

## S&T Highlights

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### Director's Office (Denver, Colorado)

*Continuing Resolution interim funding.*—Due to constraints imposed by Congressional Continuing Resolution, the selection of research and development (R&D) projects for the FY2005 Science and Technology (S&T) Program had to be delayed. To prevent ongoing R&D efforts from being severely impacted, the S&T Program provided interim funding for October and November for 33 ongoing projects. This interim funding represents a portion of the full FY2005 funding for each project. We anticipate that program funding will be in place so that all the selected FY2005 R&D projects can be awarded by early December. (Dan Levish, 303-445-2136)

*Maryanne Bach named Director of Research and Development.*—Bureau of Reclamation Commissioner John W. Keys III announced that **Great Plains** Regional Director Maryanne Bach has been named Director of Research and Development. She will assume her new duties in mid-December. “Maryanne brings a wealth of experience and a valuable perspective to the position,” said Commissioner Keys. “She accomplished much during her tenure in Great Plains, particularly working to reinforce the region’s relationships with our water and power customers.” (Siegie Potthoff, 303-445-2136)

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### Improving Infrastructure Reliability

*New generator parameter tests begin.*—A generator parameter research investigation was initiated with a field investigation at **Crystal Powerplant, Curecanti Field Division**. These parameter tests were conducted online and are of low impact to the generator. The test results will be used to determine if they may replace the traditional high impact (short circuit) acceptance testing methods and ultimately to determine/confirm, or refine system stability margins in an effort to further reduce the odds of a regional blackout. Additional tests are scheduled to be performed at Crystal Powerplant in February. (Phil Atwater, 303-445-2304)



*Insulation tests under way.*—Research on stator winding insulation system component behavior has begun. Laboratory tests were performed to measure the effects of grading paint on the current-voltage (I-V) response of a dc ramp test—the Bureau of Reclamation’s (Reclamation) main diagnostic tool for insulation condition assessment. Extensive testing also was performed on individual coil bars to determine the effects of test voltage on insulation polarization values. These research results will enable better interpretation of high voltage dc test results, which will lead to better insulation assessments. (Bert Milano, 303-445-2300)

*Hydroelectric Research and Technical Services Group invention.*—The Hydroelectric Research and Technical Services Group has invented a method that locates stator winding ground faults on large generators and motors. The group has used this method several times to quickly and accurately locate faults at Reclamation powerplants. (Eric Eastment, 303-445-2324)

*Reduced cost hydroelectric maintenance.*—A license agreement for a patent for a flexible printed circuit magnetic flux probe was negotiated with Iris Power Engineering, Inc. This license gives Iris exclusive rights to manufacture and sell this probe. The probe measures the magnetic flux within the air gap of large rotating machines and is used in conjunction with various machine-condition-monitoring equipment. This is one of six patent-related technology transfer activities that the Hydroelectric Research and Technical Service Group is pursuing in conjunction with the R&D office’s Technology Transfer Program. (Jim DeHaan, 303-445-2305)

*Concrete repair testing.*—The Materials Engineering and Research Laboratory (MERL) kicked off phase 2 testing of the concrete repair engineering experimental program (CREEP). CREEP is an American Concrete Institute Strategic Development Council consortium, of which Reclamation is a founding member. The consortium is a partnership of public and private interests with the goal of improving the performance of thin repairs to concrete. Phase 2 testing is aimed at improving the correlation between laboratory tests to evaluate cracking tendency of repair materials and actual field performance. It is an outcome from phase 1 testing, which will be documented in an upcoming report, titled *Development of Test Methods to Evaluate Cracking Tendency of Repair Materials, Phase I Report*. (Kurt VonFay, 303-445-2399)



Final preparations of the site for the phase 2 test program on the Denver Federal Center.



CREEP members were on hand to start phase 2.





Placing repair materials for phase 2 testing. Placing materials in long, narrow shapes like this is a key element of this phase.



Placing companion laboratory specimens with the aim to improve correlation between lab and field test results.

