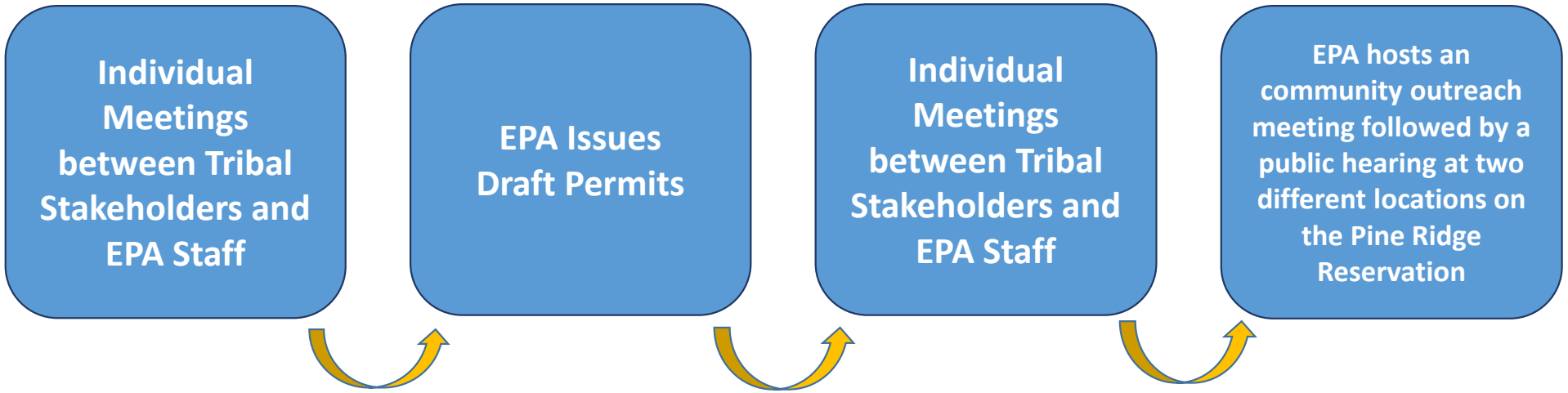
EPA REGION 8'S RESPONSE TO PETITION FOR REVIEW

# ATTACHMENT BB

Tribal consultation with Oglala Sioux Tribe documents

Administrative Record Document Nos. 854-856

# EPA's Proposed Outreach Plan Per the Request of the Oglala Sioux Tribal Leadership Regarding the EPA Draft Permits for the Dewey-Burdock Uranium In-Situ Recovery Project




Benefits of Issuing Draft Permit Before Open House/Public Hearing:

- A community outreach meeting before the draft permits are issued will lack substance.
- Issuing the draft permits opens the discussion of the full scope of EPA's actions.
- A meeting after the draft permits are issued would attain meaningful communication.
- A meeting after the draft permits are issued will allow the Tribal community to offer well-informed comments at the public hearing immediately following the community outreach session, while the information is fresh in everyone's mind.
- A meeting followed by the public hearing allows the opportunity for comments to become part of the official record of decision.
- Public hearings are one of the opportunities for the Tribal community to comment on the proposed permits. Public hearings do not allow the public to ask questions and receive answers from the EPA. The meeting prior to the public hearing would allow for this two-way communication.

# Topics for Outreach Session for the Dewey-Burdock Uranium In-Situ Recovery Project

- **Class III Injection Wells** (for uranium recovery)
- **Deep Injection Wells** (for disposal of treated ISR waste fluid)
- **EPA's Permit Application Review**
- **EPA's Public Participation Process**
- **Aquifer Exemption** for Class III Injection Wells
- **Treatment and Storage Ponds** (for deep injection well injectate)
- **EPA's Assessment of Abandoned Uranium Mines**
- **EPA's Tribal Consultation Process**
- **Issues of Concern Identified through Tribal Consultation Process**

088456

The Oglala Sioux Tribe has serious concerns about the safety of uranium mining near the Pine Ridge Indian Reservation in South Dakota. Powertech USA has proposed an in situ recovery uranium project, known as the Dewey Burdock Uranium Project, in the Edgemont uranium district approximately 46 miles west of our Reservation. The proposed project is within the traditional homeland of our Oglala Lakota people. If approved, the project would threaten the health and welfare of our people and that of our neighbors. The use of in situ mining would place a major burden on the area's water resources; it would threaten local wildlife and ecosystems; and it could produce radioactive wastes and contaminate the area's water for centuries to come.

The Oglala Sioux Tribe has an interest in protecting the health and welfare of our people, and the health of the people, wildlife and environment of the region. We demand that the EPA not issue Class III and Class V injection well permits to Powertech USA or otherwise allow this dangerous project to continue unless and until the EPA has consulted with the Oglala Sioux Tribe on a government-to-government basis about the project and assured the Tribe that it has taken all necessary steps to protect out people, our water, and the environment.

The in situ recovery method proposed for the Dewey Burdock Uranium Project differs from traditional uranium mining techniques, such as shaft and pit mining, and in situ recovery mining has many potential hazardous effects. The EPA is well aware of these risks: it proposed new rules in January 2015 to regulate in situ mining. The proposed rules require baseline groundwater quality testing, expand operational monitoring and greatly expand post-closure monitoring. The standards in place now average only six months of post-closure monitoring, whereas the proposed

standards mandate up to 30 years of post-closure monitoring. The EPA has allowed for substantial public comment, and although the Agency has not finalized the rules, the proposed new rules themselves demonstrate just how serious the dangers of in situ mining are. In situ mining uses huge amounts of water, mixed with chemicals, to dissolve uranium underground. This can cause local aquifers to drop by up to 40 feet. While the uranium is being separated on the surface, birds and other wildlife may ingest the radioactive contaminants contained by the uranium solution. Spills and leaks may contaminate local surface waters. When the uranium is extracted from the solution, mining chemicals and other radioactive contaminants remain in the water and that contaminated water is then injected back into the ground. This radioactive water cannot be closely monitored and controlled, and can migrate through the ground to neighboring aquifers. The Dewey Burdock Uranium Project threatens to contaminate our aquifer in this manner.

With the substantial risks posed by in situ recovery mining of uranium and the deficiency of the current standards regulating operations such as the proposed Dewey-Burdock project, we strongly oppose all permitting unless and until our concerns are met. The location of the proposed operation is only 46 miles from the exterior border of our reservation and traditional home. Its location is within our traditional homeland and treaty protected lands. Although the mining site is outside our current Reservation boundaries, the proposed mine has the potential to greatly affect our environment and the health of our people.

The United States has a trust responsibility to protect the people of our tribe and our trust resources, including our water. We demand that the EPA conduct meaningful, government-to-government consultations with the

Oglala Sioux Tribe before any further permits or applications for the Dewey-Burdock in situ recovery uranium mine are approved. Furthermore, we ask that the EPA ensure that no development of the Dewey Burdock Uranium Project will take place unless and until our concerns are addressed.

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science in ACTION
INNOVATIVE RESEARCH FOR A SUSTAINABLE FUTURE

# REGIONAL APPLIED RESEARCH EFFORT PROGRAM

The Regional Applied Research Effort (RARE) is an Office of Research and Development (ORD) program administered by the Office of Science Policy (OSP) that responds to the high-priority research needs of EPA Regions. RARE projects address a wide array of environmental science issues critical to ORD's regional partners. The Regional Science Liaisons (RSLs) manage the RARE process by fostering interactions and enhancing communication between the Regions and ORD laboratories and centers. RSLs play a vital role in delivering ORD science, including RARE project results, to support regional environmental decision-making.

## Goals of the RARE Program

- Provide near-term research (1–2 years) to address high-priority, regional, applied science needs
- Foster collaboration between EPA Regions and ORD laboratories and centers
- Build a regional/ORD network for future scientific interaction
- Provide opportunities for ORD scientists to apply their expertise to regional issues and explore new research challenges

## RARE Funding and Process

Annually, ORD allocates resources for each of EPA's 10 regional offices to pursue collaborative research efforts. Each Region conducts its own solicitation and, in collaboration with ORD, selects projects that best address the Region's highest priority needs. The RSLs engage ORD scientists early in the process, ensure the projects are within the scope of ORD's mission, and secure regional and ORD management support for the selected projects. OSP manages the funding process for the chosen projects.

## Sample RARE Projects

### Regions 2 and 3 Delaware Estuary Benthic Community Project

In this project, researchers will inventory and map the benthic communities in Delaware Bay, providing valuable insight into the condition of the Bay's benthic communities and areas of critical habitat. The Regions are working with ORD's National Health and Environmental Effects Research Laboratory (NHEERL) on this effort. The results from this project will con tribute to coastal resource environmen tal management decisions, including issuing dredging permits, designating areas of essential fish habitat, identify ing ecologically significant species and critical habitat for protection, and performing Natural Resource Damage Assessments related to oil spills and hazardous substance release.

