



CONSOL ENERGY™

Consolidation Coal Company
P.O. Box 566
Sesser, IL 62884
(618) 625-2041

December 19, 2011

VIA ELECTRONIC AND REGULAR MAIL

Kim Shelley
Department of Environmental Quality
Division of Water Quality
Permits and Compliance Section
195 North 1950 West, Third Floor
PO Box 144870
Salt Lake City, Utah 84114-4870

**Re: Consolidation Coal Company
UPDES Permit Renewal
Final Antidegradation Level II Review Application**

Dear Ms. Shelley:

On May 9, 2011, we submitted our UPDES Permit Renewal package, which included our Antidegradation Level II Review Application. On August 31, 2011, you indicated that DWQ had completed its review of the Level II Review Application, and provided various comments and requests for additional information. By letter of October 12, 2011, we submitted our responses to those comments and requests, which were incorporated into an attached revised UPDES Permit Renewal package, including a revised Level II Review Application.

On December 15, 2011, we discussed with you and Nicholas Von Stackelberg your comments on that revised Level II Review Application. We have incorporated those comments and suggestions into the final version of our Level II Review Application, which is attached hereto. The attached final Level II Review Application also includes a revised Supplement 2 reflecting the revised Estimated Present Value Costs of Alternatives.

Please let us know if we can provide any additional information.

Best regards,



John Gefferth

Enclosure

cc: Nicholas Von Stackelberg
Marty Banks
Karla Knoop
Rich White

Antidegradation Review Application (Flow Increase)

Part A: Applicant Information

Applicant: Consolidation Coal Company

Facility Owner: Consolidation Coal Company

Facility Location: Latitude 38° 52.5' Longitude 111°14'
Emery County, 3 miles south of Emery, Utah

Application or Plans Prepared By: JBR Environmental Consultants, Inc.
& Consolidation Coal Company

Project Name: Emery Mine

Receiving Water: Quitchupah Creek

What Are the Designated Uses of the Receiving Water (R317-2-6)?

- 2B Infrequent primary contact recreation & secondary contact recreation;
- 3C Nongame fish and other aquatic life; and
- 4 Agricultural uses.

Category of Receiving Water (Category 1, 2, or 3 from R317-2-3.2, -3.3, and -3.4):
Category 3 under R317-2-3.4

UPDES Permit Number (if appropriate): UT0022616

What is the application for? (check all that apply)

- An application for a UPDES permit for a new facility or project.
- An expansion or modification of an existing wastewater treatment works facility that will result in an additional of a new pollutant not currently covered by the permit.
- An expansion or modification of an existing wastewater treatment works that will result in an increase in the mass or concentration of a pollutant discharged to waters of the state.
- A permit renewal requiring limits for a pollutant not covered by the previous permit.
- An expansion or modification of an existing wastewater treatment works that will result in an increase in volume discharged over the volume used to obtain previous permit limits. (Treatment works will not change, but discharge will increase.)
- A proposed UPDES permit renewal with no changes in facility operations.

Part B. Is a Level II ADR required?

This section of the application is intended to help applicants determine if a Level II ADR is required for specific permitted activities. However, the Executive Secretary may require a Level II ADR for an activity that would otherwise be exempt if extenuating circumstances suggest that a more extensive review of alternatives is needed to protect water quality.

B1. Are water quality impacts of the proposed project temporary and limited (Section 3.3.4)? Proposed projects that will have temporary and limited effects on water quality can be exempted from a Level II ADR.

Yes Identify the reasons used to justify this determination from Part B1.1 and proceed to Part G. No Level II ADR is required.

No (Proceed to Part B2 of the Application)

B1. 1 Complete this question only if the applicant is requesting a Level II review exclusion for temporary and limited projects (see R317-2-3.5(b)(3) and R317-2-3.5(b)(4)). For projects requesting a temporary and limited exclusion please indicate the factor(s) used to justify this determination (check all that apply and provide details as appropriate) (Section 3.3.4 of Implementation Guidance): *N/A*

The length of time during which water quality will be lowered is limited.
How long?

Water quality impacts are related exclusively to sediment or turbidity and fish spawning will not be impaired.

