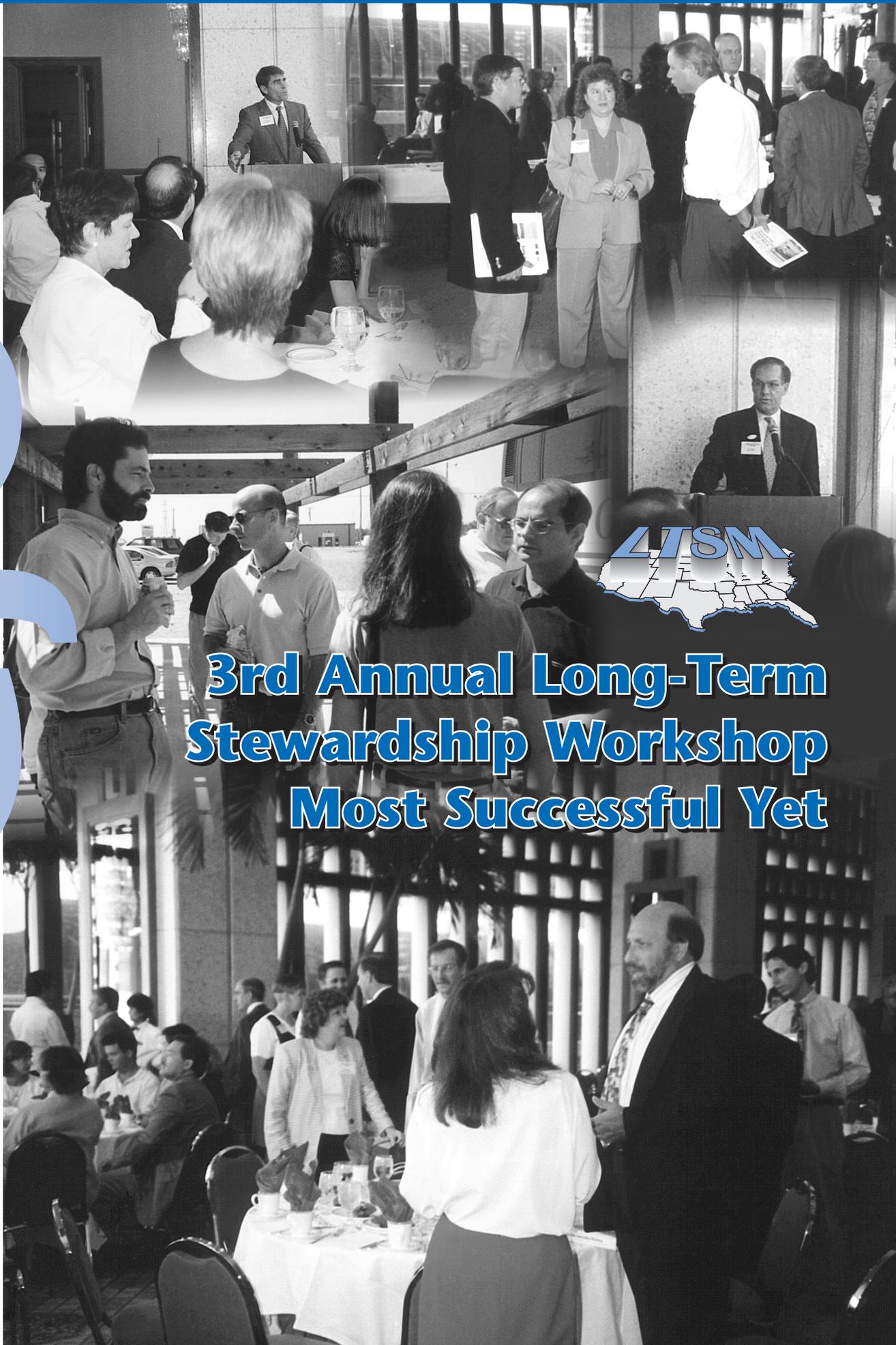


Winter/Spring
2001

Grand Junction Office
Perspective



Volume 8



**3rd Annual Long-Term
Stewardship Workshop
Most Successful Yet**

GJO Prepares for Upcoming Changes at the Site

We began the new calendar year at the Grand Junction Office (GJO) preparing for a year that looks to be full of exciting changes for the site.

Several major steps have moved us closer to the successful transfer of the GJO site to private ownership. On September 28, 2000, the U.S. Department of Energy (DOE) signed a Letter of Intent with the Riverview Technology Corporation, the nonprofit entity negotiating to purchase the site. This led to the Memorandum of Understanding that was signed in December by former Energy Secretary Bill Richardson and Knute Knudson, Chair of the Riverview Technology Corporation (see related article on page 16), and the signing of the Offer to Purchase by DOE and the Riverview Technology Corporation. A Request for Deferred Remediation, which allows transfer of property with contamination, has been submitted to the State of Colorado. The transfer of the deed is now pending the signature of the Governor of Colorado on the Request for Deferred Remediation; this approval is expected to occur in early spring this year.



Donna Bergman-Tabbert
DOE-GJO Manager

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Grand Junction Office Perspective

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Cover photos: The third annual Long-Term Stewardship Workshop held in Denver, Colorado, August 7-10, 2000, featured guest speakers, a tour of the Rocky Mountain Arsenal National Wildlife Area, and opportunities to discuss long-term stewardship activities.

Third Annual Long-Term Stewardship Workshop Most Successful Yet

The U.S. Department of Energy Grand Junction Office (DOE-GJO), the DOE Albuquerque Operations Office, and the DOE Headquarters Office of Long-Term Stewardship hosted the third annual Long-Term Stewardship Workshop August 7 through 10, 2000, at the Adam's Mark hotel in Denver, Colorado.

More than 200 registrants attended this year's event, with representatives from DOE Headquarters and Field Offices, U.S. Department of Defense, U.S. Nuclear Regulatory Commission, U.S. Environmental Protection Agency, states, foreign countries, private industry, universities, public stakeholder groups, and contractors and consultants with professional interests in the subject matter.

Long-term stewardship includes activities necessary to protect human health and the environment following cleanup and disposal of nuclear and chemical materials. The workshop consisted of eight sessions with session chairpersons and presenters who addressed a wide range of long-term stewardship subjects, followed by interactive panel discussions.

Session Topics

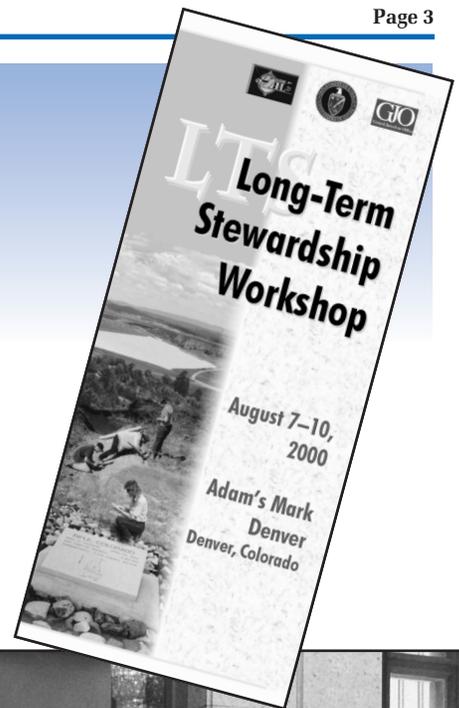
DOE stewardship policy initiatives and related matters were presented and discussed in the opening sessions. The legal challenges associated with the implementation of effective institutional controls were highlighted in a subsequent session and discussed by speakers from offices of state attorneys general, legal consultants, and other implementing federal agencies.

Other sessions covered challenges of long-term information management, technology needs, application of technology, stakeholder involvement, and concerns regarding stewardship implementation. During the daylong breakout session on Science and Technology, workshop attendees listened to the first public presentation of the results of the National Academy of Sciences–National Research Council Study on Long-Term Institutional Management of DOE Legacy Waste Sites. This report may influence the overall direction of DOE's long-term stewardship program.

The final day featured commercial and international site remedial actions and stewardship challenges. GJO will become the long-term steward for a significant number of commercial sites following completion of reclamation at those sites.

Guest Speakers

Guest speaker Stewart Brand from the Long Now Foundation warned the audience about the "mind-numbing bandits" that too often set the tone of discussions on



Jim Werner (left at lectern), DOE Headquarters Office of Long-Term Stewardship, and Dr. Carolyn Huntoon, DOE Assistant Secretary for Environmental Management, address workshop participants at the luncheon.



U.S. Senator Wayne Allard (top photo) and Congressman Mark Udall (bottom photo) of Colorado were two of the guest speakers at the workshop luncheon.

long-term stewardship. He challenged everyone to create a program that people will look at 50 to 100 years from now and say, "That's the way to run a culture."

The highlight of the workshop was a luncheon attended by 160 participants that featured guest speakers U.S. Senator Wayne Allard of Colorado, Congressman Mark Udall of Colorado, and DOE Assistant Secretary for Environmental Management Dr. Carolyn Huntoon. As

Jim Werner, Director of the DOE Office of Long-Term Stewardship, pointed out, "You can tell how important your workshop subject has become by the caliber of the guest speakers who are willing to attend."

Long-term stewardship is now on the radar screen of the U.S. Congress. Senator Allard and Congressman Udall both have strong interests in preserving the environment for the long term and have demonstrated their commitments in the numerous committees on which they sit. Each gentleman mentioned a bipartisan bill that they are jointly introducing in Congress to set aside the Rocky Flats Environmental Technology Site (located near Denver) as a permanent wildlife preserve.

Dr. Huntoon said by the year 2006, more than 350,000 acres of land will be in long-term stewardship. The DOE Office of Long-Term Stewardship was created a year ago. Dr. Huntoon has six goals in mind for this office:

- To manage long-term stewardship as a project with a defined end state that is to be achieved.
- To develop a cadre of DOE staff and contractors to perform the scope of work.
- To emphasize worker safety.
- To systematize what technical work will be performed.
- To enhance stakeholder involvement, such as has been done in Colorado.
- To be prepared for new work coming DOE's way.

Dr. Huntoon gave high praise to GJO when she said that GJO is "one of the most cost-effective offices in the entire DOE complex, with a well-trained, motivated workforce."



Other Workshop Activities

Many participants took advantage of a Colorado pastime by attending a Rockies baseball game one evening against the Pittsburgh Pirates. The Rockies won, in true Colorado fashion.

