

Uranium In-Situ Leach Permitting

Indian Affairs Committee

October 28, 2011

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NMED Resource Protection Division



NMED Ground Water Quality Bureau



Presentation Outline

Required Permit for ISL Mines

NMED Permitting Process

DP/UIC Issues

HRI, Section 8 Proposed Project

Geology of site

Groundwater (background)

Groundwater Restoration

Case Studies



Required License/Permits for ISL Mines

Nuclear Regulatory Commission

Radioactive Materials License

US Environmental Protection Agency

Aquifer Exemption

New Mexico Environment Department

UIC/Groundwater Discharge Permit



NMED Permits - ISL

- Underground Injection Control (UIC) Permit
 - Class I wells: Waste disposal is allowed via Class I wells into an aquifer with a total dissolved solids (TDS) concentration $\geq 10,000$ mg/l or into a designated aquifer with a TDS concentration between 5,000 mg/l and 10,000 mg/l, if the WQCC approves the receiving aquifer as a designated aquifer.
 - Class III wells: The injection of water contaminants into ground water is allowed via Class III wells into an aquifer with a TDS concentration between 5,000 mg/l and 10,000 mg/l without providing for complete restoration of the aquifer.

Aquifer Restoration - In lieu of seeking an aquifer designation, an applicant may propose to restore groundwater – constitutes a “temporary aquifer designation”

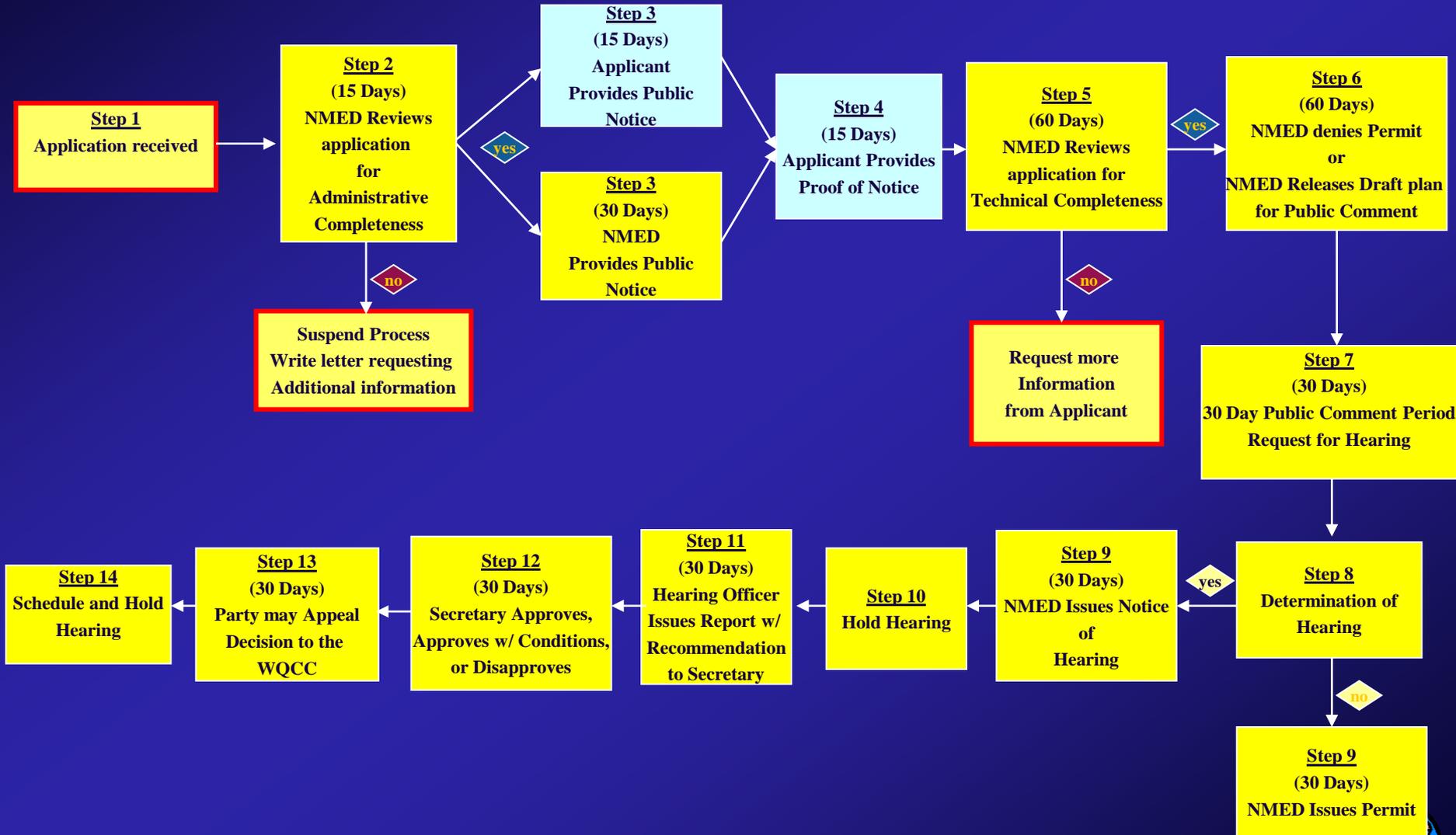


NMED ISL Permit Considerations

- Protection of ground/drinking water aquifer(s)
- Aquifer restoration upon completion
 - Numeric Standards or Background
- Financial Assurance