### Region 10 Ground Water Contamination on Yakama Reservation Project

In Washington State's Yakima River Basin, residents are using drinking water containing nitrate concentrations that exceed the Federal Safe Drinking Water Maximum Contaminant Level of 10 mg/L. Bacterial contamination has

*Continued, next page*

## Regional Science Liaison Contact Information

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**Region 10–Seattle, WA**
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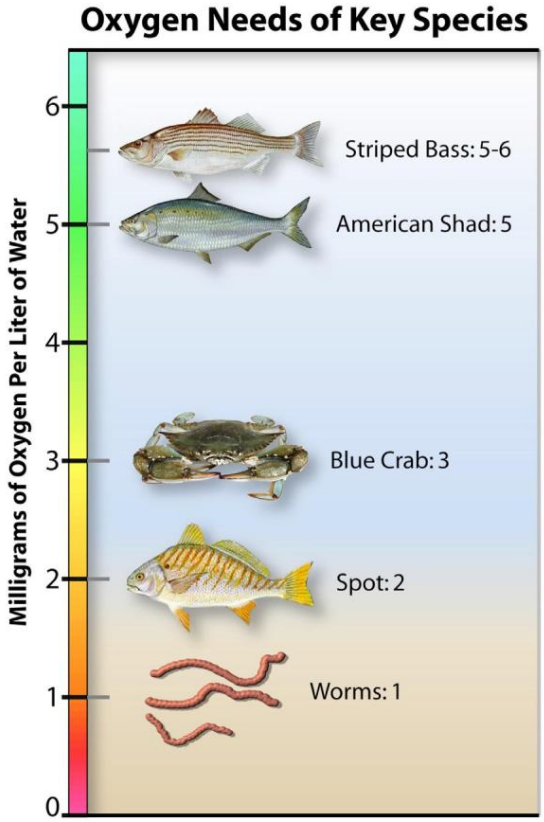
April 2013
088460

also been found, along with concentrations of pesticides and heavy metals. In many cases, members of the Yakama Nation (Tribe) or Spanish-speaking families involved in local agriculture are affected. Yakima County's population includes almost a third of the state's migrant/seasonal farm workers, and poverty impacts greater than 20% of the county's population. For this project, the Ground Water and Ecosystems Restoration Division (GWERD) of ORD's National Risk Management Research Laboratory (NRMRL) is collaborating with Region 10 and other Federal agencies, including U.S. Geological Survey, United States Department of Agriculture, and the Indian Health Service. The approach includes ground water sampling for several compounds that may assist in linking contamination to specific sources (e.g., antibiotics or hormones used in dairies that are specific to ruminants, or compounds such as caffeine that are unique to humans). The approach uses isotopic techniques that can help determine whether the source of nitrate is from humans, animals, or fertilizers, and employs microbial source tracking. Although quality assured results will not be available until late 2010, activities related to this RARE project have already resulted in development of a unique GIS method to target sample collection for purposes of determining source contributions in agricultural settings, and have also prompted Washington State to allocate $300,000 for residential devices that remove nitrates and $100,000 to establish a state-designated ground water management area (GMA) effort to decrease nitrogen loads. The multi-agency GMA effort will determine measures to protect public health, and may contribute to voluntary changes in plans for nutrient management, fertilizer application rates, or septic system design. The results can also support EPA enforcement actions, if needed.

*Concentrated Animal Feeding Operation (CAFO)*




## Region 3 Dissolved Oxygen Criteria in Chesapeake Bay

The goal of this RARE project was to address the issue of fluctuation of dissolved oxygen (DO) in Chesapeake Bay, where natural conditions indicated that in some sections of the Bay, the standard levels of DO were not met during the warmer months of the year.

Through the RARE program, scientists at NHEERL, in cooperation with Region 3's Chesapeake Bay Program, generated data that were critical to understanding the exposure effects on a range of organisms under conditions of cyclic DO concentrations. ORD scientists developed an experimental system that modeled a tidal cycle by exposing test organisms to DO levels that fluctuate to simulate a typical tidal cycle. These data were then used by the Chesapeake Bay DO Criteria Task Group to recommend and promulgate the DO criteria. These criteria were developed to protect against short-term exposures that could impact aquatic organisms, particularly during larval and juvenile life stages. This RARE project not only contributed significantly to the Chesapeake Bay DO criteria but also to the EPA Virginian Province Saltwater DO criteria document. This effort contributed to efforts to address the problem of low DO in the Bay.

**For more information on RARE, please visit: http://www.epa.gov/osp/regions/rare.htm.**

# EPA Region 8
# Regional Applied Research Effort

# Summary of Work Performed at the Dewey-Burdock Site

# THE EPA REGIONAL APPLIED RESEARCH EFFORT (RARE) PROGRAM

Purpose:

- The Regional Applied Research Effort (RARE) is an Office of Research and Development (ORD) program administered by the Office of Science Policy (OSP) that responds to the high-priority research needs of EPA Regions.
- RARE projects address a wide array of environmental science issues critical to ORD's regional partners.
- A Regional RARE project is managed by ORD. ORD may also contribute to work done on the project.

EPA

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# THE GOALS OF THE RARE PROGRAM

- Provide near-term research (1–2 years) to address high-priority, regional, applied science needs
- Foster collaboration between EPA Regions and ORD laboratories and centers
- Build a regional/ORD network for future scientific interaction
- Provide opportunities for ORD scientists to apply their expertise to regional issues and explore new research challenges

# THE STEPS INVOLVED IN GETTING A REGIONAL APPLIED RESEARCH EFFORT FUNDED

- Regional management approval to submit a proposal for consideration.
- Competitive process for proposal review and selection.
- Demonstrate that the third party has superior scientific expertise in the discipline of the proposed work.
- The EPA Office of Research and Development contributed expertise in overall review of project plan & groundwater sample analysis.

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# Uranium Resources and Environmental Investigations

## URANIUM PUBLICATIONS

Publication Type: ** Any ** Sort: Date/Author Apply

Mihalasky, M.J., Hall, S.M., Hammarstrom, J.M., Tureck, K.R., Hannon, M.T., Breit, G.N., Zielinski, R.A., Elliott, B., 2015, Assessment of undiscovered sandstone-hosted uranium resources in the Coastal Plain of southern Texas: U.S. Geological Survey Fact Sheet 2015-3069, 4 p.
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Campbell, K.M., Gallegos, T.J., Landa, E.R., 2015, Biogeochemical aspects of uranium mineralization, mining, milling, and remediation: Applied Geochemistry, Vol. 57, June 2015, P. 206-235.
Available at: http://dx.doi.org/10.1016/j.apgeochem.2014.07.022

Biewick, L.R.H. and Wilson, A.B., 2014, Energy map of southwestern Wyoming, Part B-Oil and gas, oil shale, uranium, and solar: U.S. Geological Survey Data Series 843, 20 p., 4 pls.
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Carr, N.B., Ignizio, D.A., Diffendorfer, J.E., Latysh, Natalie, Matherne, Ann Marie, Linard, J.I., Leib, K.J., and Hawkins, S.J., 2013, Interactive energy atlas for Colorado and New Mexico - An online resource for decisionmakers: U.S. Geological Survey Fact Sheet 2013-3112, 2 p.
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Available at: http://dx.doi.org/10.1007/s11053-013-9198-4

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Available at: http://dx.doi.org/10.1021/es400450z

Johnson, R.H., Stucker, V.K., Horton, R.J., and Otton, J.K., 2013, Whole rock geochemistry and grain-size analyses from sediment and rock near Tuba City Open Dump, Tuba City, Arizona: U.S. Geological Survey Open-File Report 2013-1118, 2 p.
Available at: http://pubs.usgs.gov/of/2013/1118/

Hall, Susan, and Coleman, Margaret, 2013, Critical Analysis of World Uranium Resources: U.S. Scientific Investigations Report 2012-5239, 56 p.
Available at: http://pubs.usgs.gov/sir/2012/5239/

Johnson, R.H., Horton, R.J., Otton, J.K., and Ketterer, M.K., 2012, 234U/238U isotope data from groundwater and solid-phase leachate samples near Tuba City Open Dump, Tuba City, Arizona:: U.S. Geological Survey Open-File Report 20121126, 2 p.
Available at: http://pubs.usgs.gov/of/2012/1126/

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## URANIUM TOPICS

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- Events
- Staff
- Ask a Scientist about Uranium!

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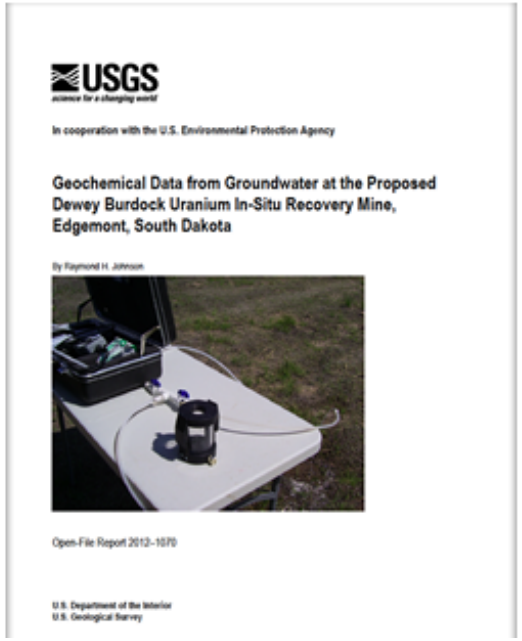
**In cooperation with the U.S. Environmental Protection Agency**

# Geochemical Data from Groundwater at the Proposed Dewey Burdock Uranium In-Situ Recovery Edgemont, South Dakota

**By Raymond H. Johnson**


USGS

In cooperation with the U.S. Environmental Protection Agency

Geochemical Data from Groundwater at the Proposed Dewey Burdock Uranium In-Situ Recovery Mine, Edgemont, South Dakota

By Raymond H. Johnson

Open-File Report 2012-1070

U.S. Department of the Interior
U.S. Geological Survey

## Abstract

This report releases groundwater geochemistry data from samples that were collected in June 2011 at the Dewey Burdock proposed uranium in-situ recovery site near Edgemont, South Dakota. The sampling and analytical methods are summarized, and all of the data, including quality assurance/quality control information are provided in data tables.