The workshop culminated with an optional field trip to the Rocky Mountain Arsenal National Wildlife Area. The Arsenal is a former chemical weapons and pesticide plant that will become the largest urban national wildlife refuge upon completion of the environmental cleanup program at this site. Bobby Templin and Scott Perkins of Argonne National Laboratory led the guided bus tour that addressed cleanup of the site, the landfill cover design, partnering with the U.S. Fish and Wildlife Service, and future uses of the facility. Numerous species of wildlife, including mule and white-tailed deer, rabbits, prairie dogs, and great blue herons appeared along the tour route.



Workshop participants toured the Rocky Mountain Arsenal National Wildlife Area that was formerly a chemical weapons and pesticide plant.

Praise for Workshop

Overall, the workshop was well received by participants who indicated their anticipation at attending future Long-Term Stewardship Workshops. GJO received high marks from the attendees on the quality and organization of the workshop. Consequently, it can be assumed that DOE-GJO will be coordinating the fourth annual Long-Term Stewardship Workshop in 2001.

“GJO feels that this workshop was very successful in confirming the capability and credibility of this office as the DOE complex leader in long-term stewardship practical experience and applications,” said GJO Manager Donna Bergman-Tabbert.

DOE-GJO Stewardship Program

DOE-GJO manages the Long-Term Surveillance and Maintenance Program, which currently has stewardship responsibility for 27 sites that contain regulated low-level radioactive materials. For each site, the Long-Term Surveillance and Maintenance Program ensures that on-site contaminated materials remain isolated from the environment, that the safety of the public and the environment is maintained, and that all applicable regulations are met.

More information about the Long-Term Surveillance and Maintenance Program is available on the DOE-GJO website at www.doegjpo.com/programs/ltsm/. Information about the DOE Office of Long-Term Stewardship is available on the DOE Headquarters website at <http://lts.apps.em.doe.gov>. ❖

Two Sites Join Long-Term Surveillance and Maintenance Program

Since its establishment in 1988, the Long-Term Surveillance and Maintenance (LTSM) Program, managed by the U.S. Department of Energy Grand Junction Office (DOE–GJO), has provided stewardship services to sites that contain regulated low-level radioactive materials. Program responsibilities have increased steadily since 1988, both in number of sites and in issues to be addressed.

In 2000, DOE assigned the Salt Lake City Processing Site in Utah and the Grand Junction Office facility to the LTSM Program for long-term custody and care. These actions brought the total to 27 sites across the nation that the LTSM Program is responsible for. In addition, the Monticello, Utah, repository composite cover system was completed last spring and responsibility for the repository is in the process of being transferred to the LTSM Program. To date, the program has developed a Long-Term Surveillance Plan for the repository and conducted a site orientation. Final transfer of the repository is expected to occur in October 2001. Ultimately, the GJO LTSM Program will provide long-term custody and care to all DOE sites where other DOE operations are no longer present.

Although DOE is actively transferring the GJO facility to non-DOE ownership, DOE will remain at the GJO facility as a tenant and the site will remain as the base for LTSM Program operations. The continuing success of the stewardship operation at DOE–GJO lends credibility to the stewardship efforts of the entire DOE complex. Last October, DOE hired a new LTSM Program Manager, Art Kleinrath ([see related article on page 8](#)), from the DOE Mound Site in Ohio. “I am confident that my past experience in industry and remediation will further the program from the strong footing left by Russel Edge, the former manager of this program,” said Kleinrath.

The GJO LTSM Program, in conjunction with the DOE Headquarters Office of Long-Term Stewardship, has hosted meetings with stakeholder groups to discuss the composition and responsibilities of a viable stewardship program. The third Long-Term Stewardship Workshop was held in Denver, Colorado, last August ([see related article on page 3](#)). GJO will host the stewardship workshop again in 2001 and will continue to disseminate program information to stewards, remediation planners, stakeholders, and regulators through other channels.

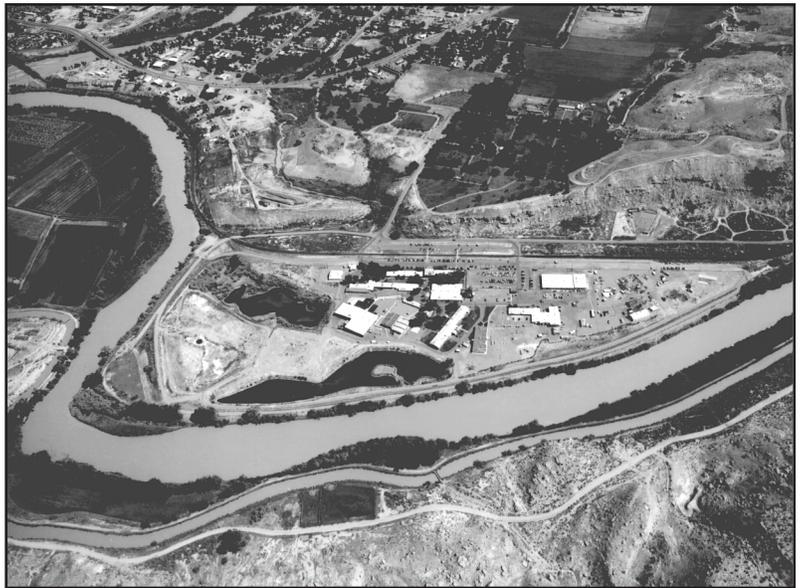


Research continues at LTSM Program sites. Often, this research requires many years of observations to define processes and to identify solutions for what are, generally, slow-acting phenomena. The program is generating results from activities such as analog site modeling, arid land revegetation, and validation and monitoring of new cover technologies. Many LTSM Program research initiatives involve working in cooperation with specialists from DOE national laboratories, the U.S. Environmental Protection Agency, and universities.

Challenges lie ahead for the program. Issues include designing, monitoring, and enforcing institutional controls; determining appropriate levels of site monitoring; defining the appropriate use of risk-based arguments for stewardship decisions; and choosing appropriate technology to enhance monitoring and surveillance. Throughout these efforts, GJO is committed to maintaining community involvement and addressing community needs. The findings and conclusions of these issues will apply to other sites that will transition into stewardship in the years to come.

The LTSM Program anticipates the publication of its 2000 Annual Report this winter. The report presents a summary of operations and recent accomplishments and provides descriptions of the spectrum of activities that constitute a working stewardship program as well as the condition of and concerns about the sites in DOE-GJO custody.

For more information about the LTSM Program, please contact Art Kleinrath, DOE-GJO LTSM Program Manager, at (970) 248-6037 or visit the LTSM Program website at <http://www.doegjpo.com/programs/ltsm/>.❖



DOE assigned the Grand Junction Office in Grand Junction, Colorado, to the Long-Term Surveillance and Maintenance Program in 2000.



Art Kleinrath, Program Manager for LTSM Program

DOE Hires New LTSM Program Manager

In October 2000, Art Kleinrath joined the U.S. Department of Energy Grand Junction Office (DOE-GJO) staff as the new Long-Term Surveillance and Maintenance (LTSM) Program Manager. Kleinrath replaces Russel Edge who accepted a position at the DOE Albuquerque Operations Office.

Before coming to Grand Junction, Kleinrath was a Remedial Project Manager for 10 years at the DOE Mound Office in Miamisburg, Ohio, and for 5 years with the U.S. Environmental Protection Agency in Chicago, Illinois. These positions entailed the cleanup, disposal, and transfer of title of government sites.

“The bulk of my work entailed dealing with government regulators and the public,” said Kleinrath. At Mound, he was instrumental in assisting with the transition of that DOE site to private ownership. DOE Headquarters adopted the land transfer processes developed at Mound.

Because his work at the Mound Office was winding down, Kleinrath was looking for new challenges when the Grand Junction position opened up. The two DOE sites are similar because Grand Junction is now going through a comparable site transition. “When we started this process at Mound, it was unformed and unfocused,” said Kleinrath. “I feel I can contribute the experience and knowledge developed at Mound to the Grand Junction process.” However, he does say that each site is unique and requires action on its own terms.

Kleinrath’s goal for the LTSM Program is to help Grand Junction become the culturally accepted center for long-term maintenance of postclosure sites. “I’d like to see a culture develop where sites that are planning to close automatically know to look to GJO for their long-term maintenance needs,” he said. He feels his strength is in forming groups and bringing together collective agendas into one. Kleinrath said, “The key to long-term stewardship is the dissemination of information and the usefulness of that information. I look forward to continuing the high standards for stewardship set by the program and to contributing to resolving the problems still faced by the stewardship community.”

Kleinrath holds a Bachelor’s Degree in Natural Resources Systems Management from the University of Michigan and a Master’s Degree in Environmental Engineering from the University of Florida. His bachelor’s degree focused on the modeling of natural systems to optimize the degree of environmental protection. Kleinrath sees this same modeling approach as being applicable to contamination. “DOE is trying to balance the desire to remove contamination from the environment with the degree of harm each activity poses to public and the environment,” he said.

In his free time, Kleinrath enjoys working on the Internet website for his wife’s home-based basket-weaving business, Woven Designs. “My wife Julie teaches basket weaving nationwide and sells supplies to make baskets,” said Kleinrath. He said she was excited about the move to Grand Junction because it gave her an opportunity to reorient her company and to expand her web and mail-order business. The couple had never been to Colorado before Art’s interview for the LTSM Program position. ❖



Groundwater Remediation— A Holistic Approach

The holistic approach, or using an integrated whole to create an outcome that is independent of and greater than the sum of its parts, is nothing new. However, using the holistic approach to stabilize uranium mill tailings and to remediate contaminated groundwater is a new concept that the Uranium Mill Tailings Remedial Action (UMTRA) Ground Water Project and the U.S. Department of Energy Grand Junction Office (DOE–GJO) are sharing with remedial project managers around the world.

Federal and contractor UMTRA Ground Water Project personnel at DOE–GJO are involved in a 4-year endeavor with representatives from 14 other countries to prepare a document about the holistic approach to remediation. “We submitted a proposal for a Coordinated Research Project to the International Atomic Energy Agency (IAEA) and it was accepted,” said Donald Metzler, DOE–GJO Project Manager of the UMTRA Ground Water Project. The outcome of this endeavor will be a guidance document based on input and case studies contributed by representatives of 14 of the 130 IAEA member states. The organization envisions the guidance document as a vehicle to share practical experiences and to transfer technologies that will benefit all member states.

