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 sections in TM-6 addressing risk assessment and exposure scenarios were intended to be consistent with TM-5 and were developed based on the text in TM-5 at that time Any discussion of risk assessment and exposure scenarios in the modeling sections of the RFI/RI Report will be consistent with the final version of TM-5

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 In order to meet schedule requirements for the OU2 RFI/RI Report, the groundwater model will be a simplified composite model used to support risk assessment studies, but not the feasibility studies Due to the simplified nature of the model, and the absence of reliable data prior to 1986, history matching of conditions prior to 1986 is not possible However, a comparison of model results to current groundwater levels and flow conditions, and composite contamination conditions will be performed as a reasonableness check of the OU2 models Available historic information including groundwater level hydrographs (post-1986 only), chemical concentrations (post-1990 only), and precipitation records (post-1978) will be reviewed and analyzed to support the development of the model and to evaluate the model-predicted results

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 known 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

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 Because the model will simulate conditions in a composite of the Rocky Flats Alluvium and No 1 Sandstone, a detailed well-by-well calibration of model results cannot be performed However, the model results will be compared to general observed current water levels, flows, and contamination conditions to verify that they are a reasonable simulation of the site conditions for the purposes of supporting risk assessment The groundwater model will be calibrated on the basis of these criteria matching of the representative (i e , composite) water table to the model-simulated surface, including comparison of observed and simulated alluvial water levels, alluvial and sandstone 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 measured OU2 hydraulic test results

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 known 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 For estimating retardation factors, site-specific total organic carbon data for soils will be used to determine distribution coefficients (Kd) Koc values will be taken from literature (Groundwater Chemicals Desk Reference [Montgomery, J H , Welken, C M , 1990]) Biodegradation values will be obtained from "Handbook of Environmental Degradation Rates" (Howard, P H et al 1991) The parameters will be selected in a manner suited to obtain conservative contaminant transport results (i e , low values for retardation and high values for biodegradation half-life will be used) Dispersivity will be evaluated based on the groundwater plume scale and the model grid dimensions Each of the parameters will be checked for reasonableness based on observed contaminant conditions and assumed source characteristics

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 Division is correct that many of the assumptions incorporated in ONED3 are not satisfied in the colluvial flow system at OU2 However, based on the very limited data available concerning hydrogeologic and contaminant conditions in the colluvium at OU2, we believe that application of a simple analytical transport model with appropriate conservative simplifying assumptions is the appropriate way to simulate the major transport effects including advection, retardation, decay, and dispersion Such a model, when applied with conservative assumptions, is suitable for providing the level of data necessary for supporting the Human Health Risk Assessment Application of a more complex model, such as a 2D numerical profile model, is probably not appropriate given the limited data available to support such a model Specific geologic data are limited for the OU2 hillslopes, due to their steepness

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