NMED Discharge Permit Process Flow Chart

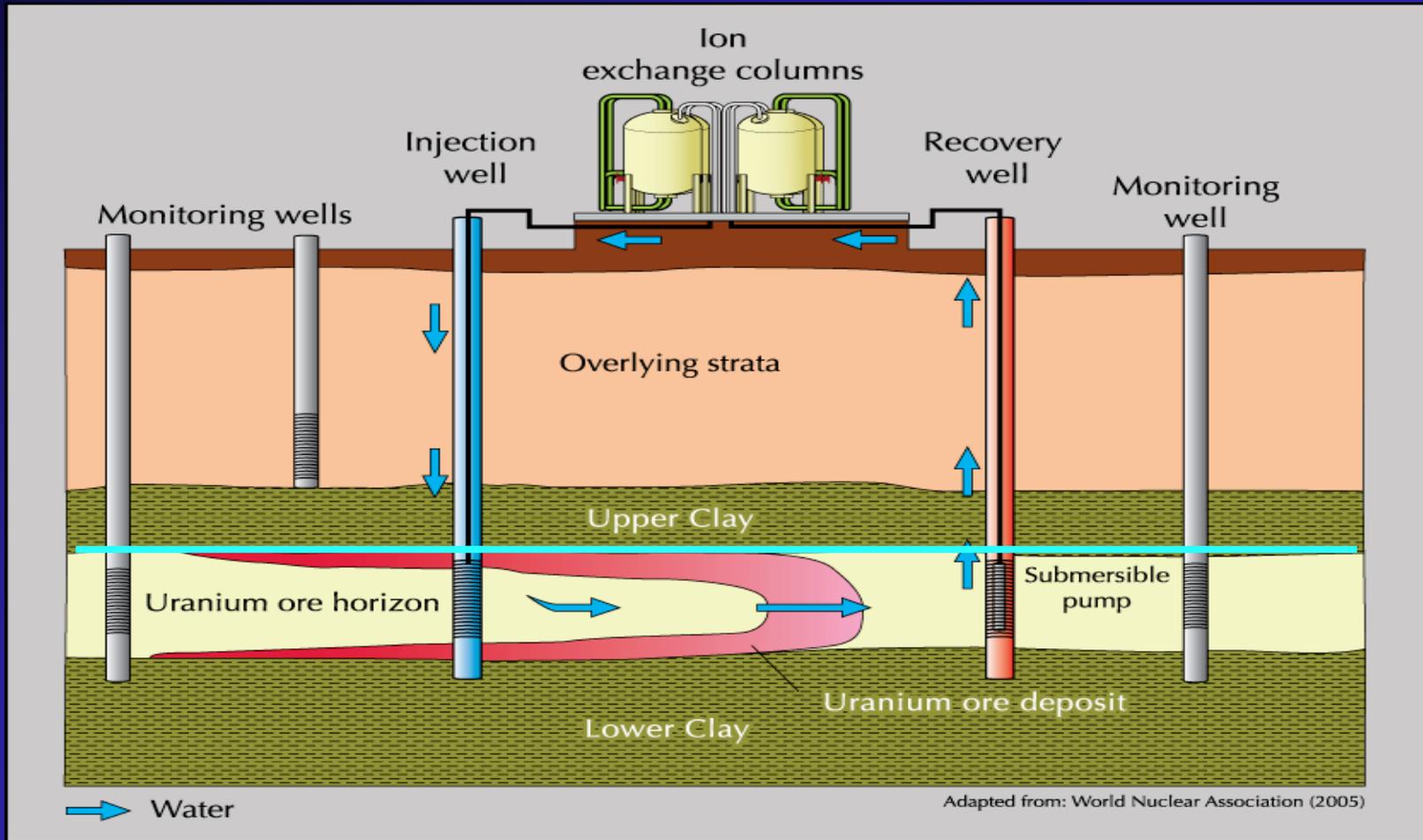


NMED ISL Permit Process

- Administratively Complete
 - Basic information on site
- Technically Complete
 - Determine if proposed Plan protects groundwater
 - Determination if GW can be restored



Groundwater Impact During Mining



- Concentration of COCs in GW will increase – aquifer exemption/TAD
- Restoration to numeric standards or background (higher of the two)



