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November 14, 2008

U.S. Bureau of Reclamation
Eastern Colorado Area Office
11056 W. County Road 18E
Loveland, CO 80537-9711
Attn: Kara Lamb

Re: Supplemental Information Report for the Southern Delivery System Draft Environmental Impact Statement

Dear Ms. Lamb:

At the request of the Colorado Springs Utilities (CSU), LimnoTech has reviewed the Draft Environmental Impact Statement (DEIS), the Water Quality Effects Analysis, and the Supplemental Information Report (SIR) for the proposed water supply project known as the Southern Delivery System (SDS). Our review of these documents, which provide justification for the Bureau of Reclamation to enter into up-to-40-year contracts with the Project Participants to provide for use of existing excess storage capacity in the Pueblo Reservoir, is in the attached report. The evaluation process for the water quality impacts associated with the SDS appears to have been very thorough, and supports selection of Alternative 2, the Participants' Proposed Action, as the best alternative. Our observations based on this review are as follows:

- The DEIS provided substantial and credible evaluation of the various alternatives, and demonstrated that the SDS was the best alternative among the scenarios evaluated.
- EPA's request for additional evaluation enhanced the analysis presented in the DEIS. The additional analyses further informed the selection process and improved the final product.
- The additional analysis provided in the SIR increases the level of confidence in the results.
- The DEIS and SIR in combination provide a thorough analysis of the effects of the various alternatives, and yielded similar conclusions, supporting the selection of the SDS as the preferred alternative.

The attached technical memorandum provides additional discussion of the evaluations. We believe the DEIS and SIR provide sufficient analysis in support of the Participants' Proposed Action to warrant approval of the project.

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Sincerely,
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MEMORANDUM

DATE: November 14, 2008

FROM: Adrienne Nemura
Kathy Sweet

PROJECT: CSSE

TO: Keith Riley
Colorado Springs Utilities
121 South Tejon Street
PO Box 113
MC 940
Colorado Springs, CO 80947-0940

CC:

SUBJECT: LimnoTech Review of Water Quality Impacts Associated with the Proposed Southern Delivery System Project for the City of Colorado Springs, City of Fountain, Security Water District, and Pueblo West Metropolitan District

OVERVIEW

Colorado Springs Utilities (CSU) requested that LimnoTech review the water quality impacts associated with the Southern Delivery System (SDS) Project specific to Fountain Creek, Monument, Creek and the Arkansas River analysis- namely the effects on instream E. coli, dissolved selenium and sulfate ("the water quality parameters"), and additional wastewater treatment facility (WWTF) effluent limits for these parameters. The SDS Project is a proposed regional water delivery project designed to serve most or all Participants' future water needs through 2046. The Participants' Proposed Action would meet their purpose and need by providing additional yield and system redundancy, and by using the Participants' existing Arkansas River Basin water rights. As proposed, the SDS Project would deliver Fry-Ark Project water and non-Fry-Ark Project water from Pueblo Reservoir to the Participants' service areas.

The Bureau of Reclamation prepared a Draft Environmental Impact Statement (DEIS) and supporting documents in February 2008 (Bureau of Reclamation, 2008a). The DEIS describes and analyzes the potential effects of seven SDS Project alternatives, including a no action alternative, on environmental and human resources in the Arkansas River Basin in Colorado. Based upon public comments received and specific requests for additional analysis by the U.S. EPA, the Bureau prepared a Supplemental Information Report (SIR) in October 2008 (Bureau of Reclamation, 2008b). The SIR provides additional effects information in light of changes to the alternatives and additional analyses since the DEIS was issued.

The DEIS provided substantial and credible evaluation of the various alternatives, and demonstrated that the Participants' Proposed Action was the best alternative among the scenarios evaluated. The additional evaluations presented in the SIR enhanced the analysis presented in the DEIS. The additional analyses further informed the selection process, increased the level of confidence in the results, and improved the final product. The DEIS and SIR in combination provide a thorough analysis of the effects of the various alternatives, and yielded similar conclusions, supporting the selection of the Participants' Proposed Action as the preferred alternative.

