STATE OF COLORADO

DIVISION OF RECLAMATION, MINING AND SAFETY
Department of Natural Resources

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COLORADO DIVISION OF RECLAMATION MINING & SAFETY

May 19, 2010

Mr. Randy Whicker
Health Physicist / RSO
To Cotter Corporation
P.O. Box 1750
Cañon City, CO 81215

Re: Schwartzwalder Mine, Jefferson County, Permit No. M-1977-300, Designated Mining Operation Environmental Protection Plan, TR-11, Adequacy Review #2

Dear Mr. Whicker:

The Division of Reclamation, Mining and Safety (DRMS) has completed a second adequacy review of Environmental Protection Plan (EPP) for Cotter Corporation's (Cotter) Schwartzwalder Mine in Jefferson County. DRMS now concludes that the EPP as submitted does not provide adequate environmental protections as required under Rules 3.1.6, 3.1.7, and 6.4.20, and the application is denied. The specific plan and submittal inadequacies that support this denial are detailed below under the section labeled "Corrective Actions – Permit Amendment". The public and agency comments received in response to the EPP submittal are enclosed with this letter. The pending issues will be addressed through the following combination of enforcement and permitting actions.

DRMS Enforcement Action

DRMS will pursue an enforcement action to address apparent mine-related impacts occurring to Ralston Creek. The water quality sampling data included with the previous EPP submittal indicate that Cotter Corporation is failing to minimize disturbance to the prevailing hydrologic balance of the affected land and surrounding land and to the quality of water in surface and groundwater systems once mining ceased. Ralston Creek is a drinking water supply source for several municipal water providers including Denver Water and the City of Arvada. Although they are presently treating for the removal of uranium, the mine-related impacts to these systems must not occur.

The levels of uranium in Ralston Creek are now consistently exceeding the receiving stream standards. The currently available data indicate that two mine-related events appear to have led to significantly increased uranium levels in the receiving stream. These events are the cessation of water treatment (both from the mine and Sump Number One) and the cessation of water recirculation from Sump Number One. The underground mine pool may also be a contributing factor.

Enforcement-related documents will be sent by separate correspondence within the next several days. In the interim, the Division directs Cotter to initiate corrective actions as outlined below.

Corrective Action – Permit Technical Revision

Cotter must submit a new Technical Revision to Permit Number M-1977-300 no later than June 1, 2010 to include plans and implementation schedules as follows:

1. Reinitiate a water treatment system to treat all water that reports to Sump Number One as soon as possible, but no later than July 31, 2010. In addition to compliance with C.R.S. 34-32-101 and the associated regulations, the plans must include direct coordination with the Colorado Department of Public Health, and must be in compliance with all applicable water quality laws and regulations.
2. Reinitiate mine dewatering and water discharge treatment sufficient to bring the mine water table to a level at least 500 feet below the Steve Level, and sufficient to reestablish a hydraulic gradient away from Ralston Creek. Implementation must occur as soon as possible, but no later than July 31, 2010. In addition to compliance with C.R.S. 34-32-101 and the associated regulations, the plans must include direct coordination with the Colorado Department of Public Health, and must be in compliance with all applicable water quality laws and regulations.
3. Detailed financial warranty provisions for the plans must be included with the Technical revision application.
4. The plan must acknowledge that Cotter will immediately cease all well abandonment activities, and immediately reinitiate all surface and ground water monitoring.

Corrective Action – Permit Amendment

Cotter must submit an Amendment to Permit Number M-1977-300 no later than August 1, 2010 to address the unresolved EPP details indicated below. These issues must be resolved to comply with the EPP requirements, and these unresolved issues are the basis for EPP denial decision referenced above. Page references are to pages in the previously submitted and now denied EPP.

SECTION 7. FACILITIES EVALUATION

1) Operator states on pg 7-3 "...because flow rates from the mine are extremely low, total mass loading from the underground workings is small." Other than the mine inflow rates, is there any direct evidence to support the statement that flow rates from the mine are "extremely low?"

2) Operator states on pg 7-3 "Issues related to the flooded mine workings include water chemistry in the mine, flow rates from the mine, potential interaction with water in Ralston Creek, and potential pathways in low-permeability bedrock." This list should also include the possibility of potential ground water pathways in structural conduits such as the Schwartz Trend and perhaps the West Rogers Fault.

SECTION 8. GROUND WATER INFORMATION

3) Operator states on pg 8-7 "Two bedrock wells are proposed for drilling in 2010, MW 13 and MW 14." Please indicate the proposed locations of these wells on a map, and please provide proposed total depths and locations/depths of screened intervals.

4) Operator states on pg 8-37 "Ralston Creek does not appear to be in strong hydraulic connection with the Schwartzwalder Mine based on stream flow rates, mine pumping rates, and isotopic comparison of mine water and surface water."

   DRMS does not agree with this statement. Considering the elevated concentrations of uranium and molybdenum in the mine pool, adverse impacts to Ralston Creek could result from relatively small inflow rates that might not be discernible in the streamflow or isotopic data. Please provide an evaluation of possible seepage from the mine pool to the alluvium.

5) Operator states on pg 8-41 "These results indicate that mine pool is not contributing loading to Ralston Creek at this location." This issue requires further analysis to more thoroughly assess any connection between the mine pool, the regional ground water gradient and possible hydraulic communication along the Schwartz trend. A lack of geochemical evidence for a connection at present should not be taken as irrefutable evidence that a connection does not or will not exist in the future under conditions of hydraulic equilibrium.

SECTION 9. GROUND WATER QUALITY

6) Operator states on page 9-49: "Water seeping into the upper levels of the mine is impacted by acid rock drainage..." This statement conflicts with the statement on pg 6-1 "No acid-forming materials exist on site."

   The locations, compositions, quantities, and potential impacts of the acid-generating materials of the mine area do not appear to be well characterized. The water seeping into the upper levels of the mine is described as having pH as low as 2.7, uranium up to 150 mg/L, copper up to 19 mg/L, and total dissolved solids as high as 11,000 mg/L (pg. 9-49). This is not something that can be easily dismissed. Please provide a more complete characterization of the acid-generating materials, including the possible scenario that, with the workings in a flooded condition, the acid-generating materials are exposed in an unsaturated condition and perhaps preferentially weathered and may be contributing a larger share of loading to the mine pool than in an un-flooded condition.

7) Ground water and surface water monitoring: Phosphorus can exert an important influence on uranium speciation and mobility in natural waters. Although P is not a regulated parameter, the operator must include total P or PO_4 in all future ground water and surface water samples.

8) The statement on pg 9-3 that the drinking water standards are not considered to be directly applicable to the alluvial monitoring wells or to groundwater in the underground void because these are not direct sources of drinking water supply is not appropriate. The mine pool and local

alluvium are directly linked to drinking water to sources. The Operator must design mitigation strategies with the drinking water standards as the target.