Sampled 28 wells over the project area

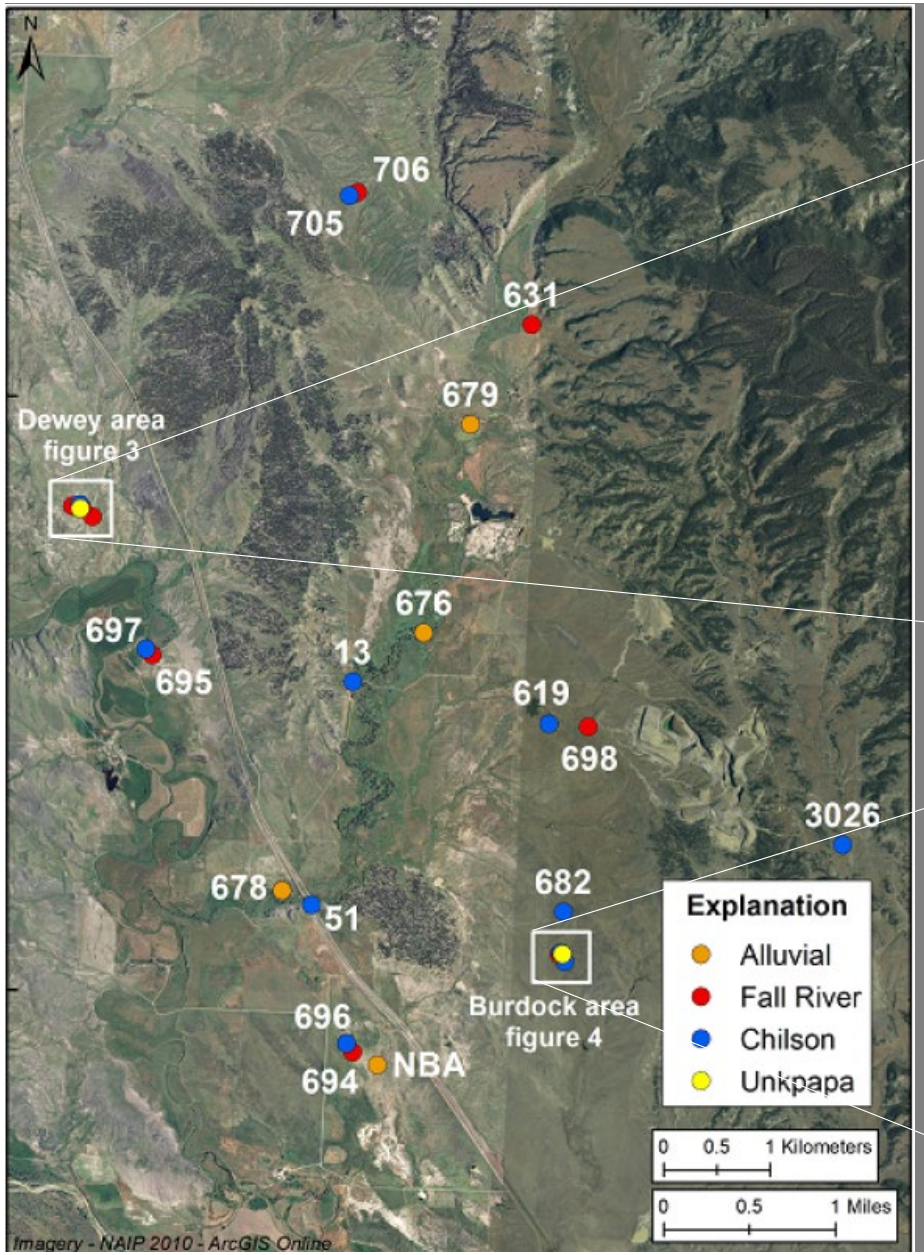
First poste

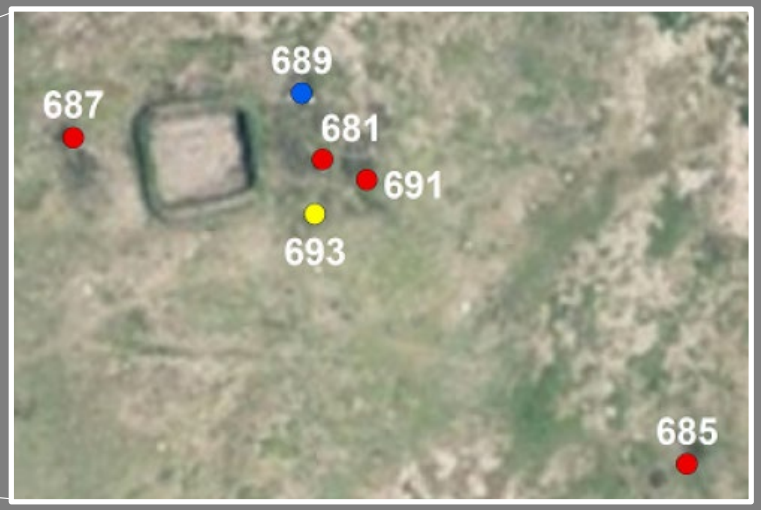
- **Report** PDF (6 M
- **Tables** in Excel
- **Appendixes** in E

**For additional inform**

USGS Crustal Geophys
Science Center
Box 25046, Mail Stop 9

# Locations of Wells Sampled





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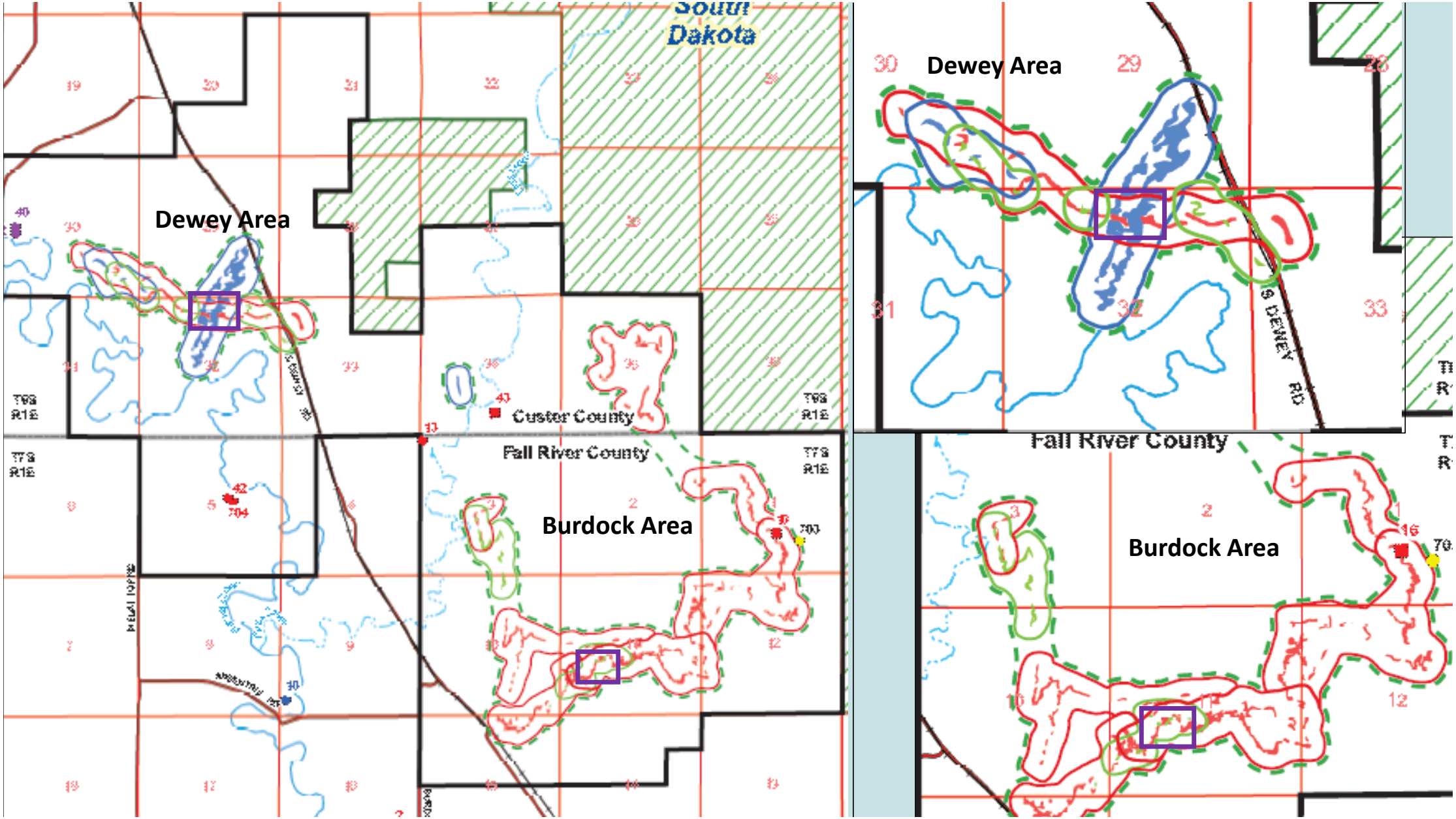

South Dakota
Dewey Area
Custer County
Fall River County
Burdock Area
Dewey Area
Fall River County
Burdock Area
088469