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This memorandum provides a summary of the DEIS and SIR evaluations and their results. Specifically, LimnoTech reviewed the original method used to assess the instream impacts on the water quality parameters; the wasteload allocation calculations used by the Colorado Department of Public Health and the Environment (CDPHE); and a revised approach suggested by EPA. This paper addresses LimnoTech's review of those calculations.

ORIGINAL METHOD

The water quality effects analysis completed as part of the DEIS included an analysis of direct and indirect effects (referred to as direct effects) as well as cumulative effects (MWH, 2008a). The direct effects analysis described the effects of each proposed SDS alternative alone. The cumulative effects analysis described the effects of each SDS alternative along with other reasonably foreseeable actions in the study area. For both direct and cumulative effects, the following comparisons were made:

- The No Action Alternative (assuming 2046 conditions) was compared to Existing Conditions (circa 2006) to provide context for the effects analyses.
- Each Action Alternative (assuming 2046 conditions) was compared to the No Action Alternative (assuming 2046 conditions) as suggested under Reclamation's National Environmental Policy Act (NEPA) guidance.

Low Flow Analysis

A daily hydrological model (Daily Model) was developed for the SDS evaluation (Kosloff & Paulson, 2008). This model, along with CDPHE's version of the EPA DFLOW model, was used to evaluate the effect of changes in streamflow on water quality and effluent limitations for permitted discharges. Chronic low flows near WWTFs in the study area were evaluated using DFLOW's biologically-based design flow method. The once in three-year 30-day average low flow (30E3) was calculated for each scenario.

Salinity

Salinity is primarily a concern for its effects on crop yield and potential changes to the cost of drinking water treatment. A spreadsheet-based salinity model was developed by MWH for Fountain Creek and the middle and lower Arkansas River (MWH, 2008a). The salinity model uses a combination of mass balance and historical regression techniques for flow, specific conductance, and salinity to simulate surface water salinity. Kosloff & Paulson (2008) indicate that the salinity model was successful in calculating central tendency and the 15th to 85th percentile range of specific conductance for all segments except the Las Animas gage.

For many surface water quality parameters, the CDPHE uses the 85th percentile as the representative statistic for surface water quality for comparison to the numeric water quality standards. For this reason, the 85th percentile was selected as the endpoint to summarize water quality effects for many constituents. The 85th percentile daily salinity was used to assess the effects of the various alternatives. The salinity model was also used to evaluate other parameters, as described below.

Dissolved Selenium

Several stream segments in the study area have been identified as exceeding the aquatic life water quality standards. The exceedances are attributed to shale formations that have been

exposed to the surface (runoff) or weathered into soil (groundwater) and studies are being conducted to identify selenium source areas (MWH, 2008b). Because of a lack of data, dissolved selenium in Fountain Creek and the middle and lower Arkansas River was evaluated using historical relationships between salinity and selenium. This numerical analysis has a large uncertainty, particularly because it builds upon the SDS daily hydrologic model and salinity effects results. However, the results provide an understanding of the relative effects of the SDS alternatives, if not the absolute selenium concentrations under each alternative. The selenium analysis was based on the median monthly simulated specific conductance, representing the central tendency of selenium concentrations for each SDS alternative. The 85th percentile of monthly median selenium was used for comparison of the effects of each SDS alternative.

Bacteria

The bacteria analysis was focused on E.coli in Fountain Creek during storm flow conditions, since Fountain Creek is listed on the 303(d) list for E. coli (MWH, 2008b). Stormwater runoff appears to be the primary source of bacteria to Fountain Creek, and none of the SDS alternatives would affect the dynamics of storm runoff or nonpoint pathogen sources. Therefore, the bacteria analysis focused on the amount of flow available to dilute bacteria. The median streamflow for each SDS alternative was used to assess whether each alternative would be beneficial for dilution of bacteria in Fountain Creek during storm flow conditions.

Other Constituents

The DEIS also evaluated the effects of the SDS alternatives on metals, nutrients, suspended sediment, temperature, emerging contaminants, and water quality and hydrology of local reservoirs. This memo focuses on the 303(d) listed parameters (selenium and E. coli, and also sulfate in the lower Arkansas River), which have been identified as the primary concern and for which EPA requested additional evaluation.