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## Improving Decision Support

*New data received.*—The Western Water Information Network Threatened and Endangered Species effort has received its first installment of Foundation Information for Real Property Management (FIRM) data and worked with an outside contractor to have the legal descriptions converted to geospatial digital data capable of being displayed on the Western Water Information Network. The research team anticipates providing a demonstration to Reclamation's Land Management Office in January. Once these data are mapped, it will represent the first time that FIRM records will be in graphic format for the 17 western States. We hope that having the data in this format will assist the Land Management Office in its ongoing reconciliation efforts. (Douglas Clark, 303-445-2271)

*Recreation surveys completed.*—Three contract personnel have completed data collection surveys in the 2004 summer season on the **Lower Gunnison River** and **Blue Mesa Reservoir**, accomplishing a major step in the progress of research on modeling economic effects on recreation from dam reoperation. The contractors completed over 1,000 surveys at key locations on the river and reservoir. Work is under way on a report, explaining and evaluating the data on the Lower Gunnison River, with completion expected by December. A similar report on the data collected at Blue Mesa Reservoir will be completed early in 2005. Work will then begin on developing a model using the collected data to evaluate the economic impacts of reservoir and river level changes on recreation in the region. (Dawn Munger, 303-445-2734)

*Jeff Rieker on detail in Carson City.*—Jeff Rieker will work in the Carson City office on a 2-week detail during January to help develop and test new modeling capabilities within the RiverWare computer model. The Carson City office will host a meeting on January 20 to share the results of the research effort with several other offices involved in the S&T program. (Don Frevert, 303-445-2473)

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## Improving Water Delivery Reliability

*Sensitive bugs.*—A report on aquatic invertebrates downstream of Reclamation dams, with emphasis on dams in the **Yakima Project** area was produced. A particular insect (*Heptageniid mayflies*) was identified as being sensitive to alterations downstream of these dams. Recovery of these indicator animals occurred at distances ranging from 2500 to 9700 meters downstream of the dams. The sensitivity of these aquatic invertebrates to river regulation may allow for biological monitoring of changes in hydrology below reservoirs. (S. Mark Nelson, 303-445-2225)

*Evaluation of revegetation strategies and technologies for restoration of bull trout habitat and shoreline woody vegetation at **Hungry Horse Reservoir, Montana.***—Research field trials were initiated in October 2004 at Hungry Horse Reservoir to evaluate a suite of native woody plant materials, shoreline siting, planting techniques, and plant supplementation for shoreline revegetation. The principal fish species of concern in the reservoir and tributaries is the federally listed bull trout, *Salvelinus confluentus*. Recent changes in federal protocols that regulate reservoir levels for flood control, power generation, and minimum flows for anadromous fisheries result in frequent drafts, including high-volume releases during the spring refill period. Repeated annual draft-and-fill regimes have depleted native woody vegetation in littoral shoreline habitats, reducing hiding cover for juvenile bull trout entering the reservoir from spawning tributaries.

Reclamation is leading an interagency research effort, including the U.S. Fish and Wildlife Service, Montana Fish, Wildlife, and Parks, the U.S. Forest Service, and Glacier National Park to assess the feasibility of re-establishing diverse, native woody species under these environmental constraints. Nine plant species anticipated to tolerate the cyclic inundation and drawdown conditions are evaluated, including local on-site harvest, as well as local-source commercial stock. Final results of plant survival, productivity, and vigor over the annual course of inundation and desiccation (2005-2007) will guide selection of plant species and planting methods for more widespread use at Hungry Horse and other regional Reclamation reservoirs. Research findings will support enhanced revegetation of suitable portions of the drawdown zone along reservoir perimeters to benefit this endangered trout species. (Kenneth Lair, 303-445-2005; Stephen Grabowski, 208-378-5030)



Hungry Horse Dam and Reservoir.



## Improving Water Supply Technologies

*Kickoff of the Affordable Desalination Collaboration's seawater reverse osmosis demonstration.*—The Affordable Desalination Collaboration (ADC), composed of seven commercial entities, three federal government agencies, three California water districts, and two California State agencies, held their kickoff meeting in December for the seawater reverse osmosis demonstration at the Naval Facilities Engineering Service Center (NFESC) Seawater Desalination Test Facility in Pt. Hueneme, California. The goals of the ADC are to demonstrate the minimum energy requirement for desalting seawater using the best combination of existing technology, and to demonstrate the effects of recovery, total dissolved solids in the feed water, boron rejection, product water quality, and feed pressure on energy consumption. The target is 1.7 kWh/m<sup>3</sup> with 40 percent recovery of high quality product water. The absolute thermodynamic minimum is 0.5 kWh/m<sup>3</sup>. The Reclamation S&T Research Program has funded Steve Dundorf to assist with monitoring and validation, and is entering into an interagency agreement with NFESC to help pay the power bill. The *International Desalination and Water Reuse Quarterly* published a cover story on the endeavor in the November/December 2004 issue (vol. 14/No. 3). (Steve Dundorf, 303-445-2263)



Site of the coming Affordable Desalination Collaboration's seawater reverse osmosis demonstration.