OGMCOAL DNR< ogmcoal@utah.gov>

UGS Hydrogeologic Proposal

1 message

Steve Christensen< stevechristensen@utah.gov> Wed, Jan 23, 2013 at 2:46 PM
To: "Steve_Falk@blm.gov" <steve_falk@blm.gov>, Steve_Rigby@blm.gov, Thomas W Lloyd <twlloyd@fs.fed.us>, Kyle Beagley <kbeagley@fs.fed.us>, Daron Haddock <daronhaddock@utah.gov>, Dana Dean <danadean@utah.gov>, April Abate <APRILABATE@utah.gov>, Amanda Daniels <amandadaniels@utah.gov>, Ken Hoffman <KENHOFFMAN@utah.gov>, Marc Stilson <marcstilson@utah.gov>, David Horsley <davidhorsley@utah.gov>, Jeffrey Brower <jeffrey_brower@blm.gov>, jeff_mckenzie@blm.gov, OGMCOAL DNR <ogmcoal@utah.gov>

Good afternoon,

I've attached the Utah Geological Survey (UGS) proposal for conducting a groundwater impact study in the Wasatch Plateau and Book Cliffs coal fields. For those who were unable to join in the conference call, representatives of the BLM, the Forest Service, DOGM and DWRi had a discussion with Paul Inkenbrandt and Mike Lowe of the UGS. We explored the possibility of having the UGS conduct an independent hydrogeologic investigation as to potential coal mining induced impacts to groundwater resources.

As a result of that meeting, the UGS has put together a proposed scope/study outline for the investigation (see attached). It was further discussed at the meeting that each of the aforementioned agencies would pursue funding options that may be obtainable for such a study. To that end, I have initiated inquiries with the Office of Surface Mining (OSM) to see if our state program may be eligible for some funding.

We also discussed having a meeting among the agencies to evaluate potential case study sites that could be examined during the course of such a study. Let me pose this question to the group: should we wait until we determine whether funding is even possible before having such a meeting, or would folks prefer to see the glass half full and have the meeting prior to determining the funding part of this?

I look forward to hearing from you.

Regards,
Steve

UGS- Wasatch Plateau Book Cliffs Coal Water Proposal - Google Drive.pdf
73K

Proposed Utah Geological Survey Study of Potential Impacts of Coal Mining on Groundwater

Problem/Issue: Currently, coal mines seeking permits claim that the units proposed to be mined have little or no hydrologic connection to the overlying aquifers, and that once the mined units are dewatered, the mines will produce no or little water. Anecdotal evidence has suggested that mines continue to produce large amounts of water over extended periods of time. However, groundwater chemistry data suggest that, in areas having few faults, near-surface groundwater has little or no connection to water in the mined units. The presence of faults and fault characteristics in relationship to hydrologic connection between near-surface aquifers and mined hydrogeologic units needs to be better described and more closely examined.

Objective: Assess the potential hydrologic connections between the upper aquifer units and the target mining units (shallow versus deeper aquifer systems) and the effects of potential connections on vegetation and surficial hydrology. Describe hydrologeologic conditions, focusing on the potential role of faults as fluid conduits, in areas of former, existing, or potential coal mining. The results of this research would benefit all parties by increasing the available information on these complex systems allowing mining companies and regulators to more accurately assess potential impacts.

Scope: Three Select Case areas; at least two of these would be on the Wasatch Plateau). Two case areas could be places where mining has already occurred, one with faults and one without mapped faults. And the third could be area where mining is planned but has not occurred yet.

Timeframe: Three years

Approximate Cost: $200,000 (50% of this would be matched by the UGS)

Approach:

1. Review and compile existing data. This portion of the approach would extend beyond the selected case areas and encompass the entire Wasatch Plateau and perhaps the Book Cliffs. Results of this work would help with selection of case areas.
    a. Conduct a bibliographic review of the relevant documents published so far on the subject, critically reviewing the information in key documents; Synthesize the previous work into a cohesive conceptual framework of the hydrogeology of the region
    b. Perform a comprehensive compilation of available water chemistry data, examining the data for statistical relationships, temporal variation, and spatial trends.
    c. Compile and digitize all available spring discharge, well water level, mine discharge, and climate data and use statistical analyses to establish correlations and relationships between the data.

    d. Compile existing geologic mapping into a GIS format.
    e. Compare discharge and chemistry changes to stages of mine development.
2. Examine structures in the selected case areas. Explore the relationship between structure locations and types to spring and mine water discharge and chemistry.
    a. Refine geologic structure mapping on 1:100,000-scale geologic maps, to a scale of 1:24,000. Finding good exposures may present some issues. Work with coal mine geologists, if possible to help refine the map. If fault exposures
    b. When mapping, if the faults are well exposed (which may be uncommon in this region), thoroughly describe the nature of the fault structure including fracture types including joint, deformation band or faults, degree and type of mineral infilling, orientation and relative density of these characteristics. Also note related hydrologic features (i.e. springs and streams).
    c. Talk to mining companies and mining geologists or even seek access (if mine is still open) to describe nature of fault and fracture structures in the subsurface.
    d. Use results of mapping to select water sample sites and sample water for dissolved gasses, Tritium, C14, H and O isotopes, and general chemistry.
    e. Assimilate collected data with existing data and determine if there are significant relationships between faults, discharge rates, and water chemistry.
3. Conduct a Landsat Vegetation Index over the selected case areas:
    a. Process and compile available Landsat satellite imagery. Landsat has good temporal resolution and consistent image properties allowing us to examine environmental changes for the past 30 years.
    b. Use processed imagery to compare vegetation indices, which are indicative of water availability
    c. Determine influence of climate variability and mining activity on vegetation indices.

After completing the three phases, we will examine our findings and deliver them in a comprehensive report describing the hydrologic framework and geochemistry in the select regions of interest.