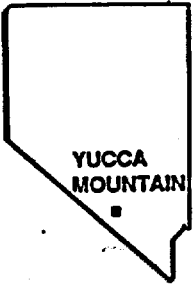


*Rec'd 3/26/92*

U.S. DEPARTMENT OF ENERGY

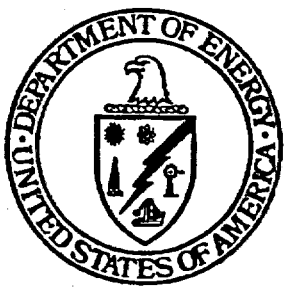
**WM**



**YUCCA MOUNTAIN  
SITE CHARACTERIZATION  
PROJECT**

**TECHNICAL DATA BASE  
QUARTERLY REPORT**

**JULY - DECEMBER 1991**



*102.2*

**YUCCA MOUNTAIN  
SITE CHARACTERIZATION PROJECT**

**TECHNICAL DATA BASE  
QUARTERLY REPORT**

**JULY-DECEMBER 1991**

**Prepared by**

**Technical and Management Support Services  
from inputs provided by  
Sandia National Laboratories, Department 6316;  
EG&G Energy Measurements, Inc.;  
and  
Lawrence Livermore National Laboratory**

## INTRODUCTION

The acquisition and development of technical data are activities that provide the information base from which the Yucca Mountain Site will be characterized and may eventually be licensed as a high-level waste repository. Consequently, it is vital that technical data be controlled and managed to ensure that these data are available for subsequent Yucca Mountain Site Characterization Project (YMP) use. The Project Technical Data Base (TDB) is the repository for the regional and site-specific technical data required in intermediate and license application analyses and models. The TDB Quarterly Report provides the mechanism for identifying technical data currently available from the Project TDB.

Due to the variety of scientific information generated by YMP activities, the Project TDB consists of three components, each designed to store specific types of data. The Site and Engineering Properties Data Base (SEFDB) maintains technical data best stored in a tabular format. The Geographic Nodal Information Study and Evaluation System (GENISES), which is the Geographic Information System (GIS) component of the Project TDB, maintains spatial or map-like data. The Geologic and Engineering Materials Bibliography of Chemical Species (GEMBOCHS) data base maintains thermodynamic/geochemical data needed to support geochemical reaction models involving the waste package and repository geochemical environment. Each of these data bases are addressed independently within the TDB Quarterly Report.

The TDB Quarterly Report is divided into sections for each TDB component and includes appendices within each section, as appropriate. The structure of each section varies due to the differing needs of each TDB component. However, as a minimum, each section identifies technical data currently available within the respective TDB component. Other optional information included within each section has been determined by the appropriate TDB component staff to be pertinent for individuals requesting data.

The Technical Data Management System on the YMP is currently undergoing significant development and expansion that will enable it to evolve into a more efficient system to meet the needs of the Project. Future plans include a TDB Handbook, TDB Parameter Dictionary, and an Automated Technical Data Tracking (ATDT) System. The TDB Handbook will provide guidelines to assist participants in the submission of technical data to, retrieval of technical data from, and modification of previously submitted data in the TDB. The TDB Parameter Dictionary will define specific structures and formats of data to be submitted to the TDB to ensure consistency in the reporting of data, and it will identify attributes associated with the data to ensure entries in the data base are meaningful. Additionally, the TDB Parameter Dictionary will define the component of the TDB in which the data will reside. The ATDT system is an Information Management System designed to trace the development of all technical data acquired by the Project and to maintain the link between the information stored in the ATDT System and the actual records of technical data maintained by the records system.

A Project Data Catalog, identifying all technical data collected by the Project, will be prepared from the ATDT System. The TDB Quarterly Report will eventually be merged with the Project Data Catalog once all of the information about the existing technical data in the TDB has been included in the ATDT System.



# **SEPDB QUARTERLY REPORT**

**SANDIA NATIONAL LABORATORIES**

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## SEPDB QUARTERLY REPORT

### 1.0 INTRODUCTION

This Site and Engineering Properties Data Base (SEPDB) Quarterly Report summarizes the current status of the SEPDB and lists Sandia's major activities and accomplishments in the development and operation of the data base during July - December of 1991. The report presents the data that is currently available in the SEPDB and gives instructions for submitting and retrieving data. An example of how data should be compiled for submittal to the SEPDB, a sample data retrieval (SEPDB product), and a blank work request form are also included.