CDPHE METHOD

The CDPHE Water Quality Analysis is used to determine stream assimilative capacity for NPDES permitting purposes. CDPHE's standard analysis consists of steady-state, mass-balance calculations at low flow conditions. The mass-balance equation is used to calculate the maximum allowable concentration of pollutants in the effluent, and accounts for the upstream concentration of a pollutant at the existing quality, critical low flow (minimal dilution), effluent flow and the water quality standard. The mass-balance equation (as described by CDPHE for the Las Vegas Street WWTP, permit CO-0026735) is expressed as:

$$M_2 = \frac{M_3 Q_3 - M_1 Q_1}{Q_2}$$

where:

Q1 = Upstream low flow (three-year, one-day average low flow - 1E3- or three-year, 30-day average low flow - 30E3)

Q2 = Average daily effluent flow (design capacity)

Q3 = Downstream flow (Q1 + Q2)

M1 = In-stream background pollutant concentrations at the existing quality

M2 = Calculated maximum allowable effluent pollutant concentration

M3 = Maximum allowable in-stream pollutant concentration (water quality standards)

This method does not incorporate other flow conditions, nor additional sources of pollutants such as nonpoint sources, non-sewered return flows, etc. that are not accounted for in the background pollutant concentration (M1).

EPA- REQUESTED METHOD

EPA requested that water quality constituents of concern for Fountain Creek and the Arkansas River downstream of Pueblo Reservoir (dissolved selenium, E. coli, and lower Arkansas River sulfate) be evaluated using a watershed loading approach. EPA requested a mass balance approach consistent with CDPHE standard water quality assessments (described above). CDPHE's assessments are typically conducted for NPDES permitting purposes and are limited to low flow conditions. However, EPA requested that the evaluation include a range of flow regimes.

REVISED APPROACH

Based on EPA's request, described above, MWH developed a revised approach (Kosloff, 2008). This approach was refined based on discussions with EPA at a July 2008 meeting and was applied to obtain the results presented in the Supplemental Information Report (Bureau of Reclamation, 2008b). The approach involved a watershed loading approach for simulated existing conditions and all of the SDS alternatives, for both Direct/Indirect and Cumulative Effects scenarios. Dissolved selenium and *E. coli* were to be evaluated throughout the Monument Creek/Fountain Creek/Lower Arkansas River study area, and sulfate was to be evaluated in the lower Arkansas River (below Pueblo Reservoir).

The selenium and *E. coli* evaluations were to be conducted for two distinct flow regimes: "all flow" and low flow. Each approach is summarized below.

"All Flow" Regime Analysis

The "all flows" analysis used 100 randomly selected dates within the hydrologic model study period; these randomly-selected dates are expected to cover the range of flows that occur in the study area. Mass balance calculations were performed using stream flows determined by the hydrologic model for the 100 dates. Median or geometric mean selenium concentrations and *E. coli* densities were used for water quality inputs, including upstream water quality, point source discharges, groundwater and stormwater inputs. The study area was divided into segments, with all loads to each segment entered to the mass balance equation to estimate concentrations and loads at the end of the segment. The 85th percentile of simulated selenium concentrations were used to compare the SDS alternatives, since CDPHE's 303(d) listing procedures use the 85th percentile concentration. Geometric mean *E. coli* levels were used to compare the effects of the SDS alternatives.

In the October 2008 memorandum, MWH indicated the effects analyses would be conducted using the same approach used in the DEIS, with differences in concentration of less than 15% not considered meaningful due to the uncertainty of the analysis. Differences of 15-25% would be considered "minor change" and changes greater than 25% would be considered "moderate

change". Alternatives were to be ranked from those with the most adverse effects (increased stream concentrations/densities) to those having the most beneficial effects (decreased stream concentrations/densities).

Sulfate Evaluation

Insufficient data are available to assess sulfate in the lower Arkansas River using the same methodology proposed for selenium and E. coli. Rather, the existing salinity model described in the DEIS and supporting documentation was to be used, along with empirical relationships between specific conductance and sulfate. The available data show a strong correlation between specific conductance and sulfate.

