

Waste Isolation Pilot Plant
Compliance Certification Application
Reference 668

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FEPs Screening Analysis, NS-1: Dewey Lake Data Collection and Compilation.
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FEPs Screening Analysis

NS-1: Dewey Lake Data Collection and Compilation

WBS No. 1.1.6.3

SWCF-A: 1.1.6.3:PA:~~NO~~:TSK: NS-1

*QA
ADS 12/21/95*

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PLAN OF WORK

This document describes the process for conducting sidebar calculations. This work was planned, conducted, and documented in accordance with the FEP Management Plan titles "Features, Events, and Processes (FEP) and Assumption Screening: Procedural Aspects, Documentation QA" Revision 5.1, effective 5/11/1995.

A set of screening analyses has been performed to evaluate the sensitivity of the Waste Isolation Pilot Plant (WIPP) repository performance to the FEP Screening Issue NS-1: Dewey Lake Data Collection and . . . Compilation

This records package provides background information on the process used for conducting the screening analysis and summarizes the scenarios considered, identifies the computer codes and input and output files used in the calculations, and describes the performance measures that are used to help establish FEPs screening decisions. The statement of recommended screening decision for this FEP is provided in the Summary Memo of Record.

PLANNING MEMOS OF RECORD (PMoR)

The Planning Memo of Record for NS-1, *Dewey Lake Data Collection and Compilation* is provided in the following pages.

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NS-1: DEWEY LAKE DATA COLLECTION AND COMPILATION
Planning Memo of Record

DATE: June 12, 1995
TO: D. R. Anderson
FROM: R. Beauheim
SUBJECT: FEP Screening Issue NS-1

STATEMENT OF SCREENING ISSUE

There are two basic screening issues regarding the Dewey Lake redbeds:

- Is there now, or will there be at any time over the next 10,000 years, a laterally continuous water table within the Dewey Lake? If so, it can conceivably be argued that, because of the relatively pure nature of Dewey Lake waters where they have been encountered, that: a) this water table should be monitored during the active-institutional-control phase of the WIPP; and b) from a regulatory standpoint, potable water does exist within the WIPP site area.
- Is there any significant potential for radionuclide release through the Dewey Lake to the accessible environment (i.e. across the site boundary) under either undisturbed or human-intrusion conditions? If so, then contaminant/radionuclide transport within the Dewey Lake might need to be explicitly included in future repository-evaluation calculations.

The revised "baseline" position for contaminant transport within the Dewey Lake, as of 2/95, is that: a) there is no laterally continuous "water table" within the unit in the site area; and b) there will be no contaminant transport through the Dewey Lake to the accessible environment, under either undisturbed or human-intrusion conditions. This approach is based on the assumed completion of this activity. If this effort is not completed, it will be necessary to return to a position in which any (or at least a portion of any) radionuclides partitioned into the Dewey Lake in calculations of brine flow are assumed to be releases to the accessible environment.

APPROACH
Calculation Design

The Dewey Lake evaluation study consists of several small efforts. These include:

- Compilation of existing lithologic, stratigraphic, and hydrologic data for the Dewey Lake and Dockum Group.
- Analysis of existing Dewey Lake core from the core library.
- Analysis of Dewey Lake core to be collected at the H-19 pad.

These three closely-coordinated efforts will lead directly to:

- Development and documentation of a conceptual flow and transport model for the Dewey Lake.
- Definition of a reasonable sorption-distribution coefficient for the Dewey Lake (K_d), using existing literature values, and considering colloid transport.

- Performing a short pumping test at the WQSP-6a well, in order to obtain site-specific hydraulic data, and performing a 1D infiltration calculation through the WIPP unsaturated zone.

These last efforts, combined with the conceptual model derived from the first steps, will provide both literature-based and site-specific information required for:

Use of the regional-scale 3D model in one-dimensional vertical calculations to calculate the effects of climate change on water levels and hence any distribution of a water table within the Dewey Lake.

Completion of lateral one-dimensional contaminant-transport calculations to assess the feasibility of radionuclide releases through the Dewey Lake quantitatively.

Resource Estimate for NS-1: DEWEY LAKE DATA COLLECTION AND COMPILATION

Total cost: \$150 K

Duration: one year to final reporting.

Reporting of conceptual and numerical model requirements to PA: 9/95.

Final reporting of required PA parameters and distributions for evaluation of Dewey Lake: 3/96.

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SOFTWARE

Title and version of software used:

Microsoft Excel Version 5.0
spreadsheet

Copy of Software Abstract for all software that is not commercially available: None; Microsoft Excel 5.0 is commercially available

Source listing of Macros and other application software codes: None

PLATFORM

List of hardware and operating system (title and version) on which each code was run:

Hardware: Compaq Deskpro 386/20
Operating System: Microsoft Windows version 3.1

INPUT DATA SET

Data set and information files used, including name and version of all databases, libraries, and data files:

- There are no data input files per se, as computer codes were not used in this analysis, only hand calculations.
- A complete development of the data is included in Appendix 2, "Proposed Conceptual Model of Dewey Lake Formation Hydrogeology."
- A page of supplementary data/information is included here (see Table 6-20, "Dewey Lake Parameters for the BRAGFLO Model" on the following page. This table is in the DCCA, which is listed in the References section).
- A note from R. Beauheim is also included.
- Three additional memos that were examined for relevant data.
 1. SREMR from Bob Diaz to many recipients on 3-2-95.
 2. Memo from Sarah Bigger to J. Mewhinney on 10-18-94.
 3. Fax from Larry Modl (Westinghouse) to Sarah Bigger on 10-18-94.

Documentation of deviations from baseline data set including rationale:

A primary purpose of this FEP was to explore the need of incorporating new data and/or concepts into the next round of PA calculations. Therefore, there are deviations from the baseline data set, by necessity. See Section 6, Summary Memo of Record in this records package for the related documentation and rationale.

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Table 6-20. Dewey Lake Parameters for the BRAGFLO Model

Parameter	Maximum	Minimum	Median or Constant
Permeability (m ²)	—	—	9.33×10 ⁻¹⁶
Porosity (%)	—	—	15
Pore compressibility (1/Pa)	—	—	6.67×10 ⁻⁴
Two-phase flow: Brooks-Corey	—	—	1.0
P _t (Pa)	—	—	0
S _{br}	—	—	0.2
S _{gr}	—	—	0.2
λ	—	—	0.7
Thickness (m)	—	—	149.3
Initial Pressure	—	—	hydrostatic, water table at 980 m, 43.3 m below top of formation
Initial pressure, atm. 20% liquid saturation, above water table	—	—	1

¹Parameters with no maximum and minimum values are treated as constants in the performance assessment.

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