# Cowboy State Is in the Nuclear Age

ROCK SPRINGS, Wyo. (AP) — The Great Plains region of the U.S. Midwest is often referred to as the Corn Belt, comprising much of the nation's agricultural production.

The region from the Midwest to the Northeast is the Rust Belt, with industrial manufacturing traditionally dominating the local economies.

Wyoming is the powerhouse. Almost every resource that fuels cars, planes, trains and power plants in the United States is extracted in the Cowboy State, including oil, natural gas, coal, sodium bicarbonate and uranium.

The state's southwest corner is rich in all five and produces almost all of the world's trona, or sodium bicarbonate, which is refined into soda ash.

While Sweetwater County's economy is driven by oil, gas and trona production, a planned uranium mine in the Lost Creek area north of Wamsutter is expected to increase domestic production between 25 and 50 percent by 2014.

Total uranium production in the United States for nuclear power generation is currently about 4 million pounds per year.

Ur-Energy, which has acquired most of the necessary licenses and permits for the project, anticipates an annual output of 1 million to 2 million pounds of refined yellowcake uranium powder.

Production is slated to begin spring 2013 and increase to full capacity by 2014.

Uranium has been mined in the Great Divide Basin, which cuts through south-central Wyoming up to its northwest corner, for more than 40 years.

One of Ur-Energy's co-founders was a uranium prospector and geologist in the 1960s and '70s who long suspected the Lost Creek area was rich with the element. It wasn't until 2005, however, that the company was established and the permitting process began.

Steve Hatten, the vice president of operations, said the company would fill 58 positions, ideally from surrounding communities.

"I'd like to see folks from Bairoil, Wamsutter, Jeffrey City and Rawlins get involved. They're pretty close, and we really hope to impact all those communities in a very positive way," Hatten tells the Rock Springs Rocket-Miner (http://bit.ly/PngwDS [1]). "We have had nothing but positive comments from all the communities."

About $4 million will be paid each year for salaries, with positions including field construction, engineering, geology, managerial, accounting and maintenance.

Uranium mining is different than the common conception of tunnels, thick with dust as pickaxes clank in the dimly lit gloom.

Uranium is a thin coating on the grains of sandstone formations 70 to 80 feet thick and about 450 feet below the surface at the Lost Creek property, Hatten said. About 15 feet of uranium will be extracted from the formations.

The process begins at an injection well, where groundwater is extracted, infused with sodium bicarbonate, carbon dioxide and oxygen, and re-injected into the rock formation.

A PVC pipe encased in concrete goes down to the 450-foot production horizon, where the mining solution is flushed through the formation.

The uranium-laden solution is then pumped back to the surface through a production well about 70 feet away.

The Lost Creek operation will process 6,000 gallons per minute at full capacity.

Both the production and injection wells are connected to the processing plant via pipes 6 feet underground to prevent water from freezing in the winter.

The company anticipates the operation will be productive for about 10 years.

Because of the dangers of radioactivity and the process of flushing uranium through the subsurface, mining companies must navigate a maze of permits and regulations and steer clear of any drinking water sources.

Uranium produces the highly radioactive element radium as it decays, so uranium-bearing formations contain higher radium concentrations.

Water in uranium-bearing formations is generally not suitable for drinking before or after mining.

"The water quality is generally bad. It's high in radium, uranium and other contaminants," Hatten said.

Ur-Energy has received eight of the nine necessary regulatory approvals for Lost Creek, including a Wyoming Department of Environmental Quality permit to mine, Nuclear Regulatory Commission source and byproduct materials license, DEQ air quality permit, Wyoming Game and Fish Department wildlife management plan and Sweetwater County development plan.

The company is awaiting final approval of the plan of operations by the Bureau of Land Management, which CEO Wayne Heili said he hopes will be granted before August.

Every material that could be removed with the uranium must be identified in an environmental impact statement, Hatten said.

The company will also be required to monitor water around the area of interest to ensure no contaminants seep beyond this boundary.

The permitting process culminates with the environmental impact statement, which includes surface, subsurface and groundwater impacts; operation and processing methods; and reclamation methods once the uranium is no longer economically feasible to extract.

Because the process doesn't slurry the sand below, it doesn't create physical caverns of displaced material, Hatten said.

"When we talk about subsurface effects, we're not talking about physical effects. We're talking about chemical effects and mobilizing constituents in the groundwater," Hatten said. "Unlike a conventional mine, we don't take away the surface to get to the subsurface. It is literally inconsequential to the total volume . (Uranium) is truly a mild coating on the sand grains. You will see no subsidence and no effects to the formation."

Uranium mining companies must submit a multimillion dollar bond to the DEQ, which is returned upon completion of a successful reclamation. If a company folds or does not adequately reclaim an area, the bond is forfeited and used to fund the cleanup.

Once mining is completed, the EPA issues an aquifer exemption permit that limits use of the area to mining in general.

Wastewater can be disposed of several different ways, including extraction, treatment and re-injection. Hatten said Ur-Energy plans to inject the waste in deep disposal wells permitted and approved by the state. It will be treated using ion exchange, reverse osmosis and simple filtration.

The company must remove well bore piping, connector pipes and roads. Under its reclamation plan, the well bores will be sealed with concrete, the surface reseeded and the processing plant dismantled and removed.

The life cycle for each 30- to 40-acre mine unit from preproduction drilling and construction to final reclamation is three to four years, Hatten said. About 600 to 700 wells will be drilled on each unit.

Nuclear power plants generate about 20 percent of the electricity used in the United States.

"We really consider nuclear and hydroelectric power as the base load power in the U.S. because those don't really turn off and on, where coal and natural gas become a little bit more flexible," Hatten said.

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