The DOE–GJO UMTRA Ground Water Project became involved in this holistic effort through Metzler’s association with Dr. Eberhart Falck, a world-renowned geochemist from Germany, who is manager of this particular Coordinated Research Project in the Waste Technology Section of IAEA. “We are realizing the value of applying the holistic approach to mill tailings remediation projects,” said Metzler. “The IAEA team agrees it’s important to look at the cultural risks and socioeconomic impacts before making decisions about the cleanup of mill tailings and groundwater.”

International Atomic Energy Agency

IAEA is an independent intergovernmental science- and technology-based organization that serves as the global focal point for nuclear cooperation. The organization was established as an autonomous organization under the United Nations in 1957 and maintains its headquarters in Vienna, Austria.

According to IAEA, the guidance document *Technologies and Methods for Long-Term Stabilization and Isolation of Uranium Mill Tailings* helps fulfill the organization’s objective to share adaptive research results and applied research and development work by member states. The document is proposed as one step toward raising the awareness of potential problems, assisting member states in the development of efficient procedures and processes for the sustainable long-term management and



Representatives of International Atomic Energy Agency member states meet to plan the guidance document on the holistic approach to groundwater remediation.

remediation (if appropriate) of uranium mining and milling waste sites, and encouraging a harmonious and systematic approach where feasible.

Guidance Document

An outline of the planned document created by the UMTRA Ground Water Project team members was well received. The outline divided the process of applying the holistic approach to remediation of groundwater contamination into seven steps: initial scoping; emergency and interim actions; planning; site characterization; remedial objectives and alternatives; remedial design, actions, and monitoring; and performance evaluation.

The document will present a general framework for performing site assessments, methods and technologies for long-term stabilization of contamination, and project integration. Contributors to the document will base their contributions on lessons learned and cumulative knowledge garnered from work on remediation projects, such as the UMTRA Surface and Ground Water Projects and the Monticello, Utah, Projects in the United States. The emphasis of this document is solutions, and it will address such topics as how long a disposal cell should last and what to expect of its performance.

Initial scoping consists of defining the problem through historical reviews and site inspections, assessing the potential and immediate risks, and preparing a summary report. Emergency and interim actions are implemented to remove unacceptable risks. Examples include alternate water supplies, physical barriers, and institutional controls to control access to the water.

Planning includes several substeps. Short-term and long-term goals and objectives are defined to attain regulatory limits, meet schedules and budget requirements, and determine future land uses. Planning also involves identifying various stakeholders, such as property owners, regulatory agencies, and state and local governments. All applicable regulations associated with the cleanup of groundwater contamination are also identified. Part of the planning process includes identifying potential remedies. For the UMTRA Ground Water Project, there are three potential remedies: no action with monitoring, natural flushing with monitoring, and active remediation. Each of these remedies has been applied either alone or in some combination at various sites in the project. The last step in the planning process is the preparation of management plans and technical plans. Management plans ensure consistency among project tasks and ensure that consensus among stakeholders is obtained. Technical plans describe fieldwork, procedures, and results of data evaluations.

The next step in the holistic approach is site characterization. Field investigations are conducted at each site to prepare land surveys and base maps, collect field data, and perform laboratory analyses. Geographical information system databases that contain information on the locations of geographical features, the types of samples and analytical results, and property improvements are developed for the project. These data are evaluated and reports are then created that include information on the nature and extent of the identified contamination, site conceptual models, and environmental and human health risk assessments.

Remedial objectives and alternatives are developed based on regulations, risk, and desired quality of the groundwater. Each remedial alternative is evaluated for effectiveness, potential for implementation, and cost. An alternative is selected that provides the best balance of the evaluation criteria. The remedial decision and rationale are documented and made available for public review.

The remedial design depends on the remediation approach. Remedial action for natural flushing is limited to installation of additional monitor wells and predictive modeling. Active remediation involves installation of extraction wells and construction of a treatment system. Long-term monitoring of the groundwater is required for all remedies.

The final step in the holistic approach is performance evaluation, which includes monitoring, verification, and closeout. Not only are the contaminant concentrations monitored through sampling and analysis, but changes in physical boundaries and compliance with institutional controls are also monitored. The effectiveness of the remediation is verified, and modeled predictions are compared to the cleanup objectives. The site is closed out when remediation is complete and the goals have been achieved.

“For the UMTRA Ground Water Project, the holistic approach integrates characterization, design, and remediation of groundwater contamination; planning; public involvement; and permitting that result in better achievement of long-term goals and objectives,” said Metzler. A draft holistic guidance document is scheduled to be complete in June 2001, and a final holistic guidance document is anticipated to be issued in June 2004.

For more information about the holistic approach to groundwater remediation or the UMTRA Ground Water Project in general, contact Donald Metzler at (970) 248-7612. ❖

Michael Tucker, the U.S. Department of Energy Grand Junction Office (DOE-GJO) Certification Officer, signed the last Uranium Mill Tailings Remedial Action (UMTRA) Vicinity Property certification letter on September 29, 2000. Overall, DOE certified 4,302 properties in Grand Junction, Colorado, and 137 properties in Edgemont, South Dakota, for a total of 4,439 properties. This action completes all certification requirements pertaining to approximately 15 years of UMTRA Project remediation work managed by DOE-GJO. ❖



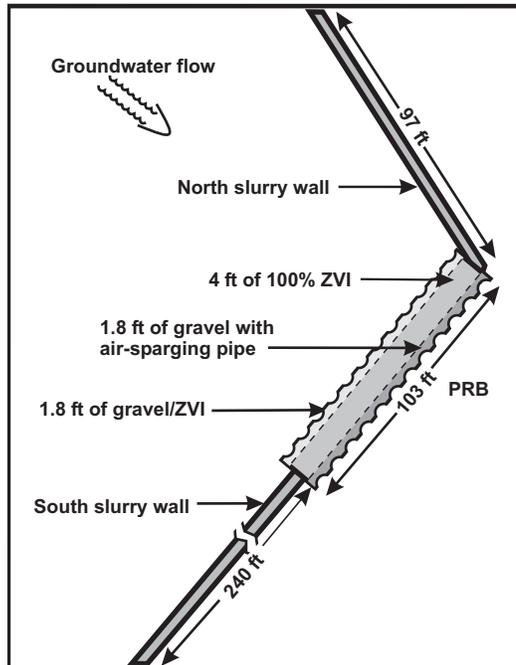
Monticello Projects Update

Long-Awaited Land Transfer Finalized

On June 28, 2000, the City of Monticello, Utah, signed a quitclaim deed from the National Park Service that completed the transfer of 383 acres of government-owned land, including the former Monticello millsite, from the U.S. Department of Energy (DOE) to the city.

The city will perform restoration work on the millsite as payment in lieu of construction under a DOE–City of Monticello Cooperative Agreement. The city received \$6.8 million for the restoration project, including funds for design, construction management, and subcontract costs. As part of the Cooperative Agreement, the city must restore the millsite in accordance with a design approved by DOE, the U.S. Environmental Protection Agency, and the Utah Department of Environmental Quality. The city must also complete the restoration work by July 2001. The city awarded the restoration contract in August 2000 and is receiving construction management services from MACTEC Environmental Restoration Services, a DOE Grand Junction Office contractor.

Starting in 1995 with the Monticello Site Specific Advisory Board, some residents of Monticello lobbied for the millsite land to be used for an expansion of the Monticello golf course. However, after consulting a golf course architect who recommended that the existing golf course be expanded at an alternate location, the city decided to use the millsite area for open recreational space to provide the public with picnic areas and a hiking trail along Montezuma Creek.



This schematic shows the permeable reactive barrier installation at Monticello, Utah.

Monticello Permeable Reactive Barrier Performing as Anticipated

In June 1999, a permeable reactive barrier (PRB) was emplaced at the Monticello Mill Tailings Site to treat contaminated groundwater (see the winter 2000 *Grand Junction Office Perspective*). The Monticello PRB project is funded by the DOE Office of Science and Technology (EM-50).

A PRB, in essence, is a subsurface zone of reactive material through which groundwater flows. Contaminants in the groundwater are either contained or degraded as a result of passing through the PRB. The Monticello PRB is a funnel-and-gate system containing zero-valent iron (ZVI) that immobilizes many contaminants. Slurry walls are used as the funnel to ensure that the contaminated plume moves through the gate containing the reactive material. An extensive monitoring network was installed to evaluate the performance of the PRB. To establish that water is in fact passing through the PRB gate, more than 50 sampling ports are being used. To date, seven rounds of monitoring have been completed. Monitoring results are available on the DOE Grand Junction Office website at www.doegjpo.com/perm-barr/projects/monticello/perform1.htm.

Monitoring Results

Overall, the PRB has effectively removed the major contaminants of concern from the groundwater. The major contaminants of concern include arsenic, selenium, vanadium, and uranium, which are present in groundwater at concentrations of 10 micrograms per liter ($\mu\text{g/L}$), 40 $\mu\text{g/L}$, 400 $\mu\text{g/L}$, and 700 $\mu\text{g/L}$, respectively. Analytical results of samples of groundwater exiting the gate show these contaminants have been reduced to nondetectable levels.

As expected, concentrations of dissolved iron increase as groundwater passes through the gate. However, levels of dissolved iron exiting the gate were lower than predicted by treatability studies and are within acceptable risk ranges. Although they are not contaminants of concern, concentrations of nitrate and molybdenum were reduced to near nondetectable levels. Geochemistry data also indicate that a strong chemically reducing environment was established in the gate. Monitoring will continue four times per year for the foreseeable future.

Tracer Study

An extensive tracer study was completed in July 2000 to better evaluate the hydraulic performance of the PRB and to help determine how long the system will remain effective. The tracer study was funded in part through a separate EM-50 project managed by Oak Ridge National Laboratory.

The comprehensive continuous-injection tracer study supplements the information obtained from performance monitoring. The tracer study involved injecting a nonhazardous, unreactive compound (the tracer) into upgradient wells and monitoring downgradient concentrations over time as it moves with the groundwater. The Monticello Mill Tailings Site tracer study used both anions (bromide and iodide) and noble gases (helium, neon, and argon).

Study results show that groundwater moved through the reactive gate faster than anticipated, at a rate of 24 to 26 feet per day. Groundwater generally moved in a straight path as it entered, moved through the ZVI, and exited the reactive gate. However, some preferred pathways were observed with groundwater flowing laterally through the ZVI before it moved downgradient. The anions were useful in tracking groundwater flow; however, the gas tracers were not detected downgradient. Additional data evaluation is ongoing to estimate more accurately the groundwater velocities and residence times in the gate.

