are necessary to enable the durability to be shown with sufficient confidence to obtain regulatory and public approval.

Data and Tools to Predict Performance of Disposal Units: Sufficient experimental data to validate performance assessment models (for accurately predicting the transport of radionuclides from disposal facilities) are not available. Source term data, physical and chemical behaviors of chemical species in soil, effects of engineered barriers, far-field transport of radionuclides, and other pertinent parameters are required for the validation of performance assessments.

Monitoring and Surveillance: Remote monitoring and inspection capabilities for storage and disposal areas are needed. Monitoring technologies need to (1) be less expensive, (2) be less invasive, (3) provide ample evidence that containment of hazardous materials has not been compromised, and (4) indicate problems at a sufficiently early stage so that corrective actions can be relatively easily implemented. Innovative techniques are required for in situ monitoring of low concentrations of radionuclides at new or currently used burial sites, particularly for alpha- and low-energy beta-emitting radionuclides.

Identified storage needs include:

- minimum requirements for the design and operation of low-level waste and transuranic waste storage facilities;
- remote monitoring and inspection capabilities for storage areas to meet

storage requirements (i.e., Resource Conservation and Recovery Act); and
- evaluations to ensure that the integrity of waste containers is compatible with the contained waste for the storage time period.

Identified disposal needs include:
- disposal concepts/technologies for waste requiring long-term isolation;
- improved performance assessment processes and techniques;
- design, development, and demonstration of a mixed-waste disposal facility;
- demonstration of closure of a waste disposal unit (e.g., low-level waste burial ground);
- alternative technology for transuranic waste that is not certifiable for the Waste Isolation Pilot Plant;
- improved monitoring and surveillance of active and inactive waste disposal sites;
- improved stabilization for active and inactive sites; and
- improved waste emplacement technologies.

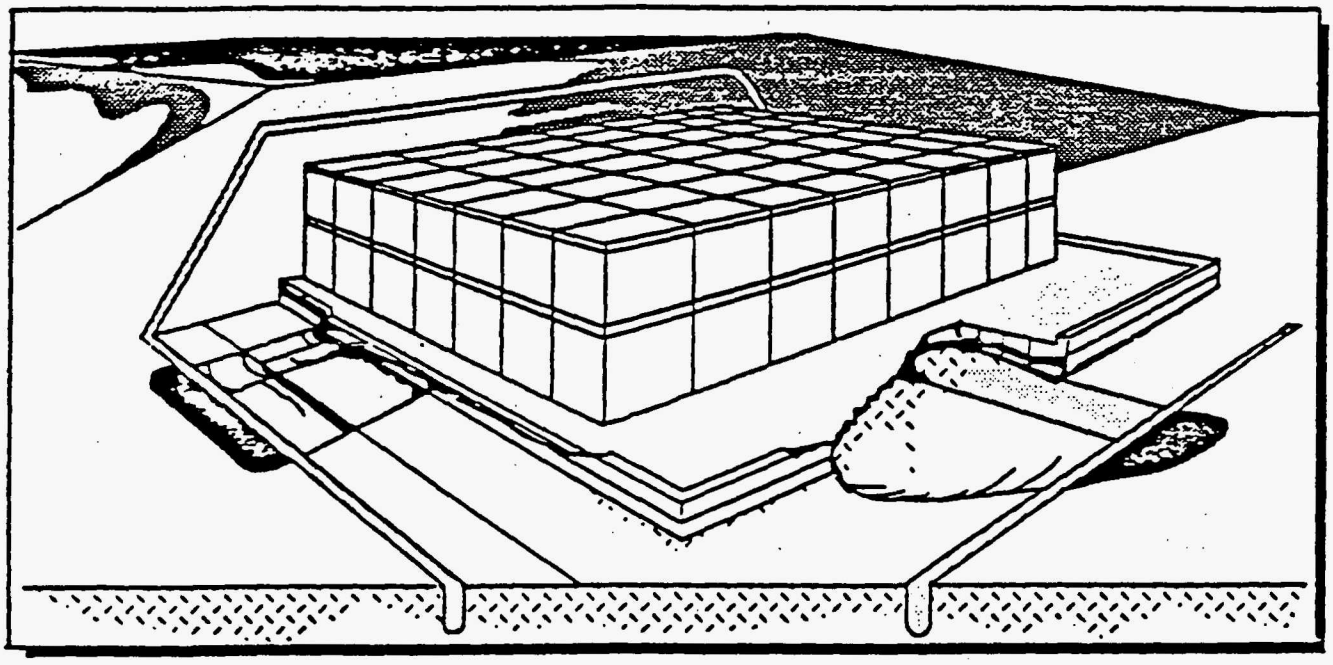

Figure 5.3.3. Tumulus disposal provides for improved long-term isolation and fixation of wastes.