The SEPDB is being developed and operated by Sandia National Laboratories as a component of the Project Technical Data Base in support of a license application. The SEPDB provides the controlled storage and reporting of scientific and engineering data generated by site characterization, performance assessment and design activities. It primarily contains the geologic, hydrologic, and rock property data from core sample testing and field measurements, but is intended for essentially all technical data that is being acquired on the project and is best stored in tabular form.

### 2.0 SEPDB ACTIVITIES AND ACCOMPLISHMENTS FROM JULY - DECEMBER 1991

1. The following data was entered and has been approved by the submitter, making it available for project use:

#### New Data Available for Project Use

- DA0026: Hydraulic conductivity data from USGS OFR 81-1338.

2. The use of SEPDB data by project participants is increasing. The following SEPDB products (data reports were issued during this quarter:

#### SEPDB Products (Data Reports)

- Porosity, grain and bulk density data report for Steve Bauer (SNL)
- Drill hole coordinates including total vertical depth data report for Mick Jones (SNL)
- Grain density, porosity, pore saturation and lithologic data report for Paul Whitney (Battelle, PNL)
- Water temperature and mineralogy data report for Romeo Jurani (RSN)
- Drill hole and bottom hole comparison data report for Dave Brickey (EG&G/EM)

- Porosity, hydraulic conductivity and bulk density data report for Tom Robey (SNL)
- Water level data report for Eugene Rose (TRW)
- Titles and authors data report for Eugene Rose (TRW)
- Drill hole information in NSP coordinates data report for Eugene Rose (TRW)
- Bulk and grain density, porosity and thermal conductivity data report for Connie Chocas (SNL)

3. The following data were submitted for entry into the SEPDB:

#### SEPDB Data Submittals

- DA0157: Mineralogy, petrology and whole-rock chemistry data compilation for selected samples of Yucca Mountain tuffs (SNL SAND report number 91-7031)
  - DA0158: Thermal expansion data for unsaturated tuffs (SNL SAND report number 88-1581)
  - DA0160: Spent fuel hardware activities as a function of time (to 1,000,000 years) (LLNL - no citation number)
4. As requested, Rick Orzel assisted TRW in Fairfax, Virginia in establishing a communications link with the SEPDB computer system. The method used is a SECUREID card that allows a link to the Sandia PBX communications network in Albuquerque. Once that link is established, access to the SEPDB VAX can be requested.
5. Work has begun on incorporating the ATDT system into the SEPDB using TDIF's. The SEPDB staff has begun converting accession numbers to data tracking numbers (DTN's). TDIF's are also being made for all data submittals that were made to the SEPDB prior to the conception of the ATDT system. Paula Adams and Rick Orzel attended a one day class on the ATDT system.

### 3.0 DATA CURRENTLY AVAILABLE FROM THE SEPDB

The data that is currently available from the SEPDB is detailed by nine different reports presented in Appendix A. These reports provide a comprehensive view of the current contents of the SEPDB. The information presented in each report and the corresponding page numbers are as follows:

1. Types of data currently stored in the SEPDB (pages A1-A2).
2. For each drill hole, the parameters for which data is available including the reference report (pages A3-A10).

3. For each parameter, the drill holes for which data is available including the reference report (pages A11-A17).
4. The data available that is not associated with a drill hole core sample (page A18).
5. The drill holes for which coordinates (Nevada State Plane, Central Zone) are available (pages A19-A20).
6. The drill holes for which bottom hole information (i.e., bottom hole coordinates, total depth, total vertical depth) is available (pages A21-A22).
7. The drill holes for which core information (i.e., length of cored interval, percent recovery) is available (page A23).
8. The hole history reports that have been submitted to the SEPDB from which the drill hole data has been taken (page A24).
9. A complete listing of the reference reports for the data contained in the SEPDB (pages A25-A28).

#### 4.0 INSTRUCTIONS FOR SUBMITTING DATA TO THE SEPDB

The procedure for submitting data to the Technical Data Base is defined in project Administrative Procedure AP-5.2Q, "Technical Information Flow to and from the Yucca Mountain Project Technical Data Base." Appendix A of this report and Appendix C of the Technical Data Management Plan should be used to determine whether or not data should be submitted for entry into the SEPDB. The SEPDB Administrator may also be contacted to discuss the format and scope of the data to be submitted.