There is little potential for long-term residual or short-term (acute) negative influences to existing uses.

B2. Will any pollutants use assimilative capacity? For most pollutants, are pollutant concentrations in the effluent higher than the ambient concentrations at critical conditions in the receiving water (Section 3.3.3 of Implementation Guidance)? For some pollutants such as pH, assimilative capacity is used when effluent concentrations are less than the ambient concentrations in the receiving water.

Yes A Level II ADR is required. Proceed to Part C.

Total dissolved solids (TDS)

No No Level II ADR is required and there is no need to proceed further with application questions.

B3. Is the proposed project to an existing UPDES permit with no proposed changes to the discharge (Section 3.3.3 of Implementation Guidance)?

- Yes** No Level II ADR is required and there is no need to proceed further with application questions.
- No** A Level II ADR is required. Proceed to Part C.

B4. Is the permit being renewed with new effluent limits and the corresponding effluent concentrations and load for these parameters will not increase (Section 3.3.3)?

- Yes** No Level II ADR is required and there is no need to proceed further with application questions.
- No** A Level II ADR is required. Proceed to Part C.

Part C. Is the degradation from the project socially and economically necessary to accommodate important economic or social development in the area in which the waters are located? *The applicant must provide as much detail as necessary for DWQ to concur that the project is socially and economically necessary when answering the questions in this section. More information is available in Section 6.2 of the Implementation Guidance.*

C1. Optional Independent Report. Questions C2 through C6 are provided for the convenience of applicants. However, in some cases it may be easier to address the factors captured by these questions in a separate report. Applicants that prefer a separate report should record the report name here and proceed to Part D of the application. N/A

C2. Describe the social and economic benefits that would be realized through the proposed project, including the number and nature of jobs created and anticipated tax revenues.

Consol must continue dewatering the Emery Mine if it is to provide safe operating conditions for underground workers and remain viable. The mine cannot function either operationally or within the terms of its Mine Safety Health Administration (MSHA) permit if groundwater is simply allowed to collect underground. Thus, the groundwater discharge must occur regardless of production levels or types of mine operations, including periods of temporary mining cessation. Ensuring worker safety is a critical social benefit.

The Emery Mine operations create mining, distribution, and related service-sector jobs as well as indirectly support the local and regional economy through increasing the demand for non-mine related goods and services. The mine is located in Emery County where coal mining is a major industry (Utah Department of Workforce Services 2010). The Emery Mine produced 1,238 thousand short tons of coal in 2009 (Utah Geological Survey

2011). During this time, Consol had 177 employees with wages and benefits paid totaling \$16,748,282. In addition, associated goods and services were purchased in the amount of \$14,108,741. Consol's total direct expenditure into the local economy in 2009 was \$38,560,915.

Because the mine is located in Emery County, it is assumed that this county receives most of the economic benefits associated with the mine. The estimated county population in the year 2009 was 10,848 (Utah Department of Workforce Services 2010), up from 10,610 in 2008, a 2.2 percent increase. Mining jobs make up 15 percent of the nonfarm employment in Emery County. Consol is the sixth largest employer in the county. Emery County currently holds the distinction of having the highest average monthly wage in the state at \$3,602. According to the Utah Department of Workforce Services (2010), most industries saw an increase in the average monthly wage, but the increase in Emery County was primarily the result of wage increases in the mining, construction, and utilities industries; between 2008 and 2009, the average mining wage rose from \$4,972 to \$5,816. Wages paid by the mining industry are an important component of Emery County's economy.

Economic multipliers are used to describe the effects on the economy resulting from changes in the industrial sector. The U.S. Bureau of Economic Analysis has provided a list of United States Industry Employment Multipliers (<http://www.contentfirst.com/multiplier.shtml>). A direct effect employment multiplier is used to predict total changes in employment due to an initial direct change in a given sector or industry. The coal mining direct effect employment multiplier is 4.4; this indicates that for every new job in the coal mining sector, employment in other sectors goes up by 4.4 jobs.

