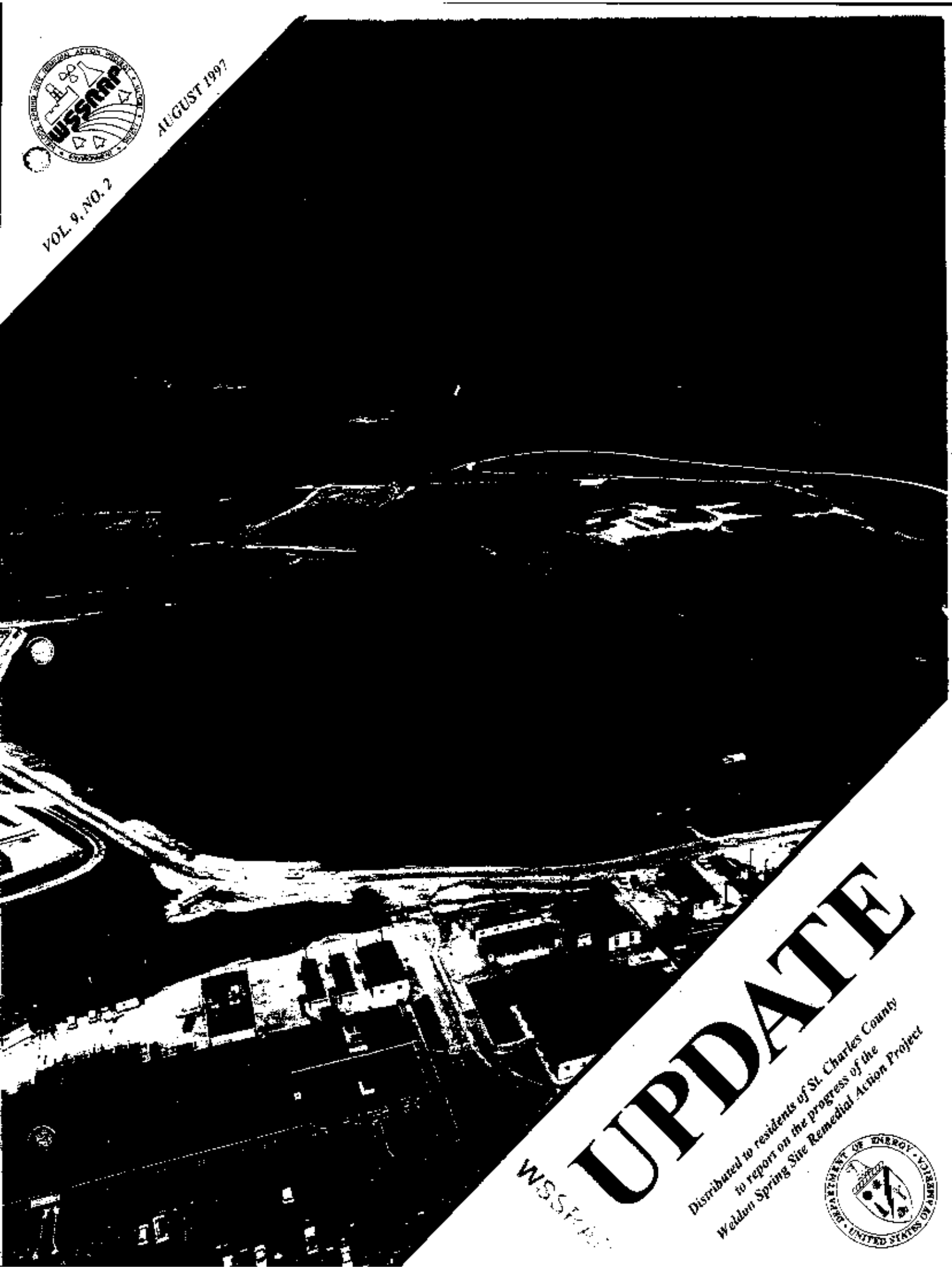
VOL. 9, NO. 2

AUGUST 1997



# WSSRAP UPDATE

Distributed to residents of St. Charles County to report on the progress of the Weldon Spring Site Remedial Action Project

# Construction Begins For Permanent Disposal Facility

Groundbreaking ceremonies on April 24, 1997 celebrated the beginning of the construction of an immense disposal facility at the Weldon Spring Site Remedial Action Project (WSSRAP).