#### 5.0 INFORMATION TO INCLUDE WHEN SUBMITTING DATA

In addition to the data values for each parameter, the SEPDB tables have been structured to store important supporting information such as the location of core samples and field measurements, the test method and conditions used to generate the data, and the report in which the data is published. It is important to include this supporting information when submitting data to the SEPDB. The structures of the SEPDB tables are presented in Appendix B. These should be used as guides when compiling data for submittal to the SEPDB. The general structure is as follows:

**Parameter Information:** List all parameters and their associated data values. Specify the units for each parameter and report any known uncertainties in the data.

**Location Information:** Report all information that specifies the location of core samples or field measurements. This should include the drill hole name and coordinates, the drill hole depth, and the sample identification number.

**Test Conditions:** Describe the test method and list all important test conditions such as date, time, temperature, pressure, flow rate, sample size, and instrument type.

**Tracking Information:** If the data is published, give the reference information for the publication. Report the QA level under which the data was collected, the CRF accession number, the Local Records Center identification number, the SCP activity number, and the WBS number if known.

The SEPDB data compilation shown in Appendix C is an excellent example of how data is best compiled for submittal to the SEPDB.

## 6.0 INSTRUCTIONS FOR RETRIEVING DATA FROM THE SEPDB

Data is requested from the SEPDB by simply filling out a Work Request form and sending it to the SEPDB Administrator. Blank Work Request forms can be found in Appendix C of this report. Requests for data may also be made by making a telephone call to the SEPDB staff (see Section 7.0 for SEPDB contacts). In either case, the following information must be provided:

1. The requester's name, organization, address, and telephone number.
2. A description of the data that is being requested including a list of the specific parameters.
3. The desired format of the data report (a separate page showing the desired format including column headings is preferred).

No special approvals are required by Project participants to retrieve data from the SEPDB. However, non-participants must obtain approval from the Technical Data Manager at the Project Office who will then notify the SEPDB Administrator of the approved request. Note that data requesters do not have to fill out a TDIF to retrieve data from the SEPDB. The TDIF is completed by the SEPDB staff after the data request is met.

The data that is available from the SEPDB can be reported in a wide range of table structures as specified by the user. This is made possible by the flexibility of the INGRES software used by the SEPDB. In addition, the relational character of the data base enables many different types of data to be reported at specific depths for drill hole core samples and at specific surface coordinates for non-core samples. The SEPDB data report shown in Appendix C is an excellent example of the ability of the SEPDB to provide various types of data in a format that can easily be used in performance assessment and design.

## 7.0 SEPDB CONTACTS

The SEPDB is operated by Sandia's Technical Projects Division 6316. The primary contacts are:

Rick Orzel	System Manager	FTS 844-2880
Paula Adams	Data Base Specialist	FTS 846-8178

Rick should be the first point of contact with questions on how to submit data and on whether or not data is appropriate for storage in the SEPDB. Rick should also be the first contact with hardware and software questions including how to use the menu driven program currently being developed to interact with the SEPDB from a terminal and how other systems can be connected to the SEPDB. Paula should be contacted first when requesting data reports.

The SEPDB staff welcomes all questions, concerns, and suggestions for improvement. Feel free to contact us at any time by phone or in writing. Written correspondence should be sent to:

SEPDB Administrator  
Sandia National Laboratories  
Technical Projects Division 6316  
P.O. Box 5800  
Albuquerque, New Mexico 87185