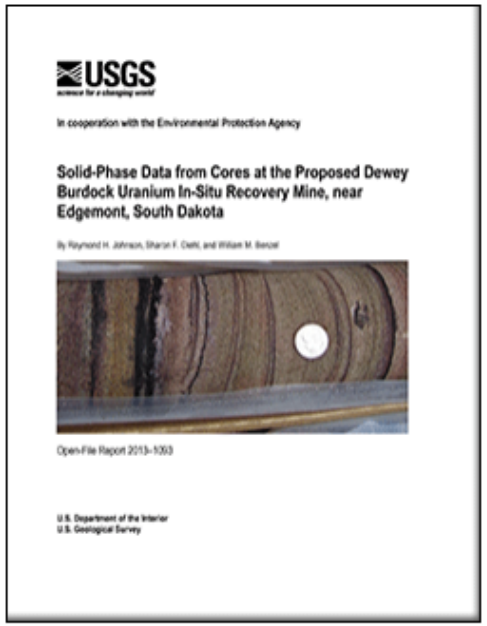
Open-File Report 2013–1093



In cooperation with the Environmental Protection Agency

# Solid-Phase Data from Cores at the Proposed Dewey Burdock Uranium In-Situ Recovery Mine, near Edg South Dakota

By Raymond H. Johnson, Sharon F. Diehl, and William M. Benzel

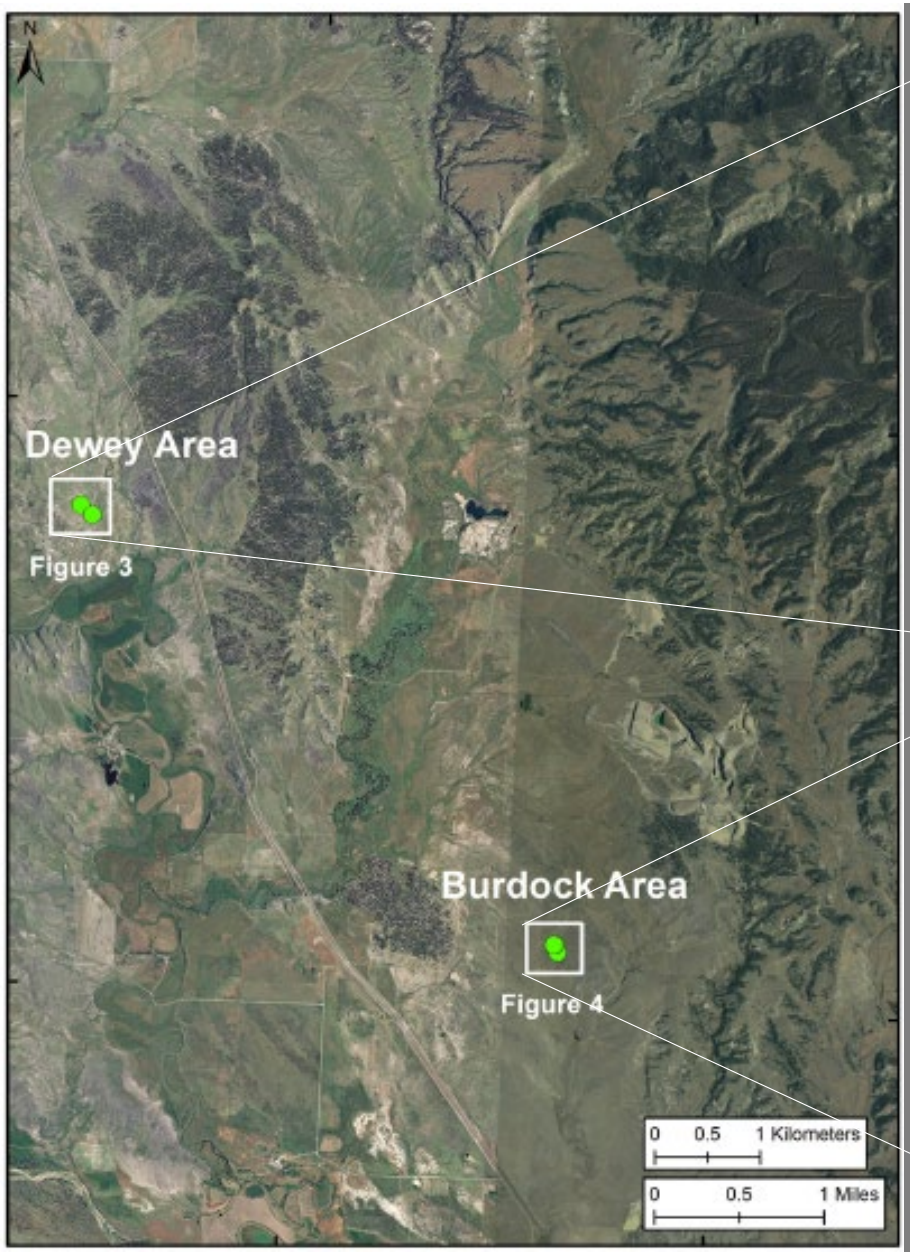


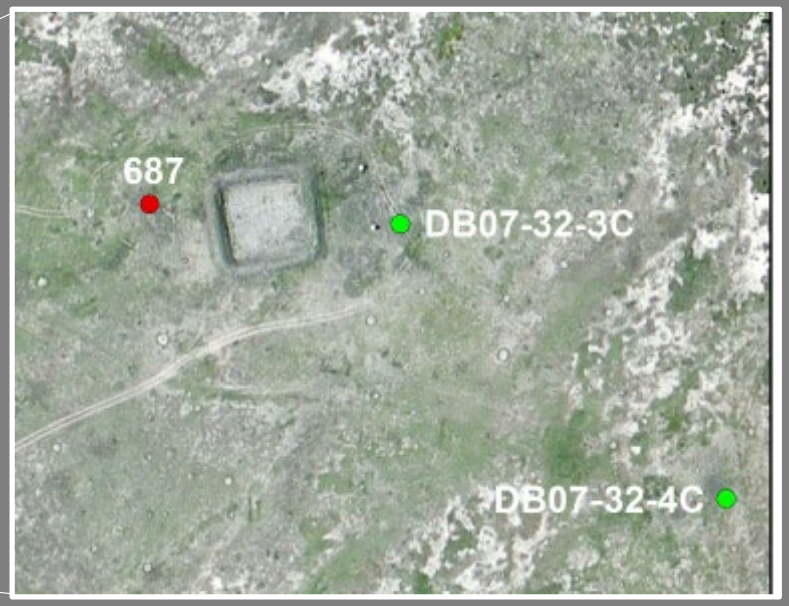

## Abstract

This report releases solid-phase data from cores at the proposed Dewey Burdock uranium in-situ recovery site near Edgemont, South Dakota. These cores were collected by Powertech Uranium Corporation, and material not used for their analyses were given to the U.S. Geological Survey for additional sampling and analyses. These additional analyses included total carbon and sulfur, whole rock acid digestion for major and trace elements, $^{234}U/^{238}U$ activity ratios, X-ray diffraction, thin sections, scanning electron microscopy analyses, and cathodoluminescence. This report provides the methods and data results from these analyses along with a short summary of observations.

First posted May 24, 201

- Report PDF (1.42 MB)
- Table 1
- Table 2
- Appendix 1
- Appendix 2
- Appendix 3
- Appendix 4
- Appendix 5





# Locations of Core Analyzed

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# How did the USGS RARE Research Help EPA?

**History of Permit Application Review**

- **Class III permit application for uranium recovery:** received Dec 2008
- Administratively-Complete Letter Jan 2009
- revised application received July 2012
- final version of application received Jan 2013

**RARE Reports**

- groundwater geochemistry data from samples that were collected in June 2011

- Johnson, R.H., 2012, Geochemical data from groundwater at the proposed Dewey Burdock uranium in-situ recovery mine, Edgemont, South Dakota: U.S. Geological Survey, Open-File Report 2012–1070, 11 p. Available at http://pubs.usgs.gov/of/2012/1070/.