This event marked the "beginning of the end" of remediation activities required for environmental restoration of the 217-acre uranium feed materials plant site, nearby "vicinity properties," and the nine-acre abandoned quarry once used as a dump site for chemical and radiological waste. Environmental restoration has been in progress at the WSSRAP since 1986, advancing toward long-term isolation of chemical and radioactive waste materials. Waste will be placed in the on-site disposal facility now being shaped by a fleet of earthmoving equipment.

Work performed to date at the WSSRAP ranges across a full spectrum of restoration activities, from remedial investigations and characterization to building dismantlement, from excavation of some 120,000 cubic yards (cy) of waste at the Weldon Spring Quarry to building foundation excavation totaling more than 500,000 cy of clean and contaminated soils and concrete. All of these contaminated materials have been placed in on-site interim storage.

Other major operations continue concurrently with disposal facility construction. Treatment of runoff waters at the site and quarry is ongoing. To date, more than 167 million gallons have been treated to meet National Pollutant Discharge Elimination System standards, and released into the nearby Missouri River. Recently, the critical task of constructing a chemical stabilization/solidification (CSS) plant to treat raffinate pit sludges and certain soils began. The plant will mix the sludges with a fly ash and cement binder to produce stabilized grout-like products.

As planned, the disposal facility will have a capacity of 1.4 million cy. At this capacity, the facility will cover approximately 40 acres and stand 65 feet tall, the average height of surrounding trees.

*(continued on page 4)*

**COVER PHOTO:** *July 1997 aerial view of WSSRAP disposal facility construction.*

# Bio-treatment Process Excels at WSSRAP

The latest water treatment operation in use at the WSSRAP is the biological treatment of nitrates in impounded surface water and sludge. The bio-treatment process reduces nitrates in water to extremely low, environmentally safe levels.

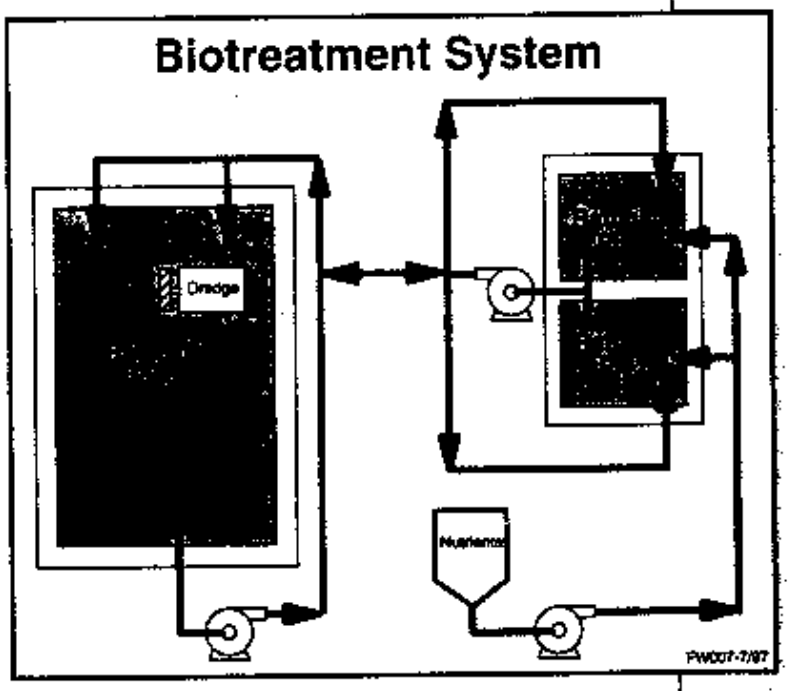
"Our ability to biologically convert nitrates to inert nitrogen and carbonates is considered a superior treatment technology. There are no hazardous by-products to treat," explains Glen C. Schmidt, project process engineer.