9) Operator states in footnote 15 on pg 9-4 "....uranium concentrations in excess of the ground water standard reported by the lab for upgradient monitoring well MW00 are questionable...." Please elaborate on why the data are questionable.

10) Operator states on pg 9-4 "Potential conduits from the flooded mine workings to the alluvium included historical exploration boreholes that were drilled into the deposit from the valley floor." Applicant later states on pg 9-5 that 33 exploration boreholes remain unaccounted for. How many of these 33 boreholes are believed to have been drilled into the deposit from the valley floor? Provide a plan to locate and map the boreholes, determine their condition, attempt to quantify the chemical loading from the mine pool via these potential water conduits, and implement a program to plug and abandon the holes.

11) On page 9-26 Operator discusses the recirculation pumping from Sump 1 to Sump 4. Was any of this water disposed on or off site?

12) The contour resolution of the base map, on which monitoring wells and other sample locations are plotted, contains an error. In the immediate area of the mine, between the 6550 and 7000 ft contours, the map shows only two contour lines where there should be four, assuming the contour interval is 10 feet as stated in the legend. The resolution in this area is important in comparing the elevation of the mine pool to features on ground surface. Please provide a revised set of maps with correct and accurate contour resolution.

SECTION 11. SURFACE WATER QUALITY DATA

13) Based on surface water quality data from stations SW-A001 and SW-BPL, the uranium concentration in Ralston Creek increases about two orders of magnitude between the two stations. Knowledge of the concentrations along this reach is important to understanding the system, yet the five surface water sampling stations between these two sites have been discontinued from the monitoring program. The monitoring plan must initially include all of the surface water sampling stations SW-BDIS, SW-PL, SW-OS, SW-BOS, and SW-GS.

14) Pursuant to comments provided by CDPHE Water Quality Control Division in their memo of 10 May 2010, please ensure that the appropriate and current water quality standards are referenced and apply to the entire stream segment of Ralston Creek.

SECTION 12. WATER QUALITY MONITORING PLAN

15) DRMS supports the proposed locations of future surface and ground water quality monitoring, and requires additional surface water monitoring sites as discussed in item 13 above. With respect to analytes, the plan must include field temperature along with pH and conductivity for

all surface and ground water samples. The extended analyte suite for surface water shown on page 5 of 7 should be expanded to include Phosphorus and Nitrate + Nitrite. As recommended by CDPHE, the surface water sampling suite must also include Gross Alpha and Gross Beta. The extended analyte suite for monitoring wells, domestic wells and sumps shown on page 6 of 7 must be expanded to include Phosphorus and Nitrate + Nitrite. As recommended by CDPHE, the sampling suite for monitoring wells, domestic wells and sumps must also include Gross Alpha and Gross Beta. Concurrently with the plan as proposed, all surface water, ground water, and sump monitoring locations must be analyzed for the extended suite on a quarterly basis.

SECTION 15. MITIGATION OPTIONS AND CONSTRUCTION SCHEDULE

16) On page 15-1 and in other sections of the EPP, the Operator states that limited source removal of contaminated material will be performed in the alluvium as part of RML termination. In light of the elevated uranium concentrations that have been reported over the last year in alluvial monitoring wells (MW3A, MW6, MW9, and MW12) and in Ralston Creek (SW-BPL, SW-FBRG, SW-ARH, and SW-LLHG), DRMS strongly recommends that the Operator scrutinize this plan to ensure that source material removal is as thorough as possible to minimize potential future loadings from the alluvium to ground water and surface water. Detailed plans and schedules must be provided to implement complete source removal and impact mitigation.

17) On page 15-3, Operator states that they may "seek higher alternate concentration limits (ACLs) based on human health risk." Operator is reminded that, under §34-32-116(7) (g) C.R.S., DRMS is required to protect the 'prevailing hydrologic balance.' In this context, DRMS will evaluate environmental impacts relative to baseline conditions rather than impacts or perceived risk to human health or aquatic life.

18) On page 15-3 Operator proposes a constructed wetland. Constructed wetlands do not always ensure effective treatment, and long term maintenance is required. Please describe in detail, the composition and construction of the wetland, the proposed loading rates, the expected geochemical attenuation processes, and the expected water quality that will ultimately be discharged from the wetland at the down gradient terminus. Please also provide maintenance and bonding details.

19) Regarding the proposed wetland, the process flow scheme is not clear. Is the wetland designed to capture only alluvial ground water, and thus mine pool water would not be routed to the facility?

20) The literature suggests that proper design of a wetland is best preceded by laboratory, bench scale, and pilot testing. Please provide a description of an appropriate testing program that will evaluate the capability of the proposed substrate to remove the contaminants of concern at the site.

21) On page 15-4 Operator states that "monitoring would be performed for up to 10 years to demonstrate that the wetlands are functioning as designed ....." DRMS does not accept the

premise that any passive treatment technology could be zero-maintenance. Please provide a plan for long-term maintenance and bonding of the facility as needed.

22) On page 15-6 Operator proposes installation of a permeable reactive barrier (PRB). Please describe in detail the composition and construction of the PRB, the proposed loading rates, the expected geochemical attenuation processes, and the expected water quality that will ultimately be discharged from the PRB at the down gradient terminus. Bonding for installation will also be required.

23) On page 15-6, Operator presents a chemical reaction for immobilization of uranium in a PRB composed of ZVI. One of the products of the reaction is Fe^{2+}, resulting from the oxidation of Fe^{0}. What is the fate of the ferrous iron; is it mobilized to the aqueous phase and transported downgradient, or is it left behind on the PRB? Provide a prediction of the concentration of any mobilized iron in solution downgradient of the PRB.

24) The EPP still contains no provision for management of the mine pool. Under Hard Rock Rule 6.4.20(6)(a), the Operator must specifically describe measures to be taken to prevent any unauthorized release of pollutants to the environment, including adequate reclamation and closure practices for toxic or acid-forming materials. The mine pool has been designated as an Environmental Protection Facility for containment of toxic-forming materials under the provisions of Hard Rock Rule 1.1(15). The Division is very concerned about the possibility of mine pool water migrating downgradient along ground water conduits and discharging to Ralston Creek. The Division rejects the Operator's assertion that, since no chemical anomalies are measurable in the creek at present there is no communication with the mine pool. The cone of depression that has been in existence around the underground mine workings needs sufficient time to recover before a hydraulic communication can be established. Operator must include long term plans in the EPP to respond to the possibility of mine pool contaminant migration. This requirement is in addition to the short term directive indicated at item number 2 under the section labeled "Corrective Action – Technical Revision"

25) On page 15-10 in the discussion of source removal, Operator states that the alluvium disposal plan that was approved by the CDPHE Radiation Management Unit includes a provision to dispose of contaminated alluvium in the underground workings of the Schwartzwalder Mine. This proposed activity represents a change to the approved Reclamation Plan. Therefore, operator cannot proceed with this activity until it has been approved by the DRMS. Detailed plans must be provided to DRMS with the amendment.