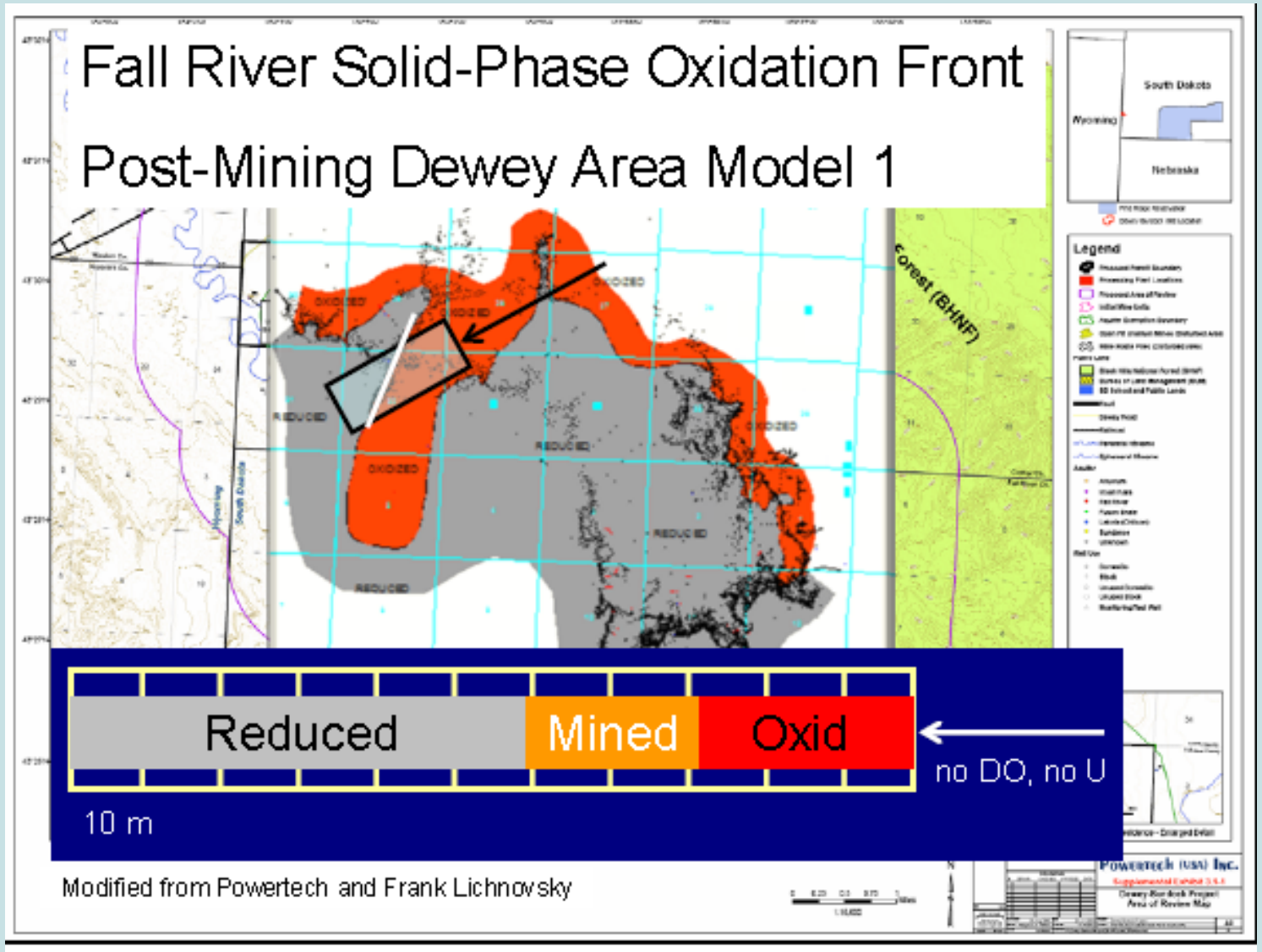
- Johnson, R.H., Diehl, S.F., and Benzel, W.M., 2013, Solid-phase data from cores at the proposed Dewey Burdock uranium in-situ recovery mine, near Edgemont, South Dakota: U.S. Geological Survey Open-File Report 2013–1093, 13 p. Available at http://pubs.usgs.gov/of/2013/1093/.

# How did the USGS RARE Research Help EPA?

Geochemical Data provided an indication of degree of communication between upper and lower aquifer

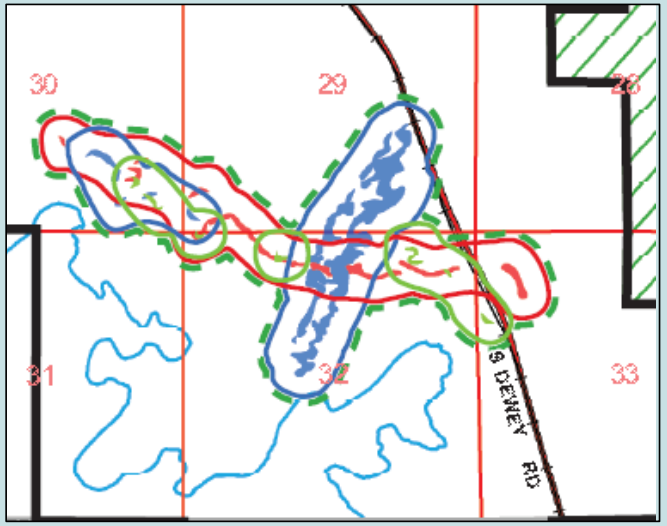