Some of the coal mined at the Emery Mine is Federal coal. Federal coal leasing generates assorted revenues including: (1) a bonus paid at the time the coal is leased, (2) rental payments to hold the lease, and (3) royalties paid on the value of the coal produced per year. The State in which the coal is leased receives half of the bonus as well as half of the royalties. Every competitively issued lease requires a royalty rate of 8 percent for coal mined by underground methods. The Utah Legislature distributes Federal mineral lease funds to communities, counties, and other entities as part of the annual budget and appropriation process.

Consol's contribution to the rural economy in this area in turn provides a social benefit to residents. Further, the Emery Mine also provides important social and economic benefits on a regional/national scale by supplying coal for domestic energy production.

C3. Describe any environmental benefits to be realized through implementation of the proposed project.

Consol's continued discharge of intercepted groundwater provides an important supplement to natural stream flows in Quitcupah and Ivie Creeks. The discharge provides water of a suitable quantity and quality to support riparian vegetation, which in turn supports a diversity of avian, reptilian, and mammalian species. It also provides water of a suitable quantity and quality to support the streams' designated Class 4 beneficial use (agricultural uses).

C4. Describe any social and economic losses that may result from the project, including impacts to recreation or commercial development.

None projected.

C5. Summarize any supporting any information from the affected communities on preserving assimilative capacity to support future growth and development.

The communities in Sevier and Emery County, who are the primary economic beneficiaries of the continued operations at the Emery Mine, are all located upstream of the UPDES discharge and thus would not be affected by any decrease in Quitchupah Creek's assimilative capacity related to the mine discharge. Further, there are no downstream communities along or near Quitchupah Creek, Ivie Creek downstream of the Quitchupah Creek confluence, or Muddy Creek downstream of the Ivie Creek confluence. Hanksville is the nearest downstream community and it is located more than 50 stream miles away at the confluence of Muddy Creek and the Fremont River. The intervening lands are remote, isolated, and topographically challenging; they are unlikely to be the subject of future growth or development that would require additional use of assimilative capacity.

C6. Please describe any structures or equipment associated with the project that will be placed within or adjacent to the receiving water.

None.

Part D. Identify and rank (from increasing to decreasing potential threat to designated uses) the parameters of concern. *Parameters of concern are parameters in the effluent at concentrations greater than ambient concentrations in the receiving water. More information is available in Section 3.3.3 of the Implementation Guidance. Proceed to Part E.*

TDS is identified as a parameter of concern for this ADR, in part, because it has previously been determined that mine discharge concentrations often exceed ambient concentrations. Sulfate was initially considered as a potential parameter of concern, but because it is a component of TDS, which is established as a parameter of concern, a separate sulfate analysis is not needed.

Quitchupah Creek was listed as impaired for TDS in Utah's 2006 Integrated Report (DWQ 2006), but the listing was removed in later Integrated Reports. The 2010 Integrated Report (DWQ 2010) lists Quitchupah Creek as impaired for macroinvertebrates, although it does not associate the impairment with any particular pollutant. The impaired reach extends both upstream and downstream of Consol's mining facilities and outfalls; the sampling location upon which the impairment was based is located upstream of the facilities and outfalls. This report is currently under EPA review.

In addition, DWQ requested that Consol evaluate whether any trace metals should be considered as potential parameters of concern. To facilitate the analysis, DWQ provided ambient trace metals data that had been obtained during their routine sampling. After

evaluating those data, as well as other data that Consol has obtained, total iron was initially considered as a potential parameters of concern, but after evaluation it was not carried forward as a parameter of concern. A summary of the data and the evaluation is set forth in Appendix A, attached.

Part E addresses alternative treatment options for the identified parameter of concern – TDS.

Part E. Alternative Analysis Requirements of a Level II Antidegradation

Review. *Level II ADRs require the applicant to determine whether there are feasible less-degrading alternatives to proposed project. More information is available in Section 5.5 and 5.6 of the Implementation Guidance.*

E1. Please attach, as an appendix to this application, a report that describes the following factors for all alternative treatment options (see 1) a technical description of the treatment process, including construction costs and continued operation and maintenance expenses, 2) the mass and concentration of discharge constituents, and 3) a description of the reliability of the system, including the frequency where recurring operation and maintenance may lead to temporary increases in discharged pollutants. Most of this information is typically available from a Facility Plan, if available.