“At some point,” says Donald Metzler, DOE Grand Junction Office Project Manager, “The ZVI medium will be ‘used up,’ or incapable of further reactions, but how long until that happens is not yet known.” Regardless of how long the system functions before new media is required, the contaminants are locked within the gate. As for economics, Metzler says PRBs can account for a tenfold reduction in cost because of their passive operation.

For more information about the Monticello Projects or the Monticello PRB, contact Joel Berwick or Donald Metzler, DOE Grand Junction Office Project Managers, at (970) 248-6020 and (970) 248-7612, respectively.❖



Oak Ridge National Laboratory and MACTEC Environmental Restoration Services personnel conducted the tracer study of the Monticello, Utah, permeable reactive barrier.

WISMUT 2000 Conference Brings East and West Together

The United States and Germany have enjoyed 10 years of technology exchange related to the cleanup of uranium mill tailings. Last July, representatives from the U.S. Department of Energy (DOE) Headquarters Office and the DOE Grand Junction Office (GJO) further enhanced their relations at the WISMUT 2000 international conference held in the Federal Republic of Germany.

WISMUT is the German government-owned environmental remediation firm. Since the inception of the WISMUT cleanup in Germany, there has been a strong cooperative tie between the Uranium Mill Tailings Remedial Action (UMTRA) Project at DOE and the German uranium mining and mill cleanup. This cooperation has broadened to include Canada, Australia, South Africa, China, and the countries of the former Soviet Union, among others. Although the United States, Germany, and Canada are the three leaders in mill tailings cleanup, representatives were in attendance from almost every country that is addressing mill tailings remediation. "This conference brought Eastern and Western thinking together," said Donald Metzler, DOE-GJO Project Manager of the UMTRA Ground Water Project.

Dr. Ralph Lightner, Director of the DOE Headquarters Office of River Protection; Donna Bergman-Tabbert, DOE-GJO Manager; and Metzler represented the United States at the conference. They presented summary reports on the results of the UMTRA Surface Project, disposal cell cover system designs at UMTRA sites, and concepts and results of the UMTRA Ground Water Project, respectively.

The focus of the conference was on the international efforts to remediate environmental damage resulting from the mining and milling of uranium and avoid future potential health risks. "The conference provided an opportunity for interaction with scientists and engineers who are working on the worldwide problem of the remediation of uranium mining and milling wastes," said Lightner. The conference was also intended to show the progress that has been made in cleaning up the extensive environmental problems left in Germany as a result of the East German role in providing uranium for use in the former Soviet Union weapons program.

Lightner discussed lessons learned from the completion of the UMTRA Surface Project. Of paramount interest to participants was the idea of establishing risk-based standards. Lightner shared with the audience data that showed the correlation between the cost of performing the UMTRA cleanup versus the theoretical number of lives saved. The average cost of avoiding a potential cancer fatality was \$1.1 million. He said this expenditure approximates the experience of other such projects, which suggests that the UMTRA cleanup was, overall, a success for human health and the environment. "The numbers also tell us that at about half the sites, large sums were spent to meet the prescribed requirements, but that very little risk was avoided," said Lightner. "If we had established a risk-based approach, many sites would probably not have been remediated." He did note, however, that many factors other than risk existed that may have prompted action at some of these "uneconomic" sites.





Waste rock piles, such as this pile near Schlema, Germany, are candidates for remediation to prevent potential hazards to humans and the environment.

Bergman-Tabbert presented information on the evolution of mill tailings disposal cell covers. “The early designs focused on radon attenuation and longevity standards,” said Bergman-Tabbert. “With the development of groundwater quality standards and the awareness of ecological factors, later designs consisted of multiple layers with different types of soil, rock, and vegetation,” she said. Long-term stewardship is becoming a bigger issue to other countries. “Discoveries made in the long-term custody of closed disposal cells will hopefully lead to improved cover design guidance for the next generation of covers and be of value to the UMTRA Ground Water Project remediation activities,” Bergman-Tabbert said.

Metzler’s paper described the effective use of natural flushing (natural attenuation) over 100 years at UMTRA sites to reduce groundwater remediation costs. “The Germans are much more interested in groundwater today than they were 10 years ago,” said Metzler. “They used to be skeptical of natural flushing, but now they are finding it difficult to afford the costly pump-and-treat methods of active remediation,” he said. The UMTRA Ground Water Project has applied a risk-based model to groundwater cleanup similar to what Lightner alluded to. This means that before prescriptive standards are implemented, cleanup through natural flushing must not be possible and sufficient risk must be identified to warrant the expenditure of remediation.

Many benefits have resulted from the continued and expanded exchange of information and technology. “Sharing our lessons learned and continuing our dialogues in the area of contaminated groundwater and long-term surveillance are contributing efficiencies and innovative thinking to all of the participants,” said Lightner.❖

Former Secretary Richardson Visits



The site currently occupied by the U.S. Department of Energy (DOE) Grand Junction Office was formally offered to the Riverview Technology Corporation at a ceremony December 4, 2000, at the DOE site. The transfer will be completed following approval of the Request for Deferred Remediation by the Governor of the State of Colorado. Participating in the Offer to Purchase ceremony (seated at table, left to right) were Donna Bergman-Tabbert, Manager, DOE Grand Junction Office; Knute Knudson, Chair of the Riverview Technology Corporation; and Bill Richardson, former Secretary of Energy; (back row, left to right) Gene Kinsey, Mayor of the City of Grand Junction; Dr. Carolyn Huntoon, DOE Assistant Secretary for Environmental Management; and Doralyn Genova, Mesa County Commissioner.

On December 4, 2000, the U.S. Department of Energy Grand Junction Office (DOE-GJO) hosted a visit by former Secretary of Energy Bill Richardson and Assistant Secretary for Environmental Management Dr. Carolyn Huntoon. This was the first time in recent history that a Secretary of Energy has visited the GJO.

The event included a ceremonial land transfer, marking the plan to transfer the GJO site out of federal ownership as part of the Department's goal to reduce overhead costs across the Energy Department complex. On December 4, Richardson and Knute Knudson, Chair of the community-based nonprofit Riverview Technology Corporation, signed a Memorandum of Understanding to transfer ownership of the site from DOE to the Grand Junction community. Richardson presented an oversized "key to the site" to Knudson at the ceremony.

The Riverview Technology Corporation will acquire all 56 acres of land and buildings at the site, with the exception of 8 acres and one building that will be purchased by the U.S. Army Reserve in 2001. "Our signing today is ceremonial," said Richardson. "But it represents change for the better." Before

the deed can be transferred in early spring 2001, Colorado Governor Bill Owens must sign a Request for Deferred Remediation, which is required when contamination is left on a federal site that is being transferred to a nonfederal entity. The transfer of the GJO site will make it the tenth DOE site in the country to be transferred for new uses—either back to the community or set aside for environmental preservation. Included in the negotiations was the agreement that DOE would lease back space from the Riverview Technology Corporation so that it could continue its functions uninterrupted.

Speaking before a crowd of approximately 180, Richardson summarized the history of the GJO site, from its purchase in 1943 by the U.S. Army for the purpose of acquiring uranium for the Manhattan Project to its current use by DOE for its environmental management mission. He also talked about the positive impact he hoped the transfer of the site would have on the Grand Junction community. "The Department will save an average of \$1.3 million annually in landlord costs, and the Riverview Technology Corporation will have the land and office space it needs to further local economic development in Mesa County," said Richardson. The site will provide office and light industrial space for community reuse.



GJO for Signing Ceremony

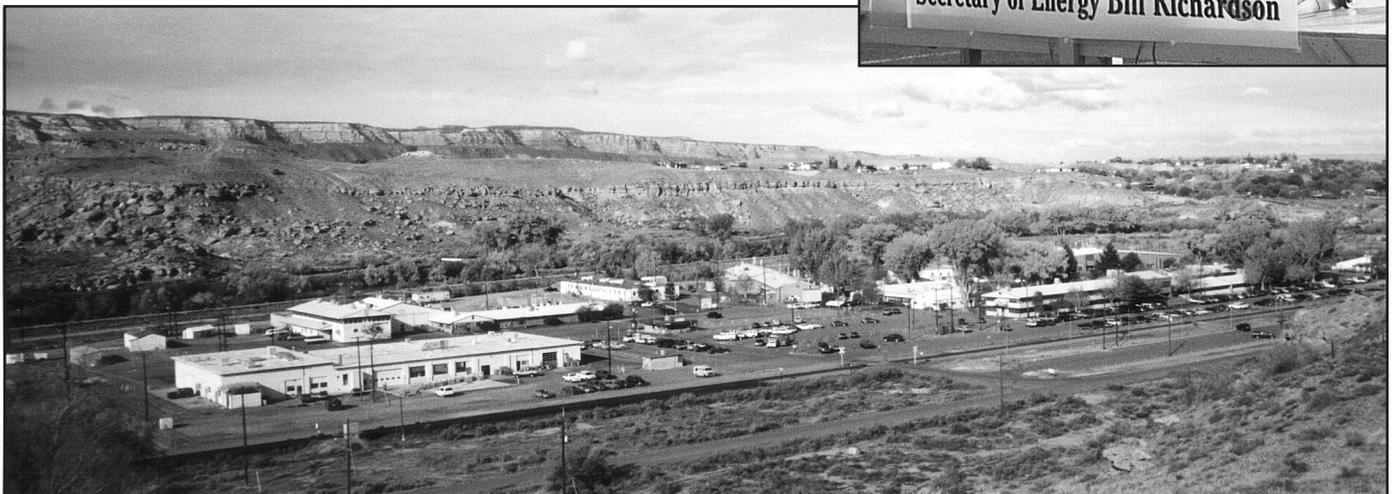
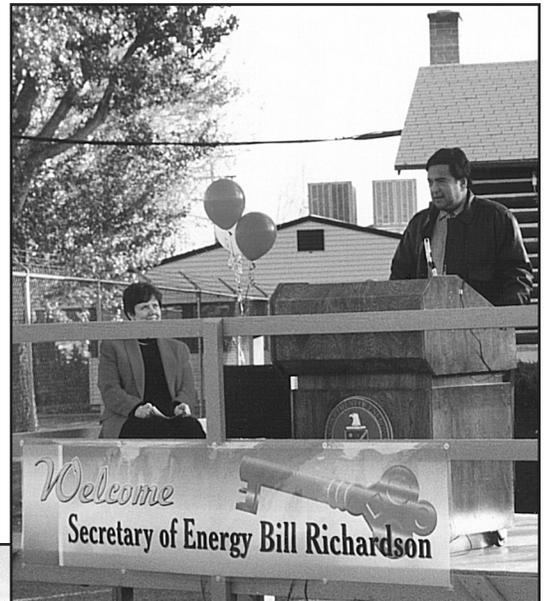
Richardson assured the audience that the critical missions the GJO performs will continue and that DOE will have a strong presence at the Grand Junction site for years to come. "You're doing a good job and the important work you're doing will be recognized," he said. One of those critical missions is the recent assignment to GJO of the uranium mill tailings cleanup work at the Moab Site in Utah, one of Richardson's initiatives and directed by recent federal legislation. He said, "This cleanup will ensure the safety of drinking water not only in Utah but also in other Western States."