Underground disposal of any material that may contain radionuclides or other potentially acid- or toxic-forming material must be preceded by geochemical testing to evaluate the potential leaching behavior of the material. The locations of the samples collected for these tests must be documented as to location (by GPS coordinate), physical description of the material, quantity of material, plus photographs of the material sampled. The testing methodology must be approved in advance by DRMS, and should consist of a standardized accelerated weathering test such as EPA method 1312 or equivalent methodology similar to that employed for TR-10.

26) Ground water is likely to be encountered during the alluvial extraction activities, and the water will likely contain radionuclides, molybdenum and other constituents. Describe the management

plan for the ground water, including proper disposal, treatment, or other plans. Surface water management plans must also be included. The Operator must also describe the methods to be used to test the soil and evaluate whether the soil excavation/disposal program in the alluvium has successfully removed the contaminants of concern.

Thank you for your cooperation in resolving these issues. You may call me with questions at 303-866-3567 ext 8108 or in my absence Tony Waldron at ext 8150

Sincerely,

David Bird
Environmental Protection Specialist

cc: John Hamrick – Cotter Corporation
Amory Quinn – Cotter Corporation
Susan Wyman – Whetstone Associates
Steve Gunderson - CDPHE Water Quality Control Division
Steve Tarlton – CDPHE Radiation Control Unit
David Berry - DRMS
Tony Waldron – DRMS

Attachments: Comments – CDPHE Water Quality Control Division
Comments – CDPHE Radiation Control Unit
Comments – Denver Water
Comments – City of Arvada
Comments – Environment Colorado
Comments – Das Agua

STATE OF COLORADO

Bill Ritter, Jr., Governor
Martha E. Rudolph, Executive Director

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Colorado Department of Public Health and Environment

To: David Berry, Office of Active and Inactive Mines, Division of Reclamation, Mining and Safety

CC: Gary Baughman, Director, Hazardous Materials and Waste Management Division

From: Steve Gunderson, Director, Water Quality Control Division

Date: 5/10/2010

Re: Comments on Schwartzwalder Mine Environmental Protection Plan

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This memo consists of the comments from the Water Quality Control Division (WQCD) on the draft Schwartzwalder Mine Environmental Protection Plan (EPP) that has been developed by the Cotter Corporation (Cotter). The Division of Reclamation, Mining and Safety (DRMS) determined in 2008 that the Schwartzwalder Mine in Jefferson County was a Designated Mining Operation (DMO) requiring an EPP. The draft Schwartzwalder Mine EPP was submitted to DRMS from Cotter in August 2009 and revised and resubmitted to DRMS on April 20, 2010. On April 26, 2010, DRMS requested that the WQCD review and comment on the draft Schwartzwalder Mine EPP.

Surface Water Quality Standards

The water quality standards for Ralston Creek listed in Table 11-3 of the EPP are outdated. It lists the water quality standards for Ralston Creek and Ralston Reservoir as of July 1, 2007. The Colorado Water Quality Control Commission (WQCC) reviewed and updated the water quality standards applicable to Ralston Creek (Clear Creek segment 17b) and Ralston Reservoir (Clear Creek segment 23) in June 2009, with the standards becoming effective on January 1, 2010.

The EPP incorrectly identifies the applicable uranium standard as 40 pCi/l. The uranium standard of 40 pCi/l no longer applies to Ralston Creek or Ralston Reservoir. {There is no record of the WQCC removing the 40 pCi/l standard. The standard does not appear in the regulation after 2001.} The uranium standard for Ralston Creek (segment 17b) and Ralston Reservoir (segment 23) is 30 ug/l. The 30 ug/l standard is explicitly stated in Regulation No. 38 at 38.5(3). Furthermore, the EPP incorrectly states that the surface water uranium standard applies only at the water supply intake. In this instance, the uranium water quality standard applies to the entire stream segment.

The EPP should be revised to include the current surface water quality standards with the implication that the standards apply to the entire stream segment.

Surface Water Quality Data

The water quality data presented in the EPP for Ralston Creek demonstrates an impairment of the water supply use of Ralston Creek due to uranium concentrations exceeding the water quality standard[i]. The EPP does clearly show that the increased uranium concentrations in Ralston Creek occur as the creek passes through the Schwartzwalder Mine. Therefore, the EPP should state that an impairment of the water supply use of Ralston Creek (WQCC Regulation No. 38) is occurring due to the creek passing through the mine property.

Groundwater Quality Standards

On page 9-3, the EPP states: "The drinking water standards listed in Table 9-1 are not considered to be directly applicable to the alluvial monitoring wells or to groundwater in the underground void, because these are not direct sources of drinking water supply." The WQCD disagrees with this statement and the implications of this statement in the EPP. The Interim Narrative in Regulation No. 41 applies in this instance, meaning that all the standards, including uranium, listed in Tables 1 through 4 in Regulation No. 41 apply at the point of compliance for the mine. For the Schartzwalder Mine, the groundwater point of compliance, which has been determined by DRMS, is Ralston Creek at the lower property boundary. Thus, the EPP needs to reflect that the domestic use groundwater standard for uranium of 30 ug/l does apply the point of compliance. DRMS is obligated to implement that standard through their mine reclamation permit.

Mitigation Options and Construction Schedule

Cotter presented three mitigation options in the EPP: constructed wetlands, a permeable reactive barrier, and partial source removal.

The constructed wetlands and reactive permeable barrier are both passive treatment systems. The EPP does not indicate that either of the treatment systems would result in water quality achieving the uranium standard at a groundwater point of compliance or in surface water. The EPP should be revised to show how the proposed mitigation options detailed in the EPP attain applicable water quality standards.

The EPP mitigation options include a discussion on page 15-10 of a partial source removal based upon the decommissioning plan for the Radioactive Materials License (RML) termination. The EPP should discuss this source removal in more detail.

The WQCD recommends that the EPP should include a mitigation option that contemplates complete removal of the alluvial fill material coupled with active water collection and treatment of seeps, springs and groundwater to assure attainment of water quality standards in Ralston Creek and at the groundwater point of compliance.

The construction schedule for implementing a mitigation option in the EPP is vague. The construction schedule should be revised to be more specific. Also, the implementation of a mitigation option must attain water quality standards as soon as possible.

Drinking Water Concerns

Ralston Creek flows directly to Ralston Reservoir along with significant water flows from other sources. Ralston Reservoir is a raw water supply for three public drinking water systems that serve large populations. The uranium concentration in Ralston Creek significantly exceeds the water quality standard for uranium. The three water treatment plants that use this water supply are capable of removing uranium, however they are not specifically designed to do so. Additionally, the uranium level in the material filtered out of the raw water will increase. The higher radioactivity level in this material could

significantly impact how this material is handled and disposed, and substantially increase the disposal costs for the impacted water systems. Therefore, this situation should be addressed as quickly as possible.

