

SUMMARY OF FINDINGS
Supplementary Groundwater Investigation
Prenter Road Area

Background

During the previous Triad study, two domestic wells (DW-25 and DW-26) exhibited the greatest evidence of mine-related impact. These wells were located along Hopkins Fork, adjacent to a reclaimed surface mine operation on the ridge top to the east of Prenter Road (Battle Ridge Companies Orgas No. 2 Mine) and immediately adjacent to an abandoned pre-law underground mine (Red Parrot Coal Co. Red Cedar Mines).

The Orgas No. 2 surface mine removed the Upper, Middle and Lower Five Block seams. The Lower Five Block lies approximately 650 ft. above the domestic wells. The Red Parrot Coal Co. Red Cedar Mines removed the Fire Clay seam at an elevation approximately 20 ft. above the domestic wells.

A third domestic well, located near the mouth of Prenter hollow (DW-32), contained lead at a concentration approximately two times the MCL. The resident was connected to public water at the time of our study but uses the water for garden and outdoor use.

Our Study

Three separate samples were planned at each location to evaluate possible effects of the domestic plumbing system, such as piping, fixtures, tanks, etc. The first sample was collected with no purging of the plumbing system or fixtures. The second sample was collected after purging approximately 10 gallons. The third sample was collected after purging approximately 30 gallons.

Three samples were collected from DW-32 according to plan. Bobby Mitchell of The Sutter Law Firm was also present during the sampling.

Since the time of the initial Triad study, public water was extended to locations DW-25 and DW-26 and the well plumbing at those locations was removed. Therefore, it was not possible to collect additional samples from these wells. The existing water line now terminates immediately upstream from locations DW-25 and DW-26.

Five environmental samples associated with the Orgas No. 2 mine were collected. Two were collected from valley fill discharges that occur in a separate watershed to provide information regarding water quality within spoil material from the mine. The valley fills are not located within

the same watershed as wells DW-25 and DW-26, and therefore, are not hydrologically connected to the wells.

Three samples were collected within the Prenter drainage area from surface stream headwaters (groundwater discharge) immediately west of the mine (between the mine and the domestic wells).

No discharge was noted at the Fire Clay seam openings; therefore, laboratory results from a mine in the same seam that was sampled previously by others for an AML Phase 2 study was used for comparison with the domestic well data.

Water samples were analyzed for metals referenced by the primary drinking water standards, total and fecal Coliform, all secondary drinking water standards, mine-drainage indicators such as acidity/alkalinity, iron, manganese, aluminum and sulfate, and volatile organic compounds. Also, samples were analyzed for major anions and cations such as calcium, magnesium, sodium, potassium, chloride, carbonate and bicarbonate.

DW-32 Findings

Department of Health and Human Resources (DHHR) collected samples from DW-32 for coliform bacteria and determined that coliform bacteria were not present in the water sample.

The initial sample with no flushing contained lead and iron above the MCL. However, samples collected after flushing 10 gallons and after 30 gallons did not contain any parameters above the MCL or secondary standard. Therefore, lead was apparently present in the initial sample due to leaching from household or down-well plumbing fittings. Galvanized lead fittings were noted at the outdoor faucet where samples were collected.

Three VOCs were detected below the Practical Quantitation Limit in the pre-flush sample. Benzene was estimated at 0.0004 mg/L, acetone was estimated at 0.0093 mg/L, and 1,4-dichlorobenzene was estimated at 0.0004 mg/L. The MCL for benzene is 0.005 mg/L. Standards have not been established for acetone or 1,4-dichlorobenzene.

After flushing, VOCs were not detected. Therefore, the presence of VOCs in the initial sample is not related to groundwater quality in the well.

These VOCs are all relatively common environmental contaminants that are likely related to the use of various household products. Benzene is present in gasoline. Acetone is a common paint thinner and solvent. 1,4-dichlorobenzene is a common ingredient in insecticides and sanitizers. The use of

various household products in the vicinity of the outside spigot where the sample was collected are the most likely source of low concentrations of VOC compounds detected in the initial sample.

DW-25 and DW-26 Findings

Water quality at locations DW-25 and DW-26 was most similar to water quality at the abandoned deep mine in the Fire Clay seam (MD-2). Both iron and sulfate were elevated at MD-2 and at locations DW-25 and DW-26.

Wells at locations DW-25 and DW-26 likely derive their water from the valley bottom bedrock aquifer rather than the thin alluvial deposits along Hopkins Fork. Groundwater generally flows from the bedrock aquifer into the alluvium. Therefore, it would not be expected that surface water quality would impact groundwater quality at locations DW-25 and DW-26.

Water quality at locations DW-25 and DW-26 was not similar to water quality associated with raw slurry. Additionally, locations DW-25 and DW-26 are not hydraulically connected to previous slurry disposal locations at the southern boundary of the Prenter watershed.

The two valley fill discharges located in the adjacent drainage area exceeded the MCL for beryllium and the secondary standard for aluminum, manganese, sulfate and total dissolved solids. However, these discharges are not hydraulically connected to the aquifer at DW-25 and DW-26.

Analysis of the five environmental samples suggests that the reclaimed surface mine may be impacting groundwater quality to a limited degree in the immediate vicinity of the mine site, but the impacts do not appear to be of sufficient magnitude to have degraded the valley bottom bedrock aquifer and impacted DW-25 and DW-26. The two valley fill discharges and sample GW-2 exhibited strong mine related impact characteristics on both Piper and Stiff diagrams, while samples DW-25 and DW-26 did not.

Domestic well samples DW-25 and DW-26 exhibit Piper and Stiff characteristics most similar to discharge from the underground mine in the Fire Clay seam.

The groundwater pooled within the abandoned deep mines lies at an elevation near the valley bottom aquifer, and therefore, has a greater potential to impact water quality within the aquifer. It is more likely that water associated with pre-law abandoned workings in the Fire Clay seam are impacting water quality at DW-25 and DW-26, than discharge from the Orgas No. 2 surface mine.