Donna Bergman-Tabbert, DOE-GJO Manager, emceed the signing event, and numerous dignitaries made remarks at the ceremony, including Dr. Carolyn Huntoon; Knudson; local representatives of Senator Ben Nighthorse Campbell, Senator Wayne Allard, and Congressman Scott McInnis offices; a Mesa County Commissioner; the Mayor of Grand Junction; and a representative for the Governor of Colorado.

Dr. Carolyn Huntoon commended GJO for its accomplishments, including the reduction of mortgage costs that will result from the site transfer. She also spoke about GJO's key role in getting rid of the nuclear waste legacy, saying, "The Grand Junction Office knows how to do the technical work." She said DOE would continue to rely on GJO as the "world's expert" in groundwater monitoring.

Knudson called the agreement a true "win-win" for everyone: DOE, the American taxpayers, the City of Grand Junction, and Mesa County. The 11-member Riverview Technology Corporation was originally formed as a commission to ensure retention of the capabilities of the DOE-GJO workforce that has supported the local economy for more than 50 years. GJO site employees were invited to attend the ceremony and reception that followed.❖

Former Secretary of Energy Bill Richardson and Dr. Carolyn Huntoon, Assistant Secretary for Environmental Management, emphasized the positive effects of transferring the DOE Grand Junction Office site (below) to the Riverview Technology Corporation.



Rifle, Colorado, Pilot Study Begins for Vanadium Removal

The U.S. Department of Energy (DOE) Uranium Mill Tailings Remedial Action (UMTRA) Ground Water Project began a pilot study in October 2000 at the New Rifle site, which is located approximately 2 miles southwest of the town of Rifle, in Garfield County, Colorado.

Funding from the Accelerated Site Technology Development Project within the DOE Office of Science and Technology (EM-50) is supporting the development of the groundwater treatment technology. Personnel from the Environmental Sciences Laboratory at the DOE Grand Junction Office are conducting the technology development portion of the investigation.

Former vanadium and uranium processing activities at the New Rifle site contaminated the alluvial (shallow) groundwater system directly beneath the site and extending at least 10,000 feet hydraulically downgradient of the former mill tailings area. Groundwater modeling demonstrated that most contaminants of concern at the site would attenuate by natural flushing to applicable standards in the 100 years permitted by the Uranium Mill Tailings Radiation Control Act. Because vanadium is not regulated by a U.S. Environmental Protection Agency maximum concentration limit, DOE must determine a risk-based threshold. The vanadium concentration would probably not reach a risk-based level of 0.33 milligram per liter in the 100-year time frame because of its low mobility in the subsurface. In addition, some soils at the site contain elevated concentrations of vanadium, which may serve as a continuing source of groundwater contamination.

The selected compliance strategy at the New Rifle site is natural flushing for all contaminants of concern except vanadium, which will be treated in the pilot study to a concentration that would allow the remaining vanadium to be removed by natural flushing. An alternative evaluation of treatment methods that would effectively remove vanadium from groundwater was presented in the Site Observational Work Plan prepared for New Rifle (dated November 1999). The alternative evaluation indicated that a flow-through treatment using zero-valent iron (ZVI) would remove vanadium to nondetectable levels and was more cost effective than other methods. ZVI is granular cast iron produced by the automotive industry and has been used extensively to treat groundwater passively in permeable reactive barriers ([see related article on page 12](#)). Because this technology had not been applied in an ex situ flow-through system, a pilot study was undertaken to optimize the design.



Environmental Science Laboratory personnel conducted a pilot study in this structure at the New Rifle, Colorado, site to determine the suitability of zero-valent iron to remove vanadium contamination from groundwater.



The DOE Grand Junction Office (GJO) developed a two-phased pilot study last summer that focuses on vanadium removal and treatment at the New Rifle site. Phase I was designed to evaluate the feasibility of removing vanadium from groundwater at the site and to determine the effect of soils as a continuing source of groundwater contamination. Phase II will focus on pumping out 1 pore volume or about 20 million gallons of the highest vanadium concentrations in the dissolved contaminant plume. Results of the pilot study should set the conditions such that natural flushing will meet risk-based standards for vanadium contamination within 100 years.



Vanadium-contaminated groundwater passes through clear acrylic columns containing zero-valent iron in the pilot study conducted at the New Rifle, Colorado, site.

Phase I of the pilot study is being conducted in two parts. In Phase Ia, which began last October and was completed in January, column tests were conducted using groundwater contaminated with high concentrations of vanadium. Phase Ia tests consisted of extracting water from an existing monitor well and passing it through clear acrylic columns containing ZVI. Effluent (outflow) from the columns was treated to remove the dissolved iron and the treated effluent was reinjected into the aquifer. Technical information obtained from the pilot study is being used to design a larger scale treatment system. Variables evaluated to optimize the treatment system include type and grain size of ZVI, flow rate, oxidation state, and pH.

ZVI was identified as a viable treatment alternative based on the Phase Ia pilot study. Work has begun on scaling up the selected ZVI system (Phase Ib) and extracting larger quantities of groundwater for treatment. Groundwater modeling determined that three extraction wells are required to capture the vanadium plume and identified the best locations for these wells. The scaled-up pilot test will operate for approximately 6 months.

DOE is committed to protecting human health and the environment and to preserving current and future uses of the shallow groundwater. "We will do this in a consensus fashion using reasonable cost-to-benefit analysis techniques," said Donald Metzler, DOE-GJO Project Manager for the UMTRA Ground Water Project. "Using the ZVI treatment approach is a simple and relatively inexpensive method to remove some of the troublesome contaminants," he said. The shallow floodplain alluvial aquifer is not projected for extensive future use because of the limited areal extent, thin saturated thickness, and variable water quality. However, there are a few domestic and industrial users of the aquifer. DOE-GJO is working with the City of Rifle, Garfield County, and the State of Colorado to provide a clean water supply to existing and future residents. "Natural flushing, coupled with an alternative water supply and institutional controls, are a winning combination for everyone," said Metzler.

For more information about the UMTRA Ground Water Project or the New Rifle pilot study, contact Donald Metzler, DOE-GJO Project Manager, at (970) 248-7612. ❖

DNAPL Remediation To Be Conducted at Pinellas STAR Center Northeast Site

The Northeast Site at the Pinellas Science, Technology, and Research (STAR) Center in Largo, Florida, is one of three designated solid-waste management units at the site that has groundwater contamination at levels in excess of regulatory standards in the surficial aquifer, which is not a source of drinking water.

Contaminants in the groundwater consist of common solvents used in previous U.S. Department of Energy (DOE) Pinellas Plant activities. Before 1968, the naturally swampy area west of the East Pond on the Northeast Site was used as a staging area for drums of waste solvents and construction debris. Investigations conducted in 1986 and 1987 of the groundwater in this area identified a potential contaminant groundwater plume of volatile organic compounds.

Administration of DOE environmental restoration activities at the Pinellas STAR Center is the responsibility of the DOE Grand Junction Office (GJO). DOE recommended that the Northeast Site undergo active remediation as part of the DOE Environmental Restoration Program at the site.

In 1991, DOE implemented an interim action that used monitor wells to recover the contaminated groundwater. The groundwater was then treated at the Pinellas STAR Center 4.5-Acre Site treatment facility. This interim action continued until late 1996 when a dedicated treatment system for the Northeast Site was installed. Organic compounds in the groundwater recovered at the Northeast Site are now volatilized in an on-site air stripper.

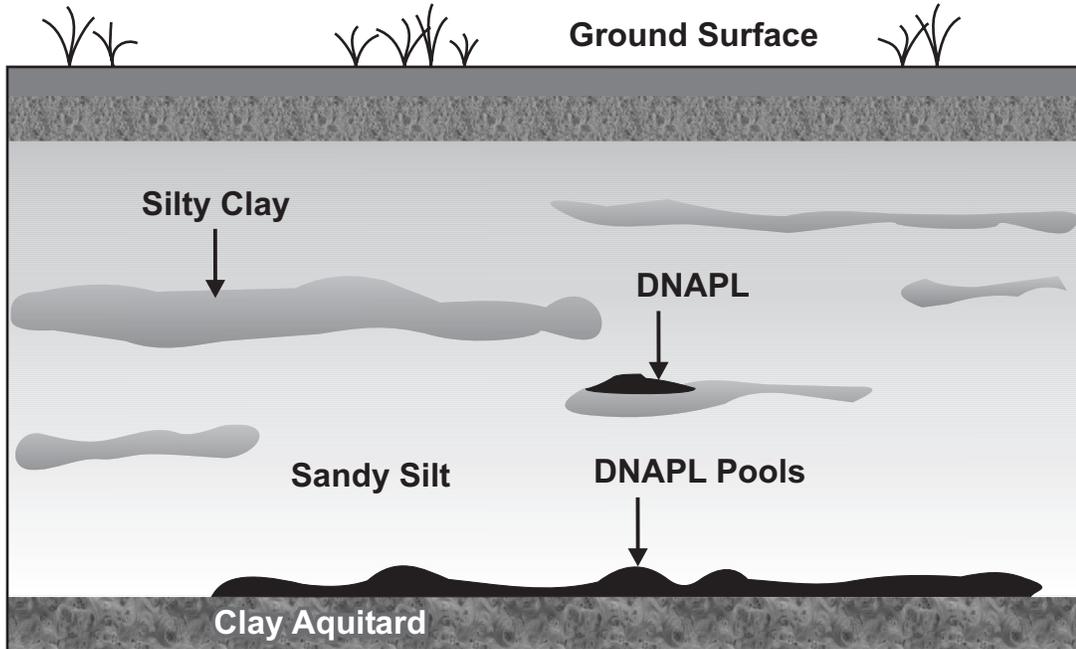
The potential presence of chlorinated organic solvents in the subsurface at the Northeast Site was first identified during routine quarterly sampling of monitor wells in July 1998. These organic solvents are denser than water and are called dense non-aqueous phase liquids (DNAPLs). Subsequent sampling and analyses confirmed the presence of DNAPLs in early 1999.