Report Name: [Appendix B. Alternative Treatment & Management Options for Consolidation Coal Company’s Emery Mine UPDES Discharges](#)

E2. Were any of the following alternatives feasible (check all that apply):

- | | |
|---|---|
| <input checked="" type="checkbox"/> Pollutant Trading | <input type="checkbox"/> Total Containment |
| <input checked="" type="checkbox"/> Water Recycling/Reuse | <input type="checkbox"/> Improved O&M of Existing Systems |
| <input type="checkbox"/> Land Application | <input type="checkbox"/> Seasonal or Controlled Discharge |
| <input type="checkbox"/> Connection to Other Facilities | <input type="checkbox"/> New Construction |
| <input type="checkbox"/> Upgrade to Existing Facility | |

E3. From the applicant’s perspective, what is the preferred treatment option?

[Continued reuse of a portion of the discharge water through on-site dust control and seasonal irrigation on leased acreage.](#)

E4. Is the preferred option also the least polluting alternative?

Yes

No

If no, what is the least polluting alternative? Pollutant trading via salt offsets.

If no, provide a summary of the justification for not using the least polluting alternative and if appropriate, provide a more detailed justification as an attachment. Limited opportunity for offset project within the Quitchupah Creek watershed.

Part F. Optional Information

F1. Does the applicant want to conduct optional public reviews? More information is available in Section 3.7.1 of the Implementation Guidance

No

Yes

F2. Does the project include an optional mitigation plan?

No Proceed to Part G

Yes Proceed to Part F2.1

F2.1 Does the mitigation plan apply to specific project alternatives?

No

Yes

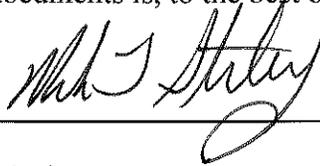
Part G. Certification of Antidegradation Review

G1. Applicant Certification

The application should be signed by the same responsible person who signed the accompanying permit application or certification.

Based on my inquiry of the person(s) who manage the system or those persons directly responsible for gathering the information, the information in this application and associated documents is, to the best of my knowledge and belief, true, accurate, and complete.

Signature: _____



Date: _____

12-16-11

G2. DWQ Certification and Approval

G2.1 To the best of my knowledge, the ADR was conducted in accordance with the rules and regulations outlined in UAC R-317-2-3.

WQM Section

Signature: _____

Date: _____

G2.2 To the best of my knowledge, all feasible treatment options were examined and a final treatment option was selected that represents the least degrading, yet affordable (as defined in R-317-2-3.5(c) treatment option (this signature is only required for Level II reviews).

DWQ Permitting

Signature: _____

Date: _____

References

Content First, LLC. n.d. Research and Information Services: Employment Multipliers. Available online: <http://www.contentfirst.com/multiplier.shtml>. Accessed September 13, 2011.

Utah Department of Workforce Services. 2010. Emery County Facts. Updated August 2010. Accessed September 13, 2011. Available online: <http://jobs.utah.gov/opencms/wi/regions/eastern/emery/emeryfs.pdf>.

Utah Division of Water Quality (DWQ). 2006. Utah 2006 Integrated Report.

Utah Division of Water Quality (DWQ). 2010. Draft 2010 Utah Integrated Report.

Utah Geological Survey. 2011. Utah Energy and Mineral Statistics. A web-based repository for energy and mineral data for the State of Utah. Accessed on September 13, 2011. Available online: <http://geology.utah.gov/emp/energydata/index.htm>.