Summary

The WQCD finds the overall approach and schedule submitted by Cotter to be unacceptable. The suggested approach does not clearly demonstrate that the proposed remedy will result in attainment of water quality standards. Furthermore, given the drinking water concerns enumerated above, this situation needs to be addressed as quickly as possible in 2010. Remedial action needs to begin immediately. The WQCD understands that additional sampling may be needed to better understand the situation and then design a permanent solution. However, if a permanent solution cannot be implemented in a very short time frame, then an interim solution, such as pumping and treating as much contaminated water as possible, should be launched immediately.

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[i] Water quality data for Ralston Creek at the Long Lake Headgate was assessed using data from 1/25/05 to 3/10/10. The 85th percentile of the data was a uranium concentration of 307 ug/l (the uranium water quality standard is 30 ug/l).

MEMORANDUM

May 7, 2010

To: Steve Tarlton

From: Edgar Ethington

Subject: Review of Cotter EPP for the Schwartzwalder Mine, Jefferson County

I have reviewed the Schwartzwalder Mine Environmental Protection Plan dated April 19, 2010 submitted by the Cotter Corporation (the EPP). The EPP was prepared by Whetstone Associates, Inc.

My review is focused first on issues relating to the increased levels of uranium being found in Ralston Creek, and second on suggestions for improving the data being generated to address the uranium issues.

1. The arguments that the alluvial fill adjacent to the stream are the sole source of the increasing uranium are not convincing. While the alluvial fill does contribute as a source term, it would remain relatively constant or increase slowly in the period from end of water treatment. The increase of in-stream uranium seems more connected to the rise of water in the mine. This relationship is temporal.
2. There is an increase in electrical conductivity in the waters adjacent to the alluvial fill area. This increase is interpreted as evidence of an increase in total dissolved solids in the water. MW-9 shows an increase in conductivity of 80% since 2007 as well as an increase of uranium of 167% in the same time interval. Wells MW-6 and MW-7 show more long-term uranium increases starting in 2002.
3. The impact of both source terms need to be addressed.

I suggest the water sampling suites be modified as follows.

Surface water: add gross alpha and gross beta.

Monitor wells, domestic well, and sumps: all samples will be analyzed for the extended suite. Add gross alpha and gross beta.

Mine refill samples: add nitrate, gross alpha, gross beta, field measured oxidation-reduction potential.

Recommendations:

1. Intercept and treat shallow ground water in the alluvial fill area.
2. Additional ground water characterizations both chemical and physical.

DENVER WATER

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May 14, 2010

Mr. David Berry
Office of Active and Inactive Mines
Division of Reclamation, Mining and Safety
1313 Sherman Street, Room 215
Denver, CO 80203

Re: ***Comments on Schwartzwalder Mine Environmental Protection Plan***

Dear Mr. Berry:

The City and County of Denver, acting by and through its Board of Water Commissioners ("Denver Water") submits the following comments for your consideration with regard to the Environmental Protection Plan (EPP) submitted by the Cotter Corporation ("Cotter") for its Schwartzwalder Mine, dated April 16, 2010.

Denver Water owns and operates Ralston Reservoir on Ralston Creek, downstream from the Schwartzwalder Mine. Ralston Reservoir provides a direct, piped feed to the Moffat Water Treatment Plant, and is one of the primary water sources for Denver Water and its 1.3 million customers. Ralston Reservoir is also the location from which raw-water deliveries to the City of Arvada and North Table Mountain Water and Sanitation District are made.

Denver Water data shows that uranium concentrations in Ralston Creek (at the Long Lake Headgate) were fairly stable, though still above the drinking water limit, at 80-100 µg/L until October 2008. This date seems to correspond to the general timeframe when Sump 1 was turned off at the Schwartzwalder Mine and the water level in the mine reached "steady state." Since October 2008, uranium concentrations in Ralston Creek entering Ralston Reservoir have risen steadily to over 500 µg/L.

Though Cotter's EPP argues that the interaction between groundwater and surface water in the vicinity of Schwartzwalder Mine is not yet precisely defined, monitoring of Ralston Creek at Long Lake Head Gate and the raw water received at the Moffat Treatment Plant clearly show increased radionuclide concentrations over the course of Cotter's reclamation activities (see attachments). In addition, Cotter's EPP provides documentation that the uranium concentration in Ralston Creek upstream of the Schwartzwalder mine is only 4 µg/L. This data strongly suggests that the interaction and the dispersal of contaminants from groundwater to surface water in the vicinity of the mine cannot be denied. Denver Water can only conclude that reclamation of the Schwartzwalder Mine is far from complete and must be modified to stem the release of contaminants in order to protect public health and the environment.

Fortunately, the drinking water being produced at the Moffat Treatment Plant does not contain elevated levels of radionuclides – it appears that treatment processes are currently removing the contamination. However, the Moffat Treatment Plant was not designed to remove uranium, molybdenum, or other metals – any removal is incidental. Therefore, it is uncertain how an increase in uranium, a steady supply of uranium, or an accumulation of uranium within the reservoir could affect treatment capabilities at the plant. Denver Water may need to make modifications to the plant to permanently address this problem. Such modifications may require new treatment processes or upgrades that are not currently included in future plans for plant modification. The cost and implementation schedule of such modifications are unknown. The financial impact to Denver Water customers could be enormous, and a violation of the safe drinking water act standard for uranium could adversely affect the state's economy. It seems reasonable that these costs should be borne by Cotter.

In addition to impacts to the Moffat Plant's treatment system, Denver Water would also have to mitigate increased levels of uranium and radium in the plant's sludge, which contains sediment removed from the water. The sludge from the Moffat Treatment Plant currently meets the requirements for beneficial reuse as a bulking agent in compost materials; it is currently used by a local vendor in this manner. As radioactive-constituent levels increase, Denver Water may be forced to find a different disposal method for the sludge and provide protections to employees managing the sludge, incurring much greater costs.

The impacts of increasing uranium concentrations in Ralston Creek, recently more than 17 times the drinking water standard for uranium, are of significant concern to Denver Water because of the potential health risk to customers (one quarter of the state's population), the impact to the environment, and the cost of additional treatment that customers will incur if Cotter does not complete reclamation of the Schwartzwalder Mine site in a responsible manner. Therefore, Denver Water asks that the Division of Reclamation partner with the Colorado Department of Public Health and Environment to take immediate and aggressive steps to ensure that reclamation of the mine is completed in a timely manner.

Specific Comments on Cotter's EPP

Cotter's EPP suggests that there are at least four potential sources of uranium entering Ralston Creek: water from the mine, the rock pile immediately adjacent to Ralston Creek, the Schwartz Trend as it intersects Ralston Creek, and the alluvial fill material under the site of the mine's old buildings. Three of these sources were created as a direct result of mine operations and need specific mitigation measures to ensure uranium and other metal concentrations are lowered in Ralston Creek.