Low Flow Analysis

The low flow analysis was to be conducted for permitted dischargers following CDPHE's typical water quality assessment (WQA) approach to evaluate the effects on effluent limitations for major permitted dischargers in the study area. These dischargers include:

- Pueblo WWTF
- City of Rocky Ford WWTF
- Colorado Springs J.D. Phillips Water Reclamation Facility (WRF)
- Colorodo Springs Las Vegas Street WWTF
- Security WWTF
- Fort Carson & Widefield WWTFs
- Fountain WWTF

The most recent CDPHE WQAs for these dischargers were to be used as the basis for this assessment. Simulated ambient quality under each alternative was to be based on the results of the "all flows" analysis. Stream flows to be used were 30E3 and 1E3, consistent with CDPHE procedures. Simulated maximum discharge in the hydrologic model was to be used for each discharge flow. Other sources were not to be considered. The resulting effluent limits for each facility under each scenario would then be presented.

COMPARISON OF RESULTS

The original DEIS evaluated the seven alternatives, and came to the following conclusion with regard to the environmental impacts:

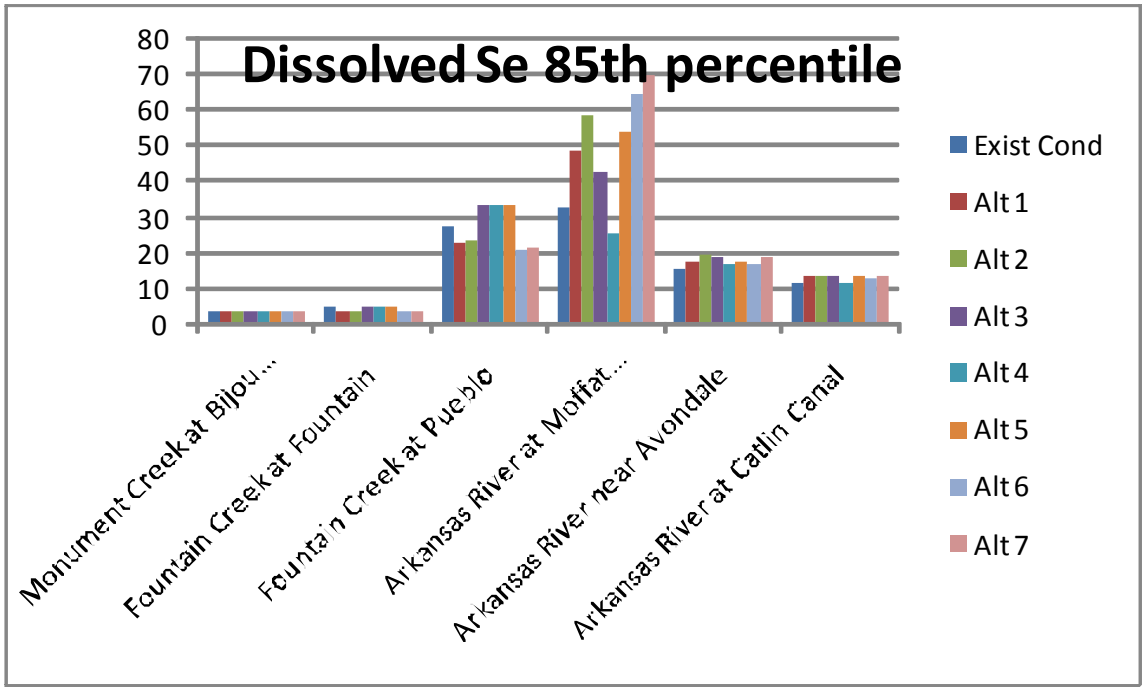
> *"… all six of the Action Alternatives are reasonable. Reclamation compared all of the alternatives in terms of how well they addressed the 10 public scoping issues (Section 2.1.1) and other relevant environmental and non-environmental issues identified by Reclamation during the DEIS process, including energy use and estimated costs. Based upon these considerations, Reclamation has initially identified the Participants' Proposed Action as the Agency Preferred Alternative. All alternatives would have adverse environmental effects. When coupled with the proposed mitigation measures described in this DEIS, the Participants' Proposed Action would result in similar*