ISL Operation

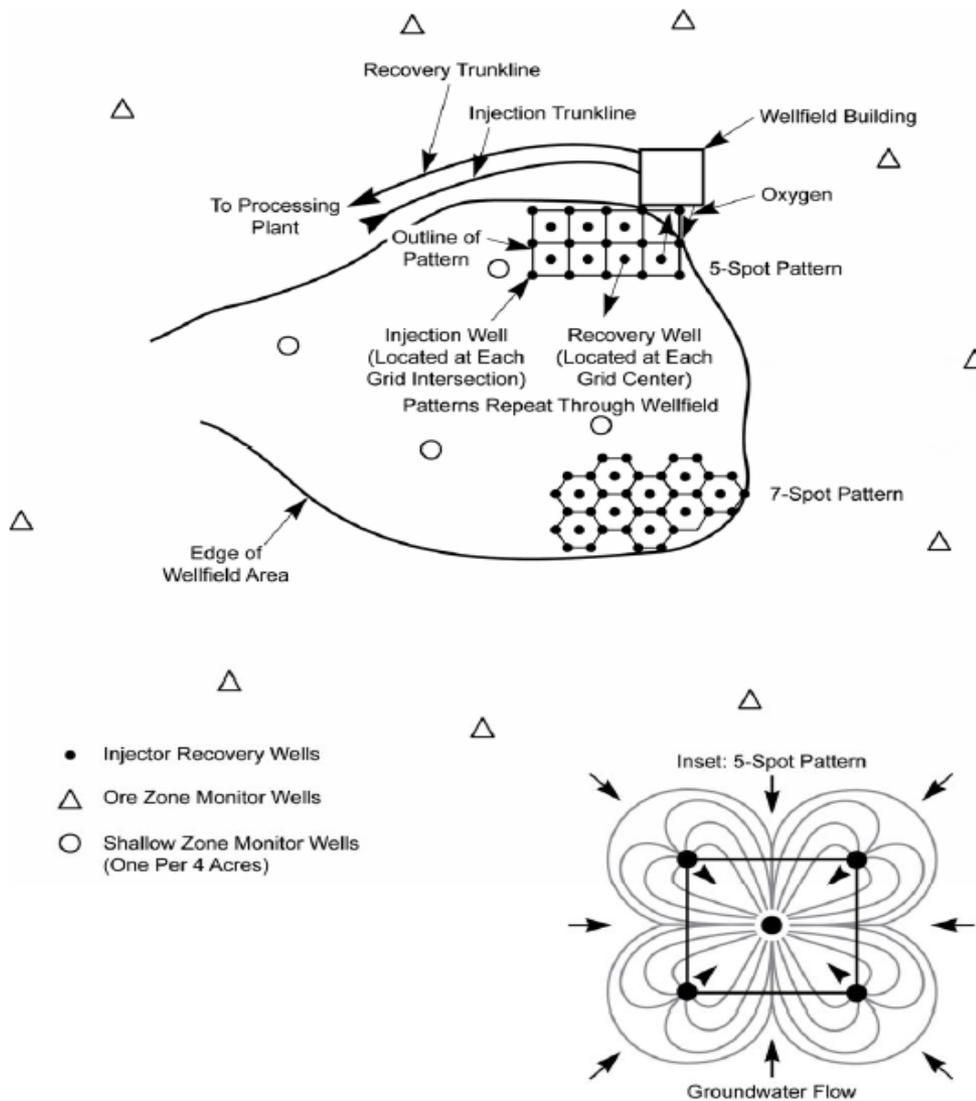
