

Oil & Natural Gas Technology

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Quarterly Report

October 2011 - December 2011

Water-related Issues Affecting Conventional Oil and Gas Recovery and Potential Oil-Shale Development in the Uinta Basin, Utah



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EXECUTIVE SUMMARY

The Utah Geological Survey's (UGS) Uinta Basin water study is now nearing completion. The Task 2 and Task 4 draft final reports are completed and in the UGS review process, while the Task 3 draft report is roughly 50% finished. A second no-cost extension was granted in January 2012, extending the project's final ending date to April 30, 2012. Remaining project funds will be used to finalize the reports, travel to Morgantown, WV to present final results to NETL staff, and travel to the American Association of Petroleum Geologists (AAPG) annual meeting in April to present final results via two poster presentations.

PROGRESS, RESULTS, AND DISCUSSION

Task 1.0: Project Management Plan

During the month of October, the PI wrote and submitted the project's twelfth quarterly report for the period July through September 2011. This report was subsequently sent via email to all interested parties and posted on the UGS project website.

Task 2.0: Moderately Saline Aquifer Study

The Task 2 draft final report is finished and midway through the extensive UGS review process and should be completed in March 2012.

Figure 1 shows the finalized depth to the base of the moderately saline groundwater in the Uinta Basin (10,000 mg/L TDS). The deeper freshwater (greens) on the western side of the basin corresponds to several north-south trending faults, while the deeper freshwater around the northern rim represents freshwater recharge from the Uinta Mountains. Another prominent feature of the map is shallow saline groundwater (reds) trending east-west in the center of the basin. The combination of available salts in the upper Green River Formation in this area, an east-west fault and fracture system (the Duchesne fault system), which may enable vertical mobility of fluids in the rock column, and the topographic low of the Uinta Basin, all likely contribute to shallow saline groundwater along this trend.

Task 3.0: Geologic Examination of the Birds Nest Aquifer

The Task 3 draft final report is about 50% finished and is expected to be completed by the end of February 2012, with the final version ready for publication in late March. Figure 2 shows the finalized extent of the Birds Nest aquifer containing large saline nodules and representing the area having potential for large-scale saline water disposal, at least north of the 10,000 TDS line.

Task 4.0: Baseline Water Quality and Quantity GIS Database

The draft final report for Task 4 is now complete. The report is midway through the extensive UGS review process and should be completed in March 2012.

Task 5.0: Integration of Analysis of Produced Water from Simulated In-situ Oil Shale Extraction Technologies

As stated in the previous quarterly report, researchers in the Department of Chemical Engineering at the University of Utah have completed laboratory experiments simulating in-situ oil shale extraction with two overall objectives in mind: (1) determine the presence and species of dissolved organics in the water phase post-pyrolysis, and (2) determine the effect of the presence of water on retorting and its products. A detailed report/paper is currently being prepared by Dr. Milind Deo and his graduate students.