Mine Water: The EPP makes an effort to discount the potential impact of contaminated water in the mine on Ralston Creek. Yet the report is clear that several constituents in mine water samples, including antimony, arsenic, molybdenum, thallium, uranium, and radium 226, tested above Colorado groundwater standards. Four of these constituents are

also regulated in drinking water. In addition, the EPP states that the water level in the mine has reached "equilibrium" at approximately 23.7 feet below the Steve Level, approximately 26 feet above Ralston Creek. This is a significant amount of hydraulic head and, coupled with the noted faults, fractured bedrock, and unsealed boreholes identified in the EPP, suggests a much stronger influence and correlation between the mine water and Ralston Creek. It is contradictory to allege in one part of the report that bedrock at the mine site "has very low permeability," suggesting that water does not flow out of the mine into the Ralston Creek, then state in another portion of the report that water inflow to the mine "occurred from several sources including infiltration of groundwater through porous bedrock."

Waste Rock Piles: The EPP states that there are, "no impacts to water quality in Ralston Creek detectable from the waste rock piles." However, there is little if any evidence to support this assertion. According to the EPP, the rock piles are of similar composition to the fill material that was placed in the valley floor and which has been identified as a source of uranium contamination in Ralston Creek. Stating that the rock piles are capped and stable is insufficient evidence to prove that their presence immediately adjacent to the creek has no impact upon water quality.

Alluvial Fill: The waste rock material that was placed in the valley floor during construction of the Schwartzwalder Mine is of significant concern to Denver Water. In addition to placement of this fill, Ralston Creek was apparently diverted to a new location to allow more room for mining-support buildings. The EPP is clear that this fill material is a source of uranium loading to Ralston Creek. However, the report is unclear about how significant the relocation of Ralston Creek and historical creek hydrology might be. In addition, the EPP states that the contaminated water in the flooded mine may be a "minor source" of contamination to the alluvium. What is clear is that both the fill and alluvial groundwater have uranium concentrations which exceed the Colorado drinking water standard for uranium, and are having a direct impact on water quality in Ralston Creek.

Denver Water is very concerned that Cotter's EPP places a high reliance on Denver Water's operations for dilution of contaminated water in Ralston Creek. The document shows a significant lack of understanding about how Denver's water collection system works, how it is used it to deliver water to customers, and about maintenance activities. In several places throughout the document, the EPP states that water from Ralston Creek receives "significant additional mixing" when water from Ralston Creek is mixed with water from Denver's Moffat Collection System. Unfortunately, this is not always true. A large construction project on the South Boulder Canal made other water sources into Ralston Reservoir unavailable for 210 days in 2007, 151 days in 2008, and 63 days in 2009. This project will continue into the future with more planned canal outages. In addition, water from Long Lakes, diverted directly from Ralston Creek, can and has been delivered downstream of Ralston Reservoir. This water, which apparently can contain high concentrations of uranium and other metals, bypasses Ralston Reservoir and flows directly into Arvada Reservoir. Deliveries to Arvada and other raw water

customers means that contaminated water in Ralston Creek can eventually make its way into Clear Creek and the South Platte River, where it becomes the supply of many other water users. Finally, caretakers at Ralston rely on the reservoir as a water supply for themselves and their families. Denver Water's raw water collection and delivery system was built for the sole purpose of supplying the needs of a municipal water system; it is not a mine reclamation or remediation tool.

Recommendations

Overall, Denver Water believes that the proposed mitigation plan submitted by Cotter is woefully inadequate. It is our belief that wetlands treatment only temporarily immobilizes and accumulates a limited amount of certain contaminants. Whether sufficient uranium can be removed fast enough through the use of wetlands is questionable. Further, even if plant uptake occurs, there is concern that when wetlands decay or die, the contaminants are again released into the environment. The contamination from the mine property reaches Ralston Creek on a year-round basis, while plant growth is seasonal. For this reason, it seems a wetlands approach would be less effective or even ineffective during winter months. The temporal variations in the concentration of the contaminants require active treatment and not simply the passive treatment, such as wetlands, proposed by Cotter. Additionally, it is not known whether the use of wetlands to improve uranium removal could lead to increased dissolution of other metals. Finally, the Permeable Reactive Barrier is not a permanent solution, as the system has a limited and unknown lifespan. Denver Water believes that neither strategy will stabilize a severely disturbed geo-chemical equilibrium. It seems that an active treatment system that physically removes contaminant mass is necessary, particularly when the water affected is a major drinking water supply.

In addition, the proposed schedule for implementation of a solution that will protect public health and the environment is not aggressive enough to address the serious threat posed by contamination in Ralston Creek from the Schwartzwalder Mine. Denver Water suggests that the Division impose specific milestones for compliance, and that an interim solution be proposed within a reasonable timeframe established by the Division (e.g. thirty days). Following the interim solution, a permanent solution should be in place within a reasonable timeframe (e.g. three months).

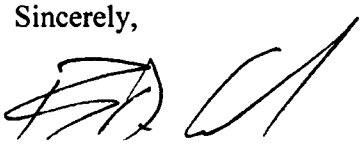
Cotter's EPP does not hide the fact that Ralston Creek water upstream of the Schwartzwalder Mine is relatively pristine. The documentation and studies performed are very clear that the mine itself is the source of the creek's contamination. Denver Water believes that a comprehensive mitigation plan should address all sources of contamination including removal of the waste rock piles, complete removal and remediation of the alluvial fill, and treatment of the mine-pool water. Mitigation measures need to be in place to ensure that these decommissioning activities do not cause additional contamination to Ralston Creek. Efforts to find and seal the thirty-three remaining boreholes should resume. Denver Water also believes that the proposal to remove the existing wastewater treatment plant is not prudent at this time, and that it should be

reactivated to accomplish the Division's remediation requirements. In addition, financial warranties should be required to address revised reclamation requirements and protection of water resources.

During implementation of reclamation activities at the Schwartzwalder Mine, Denver Water recommends that the Division, in conjunction with the CDPHE Water Quality Control Division, develop a plan for inspections, investigations, third party review of data, modification of the reclamation permit to reflect new data and reclamation requirements, and any other action needed by Cotter. The Division should implement the Water Quality Control Commission's groundwater standards and water quality standards for Ralston Creek (Clear Creek segment 17b) and Ralston Reservoir (Clear Creek segment 23). Preliminary Effluent Limits through a discharge permit should be determined by the Water Quality Control Division that will address discharges to Ralston Creek and any discharges from pumps to groundwater. Routine monitoring of the mine pool and reporting should also be required and made available to the public.