APPENDIX A
SUPPLEMENT TO PART D, ADR APPLICATION

SUPPLEMENTAL INFORMATION
PARAMETERS OF CONCERN EVALUATION
CONSOLIDATION COAL COMPANY EMERY MINE UPDES DISCHARGE

DWQ provided trace metals data for two potential ambient sites in Quitchupah Creek upstream of the mine discharge. One site (Quitchupah Creek at US10 Crossing) is located approximately one-half mile upstream of Outfall 003 and the other (Quitchupah Creek above USFS Boundary) is located another 7-plus miles further upstream. In addition to its distance from the outfalls, the latter site has other limitations as a representative ambient site: it is upstream of a major tributary to Quitchupah Creek (North Fork); it is upstream of a significant UPDES discharge (from the SUFCO mine); and its water quality reflects a different geology than does the receiving reach. For those reasons, it (Quitchupah Creek above USFS Boundary) has not been considered as a representative ambient site. Instead, the closest site (Quitchupah Creek at US10 Crossing) has been chosen as the ambient site for the parameters of concern evaluation.

DWQ-provided data for the identified ambient site consists of three samples taken between August 2007 and May 2008. Trace metals concentrations of aluminum, arsenic, cadmium, chromium, copper, iron, lead, mercury, nickel, selenium, silver, and zinc were included in the data set. Of these, only those metals for which there are also data from the mine discharge records can be considered in the evaluation, as the latter is needed to make a comparison. This narrows the list of metals to arsenic, selenium, and iron.

For both arsenic and selenium, ambient data provided by DWQ consists of the previously mentioned three data points each (including two for arsenic given as “non-detect”). Discharge data consists of a single analysis from Outfall 001 (with < Reporting Limit results for both arsenic and selenium) and a single analysis from 003 (also with < Reporting Limit results for both arsenic and selenium). These data were obtained by Consol in 2009 as part of the UPDES renewal process and were previously submitted to DWQ. Due to the paucity of data as well as the difficulties associated with performing statistical analyses using non-detect and < Reporting Limit results obtained from two different labs, arsenic and selenium have not been carried forward as potential parameters of concern.

For the iron evaluation, total iron (as opposed to its dissolved state) is the measure of interest, because that is what has been included in all previous Emery Mine UPDES permits. DWQ’s total iron data for the ambient site consists of three measured concentrations. In addition, DWQ provided a number of total iron analyses for Outfalls 001 and 003, obtained over several years since year 2000. Consol has also collected total iron data for both the discharge outfalls and the ambient site samples for many years. Outfalls are sampled twice monthly and reported on DMRs for DWQ. The ambient site is sampled on a quarterly basis for the Division of Oil, Gas and Mining permit and those samples are also analyzed for total iron. Thus, Consol’s data alone is sufficient to analyze ambient versus discharge total iron concentrations. However, the data

that DWQ provided was used to supplement the Consol data set (of which only the most recent 10-year record was used) and iron was carried forward as a potential parameter of concern with the following results.

Location	Number of Data Points	80th Percentile, Total Iron (mg/L)
Outfall 001	155	0.34
Outfall 003	206	0.53
Ambient*	34	2.92

*Ambient as measured in Quitchupah Creek at US10 Crossing.

As seen, total iron concentration at both outfalls is less than ambient concentration. Therefore iron is not carried forward as a parameter of concern.

APPENDIX B
SUPPLEMENT TO PART E, ADR APPLICATION

**ALTERNATIVE TREATMENT & MANAGEMENT OPTIONS FOR CONSOLIDATION
COAL COMPANY'S EMERY MINE UPDES DISCHARGE**

Introduction

Consolidation Coal Company (Consol) is currently working with the Utah Division of Water Quality (DWQ) to renew coverage under a Utah Pollutant Discharge Elimination System (UPDES) permit for the Emery Mine (Permit No. UT0022616). Because Consol may need to discharge water at a rate greater than the current UPDES permit allows, Consol is submitting a provisional Level II Antidegradation Review (ADR). This report addresses the alternatives analysis requirements of the ADR application.

Current Water Management and Treatment

The Emery Mine intercepts groundwater from its underground workings as part of the normal mining process. Accumulated water prohibits viable operations and causes unsafe worker conditions. Consol has only minimal opportunity to redirect, collect, and store the water underground away from the active operations. We do so to the extent possible in order to settle out coal particles and other rock material solids prior to pumping the intercepted groundwater to the surface. Once at the surface, Consol directs the water to one of two sediment ponds, where it undergoes additional settling prior to discharge into Quitchupah Creek. The ponds are designed to adequately provide sediment storage, as required by the Utah Division of Oil, Gas and Mining (DOG M) permit, and to meet the DWQ's UPDES Permit effluent limitations for total suspended solids (TSS). The estimated present-value cost associated with the existing pumping system is approximately \$0.9 million (EarthFax Engineering, Inc. 2011).