An additional benefit is the reduction of selenium. Treatability studies indicate that selenium is reduced to a concentration that meets the required permit limits. Tom Pauling, DOE Environmental Engineer, indicated "We are spending the money to treat these contaminants now rather than later in the leachate from the on-site disposal facility."

The bio-treatment process is being implemented in two of four waste retention areas at the WSSRAP. These areas, called Raffinate Pits 1 and 2, contain uranium waste sludges remaining from the operation of the Uranium Feed Materials Plant (1957-1966).

The bio-treatment process begins by pumping contaminated water from Raffinate Pit 3 into Raffinate Pits 1 and 2. Next, nutrients are fed into the pits to provide food so that the naturally occurring microbes will flourish. The microbes metabolize the nitrates along with calcium acetate and phosphorus nutrients.

The treated water is then recycled back to Raffinate Pit 3 where a dredge is positioned to continually slurry the underlying sludge with the surface water. The dredge operation washes nitrates from the sludge to the surface water. The cycle is repeated until the nitrates are at a safe level.




Each batch that undergoes bio-treatment contains approximately 2.5 million gallons of water. Nitrates are being reduced from 5,000 milligrams per liter to less than one milligram per liter. The process is expected to treat 75 million gallons of water in 1997, 1998, and 1999. During that time, more than 500 tons of nitrates will be destroyed.

# Disposal Facility Construction

*(continued from page 2)*

Contaminated materials to be placed in the facility include the quarry bulk waste, stabilized materials from the CSS plant, slag and metals, building debris, and other radiologically and chemically contaminated materials from the plant and vicinity properties.

The construction effort began well in advance of the groundbreaking ceremonies of April 24. WSSRAP employees began hauling and placing disposal facility foundation material in late March. More than 6,500 cy of soil have been placed each day, meeting demanding moisture content, clay content and compaction specifications while filling and compacting major sections of the foundation and the clean-fill dike.

Overall, the first task of disposal facility construction involves stockpiling and processing common fill and low permeable clay material. The clay is stockpiled at a borrow source area located on Missouri Department of Conservation property near the plant site. The material is transported to the WSSRAP on a dedicated haul road which crosses beneath Highway 94. This route was chosen in cooperation with the community to ensure that construction traffic does not interfere with public traffic.

Concurrent with stockpiling, some 83,000 cy of low permeable clay are being placed for the disposal facility foundation. Another 255,000 cy of common fill clay are being used in the initial segment of the clean-fill dike and over 100,000 cy of clay are being compacted in the first stage of the facility's liner.

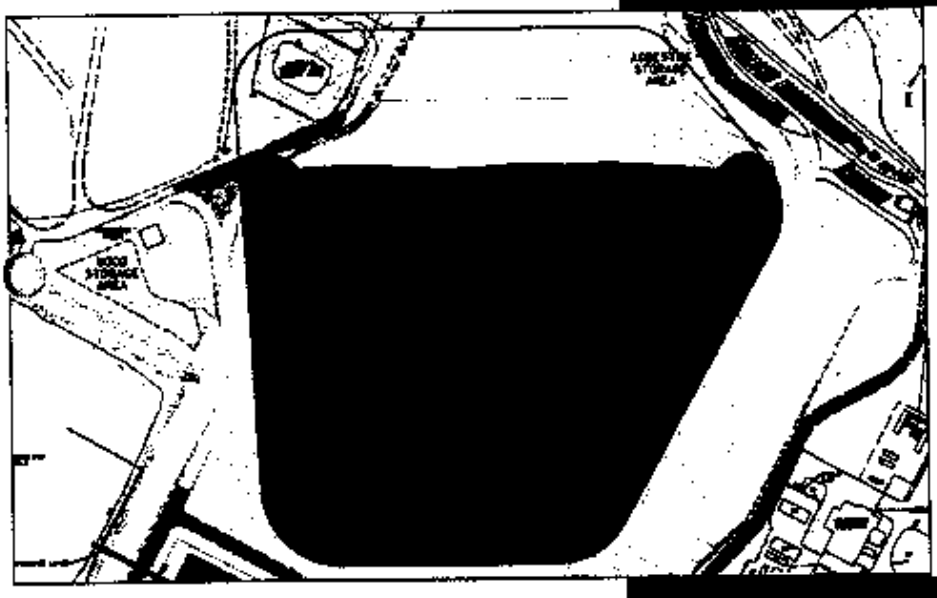
The second task of construction currently in operation is placement of more than 70,000 cy of common fill to extend the starter dike's width. Waste placement will begin upon completion of this work and is targeted to commence in early 1998. The disposal facility cover will be constructed in increments as sections of waste placement are completed.