The DOE Grand Junction Office Technical Assistance and Remediation contractor, MACTEC Environmental Restoration Services, initiated additional characterization of the plume to better determine the horizontal and vertical extents of the contamination and to better quantify the concentrations of DNAPL contaminants present. This characterization effort was completed in June 2000. Results show DNAPL contamination levels up to 29,000 parts per million (ppm) in soils. Parts per million is a unit of concentration often used when measuring levels of pollutants in air, water, and body fluids. This concentration is 3,400 times the mandated maximum contaminant level in soils for the DNAPL compound. For comparison purposes, four drops of ink in a 55-gallon barrel of water would produce an ink concentration of 1 ppm. Therefore, 29,000 ppm would be equivalent to 116,000 drops of ink in the same barrel.

Recent sampling results indicate that the DNAPL contamination has migrated downward into the upper level of the Hawthorn Formation, which is the confining layer between the surficial aquifer (shallow groundwater) and the lower Floridan aquifer, from which local drinking water is obtained.

Concurrent with the field characterization efforts, an extensive search was conducted for potential remediation technologies that could be used to address the DNAPL contamination.





This artist's concept shows the possible locations of dense non-aqueous phase liquids (DNAPLs) in the subsurface. Sampling and laboratory analyses confirmed the presence of DNAPLs at the Northeast Site in early 1999.

This search included a review of current technical issues associated with DNAPL remediation, a literary search relative to DNAPL remediation, and discussions with various scientists involved in DNAPL research and vendors specializing in DNAPL remediation.

On the basis of the information gathered to date, a form of in situ thermal treatment appears to be the remediation technology with the greatest chance of success at the Northeast Site. In situ thermal technologies use various means of heating the surficial aquifer to the boiling point to mobilize DNAPL for extraction.

DNAPL remediation methods are emerging technologies that have been demonstrated in pilot scale but have a limited track record established for full-scale success. Therefore, the Request for Proposal (RFP) was developed with decision points, referred to as go/no-go gates, to minimize the DOE commitment of funds until success is demonstrated. An evaluation team will review the proposals and evaluate each proposal based on established criteria. Although cost is one of the criteria, the evaluation criteria are heavily weighted on the various technical aspects of the proposed technologies.

The RFP is tailored as a performance subcontract based on identified remediation goals. The subcontract will structure the subcontractor's activities into several subcontract options that can be exercised based on the successful execution of the predecessor activity. The first decision point will be the selection of a technology that the evaluation team rates highest against the evaluation criteria. A subcontract will not be awarded if, after reviewing the proposals, the team does not have a high level of confidence of achieving the cleanup goals with one of the proposed technologies.

The subcontract will initially be for design of the treatment system. The design will require DOE and Florida Department of Environmental Protection approval. If the design is not acceptable, the subcontract could be terminated at that point. If the design is approved, the first subcontract option could be exercised to deploy the treatment

[Continued on page 27](#)

Building 46 Conversion Project Under Way

The Analytical Chemistry Laboratory was scheduled to be commercialized on March 1, 2001, as part of site transition at the U.S. Department of Energy Grand Junction Office (DOE-GJO). However, the negotiating commercial laboratory operator formally withdrew its proposal to the Riverview Technology Corporation in November 2000.

Because of the potential analytical work required for the Moab (Utah) Site cleanup, DOE decided to continue to own the operation of this laboratory after site transition. This decision will be reevaluated every 3 years. The GJO property will be transferred to the Riverview Technology Corporation as planned, and DOE-GJO will lease back Building 20 that houses the laboratory operations.

The Analytical Chemistry Laboratory operation requires use of a sample preparation plant that is currently located in a building scheduled for demolition this year. This building is on land that DOE-GJO has agreed to transfer to the U.S. Army Reserve.

DOE-GJO reached an agreement with the Riverview Technology Corporation in November 2000 to convert Building 46, which formerly housed the kitchen and cafeteria facility, to a new sample preparation plant. After site transition, DOE-GJO will also lease Building 46 back from the Riverview Technology Corporation.

On November 29, 2000, DOE-GJO authorized its Facility Operations and Support contractor, *WASTREN, Inc.*, to begin the Building 46 conversion. Work began immediately with the removal of the kitchen and cafeteria equipment. This equipment is being stored in another building on the GJO facility for use by another future tenant of the Riverview Technology Corporation.

Engineering design activities also started immediately. Reconfiguring the cafeteria building as a sample preparation plant has involved a significant engineering effort to meet a goal of new operations functioning in March 2001. Major tasks have included redesigning the interior of the building to accommodate sample preparation equipment and personnel, designing a process air filtration system that will comply with federal emission standards, and designing appropriate primary and emergency power systems.

A portion of the new sample preparation plant will become radiologically contaminated because of the nature of samples that will be prepared for analyses. To minimize facility remediation costs at the end of operations, the walls and ceiling in the sample preparation area of the building were encapsulated with a secondary layer of finished drywall, and the floor will be covered with an industrial-grade vinyl surface. If the building needs to be used for a different purpose, remediation may be possible by removing the secondary drywall and vinyl.

Currently, the building reconfiguration work is on schedule. New interior walls have been constructed and doors installed, primary and secondary power systems have been installed, interior electrical work is under way, air filtration and mechanical systems are being manufactured, and sample preparation equipment is being readied for transfer to the converted Building 46.❖



GJO Prepares for Upcoming Changes at the Site (continued from page 2)

The process of negotiating the transfer of the site to the Riverview Technology Corporation has overall been a very positive one. I am extremely pleased with the pace at which we have progressed in making this transition a reality, especially when considering that the original transition date set for 2006 was moved to 2000 in 1999. I applaud each of the GJO employees and community members for their tremendous effort in helping accomplish this goal.

On October 30, 2000, former President Clinton signed the Defense Authorization Act, which assigned responsibility for cleanup of the uranium mill tailings pile near Moab, Utah, to DOE. The DOE Albuquerque Operations Office has assigned this cleanup project to GJO. The work to date has been a federal effort focusing on the specific deliverables called for in the act. When DOE receives allocations, contractor involvement will begin. This project is anticipated to be approximately 10 years in duration.

Early this year, DOE will release the Request for Proposal for the new GJO Technical Assistance contract that will be awarded to a small business set-aside in 2001. The Moab, Utah, work will be bid as two separate contracts: one for an architectural engineering firm and one for a construction firm. The Technical Assistance contractor will support DOE in administering these contracts, which will be directly contracted with DOE.

A major change at GJO is that the DOE-GJO now reports to the DOE Idaho Operations Office instead of the Albuquerque Operations Office. On January 19, 2001, Dr. Carolyn Huntoon, DOE Assistant Secretary for Environmental Management, issued a memorandum reassigning DOE-GJO to the DOE Idaho Operations Office. Early last year, the Albuquerque Operations Office became a National Nuclear Security Administration Office. In addition, the DOE Idaho Operations Office was given the mission of leading all research and development efforts associated with long-term stewardship, as well as the designation as the lead national laboratory for the Office of Environmental Management.

The Idaho Operations Office became the right choice for managing GJO because the work that GJO performs is associated with environmental management, not defense or nuclear programs, and GJO has responsibility for the Long-Term Surveillance and Maintenance Program. The GJO is ready to do whatever it takes to make this transition a smooth one and we look forward to continuing our accomplishments under the leadership of the DOE Idaho Operations Office.

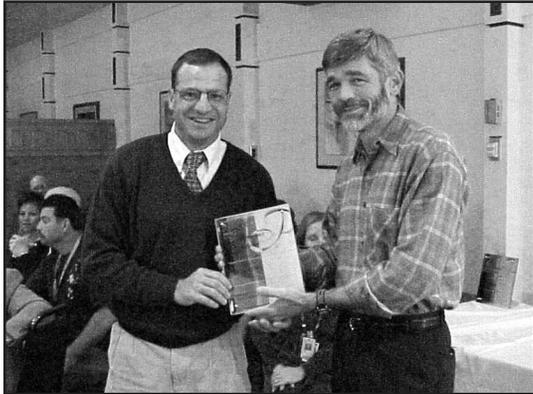
Not everything at the site will change, however. Work continues on our existing projects and programs, as you will see highlighted in this edition of the *Grand Junction Office Perspective*. Also included is a recap of our 2000 Long-Term Stewardship Workshop, articles on new and departed DOE staff members, educational outreach activities, and recent recognitions we are proud to have received.

*Donna Bergman-Tabbert, Manager
U.S. Department of Energy Grand Junction Office*



GJO Receives Coveted Manager's Award for Monticello Land Transfer

The U.S. Department of Energy Grand Junction Office (DOE–GJO) received several Performance Excellence Awards presented by the DOE Albuquerque Operations Office in October 2000.



Richard E. Glass (right), Manager of the DOE Albuquerque Operations Office, presents the Manager's Award to Joel Berwick, DOE Grand Junction Office Project Manager, for the transfer of DOE land to the City of Monticello.

GJO received the prestigious Manager's Award for the transfer of DOE land to the City of Monticello, Utah. In June, the City of Monticello signed a quitclaim deed from the National Park Service that completed the transfer of 383 acres of government-owned land, including the former Monticello millsite, from DOE to the City. The City will perform restoration of the millsite through a cooperative agreement with DOE. The restoration of the site for beneficial public use is of primary importance to the strategic mission of the DOE Albuquerque Operations Office and is in keeping with DOE's national Paths to Closure objectives. Through a tremendous amount of coordination and cooperation among the land transfer team members, the transfer was accomplished within a tight schedule that avoided a stipulated penalty to DOE. Five DOE–GJO and contractor employees shared in the award.