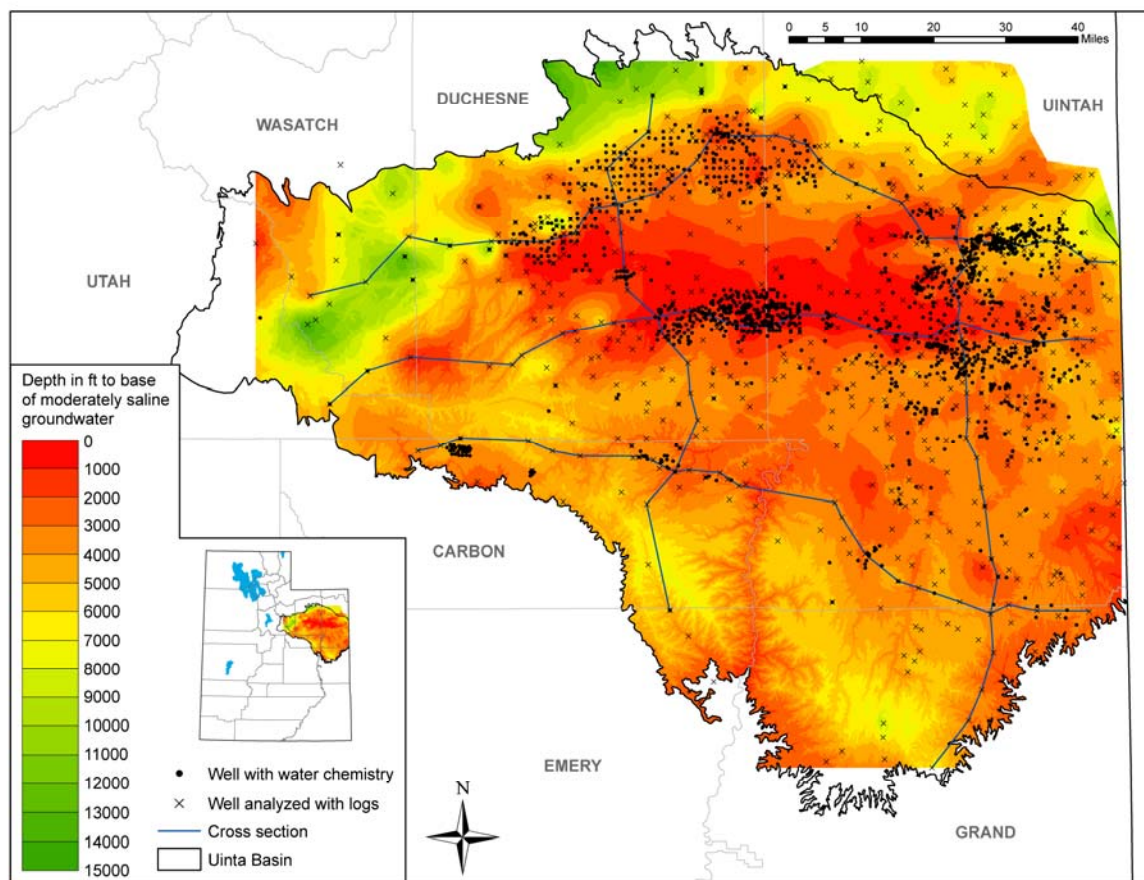


Figure 1. Depth to the base of moderately saline groundwater.

Task 6.0: Technology Transfer

- An abstract was accepted to the 2012 AAPG annual meeting which will be held in Long Beach, CA. The poster presentation will detail the final results related to Task 3, a geologic characterization of the Birds Nest aquifer.
- A second abstract was also accepted to the 2012 AAPG annual meeting. This poster presentation will detail the final results of the new base of the moderately saline groundwater mapping (Task 2).
- In October 2011, the PI led a field trip in association with the 31st Oil Shale Symposium in the Uinta Basin, stopping at Evacuation Creek to view the Birds Nest aquifer in outcrop and discuss the projects results.
- The project website (http://geology.utah.gov/emp/UBwater_study) was updated with new quarterly reports, abstracts, and presentations prepared by project team members.