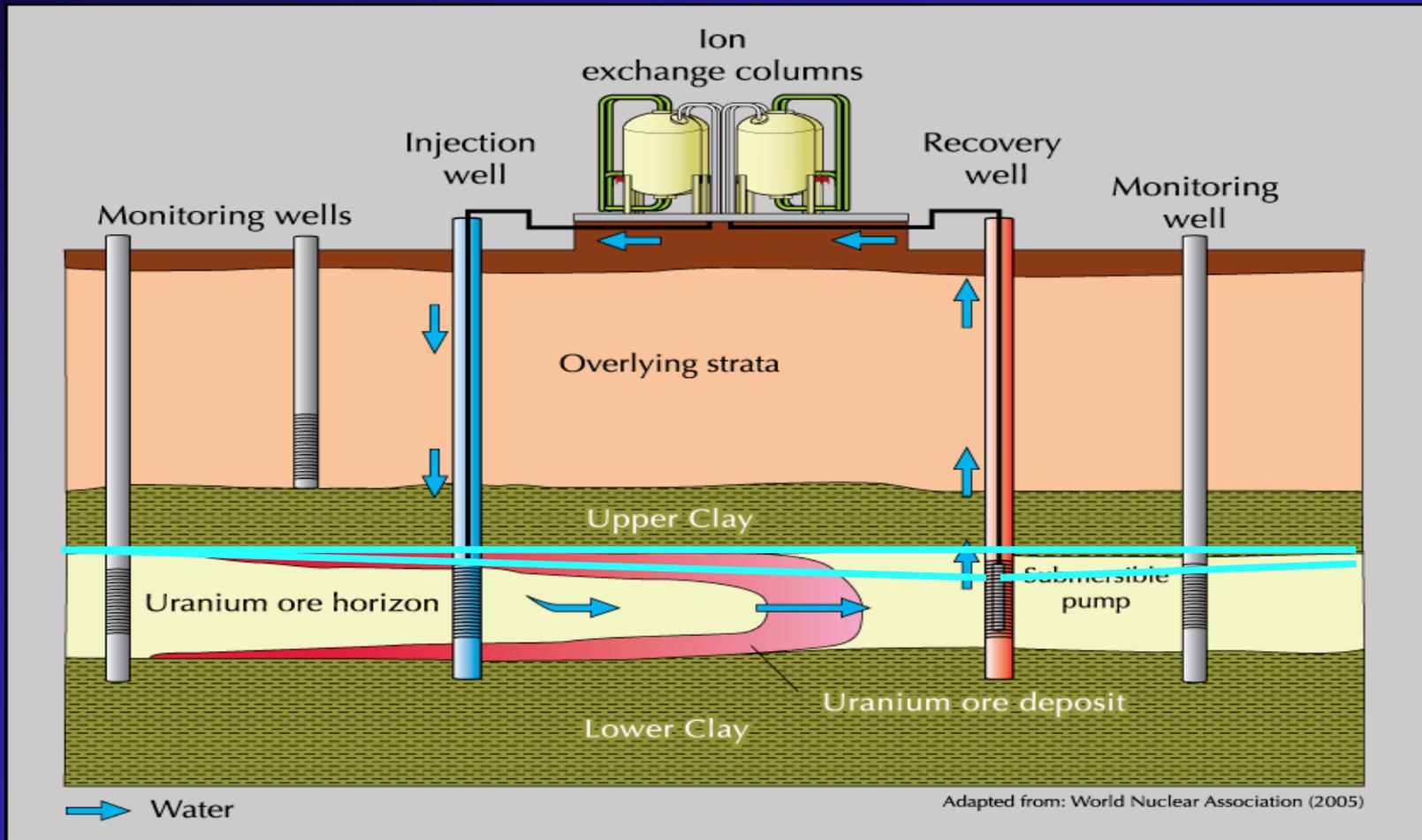


