BLM Colorado, Royal Gorge Field Office
43 CFR 3809 Minerals Inspection/Site Visit

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DIVISION OF RECLAMATION
MINING AND SAFETY

General Information

Date	09/15/15	
Time Onsite	9:40 am – 2:50 pm	
Project Name	Black Range	
Project Location	Middle Tallahassee Creek Valley (T 17 S, R 73 W, scn. 21 and 27)	
Project Status	Active	
Project Type	Exploration	
Occupancy Status	None	
Operator	Black Range Minerals	
Case No.		
Inspection Purpose	General	
Attendees	William Jenkins (BLM)	
	Stephanie Carter (BLM)	
	Tim Cazier (DRMS)	
	Pat Siglin(Black Range)	

Inspection Results

In conformance with 43 CFR 3809.420?	Yes
Mining in conformance with Notice/Plan requirements?	Yes
Reclamation in conformance with Notice and/or Plan requirements?	Yes
Hazardous materials/waste onsite?	None
Instructions to Operator	Weed species from all over the valley have spread onto drill pad sites
Recommended Action(s)	Please implement weed control on the affected drill pads
Date inspection shared with CDRMS/Operator	

Inspection Comments

- The operator does not think that they will be able to implement their NOI modification until next spring or summer because they need to renew their CUP with Fremont County
- The eventual mine plant will involve borehole mining that incorporates ablation technology to remove Uranium that is coating the grains of deeply buried sandstones
- The Western Uranium Corporation is going to buy out Black Range Minerals; although, the operations of Black Range will likely continue under the same name

- Over the course of the inspection, 8 bore holes were observed and GPS locations were recorded
    - 4 of the 8 bore holes that were observed had piezometers that record pressure (pertaining to the groundwater level) and temperature on 12 hour intervals
    - Of the 8 boreholes, one borehole (hndd010) was located on BLM land
- Eleven Ground water monitoring wells were also observed during the inspection, and their locations were recorded with GPS
    - These wells targeted several rock units (including the Echo Park SS and the Tallahassee Creek Formation) and focused on water quality
    - These wells are sampled quarterly
    - Their depths varied between 30 and 810 feet deep
        - Shallow wells focused on alluvial waters; whereas, deeper wells recorded data on groundwater
    - 3 of these 11 wells had artesian flows, and all of which were between 250 and 300 feet deep
        - MW-27-291 (250-300 feet deep) had an upward flow of ~1 liter per hour
        - MW-27-293 (250 feet deep) had an upward flow of ~ 1 gallon every 7 minutes
        - MW-27-294 (250-300 feet deep) had an upward flow of ~ 1 gallon every hour
    - The wells with artesian flow have been lightly pressurized to prevent water from rising up the borehole. The operator indicated that the wells were <u>not</u> pressurized to the extent that they dramatically increased the dissolved oxygen levels of the groundwater, so as to not act as an oxidizing agent to the uranium.
    - Each of the Groundwater Monitoring Wells had a 40 foot screen, a 20 foot bentonite seal, and a bentonite-grout mixture from the bentonite seal to the surface. They also had adequate sumps at their base.
    - Currently, the highest concentration of Uranium in groundwater was recorded at the MWC-21-202 well
        - This well is 750’ deep, and was drilled into the Echo Park formation
        - This well was drilled by Cyprus, prior to Black Range’s involvement on the site
        - The Uranium levels are measured via the metals method (total and dissolved) and its total radio chem (radium daughter products)
- As long as these monitors (on the Monitoring Wells, and bore-hole Piezometers) are in place and operational, the operations will remain at a Notice –level
    - The bore-hole monitors have a lifespan of 5 years, and were installed in 2011
- There are several groundwater monitoring wells that are already down-gradient from the operator’s proposed borehole mining site. Although, 4 additional groundwater monitoring wells will be installed at the time of drilling.

- Notes on the Uranium Enrichment process
    - Enriching uranium is a process whereby one increases the proportion of Uranium atoms that can be split by fission. These “splittable” atoms are U-235 atoms.
    - Naturally occurring Uranium ore is only 0.7% U-235, and the remaining 99.3% is U-238 (which is not fissile, and cannot undergo Nuclear Fission to generate the energy required to keep triggering more reactions to take place)
    - The chain reactions that are stimulated by nuclear fission (splitting apart an atoms nucleus, and releasing its nuclear energy) is the process that, in turn, can be used to generate nuclear power
    - At the Black Range Site, the Echo Park SS ore grade is 0.13% Uranium (it is naturally occurring so there are both U-235 and U-238)
        - So the actual usable concentration of Uranium (U-235) is much lower (only about 0.7% of the 0.13% grade)

- It should be noted that the concern with naturally occurring U-238 is specific to its metal characteristics and the products of its radioactive decay (such as Radon gas)
  - U-238 is weakly radioactive and considered a toxic heavy metal (although, it is less toxic than Arsenic and Mercury)

Photo Summary

The hndd002 drill pad. This site was active in 2011, and vegetation has only recently started to return because of this year's rains.

The hndd003 borehole and piezometer. Note the fence which is protecting the piezometer equipment.

One of the GW monitoring wells onsite (MW-27-291). This one was lightly pressurized to prevent the well's artesian flow from rising too high. These wells are checked on a quarterly basis.

GW monitoring well MW-27-290. Note the thistle-like weed in the foreground. This species has covered a very widespread area of the valley floor this year.

GW Monitoring Well MW-27-287. This well has a total depth of 120’ and intersects the Picnic Tree deposit.

An exploration borehole (hndd009) that intersects the Picnic Tree deposit.

The hndd011 borehole and piezometer

The hndd010 borehole and piezometer. Currently, it is the only borehole on BLM land.

The proposed borehole mining site looking southeast down the Middle Tallahassee Valley.

The GW monitoring well MWC-21-202 that was Cyprus drilled, and had the highest concentration of Uranium relative to the other 11 monitoring wells.