## Groundwater Geochemistry

| Element | Dewey – Fall River | Burdock - Chilson |
|---|---|---|
| Oxygen | <1 mg/L | <1 mg/L |
| Ca | 56.9 mg/L | 365 mg/L |
| Alkalinity | 164 mg/L | 269 mg/L |
| $SO_4$ | 508 mg/L | 1,460 mg/L |
| $^{34}S$ | -3.6 per mil | -15.5 per mil |
| Fe | 0.01 mg/L | 1.83 mg/L |




# Geochemical Modeling

## Dewey Area

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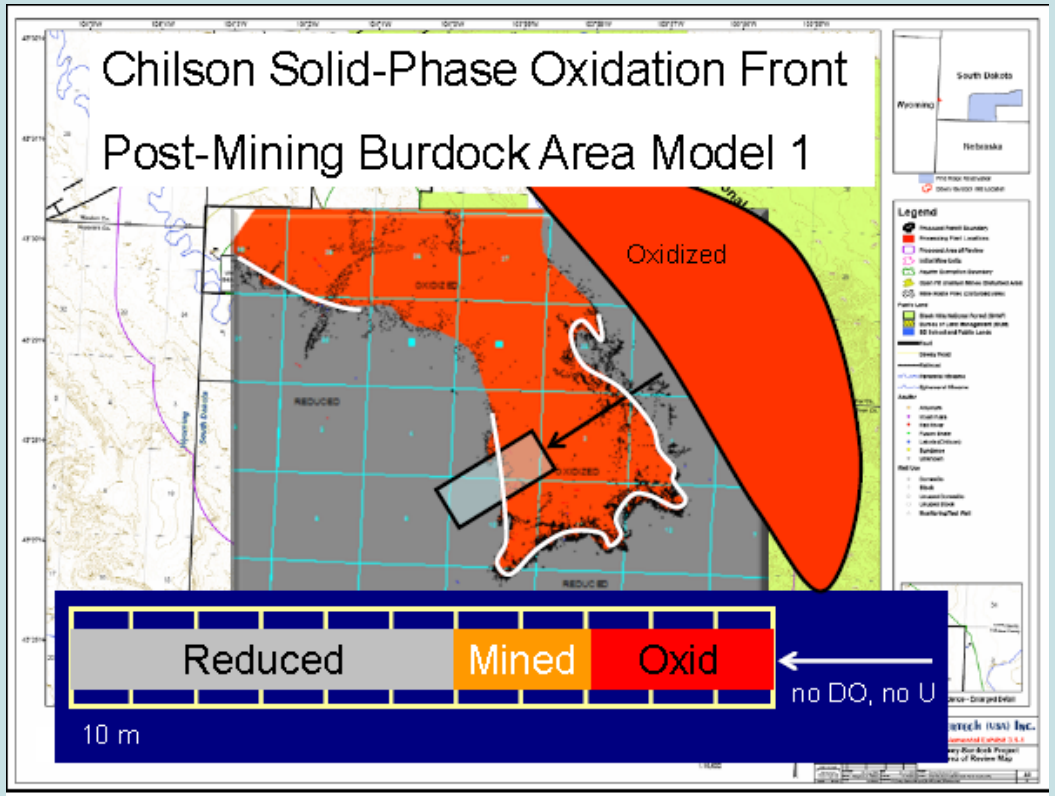
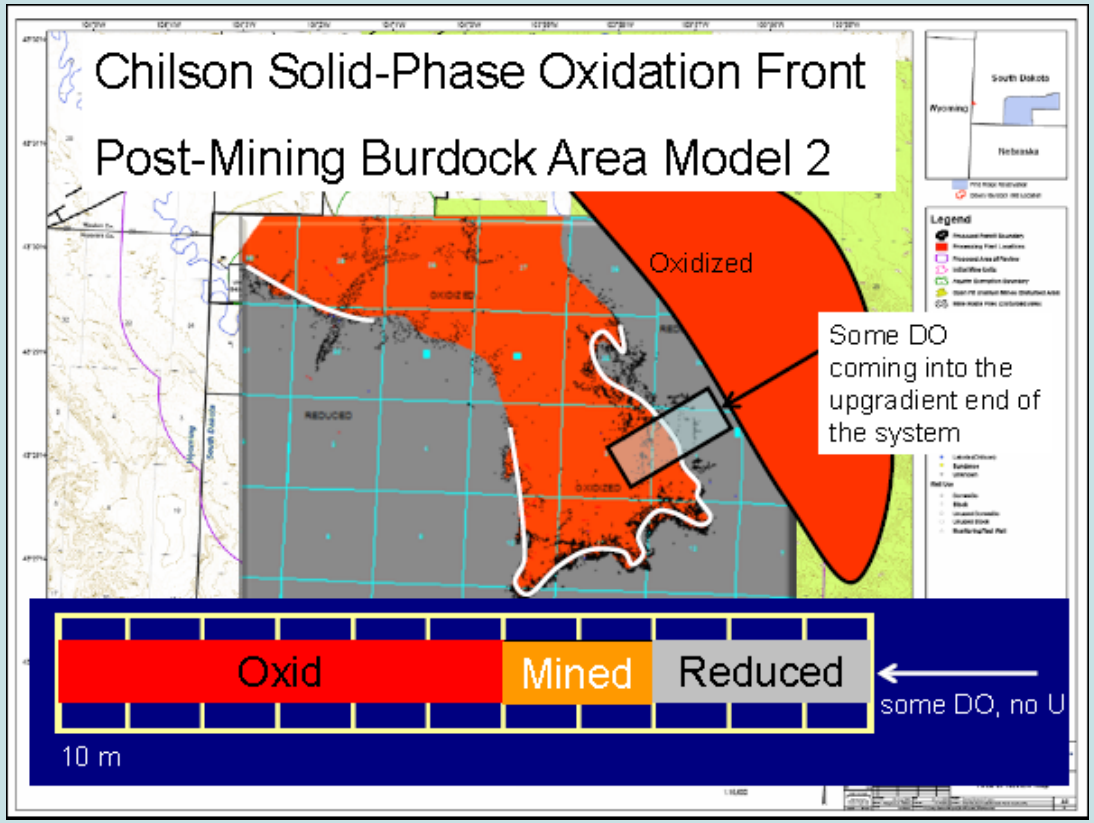
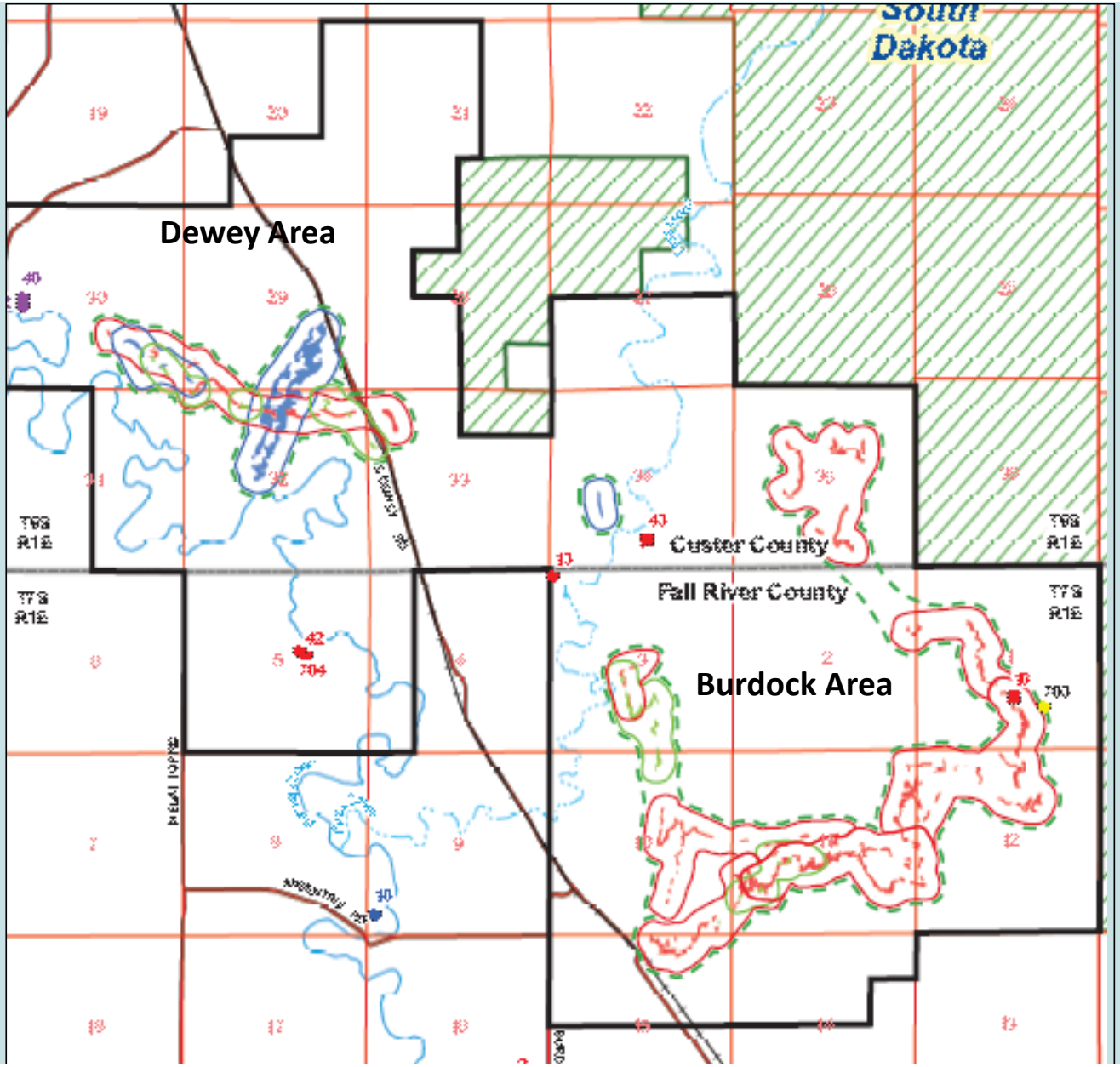
## Two modeling scenarios for Burdock Area

