COLORADO DEPARTMENT OF HEALTH
REVIEW AND COMMENT
TECHNICAL MEMORANDUM (TM)6 - MODEL DESCRIPTIONS
OPERABLE UNIT 2, JANUARY, 1993

General Comments:

1) Comments from the Division to TM 5 for OU2 will have a direct impact on several sections of TM 6. Affected sections include the Executive Summary, Section 1.1, all of Section 2, ;and portions of Section 3.

Response: The revised version of TM6 will reflect and be consistent with the modifications made to TM5.

2) To support both the risk assessment and the feasibility study, history matching needs to be attempted for at least the ground water modelling. In order to have any confidence in a model's ability to predict future exposure point concentrations, the ability of the model to recreate present conditions (given past knowledge, source characteristics, and chemical behavior) must be calibrated.

Response: Accurate history matching is considered to be excessive (and probably impossible) for the OU2 groundwater model, due to the simplified nature of the model and the lack of information regarding the character of contaminant source areas and the time of contaminant releases. The OU2 groundwater model is a simplified numerical flow and transport model designed to estimate conservative values for contaminants in groundwater to support the risk assessment. The model will be checked for reasonableness, based on representative contaminant conditions and assumed source area characteristics.

Specific Comments:

Section 1.1: Please clarify the statement "This document does not address the application of selected models to the site-specific conditions at OU2; that will be included in the Phase II RFI/RI Report" that occurs in the second paragraph on page 1-2. Unless the models chosen in this TM can address site-specific conditions, they should not be used. We presume that this evaluation has taken place and would like to see this presented in this TM. Delaying the

communication of this information to the RFI/RI Report could result in the same problems that occurred in the OU1 Report. The more information that can be included in these TMs prior to submission of the Report, the better.

Response: Selected models, described in the TM, are appropriate for site conditions. General site conditions were outlined in the TM. However, detailed site conditions had not been evaluated at the time of completion of the memorandum. The generalized site conditions were adequate to determine that the models met selection criteria. The statement means that details regarding the incorporation of site data into the models will be provided in the RFI/RI Report. This statement will be revised for clarity.

Section 3.1: This section never clearly states how the selected models will be calibrated. Calibration is necessary for past, current, and future site representations and process descriptions in support of risk assessments and feasibility studies.

Response: The simplified groundwater model will be calibrated on the basis of these criteria: matching of the representative water table to the simulated surface, including comparison of observed and simulated alluvial water levels, flow direction, and hydraulic gradient; matching of the qualitative descriptions of seep flow discharge; and using hydraulic conductivity values that fall within the range of OU2 pumping test results.

A discussion of model calibration will be added to the Final TM6.

The air quality models selected and discussed in the TM6 are part of the UNAMAP series, have been sanctioned by the EPA and other regulatory agencies, and have already undergone extensive validation.

Section 3.2: Please ensure that a realistic treatment of the upgradient edge of the modelled area and its effect on the hydrology of OU2 is incorporated into the ground water modelling. This was a problem in the draft RFI/RI Report for OU1 in that the upgradient portions of OU1 were not adequately or accurately represented.

Response: Hydrological impacts from the area upgradient (west) of the model are being treated in a representative manner in the flow model. Boundary conditions account for inflow to the model through the Arapahoe No. 1 sandstone channel. It is assumed that no western boundary

inflow from alluvium into the model area occurs. This assumption is justified by existing site conditions.

Section 3.3: Please provide more information on how other sources of available data (e.g., chemical decay and dispersivity, etc.) will be integrated into the MT3D effort. Some of these parameters may require separate modelling efforts to determine quality MT3D inputs.

Response: Site-specific total organic carbon data will be used to determine the distribution coefficients (Kd). Appropriate literature values will be used for other fate and transport parameters. Dispersivity will be evaluated based on model scale. Each of the parameters will be checked for reasonableness based on representative contaminant conditions and assumed source characteristics. This information will be provided in the Final TM6.

Section 3.4: The Division does not believe that ONED3 is a valid model for colluvial ground water. Many of the basic assumptions for ONED3, including use for confined aquifers, horizontal flow, homogenous and isotropic medium, and fully saturated and steady state conditions, are not satisfied by the colluvial ground water. The Division suggests that a 2D profile model used with adequate understanding of the colluvial heterogeneity would be more valid.

Response: The ONED3 model is considered to be appropriate for application to colluvial contaminant transport in OU2. Geologic heterogeneities of the hillsides in the area are not well defined, thus simplifying assumptions are required. ONED3 will be applied using assumptions that will provide for a conservative estimate of transport of contaminants.

Section 3.5: The division does not believe that the surface water model mass-balance equation given is adequate. Risk assessment is dependent on both human health parameters and ecological parameters. Both of these endpoints have chronic and acute considerations which must be assessed, neither of which can be assessed by using average annual concentrations. Certain potentially dangerous solutes might be concentrate during periods of low flow causing chronic effects. Others might only occur during high flow events.

Response: The annual average (which is actually a maximum 30-year moving average) concentrations are sufficient to characterize risks; thus, application of the mass balance equation on an annual average basis should be adequate. Confidence limits for these long-term average concentrations will be developed.

On page 3-11, please define the terms M, L, and T in the soil loss equation.

Response: Those symbols are generic representations for units of mass, length, and time, respectively. These terms will be clarified in the text.