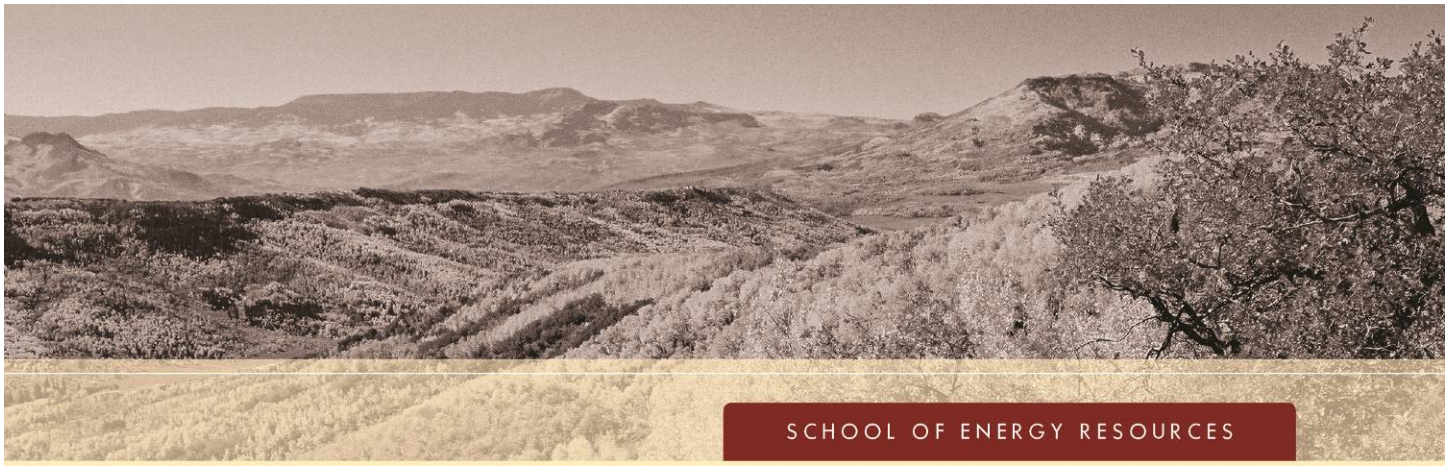

SCHOOL OF ENERGY RESOURCES

Annual Report of the In-Situ Recovery of Uranium Research Program to The Joint Minerals, Business, and Economic Development Interim Committee

September 30, 2012

UNIVERSITY OF WYOMING

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This report provides a summary of the in-situ recovery of uranium (ISRU) research program for Fiscal Year 2012 (July 1 2011 – June 30, 2012) along with important updates through August 31, 2012. It provides background on the ISRU program, status of research projects selected for funding by the program to date, and the balance of funds remaining in the program.

Background

In the 2009 General Session, the Legislature of the State of Wyoming appropriated $1.6 million to the University of Wyoming, School of Energy Resources (SER) for activities related to the development of ISRU in Wyoming. SER spent $1,021,386 of that appropriation toward the following outreach and research activities:

- September 22, 2009 - Uranium Extraction Workshop, Cheyenne, WY.
- October 2009 –Research Priorities for In-Situ Uranium Recovery in Wyoming – report of findings.
- *Public Opinion in Wyoming about In-Situ Uranium Recovery,* (2010) Wyoming Survey & Analysis Center, University of Wyoming.
- August 4, 2010 – The Future of Uranium Production in Wyoming – A Public Forum on In-Situ Recovery, Laramie, WY.
- Analysis of Remediation Strategies for Radionuclide Contaminated Soils in Uranium Mining – graduate student research project completed April 30, 2012.
- University of Wyoming College of Law summer internship program – law student research project detailing the implications of Wyoming obtaining agreement state status from the Nuclear Regulatory Commission, completed September 30, 2011.
- In 2011, under the direction of the University of Wyoming Energy Resources Council and in consultation with the Wyoming mining industry, a competitive research program was developed focusing on optimizing the economic recovery of the resource through ground water restoration and research on waste water management. A request for proposals (RFP) resulted in funding four research projects related to aquifer restoration and groundwater treatment and identification of uranium deposits. More details on the RFP and the projects can be found below.

ISRU Program Account Sunset Date

In the 2012 budget session, the Legislature of the State of Wyoming provided for extension of the reversion date of the appropriation for the ISRU research program from June 30, 2013 to June 30, 2015 (HB29/HEA5). Extension of the reversion date allows time to deploy the remaining $578,614 to additional research efforts.