The GJO Ground Water Team that manages the Uranium Mill Tailings Remedial Action (UMTRA) Ground Water Project received the Albuquerque Award. The goal of the UMTRA Ground Water Project is to implement a programmatic process that is unique to the DOE Albuquerque Operations Office system. This process systematically implements a compliance strategy for each of the 22 former uranium processing sites in the project that protects the public, is technically defensible, meets cleanup standards cost effectively, and satisfies stakeholder concerns. Nine of the 22 sites in the project have been closed out. Innovative approaches to groundwater cleanup developed at DOE–GJO include the installation of a permeable reactive barrier at the Monticello Mill Tailings Site to treat contaminated ground water ([see related article on page 12](#)). GJO's leadership in technology exchange, technology transfer, and technical support to other DOE facilities and the international community is evidenced in use of permeable reactive barriers at numerous other sites.

GJO also received a certificate of achievement for its Integrated Safety Management (ISM) Team. The two GJO contractors developed a single ISM system description within the limited time and budget resources that were available. The system description crosswalks shared and organization-specific lower tier, or subordinate, documents. The savings in cost and time realized by partnering efforts allowed the contractors to conduct a full self-assessment of all ISM elements within budget. GJO was the first site in the DOE Albuquerque Operations Office system to complete its ISM requirements.❖



Analytical Chemistry Laboratory Employees Recognized for Assistance During Cerro Grande Fire

The U.S. Department of Energy (DOE) Los Alamos National Laboratory (LANL) recognized eight chemists in the DOE Grand Junction Office (GJO) Analytical Chemistry Laboratory for their assistance during the Cerro Grande Fire that raged through the Los Alamos, New Mexico, area in May 2000.

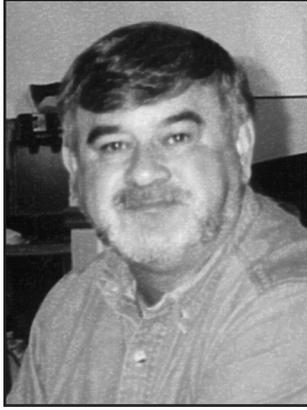
Dr. Ron Chessmore, manager of the DOE–GJO Analytical Chemistry Laboratory, received an urgent request from LANL for assistance in analyzing air samples collected from locations directly downwind of the fire. The samples represented those areas that received the heaviest amounts of smoke and ash. Air samples were also collected from two areas upwind of the fire.

“The GJO Laboratory was extremely responsive to our needs,” said Dr. Ernie Gladney of LANL. “We needed quick analyses of the samples to respond to public concerns about any possible release of radioactive material.” The samples were sent to the GJO Analytical Chemistry Laboratory because of its proven ability to provide quality analytical services rapidly.

Scientists at LANL released the results of GJO’s analyses of samples for radioactive materials. Results indicated that smoke and ash did not deposit significant amounts of radioactive contaminants onto surrounding areas. None of the post-fire contaminant levels presented an increased health risk to the public.

In October 2000, Dr. Gladney presented certificates of appreciation from LANL to Dr. Chessmore, Gretchen Baer, Sue Ball, Laura Davis, Steve Donovan, Sue Lopata, Ralph Smith, and Brian Thompson for conducting the analyses. *WASTREN, Inc.*, contractor to DOE–GJO, operates the GJO Analytical Chemistry Laboratory.

At the time of the analyses, the GJO Analytical Chemistry Laboratory was still preparing to be privatized. “In a time of uncertain future for the GJO laboratory, these employees really took the initiative and provided timely and quality assistance to another DOE site,” said Larry Arnold, DOE–GJO Project Manager. “This kind of responsiveness speaks highly of these qualified, dedicated individuals.”❖



Bennett Young

DOE Bids Farewell to Long-Time Employee

Bennett Young retired from the U.S. Department of Energy Grand Junction Office (DOE–GJO) in December 2000 after 29 years of service to the Federal Government. Before joining DOE, Young worked as a geologist for the National Park Service and the U.S. Department of the Interior's Office of Surface Mining and Minerals and as an on-scene coordinator for the U.S. Environmental Protection Agency.

Young began his DOE career in 1987, working as a hydrogeologist at the Waste Isolation Pilot Plant in Carlsbad, New Mexico. In this position he interfaced with Sandia National Laboratories/New Mexico and conducted oversight of groundwater studies and water infiltration studies at the plant. He also had a short stint in the Environmental Restoration Division at the DOE Albuquerque Operations Office in Albuquerque, New Mexico.

In 1989, Young relocated to the DOE–GJO and worked in the areas of environmental safety and health and quality assurance. For personal reasons, he requested a transfer back to the DOE Albuquerque Operations Office where he spent the next 4 years managing the Environmental Safety and Health Department. This position required extensive travel to conduct site inspections, readiness reviews, and audits at Uranium Mill Tailings Remedial Action Project sites around the country.

Since his return to GJO in December 1996, Young has been a DOE Project Manager for numerous projects, including the GJO Remedial Action Project, Facilities Management, part-time with the Long-Term Surveillance and Maintenance Program, and Safeguards and Security. While he was manager of the GJO Remedial Action Project, several buildings on the 56-acre GJO site were demolished and several buildings were remediated.

Young was born in Grand Junction and raised in nearby Palisade. He received his Associate's Degree from Mesa State College in Grand Junction; his Bachelor's Degree in Chemistry from Colorado State University in Fort Collins; and his Master's Degree in Hydrology from the University of Northern Colorado in Greeley. Young served overseas in the military during the Gulf War as a Chemical Officer and was also stationed at Fort Carson, Colorado.

Young now lives in Molina, which is located on the Grand Mesa approximately 40 miles east of Grand Junction, on 35 acres of ranchland. "My original intention for buying the lot was to turn it into a bed and breakfast," said Young. He now leases his pastures for grazing in the summer and keeps a "gaggle" of dogs around.

"It was time to do something different," said Young of his decision to retire. "I've done my share of job hopping, but overall it's been a pretty interesting experience." He plans to work on outbuildings and do other finish work on his ranch. He would also like to renew his teaching certificate and teach high school science part-time if the right opportunity arose. "I am interested in any science-related subject," he said.

Young is an avid auction and estate sale attendee and enjoys buying and selling his finds on the popular Ebay Internet auction site. "If you know what to look for, you can

[Continued on page 27](#)



Training Collaboration Nets Cost Savings



Training on an ion chromatograph used to analyze water samples was conducted in the Environmental Sciences Laboratory at the DOE Grand Junction Office.

Employees at two government entities and one private business in the Grand Junction, Colorado, area needed training on ion chromatographs for analyses of water samples. But the costly training classes were only available at a West Coast location and did not fit the employees' schedules.

The solution was to bring an instructor to Grand Junction at a cost savings of more than \$10,000. The collaborative effort by the U.S. Department of Energy Grand Junction Office (DOE-GJO), the City of Grand Junction, and Ute Water allowed employees to be trained in the use of this laboratory equipment about 1 month sooner than was possible at the West Coast training facility.

Five DOE-GJO contractor employees participated in the training conducted at the GJO site and in the GJO Environmental Sciences Laboratory. The training was particularly needed by employees working at the Uranium Mill Tailings Remedial Action Ground Water Project site at Tuba City, Arizona, to analyze sulfate, nitrate, and chloride anions in conjunction with operation of the water treatment plant at that location.

The 3-day course covered the theory of ion chromatography and included hands-on training on the instrument and hands-on training on the associated computer software. Eileen List coordinated the training for herself and other City of Grand Junction employees and for Ute Water participants; Dr. Stan Morrison made the training arrangements for five MACTEC Environmental Restoration Services employees at GJO.❖

DNAPL Remediation at Pinellas STAR Center (continued from page 21)

system in Area A (0.5 acre). Approximately 3 acres of the Northeast Site has been identified in the RFP for treatment. Once the subcontractor demonstrates attainment of the remediation goals in Area A, an option could be exercised to treat Area B. If the goals are not achieved, the subcontract would be terminated, and further costs for treatment would cease.

This procurement strategy allows DOE to proceed with innovative technologies required for DNAPL remediation, while minimizing risk should the selected technology not achieve the remediation goals.

For more information about DNAPL remediation at the Northeast Site or the DOE Environmental Restoration Program at the Pinellas STAR Center, contact David Ingle, DOE-GJO Environmental Specialist, at (727) 541-8943.❖

DOE Bids Farewell to Long-Time Employee (continued from page 26)

really stretch a family budget by buying goods this way for pennies on the dollar," claims Young. He also collects antique automobiles, telephones, firearms, military equipment, and a type of glassware handed down from his family. His car collection includes four Model A Fords, two Mustangs, and a 1947 Willys Jeep. He estimates that he owns 30 to 35 antique phones ranging from 1905 to pre-1955 and an additional 20 modern phones.❖

Educational Outreach

Campers Investigate the Elusive Atom at S.N.A.R.F. Science Camp

More than 80 children in Grand Junction got an unusual and enjoyable experience last summer at the S.N.A.R.F. Science Camp that was sponsored by the U.S. Department of Energy Grand Junction Office (DOE–GJO) and the DOE Idaho National Engineering and Environmental Laboratory. The camp was held July 24 through 27 at a local middle school and was open to elementary-age children entering grades three through six.

S.N.A.R.F. stands for Science, Nature, Astronomy, Radiation, and Flight. The camp offered a fun way to learn about science through fast-paced, hands-on activities that explored the atom and how it applies to many different areas of science, such as archeology, astronomy, radiation, and chemistry. The camp also allowed campers an opportunity to investigate scientific topics that are not normally covered in their school curricula.



Camp activities were designed to encourage basic scientific reasoning and observation skills, along with group cooperation. “The campers involved in the camp left excited about science, while the high school students who served as camp counselors gained valuable experience,” said Mike Davis, Physics and Chemistry teacher at Fruita Monument High School and the Grand Junction camp director. The reasons for using high school students as camp counselors are twofold: they bring a lot of energy and enthusiasm to the activities that transfers to the campers, and it gives those students who may be interested in a teaching career an opportunity to see if working with kids is something they want to pursue.



Students at the S.N.A.R.F. Science Camp explore the world of science with a variety of hands-on experiments.

Campers learn to apply the scientific method in a variety of situations. Some of the many activities included building solar ovens that used radiation from the sun to cook s’mores; designing aluminum foil boats into which pennies were dropped to learn about the effect of surface tension; visiting a Starlab, a giant inflatable planetarium, to identify constellations; and a camper favorite—making rockets that are launched using air pressure.