Figure 2.3-1. Schematic Diagram of a Well Field Showing Typical Injection/Production Well Patterns, Monitoring Wells, Manifold Buildings, and Pipelines (From NRC, 1997a)



Groundwater Impact During Mining

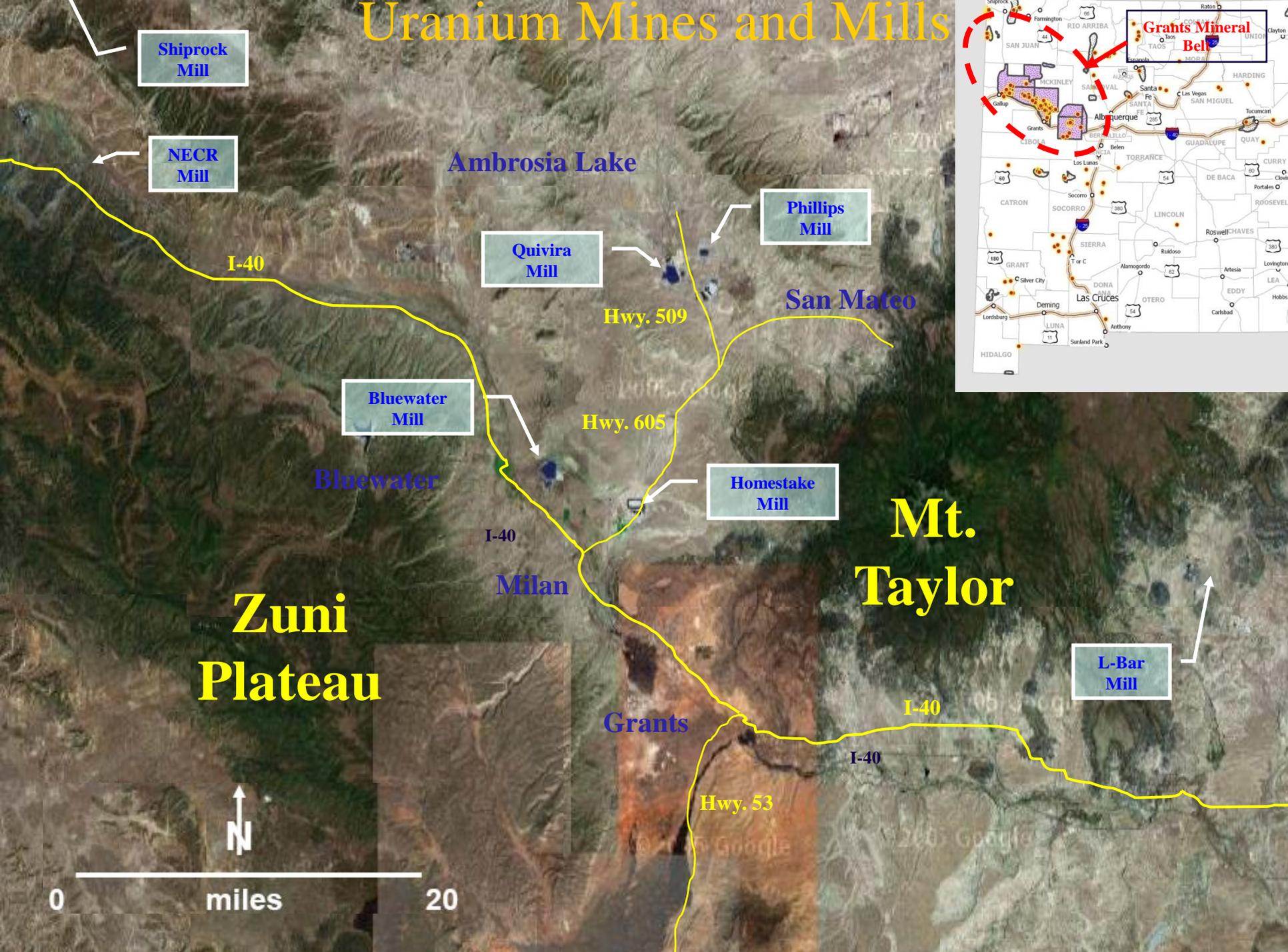


HRI Permit Status

- Revised Renewal Application submitted April 2011
- Application deemed Administratively Complete
- Notification to Tribal entities completed
- Tribal Consultation with Navajo Nation, Hopi Tribe, and Acoma Pueblo have been initiated or scheduled