### 1. Reduced Zone Downgradient




### 2. Oxidized Zone Downgradient


South Dakota
Dewey Area
Custer County
Fall River County
Burdock Area
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T7S R1E

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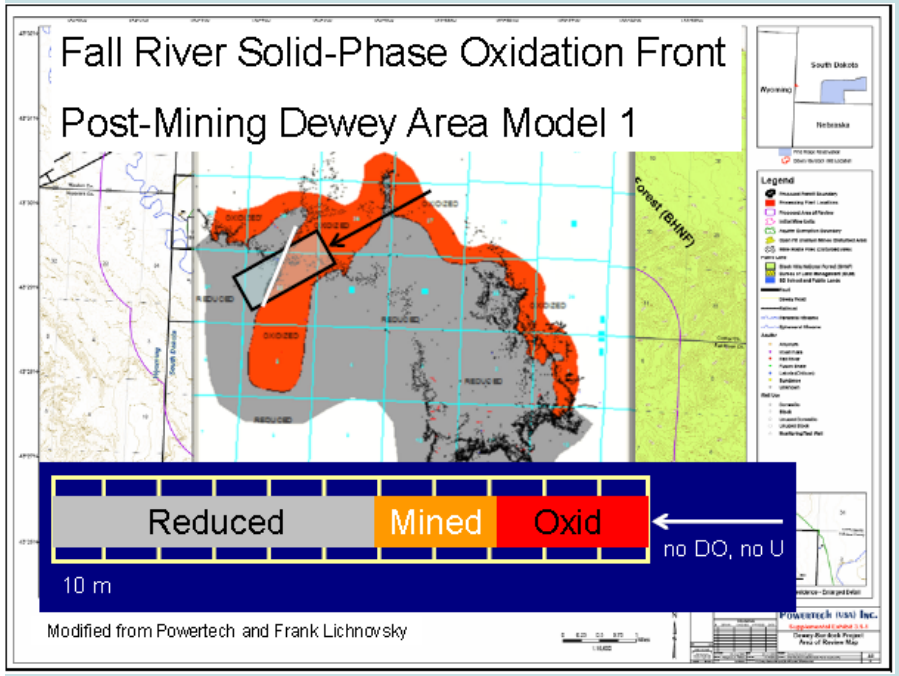
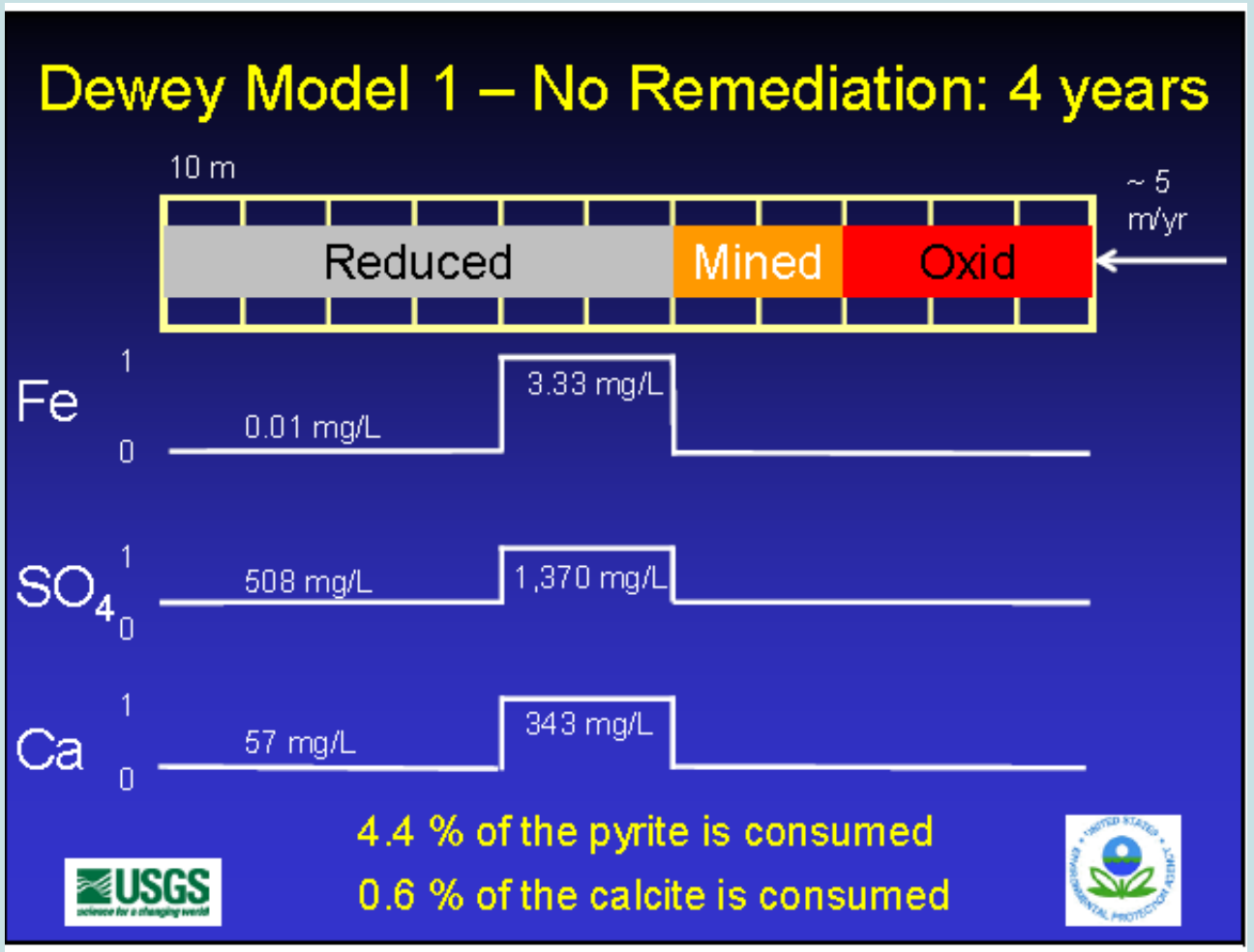
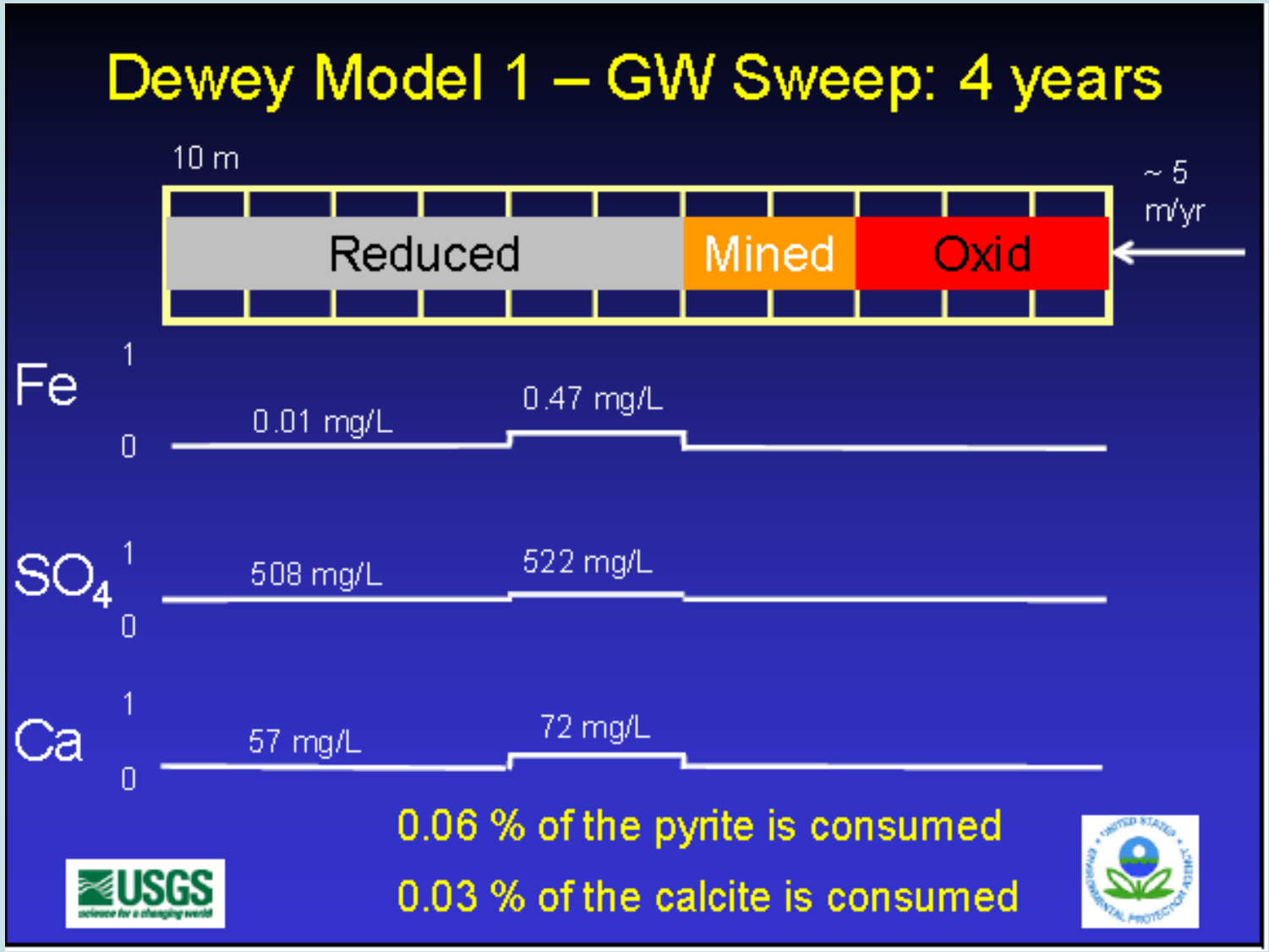
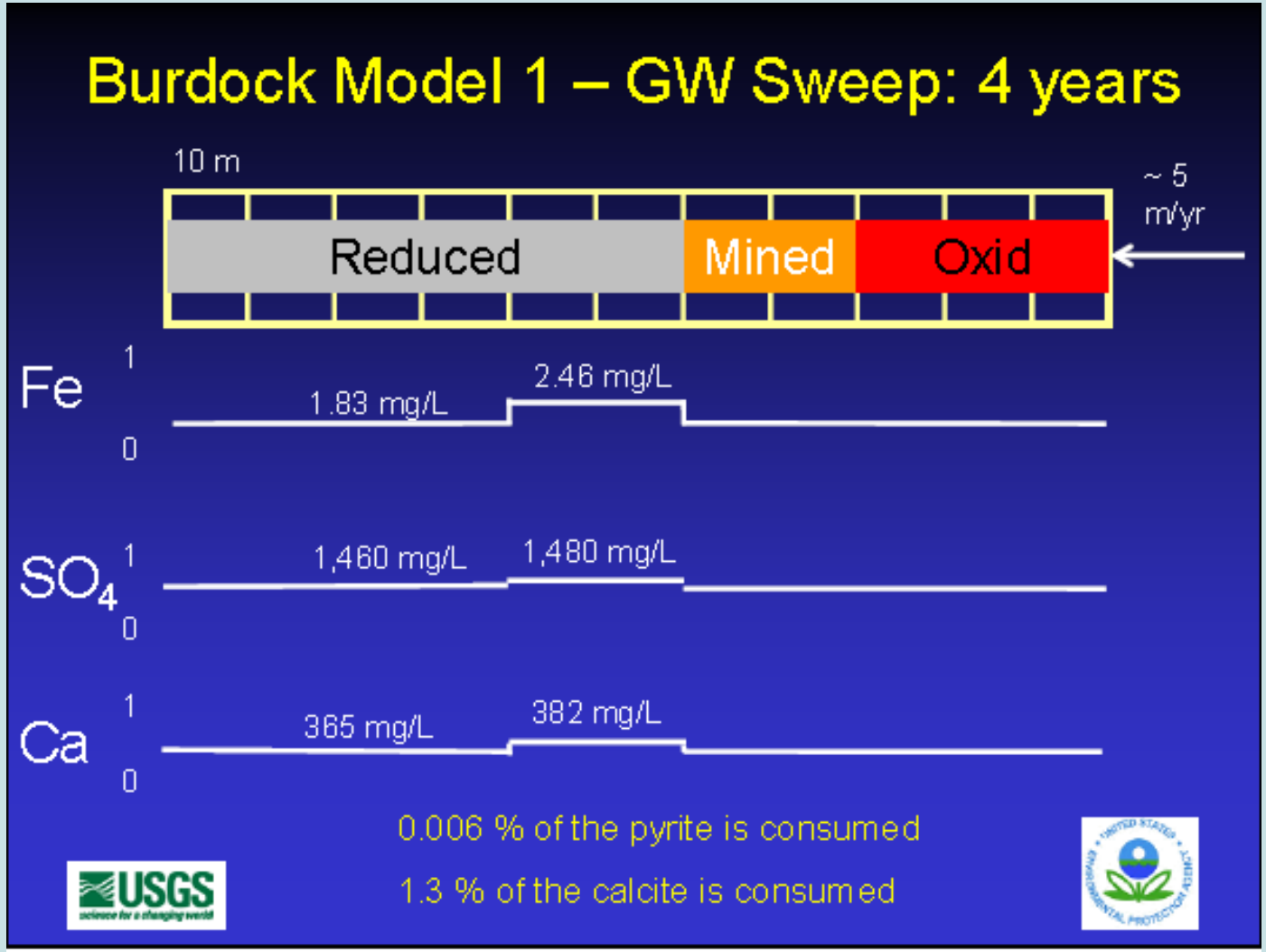
# How did the USGS RARE Research Help EPA?