The chemical quality of the intercepted groundwater is essentially unchanged from its natural state as it is collected in the mine and discharged to Quitchupah Creek. Total dissolved solids (TDS) concentration reflects natural background levels of salts in the groundwater. However at times, the TDS concentration (in mg/L) of this groundwater exceeds Quitchupah Creek's TDS standard. In addition, the combination of the discharge water's TDS concentration and the necessary discharge rate means that salt loading (in tons/day) is elevated at times.

TDS is not easily controlled, treated, or otherwise removed from water. Instead, Consol manages the quantity of water that it discharges, to the extent possible. First, we use the intercepted groundwater for dust control on mine roads and coal piles. Second, a local rancher has the ability to mix the water with his irrigation water shares and use it to raise hay. Such practices enable us to reduce our salt load contribution by reducing the quantity of water that we discharge, while also providing a beneficial use. However, these methods can only consume a small portion of the total quantity of groundwater that is intercepted. In addition, irrigation water can only be used during the growing season.

Consol also purposely refrains from using gypsum in the mine. While rock dusting is necessary for underground coal fire prevention, Consol uses a product that is much less soluble than gypsum.

Alternatives Analysis

This section describes numerous control options to either treat the intercepted groundwater or decrease the quantity of water that must be discharged to the receiving stream. While a decrease in effluent volume or rate would not change the water's TDS concentration, it would reduce the receiving stream's TDS concentration. It would also reduce the overall TDS load that Consol contributes to the Colorado River system.

Treatment and/or management options that have been considered include: reverse osmosis; more extensive use of the water for dust control; more extensive use of the water for irrigation; containment with evaporation; reinjection into a deep aquifer; and piping overland to Muddy Creek. EarthFax Engineering, Inc. (EarthFax 2008) previously assessed most of these options for Consol and their report was provided to DWQ. It provides much of the information that follows. All of these options would still require the continued use of (and costs associated with) the existing pumping system described above.

Reverse Osmosis

As stated above, TDS is not easily removed from water. Reverse osmosis (RO) is the typical means by which water is desalinated. In 2008, EarthFax analyzed RO as a potential solution to UPDES permit issues and estimated a \$5.6-million startup cost for an RO system. When land acquisition (or rights-of-way), operational costs, and the required continuing use of the existing pumping system are included, the present-value cost associated with this water disposal alternative is estimated at approximately \$7.0 million (EarthFax 2011). In addition to being cost-prohibitive, EarthFax (2008) notes that such a system needs a substantial amount of power, is maintenance-intensive, and results in a high concentration waste brine flow that requires disposal. Considering all of these factors, this alternative is not feasible.

Increased Water Reuse

Consol already uses approximately 2.9 acre-feet/year of intercepted groundwater for dust control on all of the appropriate surfaces and at all of the appropriate times. There are no feasible means of increasing this use.

Additional application to land surfaces beyond that needed for dust control would simply become a land application of wastewater. This would require an extensive acreage to dispose of even a portion of the intercepted groundwater and would likely involve public lands. Further, land application requires a sprinkler or other type of delivery system and intensive operational protocols to ensure a proper application rate. Given the nature of area soils along with the TDS concentration in the intercepted groundwater, land application would likely result in either

increased stream salinity due to shallow groundwater flow towards Quitchupah Creek or buildup of evaporites in the soil profile. This alternative is not feasible.

Consol has also investigated the potential to increase irrigation usage of its intercepted groundwater, by possibly having the local irrigation company (Muddy Creek Irrigation) take some of the water, as long as its quality was acceptable (after mixing with other, better quality, water) and delivery costs were borne by Consol. EarthFax (2008) estimated that approximately \$0.3 million would be required to construct a pipeline/pumping delivery system for a portion of the intercepted groundwater. When land acquisition (or rights-of-way), operational costs, and the required continuing use of the existing pumping system are included, the present-value cost associated with this water disposal alternative is estimated at approximately \$1.6 million (EarthFax 2011).