After all contaminants are in place, the final cover system increment will be finished to complete a disposal facility designed to last for centuries. Construction of the disposal facility is a culmination of many years of planning and a three-year design effort.

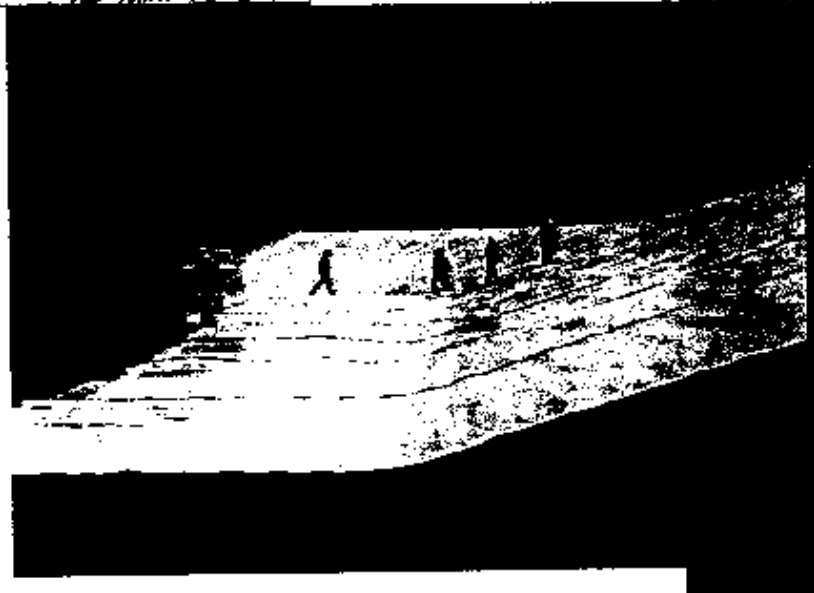
Final road construction, site grading, fencing, revegetation, and surface runoff control will be completed to leave as much of the project area as possible open for use in the future. It is estimated that 155 acres of the plant site will be available for unrestricted use and that nine acres at the quarry will be fit for recreational use. Present plans call for the completion of all activities in 2002.

*Nearly one-half million cubic yards of contaminated soils and concrete were removed in preparation for disposal facility construction.*

*(Right) Clay liner in the structure's foundation was trimmed in preparation for disposal facility liner placement.*



*(Left) This diagram shows the first phase of disposal facility construction to be completed in 1997. The shaded area includes construction of the clean fill starter dike, disposal facility foundation, clay liner and geo-synthetic liner.*



*Placement of the disposal facility liner began in July 1997. A system comprised of a combination of liners and leachate collection and removal systems will form a 4.5 foot thick bottom and the interior side slopes of the disposal facility.*