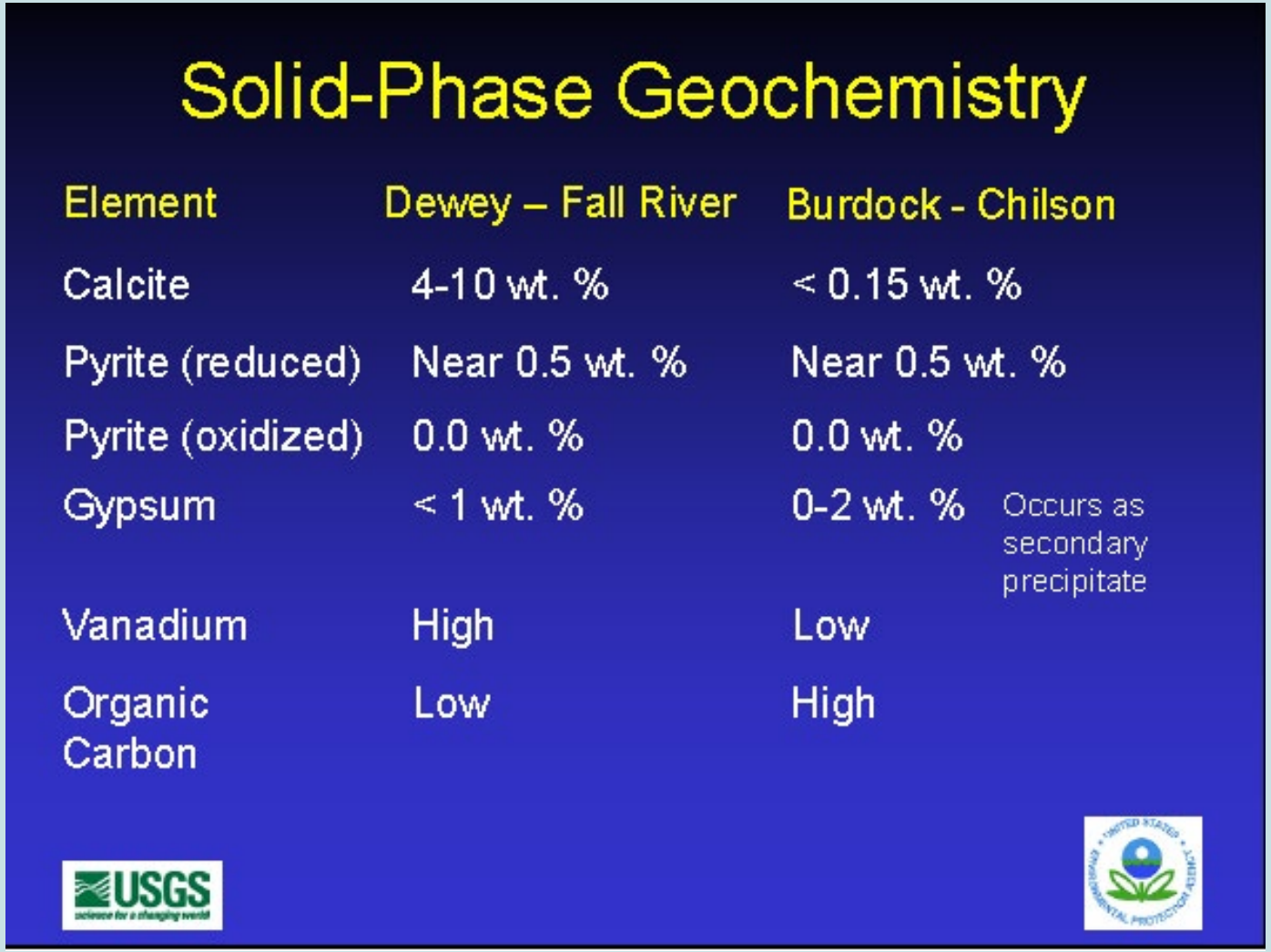



Dewey Model 1 – GW Sweep: 4 years
10 m
~ 5 m/yr
Reduced
Mined
Oxid
Fe
1
0
0.01 mg/L
0.47 mg/L
SO4
1
0
508 mg/L
522 mg/L
Ca
1
0
57 mg/L
72 mg/L
0.06 % of the pyrite is consumed
0.03 % of the calcite is consumed
USGS


Burdock Model 1 – GW Sweep: 4 years
10 m
~ 5 m/yr
Reduced
Mined
Oxid
Fe
1
0
1.83 mg/L
2.46 mg/L
SO4
1
0
1,460 mg/L
1,480 mg/L
Ca
1
0
365 mg/L
382 mg/L
0.006 % of the pyrite is consumed
1.3 % of the calcite is consumed
USGS

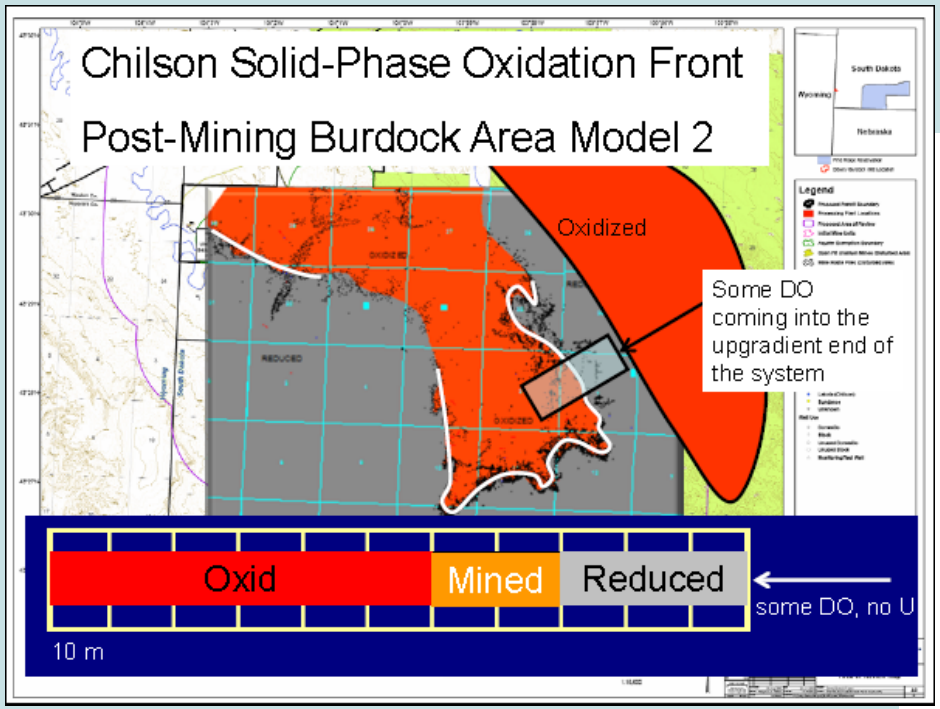
# How did the USGS RARE Research Help EPA?



# Take Home Points

- Pyrite is potentially the key to removing uranium (modeled reducing conditions)
- Calcite is potentially the key to buffering acidity
- With these minerals present, get an iron, sulfate, calcium, carbonate: "plume"
  - Not toxic
  - Already relatively high concentrations in some locations
  - What levels are acceptable?
- Increase in these elements depends on the amount of oxygen left in the mining zone

What about in the area where an oxidized zone is downgradient?



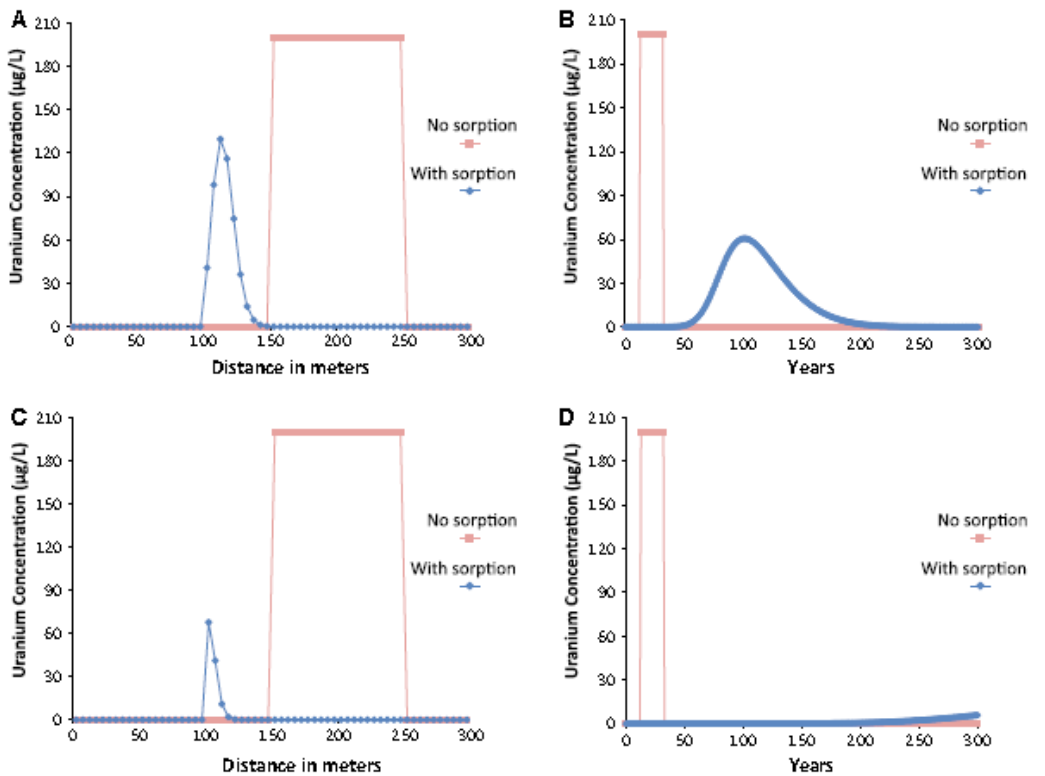




Fig. 5 Sample 11-14C-4, 1D column at 30 years (a) and at monitoring well ring (b). Sample 11-16C-2, 1D column at 30 years (c) and at monitoring well ring (d)

Last RARE Project Began in 2014 with Las Alamos National Laboratory
Field Site at Cameco Smith Ranch Highlands
Field Test: injection of unrestored groundwater from wellfield where uranium extraction has been completed into wellfield before uranium extraction has begun.
Simulates downgradient reduced zone.
Question to be answered: How much natural attenuation occurs?