2012 ISRU Research Program Request for Proposals

On June 14, 2012, SER issued an RFP for research focused on ISRU with the intent of deploying the $578,614 that remains from the original $1.6 million appropriation. The objective of the 2012 RFP is to stimulate research and development in the area of ISRU in Wyoming. Prior to release of the RFP, SER solicited input from representatives from the uranium industry to identify their preferred research focus areas. The areas they listed continue to be consistent with those previously identified by industry and other stakeholders in the September 2009 workshop and August 2010 public forum. These research areas are:

- Exploration and ore body delineation
- Ore body characterization and uranium recovery
- Water management, treatment and disposal
- Cost efficient aquifer restoration technologies and practices
- Investigation of the impact of existing regulatory requirements on the economics and timing of ISRU projects in Wyoming

Provision of matching funds is not a requirement of this RFP; however, demonstration of matching funds improves the applicant's probability of success. Applicants can request between $25,000 and $300,000 in funding. Proposals will be accepted from all university and community college faculty and staff, private industry, government agencies, and individuals and will be evaluated for scientific feasibility of the research and probable benefit to the State of Wyoming.

Proposals in response to the 2012 RFP were submitted to SER on August 13, 2012. A total of six proposals were received with a total funding request of $1,251,512. The proposals focus on ore body exploration and delineation, water treatment and aquifer restoration or both.

All proposals will be evaluated and scored by at least two independent reviewers. In accordance with the RFP, funds for successful proposals will become available by November 30, 2012 and all projects must be completed by February 29, 2015. Researchers are required to submit a final executive summary report and a final technical report within 90 days of the project end date. Researchers will also be required to present a seminar on their research at a public workshop to be convened by SER in November 2015.

2011 ISRU Research Program Funded Projects

From the 2011 RFP, four proposals were funded in the amount of $826,849. Details about these projects are listed below and are summarized in Table 1.

1. "Enhancing Bioremediation of In-Situ Uranium Aquifers through Uranium and Carbon Isotopic Tracing of Biologic Activity," submitted by University of Wyoming, Kevin Chamberlain, Principal Investigator. This project focuses on studying restoration of uranium aquifers using bioremediation at the Cameco Smith Ranch-Highland Ranch in-situ uranium mines near Douglas, WY. The award from the ISRU fund is $100,000 with provision of outside match of $25,000 for a project total of $125,000. This project is estimated to take 24 months to complete.

2. "Testing the Chemical and Biological Efficacy of Cupric Oxide Nanoparticles to Remove Contaminants from Uranium ISR Produced Water," submitted by University of Wyoming, Suzanne Clark, Principal Investigator. This project uses cupric oxide nanoparticles to remove arsenic from production bleed water. The effectiveness of this contaminant removal process will be compared to other water decontamination systems currently used in the industry. The ISRU award is $100,000 with provision of an outside match of $25,000 for a project total of $125,000. This project is estimated to take 24 months to complete.

3. "Field Evaluation of the Restorative Capacity of the Aquifer Downgradient of a Uranium ISRU Mining Site During Mining Operations," submitted by Los Alamos National Laboratory, Paul Reimus, Principal Investigator. This project predicts the degree of natural attenuation of uranium and other constituents of concern as groundwater migrates down gradient of an ISRU operation. This will be done at a field site at the Cameco Smith Ranch-Highlands Ranch in-situ uranium mine near Douglas, WY. The ISRU program award was $399,400 with provision of an outside match of $100,000 for a project total of $499,400. This project is estimated to take 24 months to complete.

4. "The Mineralogy and Provenance of Wyoming Uranium Roll Front Deposits and Their Significance to In-Situ Recovery Mining Processes," submitted by University of Wyoming, Susan Swapp, Principal Investigator. This project will use various analytical methods to identify and characterize uranium deposits and their sources. The ISRU award was $227,449 with provision of an outside match of $92,400 for a project total of $319,849. This project is estimated to take 24 months to complete.

Table 1. 2011 ISRU Research Program Funded Projects

Proposal Title	Submitted By	Funding Requested	Outside Match	Outside Match Source	Total Funds	Technology Areas	Project Status
Enhancing Bioremediation of In-Situ Uranium Aquifers Through Uranium and Carbon Isotopic Tracing of Biologic Activity	University of Wyoming	$100,000	$25,000	Cameco	$125,000	Aquifer Restoration	In Progress
Testing the Chemical and Biological Efficacy of Cupric Oxide Nanoparticles to Remove Contaminants from Uranium ISR Produced Water	University of Wyoming	$100,000	$25,000	University of Wyoming, Colorado State University	$125,000	Aquifer Restoration	In Progress
Field Evaluation of the Restorative Capacity of the Aquifer Downgradient of a Uranium ISR Mining Site During Mining Operations	Los Alamos National Laboratory	$399,400	$100,000	Cameco	$499,400	Aquifer Restoration	In Progress
The Mineralogy and Provenance of Wyoming Uranium Roll Front Deposits and Their Significance to In-Situ Recovery Mining Processes	University of Wyoming	$227,449	$92,400	University of Wyoming	$319,849	Exploration and Ore Body Delineation	In Progress
Totals:		$826,849	$242,400		$1,069,249		