- NMED currently conducting technical review of application



Uranium Mines and Mills



Shiprock Mill

NECR Mill

Ambrosia Lake

Quivira Mill

Phillips Mill

I-40

Hwy. 509

San Mateo

Bluewater Mill

Hwy. 605

Bluewater

Homestake Mill

I-40

Milan

Mt. Taylor

Zuni Plateau

Grants

L-Bar Mill

I-40

I-40

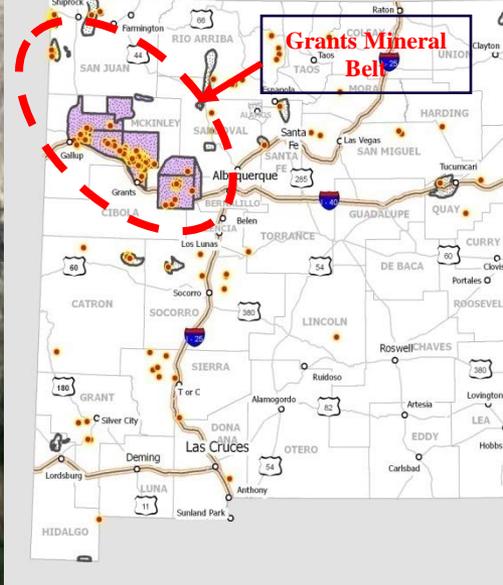
Hwy. 53



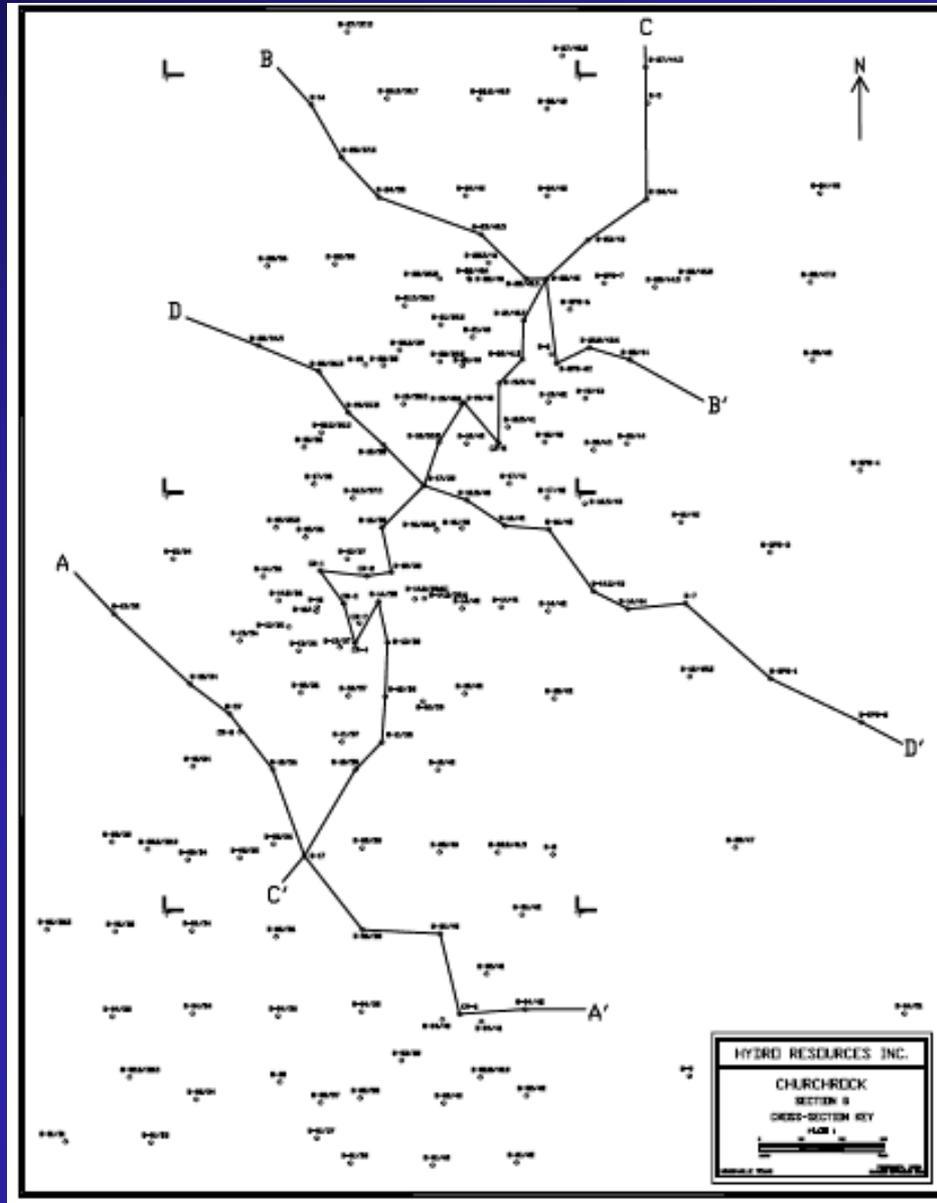
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Current Conditions - Geology