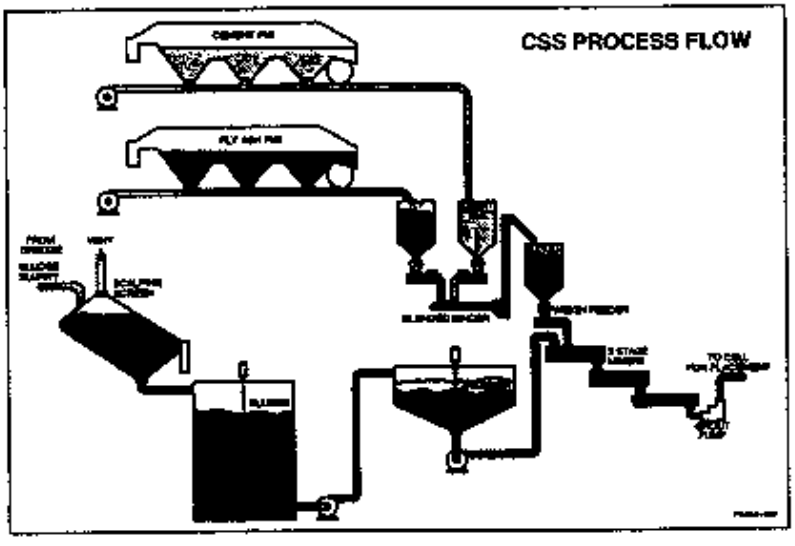
# Waste Treatment Facility Construction

Construction of a facility to treat waste sludges is under way at the WSSRAP. The Chemical Stabilization/Solidification (CSS) facility will produce a structurally stable waste form to immobilize materials before placement in the disposal facility.

The CSS process was developed using knowledge gained during bench-scale testing and operational testing of a pilot facility. This treatment method combines fly ash and portland cement with waste sludges to produce a grout-like product. The grout will be placed in the disposal facility.

The treatment facility consists of several modules. Each module was prefabricated to perform a specific function of the CSS process. (See process diagram below for a detailed description.)

Construction of the CSS facility will be complete in early 1998. The facility will operate 24 hours a day, five days per week for an estimated eight months. Operations are expected to be complete in 1999.




**THE CSS PROCESS:** A dredge will slurry waste sludges (raffinate) from the WSSRAP raffinate pits. The slurried raffinate will be pumped into two storage tanks after passing through scalping screens which will remove oversize particles and debris. The storage tanks will maintain solids in suspension by means of agitators before the slurry is transferred to a thickener tank. Polymer will be added to aid in the thickening and dewatering of the sludge.

From the thickener tank, the sludge will be pumped into two mixers where a 60\40 blend of fly ash and cement will be added to produce the grout-like product. The grout will be continuously mixed and discharged from the mixers into the grout pumps and pumped via two pipelines to the disposal facility for placement.

# Restoring The Weldon Spring Quarry

In October 1995, the final load of bulk waste was removed from the Weldon Spring Quarry. Today, plans are being made for restoration.

Quarry restoration will be completed in several phases. Planned work includes backfilling the quarry with pre-selected and prepared borrow material, dismantling the Quarry Water Treatment Plant, restoring the haul road, and final grading.

Backfilling will reduce the physical hazards associated with excavated areas such as potential instability in the high wall, rock benches, open fractures, and ponding of water. The backfill will address these hazards and provide a gentle slope to create sheetflow of rainwater to the Little Femme Osage Creek.

The Quarry Water Treatment Plant, which has been in operation since 1992, will be dismantled and transported to the chemical plant site. The building and its contents (piping, electrical, plumbing, etc.) will be handled in one of several possible ways. The materials could be placed in the disposal facility, used in a future WSSRAP water treatment plant, transferred to another DOE site or decontaminated for unrestricted release.

Prior to the beginning of quarry bulk waste removal, a dedicated haul road was built for hauling wastes to the chemical plant area. The haul road is located on a U.S. Department of Energy easement that crosses property owned by the Missouri Department of Conservation, St. Charles County, and the U.S. Department of the Army. The WSSRAP Transition Planning Group is currently discussing possible future uses for the haul road.

Final grading of the quarry area will be the last phase of restoration. The goals of final grading are to minimize erosion and return the area as near as possible to its natural contours. Restoration of the quarry is scheduled to be complete in August 2000.