## APPENDIX A



# DATA CURRENTLY STORED IN THE SEPDB

PARAMETER -----	DESCRIPTION -----
BOTTOM HOLE COORDINATES	Nevada Plane Coordinates for Bottom of Surveyed Drill Holes
BULK DENSITY	Bulk Density Values and Test Conditions
BULK MODULUS	Bulk Modulus Data and Test Conditions
COMPRESSIVE STRENGTH	Compressive Strength Data and Test Conditions
CORE INFORMATION	Core Information, Intervals and Percent Recovery
CURVE FIT	Saturation Curve-Fit Parameters and Test Conditions
DRILL HOLE COORDINATES	Drill Hole Locations, Surveys and Status
DRILL HOLE WATER CHEMISTRY	Water Chemical Constituent Values for Drill Holes
ELASTIC PROPERTIES	Elastic Properties (Poisson's Ratio & Young's Modulus)
FLOOD PREDICTIONS	Flood Predictions (100 yr, 500 yr & Regional Maximum) & Locations
GRAIN DENSITY	Grain Density Values and Test Conditions
HYDRAULIC CONDUCTIVITY	Hydraulic Conductivity Values and Test Conditions
LITHOLOGIC UNITS	Lithologic Unit Depths in Drill Hole
MATRIX POTENTIAL	Matrix Potential Data and Test Conditions
MEASURED FLOODS	Parameters for Measured Floods
MINERALOGY	Mineralogical Samples and Test Conditions
PALEOMAGNETIC	Paleomagnetic Data and Test Conditions
PERMEABILITY	Permeability and Test Conditions
PORE SATURATION	Pore Saturation and Test Conditions
PORE WATER CONTENT	Natural-state Porewater Content Percentages
POROSITY	Porosity Values and Test Conditions
PREDICTED FLOOD LOCATIONS	Cross Section Locations for Predicted Floods
RELATIVE HYDRAULIC CONDUCTIVITY	Relative Hydraulic Conductivity & Test Conditions
SAMPLE LOCATIONS	Location Coordinates for Surface Samples
SONIC VELOCITY	Laboratory Sonic Velocity Measurements
SPRING WATER CHEMISTRY	Water Chemical Values for Springs & Non-Drill Hole Wells
STORAGE COEFFICIENT	Storage Coefficient Values for Well Tests
STRATIGRAPHIC	Thermal/Mechanical Stratigraphic Units
THERMAL CONDUCTIVITY	Thermal Conductivity Data and Test Conditions
TRANSMISSIVITY	Transmissivity Data and Pumping Conditions

WATER LEVEL

WATER PRODUCTION

WELL HYDRAULIC CONDUCTIVITY

Water Elevations and Depths, Dates of  
Measurements  
Percent Water Production in Drill Hole  
Intervals  
Well Test Hydraulic Conductivity  
Measurements

DATA CURRENTLY AVAILABLE ORGANIZED BY DRILL HOLE

HOLE	TYPE OF DATA	REFERENCE CITATION
----	-----	-----
J-11	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
J-12	Mineralogical Samples and Test Conditions	LA-11497-MS
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
	Water Chemical Constituent Values for Drill Holes	USGS OFR 85-484
J-13	Bulk Density Values and Test Conditions	USGS WRIR 83-4171
	Grain Density Values and Test Conditions	USGS WRIR 83-4171
	Hydraulic Conductivity Values and Test Conditions	USGS WRIR 83-4171
	Lithologic Unit Depths in Drill Hole	USGS WRIR 83-4171
	Mineralogical Samples and Test Conditions	LA-11497-MS
	Pore Saturation and Test Conditions	USGS WRIR 83-4171
	Natural-state Porewater Content Percentages	USGS WRIR 83-4171
	Porosity Values and Test Conditions	USGS WRIR 83-4171
	Laboratory Sonic Velocity Measurements	USGS WRIR 83-4171
	Transmissivity Data and Pumping Conditions	USGS WRIR 83-4171
	Well Test Hydraulic Conductivity Measurements	USGS WRIR 83-4171
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
	Water Chemical Constituent Values for Drill Holes	USGS OFR 85-484
		USGS WRIR 83-4171
UE-16d	Water Elevations and Depths, Dates of Measurements	USGS 1543-3
	Water Chemical Constituent Values for Drill Holes	USGS 1543-3
UE-16f	Water Elevations and Depths, Dates of Measurements	USGS 1543-3
	Water Chemical Constituent Values for Drill Holes	USGS 1543-3
UE-17a	Water Chemical Constituent Values for Drill Holes	USGS 1543-4
UE-25 WT #12	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
UE-25 WT #13	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197

DATA CURRENTLY AVAILABLE ORGANIZED BY DRILL HOLE

HOLE ----	TYPE OF DATA -----	REFERENCE CITATION -----
UE-25 WT #14		
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
UE-25 WT #15		
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
UE-25 WT #16		
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
UE-25 WT #17		
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
UE-25 WT #3		
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
UE-25 WT #4		
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
UE-25 WT #6		
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
UE-25a #1		
	Bulk Density Values and Test Conditions	SAND88-0811
	Grain Density Values and Test Conditions	USGS OFR 81-1338
	Mineralogical Samples and Test Conditions	SAND88-0811
		USGS OFR 81-1338
		LA-11497-MS
		SAND88-0882
		USGS OFR 84-491
	Porosity Values and Test Conditions	SAND88-0811
	Laboratory Sonic Velocity Measurements	USGS OFR 81-1338
	Thermal/Mechanical Stratigraphic Units	USGS OFR 81-1338
		SAND84-1076
UE-25a #4		
	Thermal/Mechanical Stratigraphic Units	SAND84-1076
UE-25a #5		
	Thermal/Mechanical Stratigraphic Units	SAND84-1076