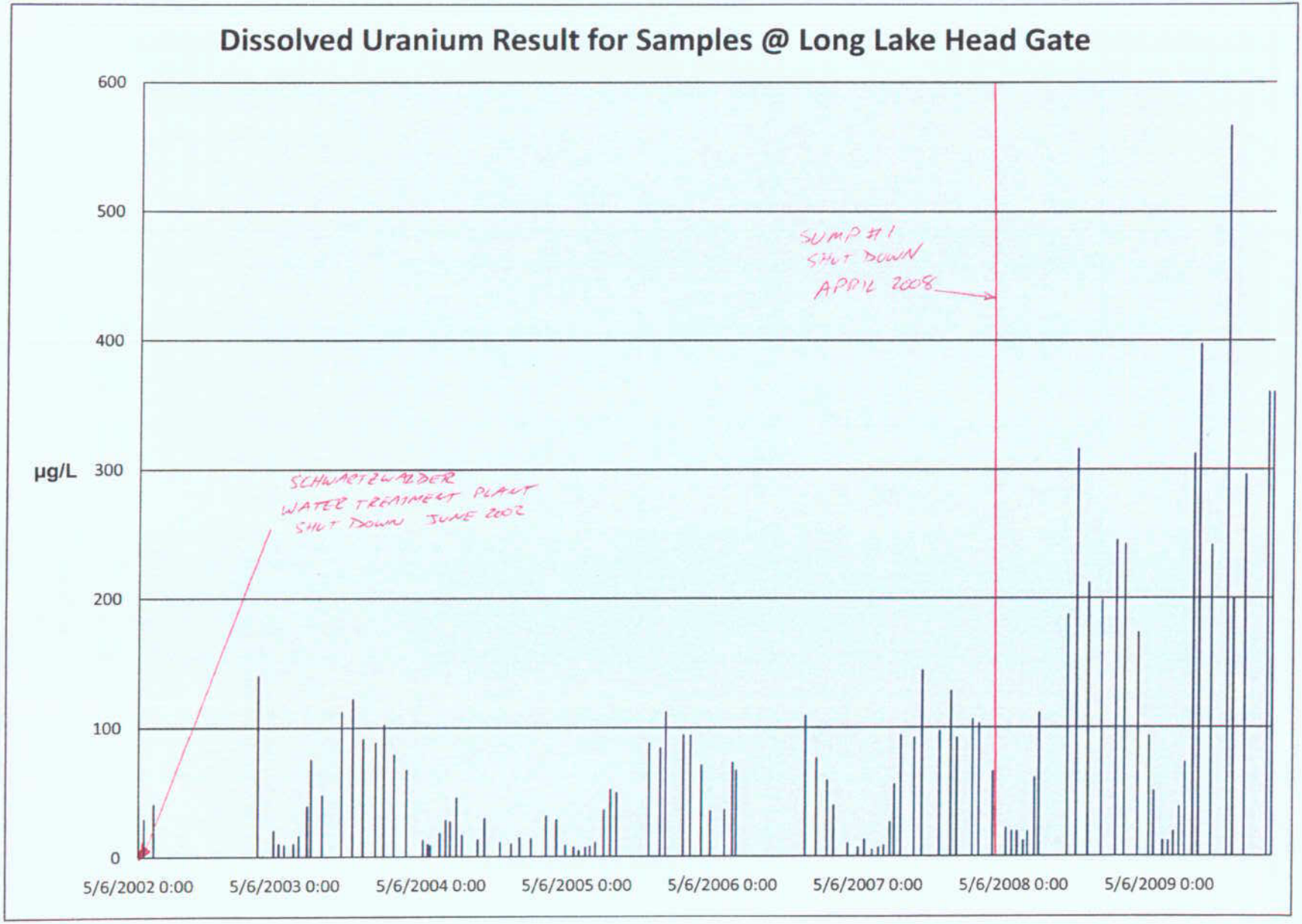
Denver Water appreciates the opportunity to submit these comments to the Division. It is critical that Denver Water be able to monitor the reclamation efforts at the Schwartzwalder Mine in an effort to determine the impacts to Denver's water facilities. As mentioned previously, the potential health risk to customers and employees could be significant if immediate action is not required of Cotter Corporation. Inaction due to a prolonged debate between the Division and Cotter over what remediation action is appropriate is not acceptable. In addition, Denver Water customers should not have to bear the increased cost associated with water and sludge treatment for a problem that is clearly being caused by another entity. Please keep me informed about the Division's requirements for Cotter Corporation as well as the progress of remediation at the Schwartzwalder Mine.