The camp raises enthusiasm about science in pre-high school students. Melissa Schmalz, a *WASTREN, Inc.*, employee at DOE–GJO, said her children loved the camp so much they wanted it to be extended for another week. “My daughter, who usually isn’t interested in science, couldn’t stop talking about all the fun activities she did at camp,” said Ms. Schmalz. Evaluation forms sent to campers’ parents were returned with overwhelming positive

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DOE-GJO and McInnis' Office Collaborate on Computer Donations

The School District 51 Career Center in Grand Junction, Colorado, got a boost from a donation of excess computer equipment last fall. The donation was a collaborative effort between Congressman Scott McInnis' Operation S.E.E.D.S. (Sharing Electronic Equipment District and Statewide) and the U.S. Department of Energy Grand Junction Office (DOE-GJO).

The equipment, which totaled 97 IBM-compatible central processing units, 84 monitors, 22 laptop computers, 47 printers, and a collection of other miscellaneous computer accessories, was excess to DOE's needs. The donation also included computer systems and other electronic equipment transferred to DOE-GJO from the Grand Junction office of DOE Oak Ridge National Laboratory, now managed by contractor Advanced Infrastructure Management Technologies (AIMTech).

The S.E.E.D.S. Program was started in 1996 as a coalition effort to provide for the transfer of excess scientific and technological equipment to schools and educationally related nonprofit organizations in the four corner states of Colorado, Arizona, New Mexico, and Utah. S.E.E.D.S. is a federally authorized program that operates under the authority of the Stevenson-Wydler Technology Act of 1980.

Congressman Scott McInnis initiated the program in Colorado to benefit the citizens of the Third Congressional District. "The S.E.E.D.S. Program is a prime example of how smarter, more efficient government can have a positive impact on American communities. It's a groundbreaking program that's being emulated around the country and I'm proud to be its sponsor," said McInnis.

"We're very appreciative of this generous gift we received from the Department of Energy and S.E.E.D.S.," said Dean Blair, principal of the Career Center. The Career Center is a vocational school for District 51 high school students. The center offers six programs for students to choose from, including a computer maintenance operations program.

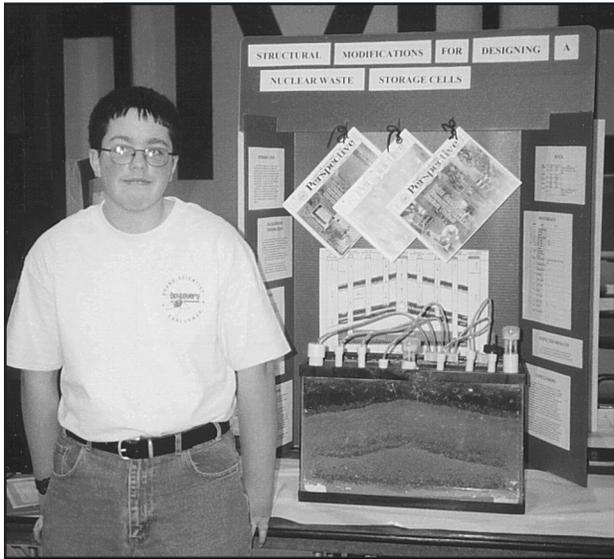
The Career Center's computer program was started in 1999, and the center has its own computer laboratory where students learn how to assemble and repair computers. The repaired computers are then sent to District 51 schools and to children who do not have access to computers in their homes. "Our goal is to get 200 computers out to kids this school year," said Blair. He estimated this batch of computers would keep his Career Center students busy for several months.

Primary target recipients of S.E.E.D.S. equipment include high-risk, low-income, disadvantaged youth and Native American populations in rural America. Entities in Colorado that wish to donate computers or other scientific equipment or to receive



Excess computer equipment from the DOE Grand Junction Office is readied for transfer to the School District 51 Career Center in Grand Junction.

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Brandon Williams, a student at Redlands Middle School in Grand Junction, won prizes and praises for his science fair entry.

GJO Nurtures Student's Interests in Science

Science fairs. To some middle school and high school students that phrase brings on a sense of dread or panic. But to others, it means an opportunity to really delve into an area of scientific fascination.

That's what the 2000 Western Colorado Science Fair meant to one eighth grade student from Redlands Middle School in Grand Junction, Colorado. Brandon Williams' science fair project was entitled "Structural Design Modifications for Nuclear Waste Storage Cells." During creation of his project, Williams met with Jody Waugh, a research scientist for the U.S. Department of Energy Grand Junction Office (DOE-GJO) contractor MACTEC Environmental Restoration Services (MACTEC-ERS). Waugh has worked

on innovative cover designs for storage or disposal cells located in different parts of the United States.

Williams studied various low-level nuclear waste storage designs, including the one DOE-GJO used to construct the Monticello, Utah, disposal cell. He identified alternative design modifications that address two key concerns with waste containment: (1) penetration of moisture in the cell layers and (2) accumulation of waste gas that may develop as nuclear waste decays. In his cover design and the small-scale model he constructed for the science fair, Williams angled the cell layers so that the highest point was in the center of the cell. He sloped the layers downward so that any moisture entering the top of the cell would be redirected to collection pipes. Pumps continuously force air through the collection pipe system in and under the cell to enhance evaporation of moisture. Air scrubbers connected to exhaust pipes could remove radon gas from the air before it is released to the atmosphere. "I was impressed with the way Brandon thought through the idea, researched the options, and came up with a feasible alternative cover design," said Waugh.

Williams' project earned him a finalist position in the Redlands Middle School science fair. He was then eligible to enter the Western Colorado Science Fair, a regional science fair held in March 2000 at Mesa State College in Grand Junction. Williams was again a finalist in the junior category and went on to compete in the Colorado State Science Fair held in Fort Collins in April. Although he did not place at the state level, Williams commented, "Just getting to go to the state competition was a great experience." Williams received many laudable comments from the judges.

Williams also won a special science award from DOE-GJO at the regional fair. "Williams' project impressed us because it so closely paralleled DOE activities," said Vernon Cromwell, the DOE-GJO Project Manager who presented award certificates to Williams and another middle school student, Jared Farnsworth, from Paonia Middle School, in Paonia, Colorado. "New technologies and concepts are very attractive to DOE and fresh thinking like these students demonstrated should be encouraged," said Cooper Wayman, another DOE-GJO science fair judge.



The Western Colorado Science Fair attracted 185 junior-level (grades seven and eight) entries and 40 senior-level (grades nine through twelve) entries from 13 counties on the Western Slope. The top 10 junior entries and the top 6 senior entries competed in the state competition.

Twelve DOE and contractor employees volunteered as judges at the 2000 science fair. "I was personally very impressed with not only the quality of the judging but also the professional manner in which the judging was accomplished," wrote Forbes Davidson, former co-director of the Western Colorado Science Fair. For the third year, DOE-GJO contractor *WASTREN, Inc.*, was a co-sponsor of the fair. *WASTREN, Inc.*, contributed \$500 to the fair and awarded junior and senior division environmental sciences certificates and checks.

During his spring break from school, Williams and his father, Dave Williams, requested a tour of the GJO laboratories. Ron Chessmore, a *WASTREN, Inc.*, employee and Laboratory Manager for the Analytical Chemistry Laboratory, and Sarah Morris, a MACTEC-ERS scientist in the Environmental Sciences Laboratory, explained the projects being worked on, the laboratory and computer equipment used, and the types of analyses being performed in the laboratories. "Brandon was obviously very interested in science, especially chemistry," said Morris. "I hope the tour helped shape his career goals in some area of science."❖

S.N.A.R.F. Science Camp (continued from page 28)

comments. One parent wrote, "Every day was packed with activities. I kept thinking, how will they top this tomorrow? But each day had a full and exciting agenda."

This was the first S.N.A.R.F. Science Camp to be conducted in Grand Junction. The camp originated 2 years ago in a small town in south-central Idaho and was a success. DOE-GJO plans to make the camp an annual event and possibly offer more than one session based on the long waiting list for last year's camp.❖

The molecular structure of a compound fascinates a student at the S.N.A.R.F. Science Camp.



Computer Donations (continued from page 29)

donated equipment must apply through the S.E.E.D.S. Program main office in Pueblo, Colorado.

This is the first time DOE-GJO has coordinated its computer donation through S.E.E.D.S. "DOE is pleased to learn about the S.E.E.D.S. Program, which provides us with a simplified way to excess our equipment and still have it go to needy schools and qualifying organizations throughout Colorado," said Audrey Berry, DOE-GJO Public Affairs Specialist.

In addition to the equipment donated to the local school district, AIMTech also donated 17 computer systems, 3 laptops, and 7 printers through S.E.E.D.S. to the Rocky Mountain School of Expeditionary Learning in Denver, Colorado.❖

GJO Editing Book With U.S. Geological Survey

Dr. Stan Morrison, a MACTEC Environmental Restoration Services (MACTEC-ERS) employee at the U.S. Department of Energy Grand Junction Office (DOE-GJO), and three scientists with the U.S. Geological Survey (USGS) are editing the first book published on the use of permeable reactive barriers (PRBs) to treat inorganic contaminants.

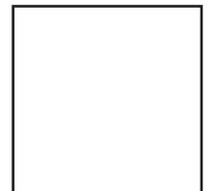
PRB installations and their capability to treat inorganic contaminants in groundwater are drawing worldwide interest. Enough interest that Academic Press will publish *Handbook of Groundwater Remediation of Trace Metals, Radionuclides, and Nutrients with Permeable Reactive Barriers* in early 2002. The other editors are David Naftz, USGS Water Resources Division in Salt Lake City, Utah, and Jim Davis and Christopher Fuller, USGS Water Resources Division in Menlo Park, California.

The book is based on presentations made at a topical session of the American Geophysical Union in December 1999 and will consist of 22 chapters

in four sections. The titles of the four sections are "Innovations in Construction and Design of PRBs," "Methods To Evaluate the Performance of PRBs," "Innovative Placement Methods for PRBs," and "Case Studies of PRB Installations." DOE and MACTEC-ERS personnel at the Grand Junction Office will be coauthors of two chapters. Donald Metzler (DOE-GJO), Morrison, and Clay Carpenter, Tim Bartlett, and Sarah Morris (MACTEC-ERS) will write "Design and Performance of a Permeable Reactive Barrier for Containment of Uranium and Associated Contaminants at Monticello, Utah." Morrison, Metzler, and Brian Dwyer (Sandia National Laboratories/New Mexico) will prepare "Design and Performance of Passive Zero-Valent Iron Water-Treatment Cells for Uranium and Metals at Durango, Colorado." Researchers in the United States, Canada, and Australia will prepare the other 20 chapters. The manuscript for the book will be delivered to Academic Press by September 2001. ❖

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