5.3.4 TECHNOLOGY NEEDS FOR ENVIRONMENTAL RESTORATION

If DOE is to meet its 30-year cleanup goal in a cost-effective manner, safer and more efficient technologies for site characterization, soil/groundwater remediation, and facility decontamination and decommissioning (D&D) need to be developed.

Technologies need to be developed that will (1) constitute a permanent restoration solution, (2) minimize wastes as well as health and safety risks during restoration, and (3) prepare restored sites for subsequent use and development.

Present environmental restoration technologies are inadequate and involve high costs because of (1) the inability to accurately assess or characterize the site health/environmental status and cleanup requirements; (2) the absence of safe, efficient, and cost-effective remediating technologies for the diverse assortment of contaminated sites (soils, underground storage tanks, waste lagoons, equipment, and buildings containing a wide variety and levels of contaminants); and (3) the lack of quantitative cleanup goals for remedial action efforts.

New, quicker, and more effective methods for identifying and characterizing the extent of groundwater and soil contamination are needed. Also needed are faster, less expensive, and less intrusive methods for characterizing subsurface geohydrologic features. Present methods rely almost entirely on coring technologies and the drilling and nonautomated surveillance of coreholes and monitoring wells, which are expensive, labor-intensive, and time-consuming, and which are likely to result in conduits for the migration of contaminants to uncontaminated subsurface regions. Strategies for soil and groundwater sampling should conform to prevailing State and Federal regulations as well as rely upon geostatistical design techniques that take into account the existing knowledge of the site. Practical subsurface environment transport models need to be developed and tested to improve field-scale predictive capabilities. Remote and real-time characterization technologies need to be developed for accurately sampling and evaluating the quantities and types of contaminants (radionuclides, heavy metals, and toxic organic compounds) contained in underground storage tanks and waste lagoons. The combination of improved sensors and robotic capabilities can provide a significantly enhanced and powerful tool. Similar technologies are necessary for determining the types and quantities of waste generated in the D&D of inactive facilities.

Upon implementation, these methods will provide data that need to be managed in a timely and effective manner. Management of the data can be accomplished through a standardized DOE data base management system dedicated to site characterization, remediation efficacy, and D&D and specifically tailored to programmatic needs.

Conventional remediation technologies are often ineffective and involve high costs. For example, excavation, treatment, and redisposal is the most common process for remediating contaminated soils and waste treatment sludges and sediments contained

in underground storage tanks and unlined waste lagoons. Soils needing remediation frequently contain unacceptable levels of radionuclides, heavy metals, and a variety of hazardous organic compounds as well as buried wastes from waste treatment/disposal operations. Robots offer a safe and potentially cheap means of performing hazardous excavation of contaminated material as well as in situ treatment/stabilization.

It is imperative that DOE develop safe, reliable, and cost-effective in situ technologies for remediating contaminated soils and water. Potential in situ technologies include vitrification, bioremediation, and grouting. For contaminated groundwater, when interdiction of the contaminant source is not practical, remediation is generally accomplished by pumping and treatment technologies that are time-consuming, expensive, and burdened with uncertainties as to their overall effectiveness.

A detailed, accurate monitoring program is necessary for thoroughly evaluating the effectiveness of any environmental restoration activity. Monitoring should demonstrate whether site restoration has been successful. The monitoring design should also provide sufficient warning if the restoration activity was not successful, so that adequate time would be available for implementing a corrective action to avoid possible adverse health, safety, and environmental consequences.

The DOE sites themselves are important resources for technology development and may be used as "test beds" for the demonstration and evaluation of new methods.

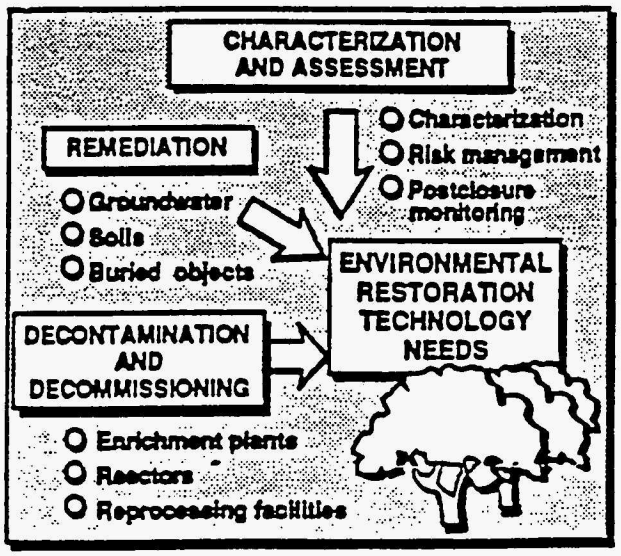

Figure 5.3.4. The needs for environmental restoration technology fall into three categories: (1) characterization and assessment, (2) remediation, and (3) decontamination and decommissioning.