> *environmental effects when compared to the other alternatives. Additionally, this alternative would have the lowest total project costs and lowest energy use requirements, resulting in the lowest greenhouse gas emissions, of any alternative. All of the Action Alternatives were developed to address specific environmental issues or meet public interest objectives. However, the other alternatives would have adverse environmental effects on other resources, would be more expensive, and would require at least as much or substantially more energy than the Participants' Proposed Action."* (Bureau of Reclamation, 2008a)

The Supplemental Information Report (Bureau of Reclamation, 2008b) presents the results of the revised approach. In preparing the SIR, some modifications were made with regard to the alternatives, to avoid or minimize some effects described in the DEIS, and to accommodate changes in infrastructure unrelated to the SDS. The modifications avoid or minimize effects on wetlands, cultural resources, important paleontological resources, and aquatic and avian species. Based on both the DEIS and the SIR, the Bureau of Reclamation identified Alternative 2, the Participants' Proposed Action, as the Agency Preferred Alternative. While the SIR focused largely on dissolved selenium, *E. coli*, and sulfate, it also summarized environmental consequences for surface water hydrology, ground water hydrology, flood hydrology and floodplains, geomorphology, aquatic life, wetlands, vegetation wildlife, recreation, socioeconomics, cultural resources, noise, visual quality, traffic, soils, air quality, and hazardous materials.

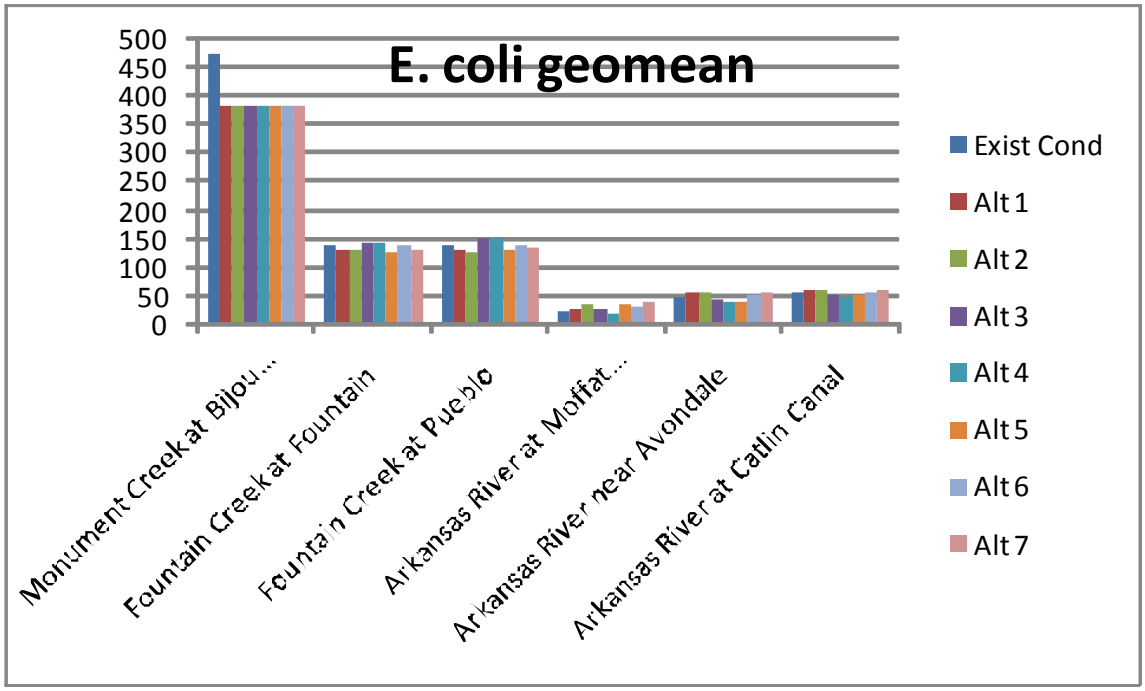
The SIR evaluation generally determined the following:

1. Selenium
    - All alternatives would result in a combination of negligible, beneficial, and adverse effects on dissolved selenium concentrations in Monument Creek, Fountain Creek, and the Arkansas River below Pueblo Reservoir.
    - At the Monument Creek at Bijou Street and Fountain Creek at Fountain locations, dissolved selenium concentrations would be similar among all alternatives, and would meet chronic water quality standards.
    - The chronic water quality standard (WQS) for selenium would be met in Fountain Creek at Pueblo under several alternatives, including the Participants' Proposed Action.
    - The chronic WQS for dissolved selenium (17.4 ug/L) is exceeded for existing conditions in the Arkansas River at the Moffat Street location and would be exceeded for all alternatives.
    - Below the Fountain Creek confluence, Arkansas River dissolved selenium concentrations would be similar among all alternatives, and would vary primarily as upstream concentrations in the Arkansas River above Fountain Creek vary.
    - The temporary chronic WQS (14.2 ug/L) for the Arkansas River is exceeded at Avondale under existing conditions and would continue to be exceeded under all alternatives.

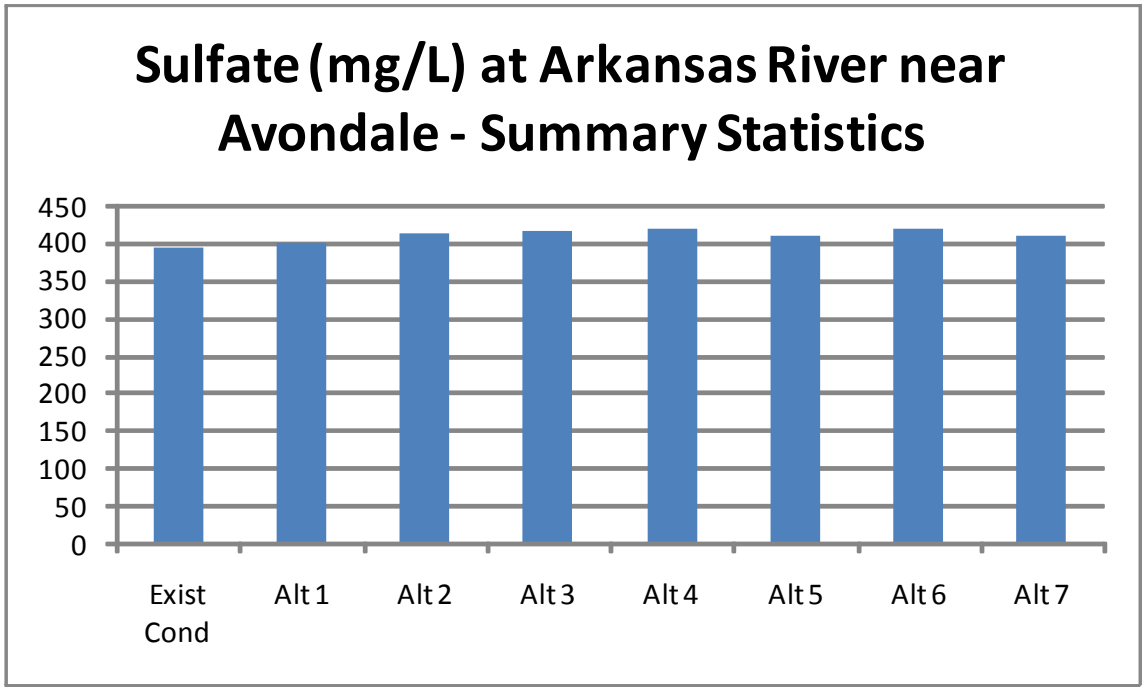


2. *E. coli*

- The beneficial effects of all alternatives on *E. coli* densities in Monument Creek, Fountain Creek, and the Arkansas River below Pueblo Reservoir would be negligible to minor.
- All alternatives would have similar *E. coli* densities in Monument Creek, and would have lower densities than existing conditions.
- Within Fountain Creek, most of the alternatives, including the Participants' Proposed Action, would have densities similar to the No Action Alternative.
- In the lower Arkansas River, the WQS would be met under all alternatives.



3. Sulfate
    - Direct effects on sulfate concentrations would be negligible to minor for all alternatives.
    - Estimated sulfate concentrations for all alternatives would be similar to those for existing conditions. Small calculated differences among alternatives are likely to be within the range of uncertainty for the estimation method.
    - The temporary WQS for sulfate (329 mg/L) is exceeded in the Arkansas River near Avondale under existing conditions and would continue to be exceeded under all alternatives.



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