Current Conditions - Geology

CHURCHROCK PROJECT - TYPE STRATIGRAPHIC COLUMN

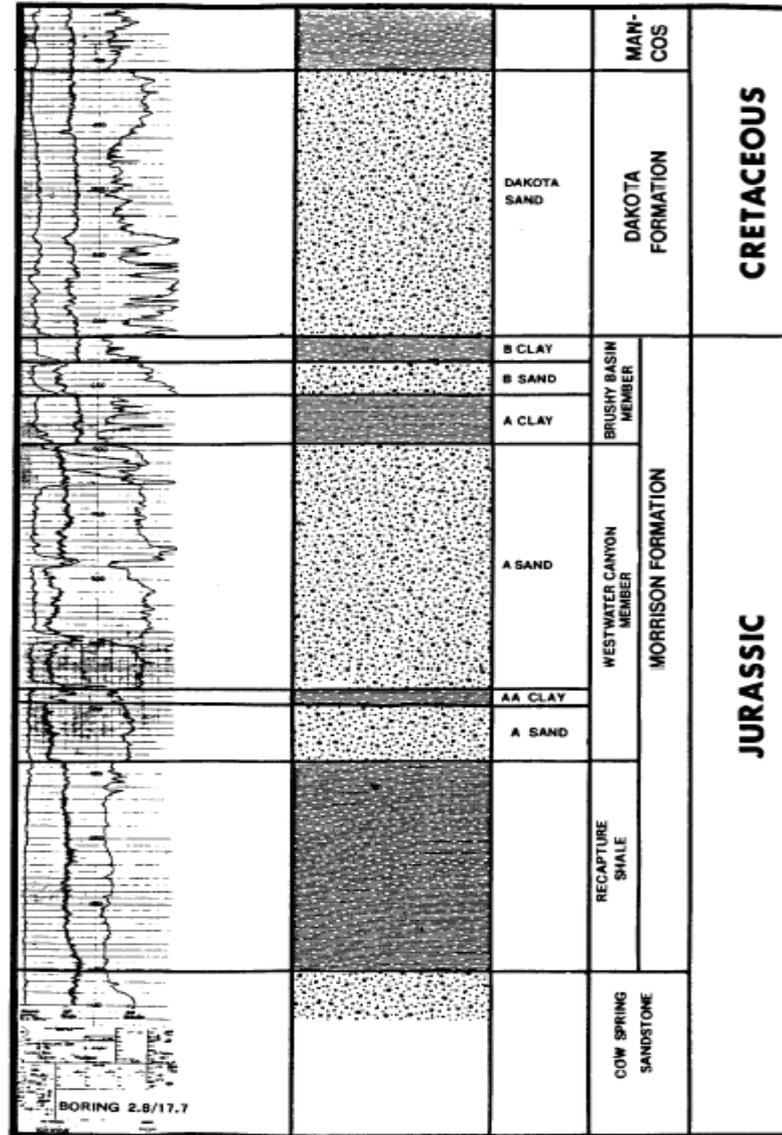
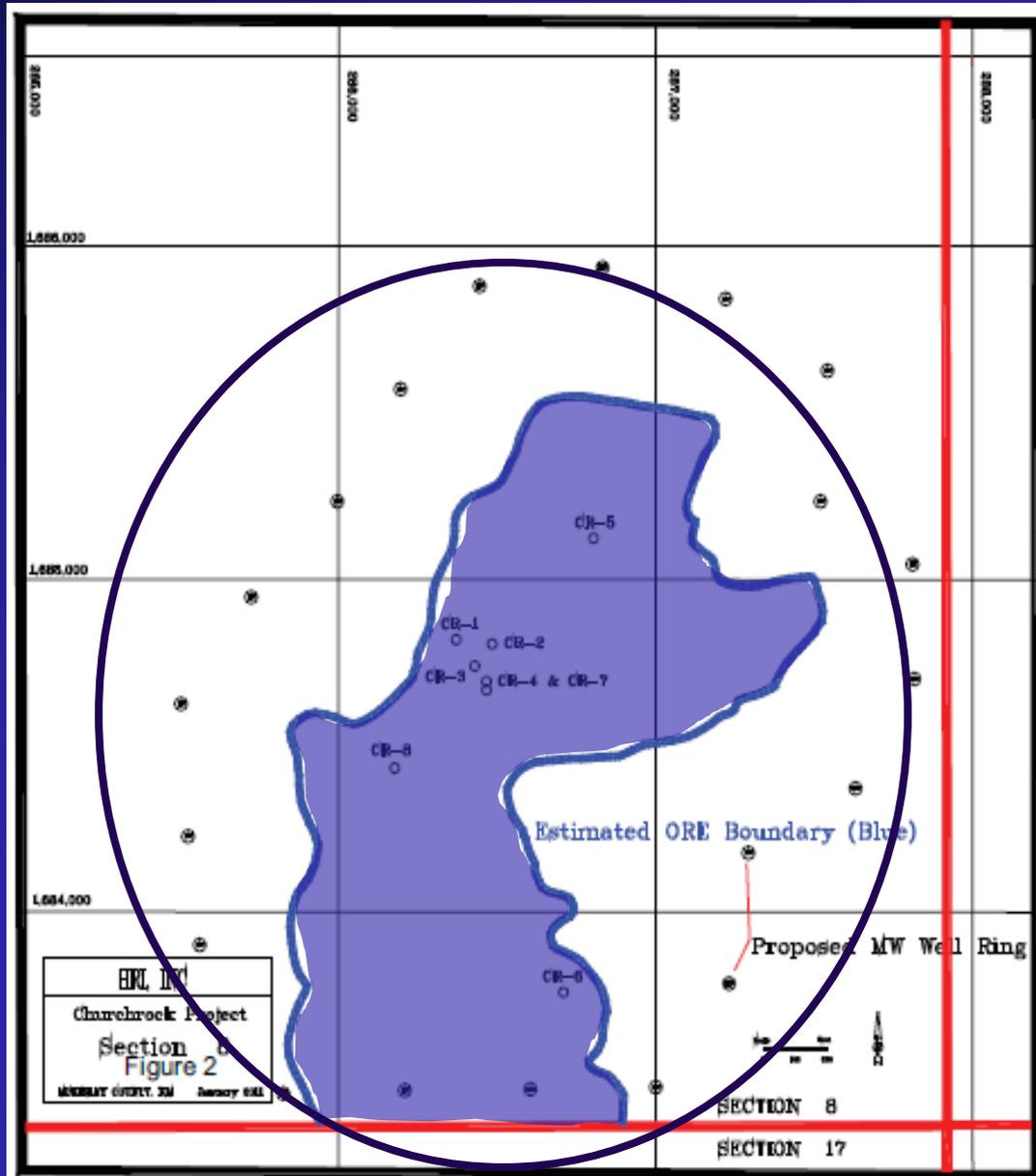