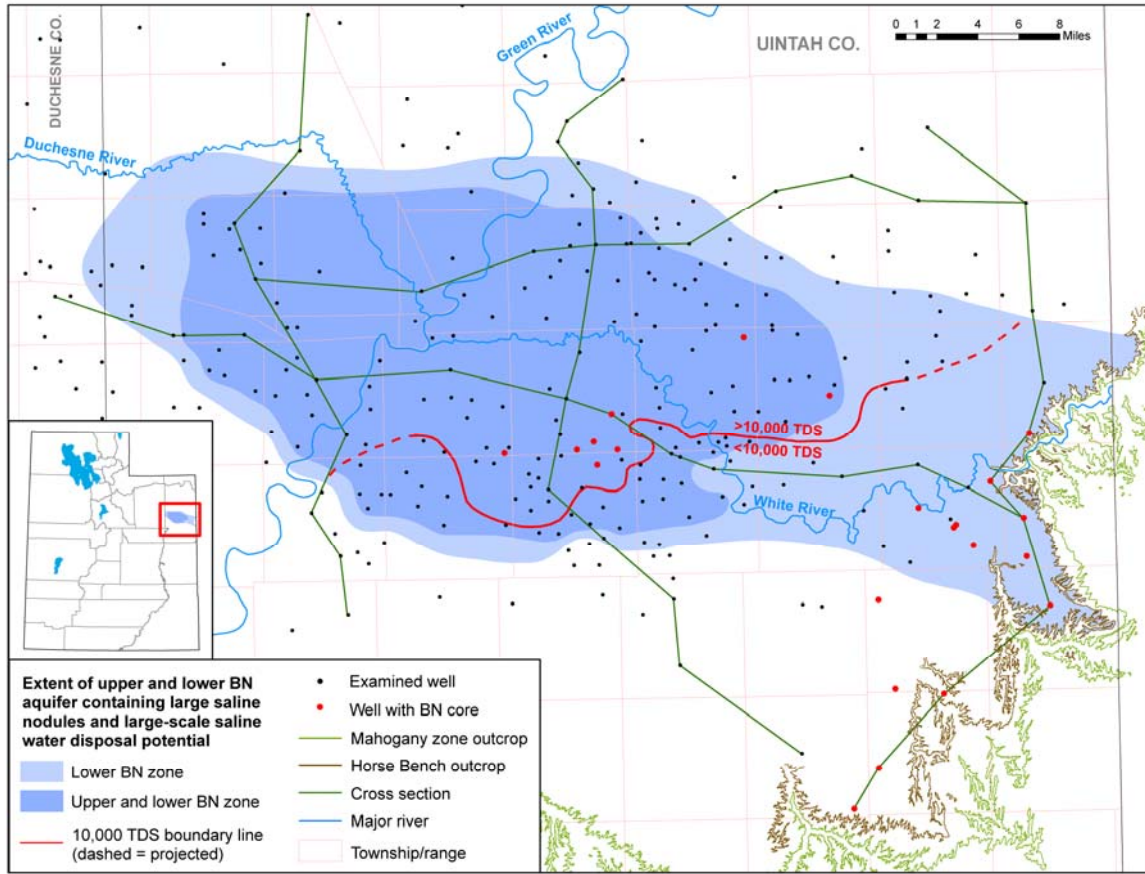


Figure 2. Extent of the Birds Nest aquifer containing large saline nodules; potential saline water disposal areas are north of the 10,000 TDS line.

CONCLUSION

The final draft reports for Task 2 and Task 4 are completed and in the UGS review process, while the final draft report for Task 3 is roughly 50% completed. A second no-cost extension was granted which extended the project's official ending date to April 30, 2012.

COST STATUS

A one-quarter no-cost extension was granted in August 2011, changing the project's official completion date to December 31, 2011. A second, four-month, no-cost extension was granted in January 2012, extending the final project ending date to April 30, 2012. As of December 2011, the project has billed 95.4% of projected costs; the remaining funds (\$33,239) will be used to finish the final reports and travel to Morgantown, WV and the AAPG in Long Beach to present final results.

Table 1. Project costing profile for first no-cost extension (3 months).

	Oct 2011		Nov 2011		Dec 2011	
	Plan	Actual	Plan	Actual	Plan	Actual
UGS-personnel		\$1,782		\$3,865		\$11,931
Travel Expenses ¹		\$193				
Water Chemistry				\$1,192		
Miscellaneous						
SUBTOTALS		\$1,974		\$5,057		\$11,931
UGS OVERHEAD (32.40%)		\$640		\$1,639		\$3,866
SUBCONTRACTS						
P. Anderson ²		\$7,176				\$5,880
GRAND TOTALS		\$9,790		\$6,696		\$21,677

¹October – Trip to Vernal to study Birds Nest in outcrop.

²December billing is for November

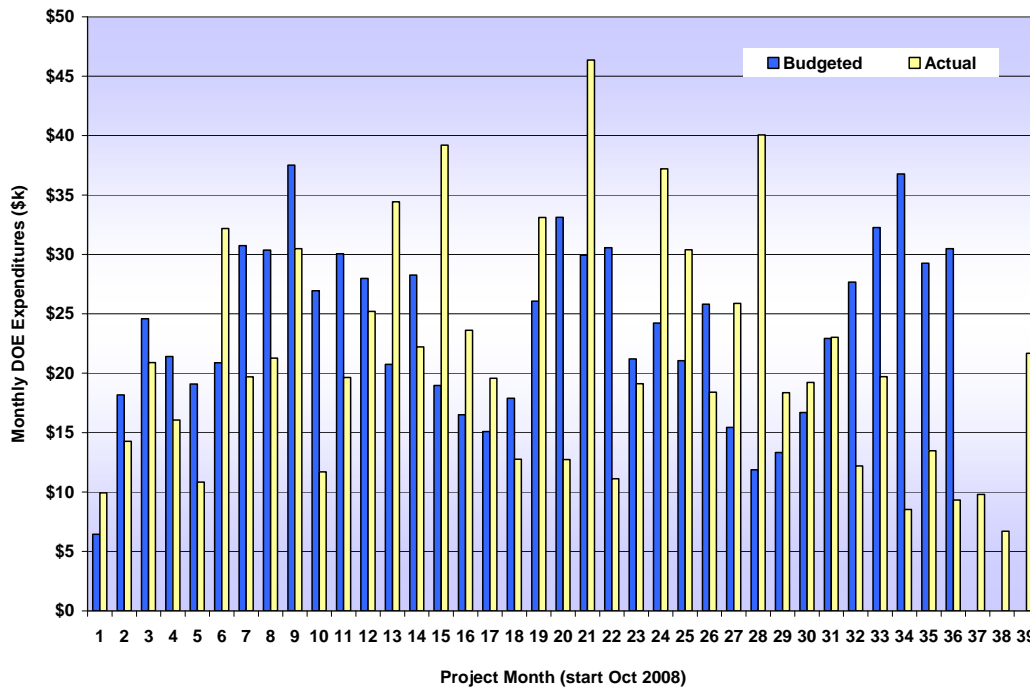


Figure 3. Project costing profile.