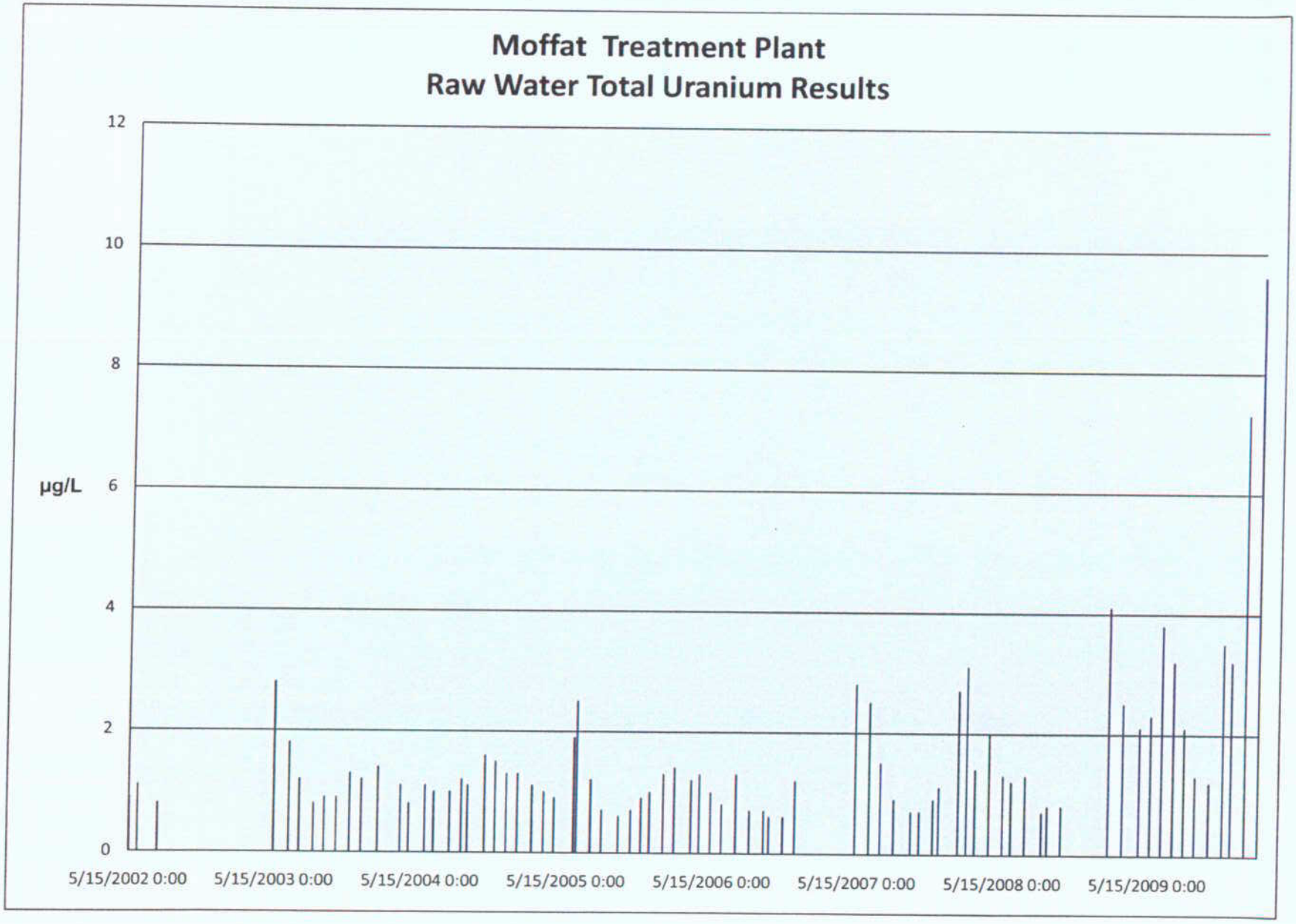
Sincerely,



Brian D. Good
Director of Operations and Maintenance

cc: Mr. Steve Gunderson, CDPHE Water Quality Control Division
Mr. Jim McCarthy, City of Arvada
Mr. Rick Jeschke, North Table Mountain WSD


Dissolved Uranium Result for Samples @ Long Lake Head Gate
600
500
400
300
200
100
0
µg/L
SUMP #1 SHUT DOWN APRIL 2008
SCHWARTZWALDER WATER TREATMENT PLANT SHUT DOWN JUNE 2002
5/6/2002 0:00
5/6/2003 0:00
5/6/2004 0:00
5/6/2005 0:00
5/6/2006 0:00
5/6/2007 0:00
5/6/2008 0:00
5/6/2009 0:00


Moffat Treatment Plant
Raw Water Total Uranium Results
µg/L
12
10
8
6
4
2
0
5/15/2002 0:00
5/15/2003 0:00
5/15/2004 0:00
5/15/2005 0:00
5/15/2006 0:00
5/15/2007 0:00
5/15/2008 0:00
5/15/2009 0:00

CITY OF ARVADA

OFFICE OF THE CITY MANAGER
FACSIMILE: 720-898-7515 ▲ TDD: 720-898-7869
PHONE: 720-898-7500

May 14, 2010

David Berry
Colorado Dept of Public Health and Environment
Division of Reclamation Mining and Safety
4300 Cherry Creek Dr. S.
Denver, Colorado 80246-1530

Subject: Schwartzwalder Mine Environmental Protection Plan

The City of Arvada appreciates the opportunity to comment on the draft Schwartzwalder Mine Environmental Protection Plan (EPP) that has been developed by the Cotter Corporation (Cotter). The City has only recently been made aware of the contamination of Ralston Creek from uranium and we are looking to the Colorado Department of Public Health and Environment (CDPHE) to provide prompt and effective corrective action. Recognizing an inactive mine site and surface water contamination involves multiple state agencies that include Division of Reclamation Mining and Safety (DRMS) and the Radiological Division and Water Quality Control Division (WQCD). We strongly encourage and support close collaboration among responsible regulating agencies.

By Cotter's own admission in the 2009 Schwartzwalder Mine Semiannual / Annual Radiological Monitoring and Effluent Report (March 30, 2010), Ralston Creek has been impacted by past mine operations:

> "Surface water in Ralston Creek adjacent to and below the mine and the remaining licensed area has been impacted in recent years by residual contamination from past operations within alluvial fill materials." (page 24)
>
> "Beginning in late 2002, there were notable increases in uranium concentrations in the creek downstream from the mine site. The observed "peaks" are generally believed attributable to termination of WWTP operations in June 2002, followed by cyclic "flushes" driven by seasonal runoff cycles. In 2008, pump back operations from the lower sump to an upper sump, which had created a hydraulic barrier between groundwater in the alluvial fill and surface water in Ralston Creek, were terminated resulting in additional concentration increases in 2008/2009." (page 24)
>
> "Four (4) sumps were also installed at the site in 1990 to intercept groundwater and pump it to the WWTP for contaminant removal before discharging treated water into Ralston Creek. The sumps were operated in this fashion until 2002. From 2002 until 2008, water from sump 1 continued to be pumped back to sump 3 to create a re-circulating hydraulic barrier between groundwater in the alluvial fill and surface water in Ralston Creek. This practice was discontinued in 2008 due to concerns of potentially violating regulations. Concentrations in Ralston Creek increased as a result of termination of this interim mitigation measure." (page 30)

The City of Arvada's Request for Immediate Action

The EPP appears to be aimed at complying with DRMS requirements to decommission the license(s), but is inadequate in terms of developing a plan to attain water quality standards for Ralston Creek--a source of drinking water for three municipal water providers, including Arvada.

The uranium increases of which we have recently been made aware are alarming and of concern for our water treatment operations. Water quality data referenced in a May 12, 2010, WQCD memo states that: "Water Quality data for Ralston Creek at the Long Lake Headgate was assessed using data from 1/25/05 to 3/10/10. The 85th percentile of the data was a uranium concentration of 307 ug/l (the uranium water quality standard is 30 ug/." Having the uranium concentrations in a state classified stream ten times the standard is unacceptable.

While conventional water treatment is effective in reducing uranium in the concentrations which we have seen to date, it is unknown how much more the City's water treatment process can remove. Fortunately, the City is meeting State and Federal drinking water standards; however, what needs to take place to ensure continued compliance with the Safe Drinking Water Act is an interim plan of action to return Ralston Creek to a water supply that meets water quality standards. There are many options that should be evaluated including in-situ uranium treatment or a pump and treatment system for the mine pool and the reinstatement of the re-circulating hydraulic barrier between groundwater in the alluvial fill and surface water in Ralston Creek. This plan should be developed within the next 30 days and implemented within 60 days.

One advantage Cotter has is that there are cost recovery opportunities from the extracted uranium that would occur with the treatment of the mine pool water. The opposite is true for the City of Arvada and the negative impact on our water treatment residuals. While the City currently recycles our residuals--a green and sustainable practice--the continued inaction and elevated uranium will most certainly lead to dumping over 500 cubic yards per year into an industrial landfill. Given the required additional testing, increased transportation costs, and increased disposal cost, our residuals cost will increase by an unknown but significant amount. Not only will there be increased costs, but the City will forever have its name associated with manifested waste in a landfill even while meeting water quality standards. Should future clean-up of the landfill be necessary, the City would have to contribute to the clean-up cost.