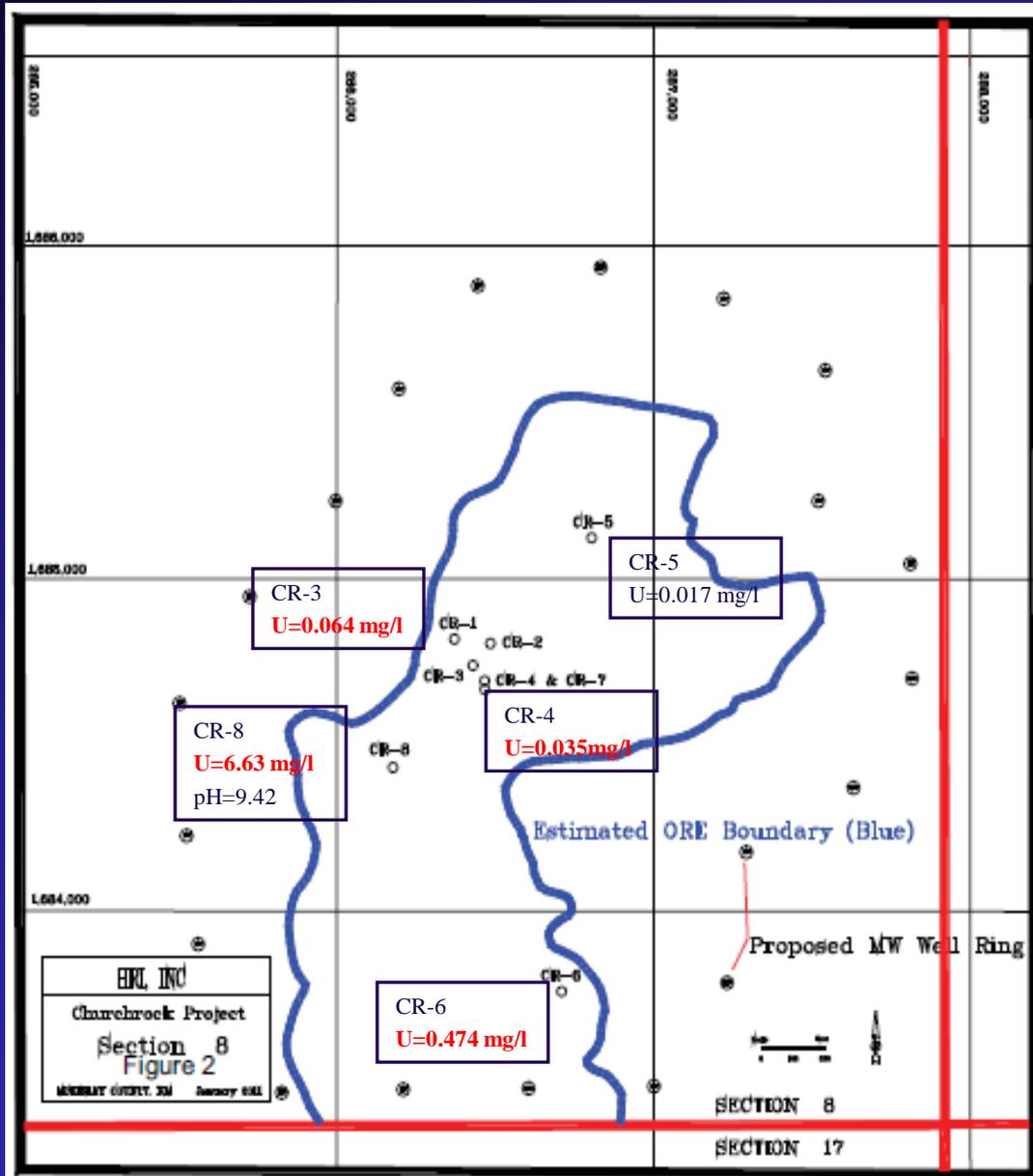
Figure 4. Type Stratigraphic Column



Establishing Groundwater Background



Establishing Groundwater Background



Historic Conditions

- 5 Wells Sampled
- 1987-1989
- 6-13 events
- Averages reported



Groundwater Restoration – Case Studies

Summary of GW Restoration at ISL Mines in Texas

2007

- 27 ISL mines permitted, all but 1 operated
- 80 Production Authorization Areas (PAAs)
 - 76 of 80 permitted PAAs operated
 - 51 out of 80 PAAs have restoration values established
- 1 out of 51 PAAs did not require an amendment to close
 - MCL's may be higher than baseline, but baseline determines restoration
- COC's (Restoration) > Baseline

Arsenic	7
Molybdenum	8
Selenium	12
Radium	22
Uranium	40



Groundwater Restoration – Case Studies



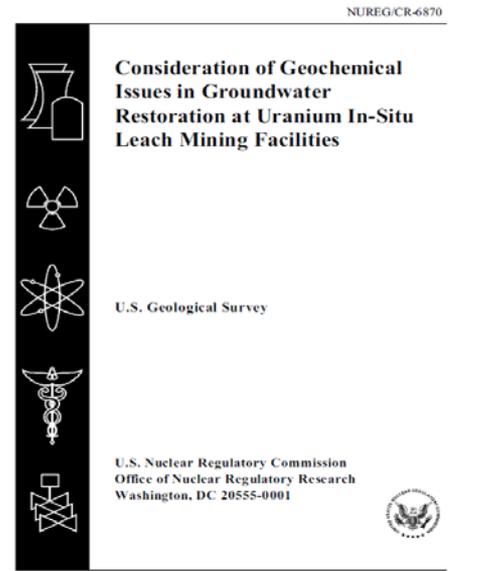
Groundwater Restoration at Uranium In-Situ Recovery Mines, South Texas Coastal Plain



Open-File Report 2009-1143

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

- Reviewed 27 Texas sites in 2009
- 22 of 77 PAAs have post-restoration data
- Conclusions similar to Southwest GW report
- Open File Report, not final



- Reviewed 4 sites; 2 in Wyoming, 2 Nebraska in 2007
- Concluded that restoration > Baseline and MCLs for
- Radium and uranium (all 4 sites)

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Report on Findings Related to the Restoration of Groundwater at In-Situ Uranium Mines in South Texas

Submitted to
Blackburn & Carter
4709 Austin Street
Houston, Texas 77004



September 29, 2008

Bruce K. Darling

- Reviewed Texas sites in 2008
- Concluded that out of 76 PAAs
- 51 had restoration tables established
- 25 restoration tables not established
- 2 sites met baseline w/out amending tables for all COCs
- All others closed under amended tables



Groundwater Restoration Demonstration HRI

Evaluation of Existing data at ISL sites in Texas - Limitations

Limited dataset

Establishment of Baseline - Average values

Easy to amend restoration tables

Where in the clean up curve did restoration end?