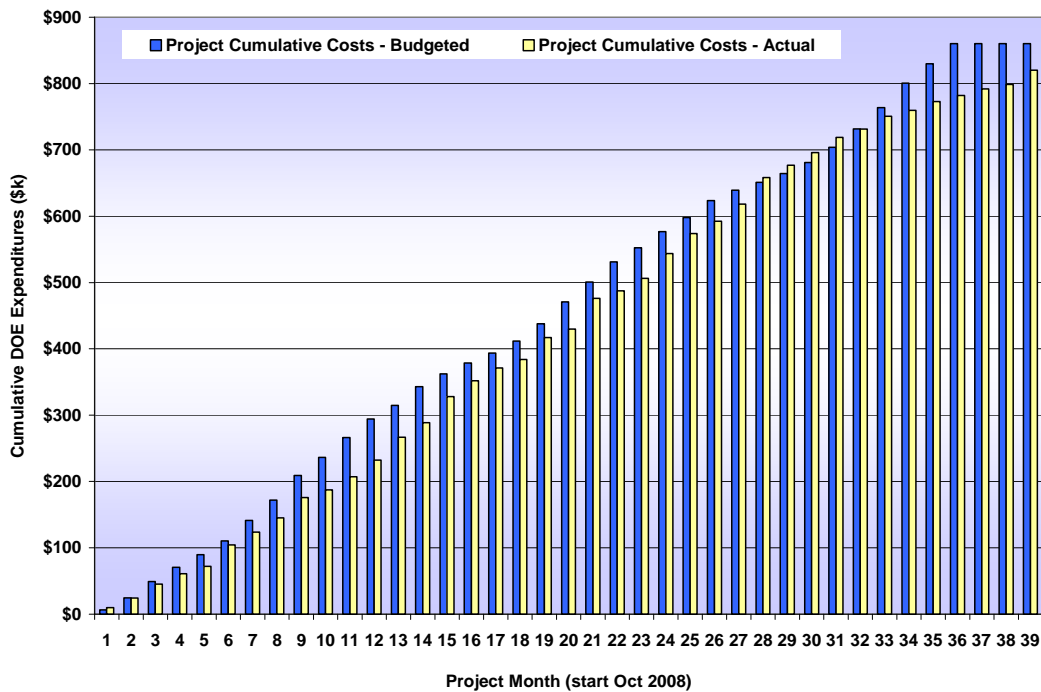


Figure 4. Project cumulative costs.

MILESTONE STATUS

Table 2. Milestone log for Budget Period 3.

	Title	Description	Related task or subtask	Completion Date	Update/comments
Milestone 3.1	Map the base of the moderately saline aquifer	Re-map the base of the moderately saline aquifer, including cross-sections, based on data collected during the previous two years	Subtask 2.2	3/31/2011	Draft report completed.
Milestone 3.2	Creation of Birds Nest aquifer maps	Map the thickness, extent, and water chemistry of the Birds Nest aquifer	Subtask 3.5	6/30/2011	All Birds Nest related maps are completed, final report in progress.
Milestone 3.3	Water quality and quantity analysis	Combine all collected water data and combine into a final report	Subtask 4.4	9/30/2011	Draft report completed.
Milestone 3.4	Integration analysis	Model transfer of oil and water to adjacent aquifers and beyond	Task 5	6/30/2011	Researchers at the University of Utah have completed this part of the project and are in the process of preparing a final report/journal article

ACCOMPLISHMENTS

- Two abstracts were accepted to the AAPG Annual meeting to be held in April 2012.
- Task 2 draft final report was completed.
- Task 4 draft final report was completed.

PROBLEMS OR DELAYS

A second no-cost extension (four additional months) was granted in January 2012, pushing the project's final ending date to April 30, 2012. This will allow the project team to utilize remaining funds for final report preparation and travel to present results in Morgantown, WV and at AAPG in Long Beach, CA.

PRODUCTS AND TECHNOLOGY TRANSFER ACTIVITIES

- Completed twelfth quarterly report
 - July 2011 through September 2011 – available on the UGS project website
- Updated project website
 - Posted various new reports, abstracts, and presentations prepared by project team members
 - http://geology.utah.gov/emp/UBwater_study
- Abstracts – AAPG Annual meeting – Long Beach, CA – April 22-25, 2012
 - Two abstracts were accepted, one detailing the final results of Task 2 (re-mapping the BMSA) and one detailing the final results of Task 3 (Birds Nest aquifer study)
 - The abstracts are available on the UGS project website
- Field trip – 31st Oil Shale Symposium, Colorado School of Mines, October 20-21, 2011
 - The PI led a field trip to the Uinta Basin for the 31st Oil Shale Symposium, stopping at Evacuation Creek to look at the Birds Nest aquifer and discuss the results of this project.

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