Because water deliveries could only occur during the irrigation season, during several months of the year the full volume of intercepted groundwater would still need to be discharged to Quitchupah Creek. Moreover, given the difficulties and uncertainties of getting the various irrigators contractually committed both initially and in the future as needed, and the difficulties and uncertainties of obtaining all of the necessary easements from the various affected landowners, this option does not appear to be reasonable.

Containment and Evaporation

Containing some or all of the intercepted groundwater in large ponds and facilitating evaporation is another potential way to reduce the amount of water that must be discharged. EarthFax (2008) produced preliminary designs and costs for such a system at the Emery Mine. They determined that Consol would need approximately 350 acres of ponds, with an associated construction cost of approximately \$3.2 million. When land acquisition (or rights-of-way), operational costs, and the required continuing use of the existing pumping system are included, the present-value cost associated with this water disposal alternative is estimated at approximately \$4.6 million (EarthFax 2011). The design prescribed that Consol would still need to discharge some of the intercepted groundwater to Quitchupah Creek. Eventually, accumulated salts would need to be removed and disposed. While technically feasible, numerous permits and approvals from several other State and federal agencies would be required for this high-cost option. Overall, this option is not considered feasible.

Reinjection

EarthFax (2008) estimated a cost of approximately \$1.4 million for an injection well scenario wherein a portion of the intercepted groundwater would be disposed of within the Dakota Sandstone aquifer and a portion would continue to be discharged to Quitchupah Creek. When land acquisition (or rights-of-way), operational costs, and the required continuation of the existing pumping system are included, the present-value cost associated with this water disposal alternative is estimated at approximately \$2.8 million (EarthFax 2011). There were numerous broad assumptions made as part of the estimate and actual conditions could vary substantially

from those assumptions. While an injection well setup has minimal surface disturbances, there are many unknowns that could affect not only cost but effectiveness of the wells (e.g., low material permeability, high hydraulic pressures, or chemical incompatibilities). An Underground Injection Control (UIC) permit would be required for this alternative. This alternative is not considered to be economically feasible.

Piping Overland to Muddy Creek

Another option that EarthFax (2008) considered was overland piping. With this option, Consol would bypass both Quitchupah and Ivie Creeks, and instead the intercepted groundwater would be conveyed in a 10.5-mile pipeline and discharged directly to Muddy Creek. Quitchupah Creek would no longer be the receiving water. Muddy Creek has a higher (5,800 mg/L) TDS stream standard than Quitchupah Creek (3,800 mg/L). There are numerous permitting, engineering, and construction difficulties with this option. These, coupled with the estimated high cost (\$3.7 million) of this option, make it economically infeasible. When land acquisition (or rights-of-way), operational costs, and the required continuation of the existing pumping system are included, the present-value cost associated with this water disposal alternative is estimated at approximately \$4.9 million (EarthFax 2011).

Other Alternatives

Consol has also considered purchasing salinity credits through DWQ's offsets program. With this program, there would be no change to our discharge rate or water quality. However, through the offsets program, Consol would be required to pay into a fund which would then be used to support a salinity reduction project (most likely irrigation improvements on existing agricultural land) elsewhere in the receiving stream's watershed. Overall, TDS concentrations in the receiving stream downstream of the Emery Mine/funded project would theoretically be reduced. However, given the lack of irrigated agriculture downstream of the Emery Mine, and the relatively small amount of irrigated lands upstream within the Quitchupah Creek watershed, opportunities to fund a salinity project that could have a beneficial impact on Quitchupah Creek are limited and this option is not feasible.

References

EarthFax Engineering, Inc. 2008. Mine Water Disposal Alternatives and Cost Estimates - Emery Mine, Emery County, Utah. Prepared for Consolidation Coal Company, Emery Mine, Emery, Utah. June 2008.