# Treatment Of Reactive and Oxidizer Wastes Complete

The former Weldon Spring Uranium Feed Materials Plant (1957-66) used many types of industrial chemicals and laboratory reagents. Part of the WSSRAP's mission is to manage, treat, and dispose of the chemical wastes left behind after the plant was shut down and closed in 1966. A significant milestone was recently reached when chemical deactivation of over 7,000 pounds of reactive and oxidizer wastes was completed.

Reactive wastes can be explosive, shock-sensitive, or spontaneously combustible (when exposed to air or moisture). Flammable metals and materials that can react to produce highly toxic gases are also classified as reactive. Oxidizers are substances that cause or enhance the combustion of other materials. Seventeen types of reactive and oxidizer wastes were included in the WSSRAP's mixed waste inventory.

On-site treatment methods were developed based on the results of bench-scale treatability tests. The wastes were treated by controlled reaction with other chemicals to yield nonhazardous products.

In accordance with the Site Treatment Plan, the treatment of reactive and oxidizer wastes was completed prior to the June 30, 1997 milestone.

*Francis Howell Environmental Biology students conduct water quality tests with their instructor at Lake #9 in the Busch Conservation Area.*

# DOE Donates To Education

The DOE donated several pieces of water chemistry equipment, formerly used at the WSSRAP, to the Francis Howell School District. Two pH meters, two conductivity meters, and three oxygen meters were donated to the district for use in the science curricula at Francis Howell High School.

Presidential Executive Orders signed by Presidents Clinton and Bush allow and encourage government agencies to transfer or donate education related equipment to schools. Such donations help to enhance science education and research studies.

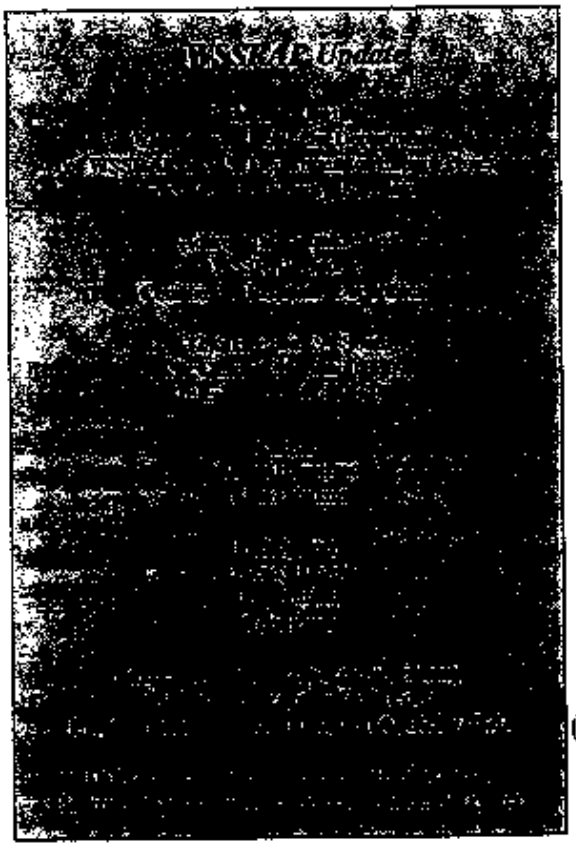
# Citizen Input

The Weldon Spring Citizens Commission is a volunteer organization that provides oversight of activities at the WSSRAP. Members representing a cross-section of the St. Charles County population serve on the Commission.

The Commission meets on the third Thursday of each month at 7:00 p.m. in Room 107 of the old St. Charles County Courthouse. Meetings are open to the public. For information, contact the Weldon Spring Citizens Commission at (314) 949-7545.

**Weldon Spring Citizens Commission**

| | |
|---|---|
| Dr. Daryl Anderson | Patrick McDonough |
| Elaine Blodgett | Paul Mydler |
| Dr. Glenn Hachey | John Urbanowicz |

**Technical Support Assistant**
Sue Davis

**Administrative Assistant**
Sue Davis  Helene Diller