Longer Term Action

The radiation license held by Cotter needs to be maintained and or expanded--not terminated—in order that a long-term solution to safely reclaim the land can be developed and implemented. The City of Arvada is looking to CDPHE to thoroughly evaluate the multitude of complicated technical and regulatory issues, and apply them in a manner that is protective of both public health and the environment.

I look forward to hearing of an action plan that will protect the City's water supply.

Sincerely,

Craig G. Kocian
City Manager

C: City Council
Steve Gunderson, WQCD

WESTERN MINING ACTION PROJECT

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Jeffrey C. Parsons, Esq.
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(303) 823-5738
Fax (303) 823-5732
wmap@igc.org

May 14, 2010

Mr. David Bird
Reclamation Specialist
Colorado Division of Reclamation Mining and Safety
1313 Sherman Street, Room 215
Denver, CO 80203

RE: Cotter Corporation, Schwartzwalder Mine Permit No. M-1977-300; Environmental Protection Plan (EPP), TR-11

Dear Mr. Bird:

Thank you for the opportunity to provide these comments on the revised Environmental Protection Plan (EPP) submitted by the Schwartzwalder Mine operator, Cotter Corporation, on April 20, 2010. These comments are submitted on behalf of Environment Colorado, a state-wide conservation and advocacy group with hundreds of members in the Arvada and greater Jefferson County area who are potentially directly affected by the contamination issues at the mine site.

As you are aware, the serious radioactive water contamination issues at this site have caused a much heightened level of public awareness of this inoperational mine site and the potential threat it poses to drinking water supplies on the Front Range, among other threatened natural resources. It is imperative that the Division take all action necessary to ensure cleanup at this site in an expedited manner. In doing so, the Division should adhere to the recommendations set forth by the Colorado Water Quality Control Division (WQCD) to institute an aggressive pollution source remediation plan and an active water treatment plan to clean the water at the site. In conducting its review, the Division should ensure that the EPP is processed in accord with the Mined Land Reclamation Act and Mined Land Reclamation Board regulations. Lastly, because of the significant costs that are likely to be associated with reclamation of this site moving forward, the Division should take the opportunity now to review and update the financial assurance amounts for this site.

In conducting its review of the EPP and in selecting a reclamation strategy for the site, the DRMS should follow the strong advice presented to it by the WQCD as set forth in the WQCD's May 10, 2010 memo on this issue, which is included in the mine reclamation permit file. Therein, WQCD strongly recommends extensive reclamation activities to ensure protection of water quality. Among these needed actions are requiring complete removal of the alluvial fill material coupled with active water collection and treatment of seeps, springs, and groundwater to assure attainment

of water quality standards in Ralston Creek and at the groundwater point of compliance. Further, the DRMS should take up the WQCD's recommendation to establish a specific and binding construction and reclamation schedule. It appears that for too long, Cotter has been able to manipulate the regulatory process in such a way that it has been able to escape taking the strong and decisive action necessary to address the serious on going water quality contamination issues at the Schwartzwalder Mine. The DRMS should put an immediate stop to these tactics, and ensure complete clean up at the site in as expeditious of a manner as possible.

In conducting its review of the EPP, the Division should reclassify the EPP as an Amendment to the reclamation permit, and not a Technical Revision. This designation has a major impact on the level of involvement by the public and review by the Division - as an amendment has to go through the full process and a technical revision receives less formal public review. The current MLRB regulations define a technical revision as follows: "'Technical Revision' means a change in the permit or an application, which does not have more than a minor effect upon the approved or proposed Reclamation or Environmental Protection Plan." MLRB Hardrock/Mineral Mining Rule 1.1(52). There can be little argument in this case that the changes needed at the Schwartzwalder Mine are "more than minor," and as such, the EPP should be treated as an amendment. Importantly, however, any change in designation should under no circumstances be grounds to in any way delay the need for immediate action at the site to ensure protection of water resources. To the extent any such delay may occur, DRMS should make full use of its enforcement authority to require interim actions to immediately begin work to alleviate the identified violations of surface and ground water quality standards (or any other violations) that are currently on going.

Lastly, given the clear need for increased reclamation action at the site, including the strong prospect for active water treatment on-site, DRMS must take action to review and update the financial surety covering reclamation at the site. The current bond was set back in 2003 at $104,082.52. The DRMS documents reflecting this bond amount make no provision for any water quality treatment, active or otherwise. See February 3, 2003 Request for Financial Warranty Reduction. Given that the bond does not appear to have been updated in some seven years, it is fully appropriate, and indeed necessary, to do so now. This revised bonding calculation must account for the need for active water quality treatment, in accord with MLRB regulations. MLRB Hardrock/Mineral Mining Rule 4.2.1(4) (mandating that the bonding amount cover all necessary costs, including "all measures taken to assure the protection of water resources, including costs to cover necessary water quality protection, treatment and monitoring as may be required by Permit, these Rules or the Act.").

Thank you for the opportunity to comment on this highly important manner. We look forward to following this issue closely as the potential impacts associated with this mine site are immense. We hope and encourage the Division to take a highly aggressive approach to dealing with what appears to be a long-neglected problem by the mine operator.

Sincerely,

/s/ Jeffrey C. Parsons

Jeffrey C. Parsons
Senior Attorney
on behalf of Environment Colorado

cc: David Berry, DRMS
Martha Rudolf, CDPHE
Rebecca Swanson, Office of Gov. Bill Ritter
Mike King, CDNR

From: das.ellis@gmail.com [mailto:das.ellis@gmail.com] **On Behalf Of** Agua Das
Sent: Tuesday, May 11, 2010 4:11 AM
To: Berry, David
Subject: Re:

Please place me on your list of concerned parties concerning M1977300.
I would like to know why ion exchange treatment of the mine water at its source within the mine was not included in the options.
Considering the levels of Uranium reported in the water, there are economically recoverable quantities.
This is the best of both worlds in protecting the public health and and generating cash flow to fund continued mine reclamation needs.
Uranium tainted mine drainage water from this mine was being sold to the North Table Mesa Water District a number of years ago involved in a law suit.
This is too close to too many people.
I hope that you will apply a high standard of community protection to this matter and require ion exchange treatment and pumping to prevent percolation into Ralston Creek.
Thank You

Agua Das
Box 7137
Boulder, CO
303-524-4339
Aguadas@Onebox.com
Former member Rocky Flats Cleanup Commission
On Mon, May 3, 2010 at 2:55 PM, Berry, David <David.Berry@state.co.us> wrote:

Das – Our notice attached. Thanks for your interest.

David Berry

Director, Office of Mined Land Reclamation

Division of Reclamation, Mining and safety

303-866-3567 x 8106