EarthFax Engineering, Inc. 2011. Emery Mine Water Costs. Excel spreadsheet prepared for Consolidation Coal Company, Emery Mine, Emery, Utah. October 2011.

Estimated present value costs of Emery Mine water handling baseline and alternatives

Prepared by: Richard B. White, P.E. (EarthFax Engineering, Inc.)
 Date: 2-Dec-2011

	Disposal Alternative				
	Irrigation Pipeline	Evaporation Pond	Deep Well Disposal	RO Treatment	Muddy Cr. Pipeline
Capital	\$ 292,000	\$ 3,195,000	\$ 1,430,000	\$ 5,623,000	\$ 3,709,000
Land/Right-of-Way	\$ 3,000	\$ 525,000	\$ 1,500	\$ 45,000	\$ 24,000
Basic Operation	\$ 426,000	\$ -	\$ 426,000	\$ 426,000	\$ 213,000
Settling Ponds 1 and 6	\$ 250,382	\$ 250,382	\$ 250,382	\$ 250,382	\$ 250,382
Borehole 3 Operation	\$ 915,834	\$ 915,834	\$ 915,834	\$ 915,834	\$ 915,834
TOTAL	\$ 1,887,216	\$ 4,886,216	\$ 3,023,716	\$ 7,260,216	\$ 5,112,216
Total as percent of Borehole 3 operation	161.8	419.0	259.3	622.5	438.4

- Notes:
1. Capital costs from "Mine Water Disposal Alternatives and Cost Estimates, Emery Mine, Emery County, Utah (EarthFax Engineering, 2008)
 2. Land/Right-of-Way costs based on \$1,500/acre
 3. Basic operation costs include electrical only, based on ratio of energy required for the indicated alternative with the energy required for Borehole 3 operation (see accompanying spreadsheet)
 4. Borehole 3 operation costs detailed on the accompanying spreadsheet.
 5. Settling Pond costs detailed on the accompanying spreadsheet.

Estimated cost of operating Borehole Pump #3

Motor rating: 350 HP 261.0 kW
 Period of operation: 365 days
 Percent operation: 90 %

Period power usage: 2,057,685 kw-hr

Average energy rate (\$):	0.03049 /kW-hr	} (see Rocky Mountain Power Service Schedule No. 8, 06/06/2010)
Customer service rate (\$):	55.00 /mo.	
Facilities rate (\$):	3.77 /kW-mo.	
Average power rate (\$):	10.32 /kW-mo.	

Transmission efficiency: 90 %

Annual power costs:

Energy charge: \$69,701
 Customer service charge: \$660
 Facilities charge: \$13,119
 Power charge: \$35,913

Present value costs at assumed interest rate:

Total annual power costs: \$119,393 \$ 745,834

Annual pump replacement and maintenance costs:

Assumed interest rate: 8 %

Cost of new pump and motor: \$110,000
 Frequency of replacement: 9 yr
 Annual cost of new pump/motor: \$17,609 \$ 110,000

Cost of pump rebuild: \$60,000
 Frequency of rebuild: 3 yr
 Annual cost of rebuild: \$23,282 \$ 60,000

Estimated Annual Cost of Pumping: \$160,284

Estimated Present Value of Pumping: \$ 915,834

Cost associated with the Emery Mine settling ponds

(Ponds 1 and 6)

Item	Units	Est. Quan.	Unit Price	Total Price	Comment
Land - Pond 1	ac	6	1,500	9,000	Total area affected
Land - Pond 6	ac	5	1,500	7,500	Total area affected
O&M - Pond 1	ea	1	5,000	5,000	Estimate for life of pond
O&M - Pond 6	ea	1	5,000	5,000	Estimate for life of pond
Reclamation Earthwork - Pond 1	ea	1	87,889	87,889	See MRP Chapter IV
Reclamation Earthwork - Pond 6	ea	1	42,900	42,900	See MRP Chapter IV
Reclamation Reveg - Pond 1	ac	6	8,463	50,778	Unit price from MRP Chapter IV, main facility reveg.
Recalamtion Reveg - Pond 6	ac	5	8,463	42,315	Unit price from MRP Chapter IV, main facility reveg.
TOTAL				250,382	