DATA CURRENTLY AVAILABLE ORGANIZED BY DRILL HOLE

HOLE -----	TYPE OF DATA -----	REFERENCE CITATION -----
UE-25a #6		
	Thermal/Mechanical Stratigraphic Units	SAND84-1076
UE-25a #7		
	Thermal/Mechanical Stratigraphic Units	SAND84-1076
UE-25b #1		
	Bulk Density Values and Test Conditions	USGS WRIR 84-4253
	Grain Density Values and Test Conditions	USGS WRIR 84-4253
	Hydraulic Conductivity Values and Test Conditions	USGS WRIR 84-4253
	Lithologic Unit Depths in Drill Hole	USGS WRIR 84-4253
	Mineralogical Samples and Test Conditions	LA-11497-MS
		USGS BULL-1777
	Pore Saturation and Test Conditions	USGS WRIR 84-4253
	Natural-state Porewater Content Percentages	USGS OFR 83-855
		USGS WRIR 84-4253
	Porosity Values and Test Conditions	USGS WRIR 84-4253
	Thermal/Mechanical Stratigraphic Units	SAND84-1076
	Transmissivity Data and Pumping Conditions	USGS WRIR 84-4253
	Well Test Hydraulic Conductivity Measurements	USGS WRIR 84-4253
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
		USGS WRIR 84-4253
	Water Chemical Constituent Values for Drill Holes	USGS OFR 83-855
		USGS OFR 85-484
		USGS WRIR 84-4253
		USGS WRIR 84-4267
UE-25c #1		
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
	Water Chemical Constituent Values for Drill Holes	USGS OFR 85-484
UE-25c #2		
	Water Chemical Constituent Values for Drill Holes	USGS OFR 85-484
UE-25c #3		
	Water Chemical Constituent Values for Drill Holes	USGS OFR 85-484
UE-25p #1		
	Lithologic Unit Depths in Drill Hole	USGS OFR 84-450
		USGS OFR 86-175
	Mineralogical Samples and Test Conditions	LA-11497-MS
	Transmissivity Data and Pumping Conditions	USGS WRIR 84-4248
	Water Elevations and Depths, Dates of Measurements	USGS OFR 84-450
		USGS WRIR 84-4197

DATA CURRENTLY AVAILABLE ORGANIZED BY DRILL HOLE

HOLE -----	TYPE OF DATA -----	REFERENCE CITATION -----
	Water Chemical Constituent Values for Drill Holes	USGS WRIR 84-4248 USGS OFR 85-484 USGS WRIR 84-4248
UE-29a #1	Water Elevations and Depths, Dates of Measurements Water Chemical Constituent Values for Drill Holes	USGS OFR 84-142 USGS OFR 84-142
UE-29a #2	Water Elevations and Depths, Dates of Measurements Water Chemical Constituent Values for Drill Holes	USGS OFR 84-142 USGS OFR 84-142 USGS OFR 85-484 USGS WRIR 84-4267
USW G-1	Bulk Density Values and Test Conditions  Saturation Curve-Fit Parameters and Test Conditions Grain Density Values and Test Conditions  Hydraulic Conductivity Values and Test Conditions Lithologic Unit Depths in Drill Hole Matrix Potential Data and Test Conditions Mineralogical Samples and Test Conditions  Porosity Values and Test Conditions  Thermal Conductivity Data and Test Conditions Thermal/Mechanical Stratigraphic Units Water Elevations and Depths, Dates of Measurements	SAND87-2380 SAND88-0811 UCLR-53602 UCLR-53645 SAND87-2380 SAND88-0811 UCLR-53645 SAND87-2380 USGS OFR 81-1349 SAND87-2380 LA-11497-MS SAND88-0882 USGS BULL-1777 USGS OFR 81-1349 USGS OFR 84-491 SAND88-0811 UCLR-53602 UCLR-53645 SAND88-0624 SAND84-1076 USGS WRIR 84-4197
USW G-2	Bulk Density Values and Test Conditions Compressive Strength Data and Test Conditions Elastic Properties (Poisson's Ratio & Young's Modulus) Grain Density Values and Test Conditions Lithologic Unit Depths in Drill Hole Mineralogical Samples and Test Conditions	SAND88-0811 SAND85-0703 SAND85-0703 SAND88-0811 USGS OFR 83-732 LA-11497-MS SAND88-0882 USGS BULL-1777 USGS OFR 83-732

DATA CURRENTLY AVAILABLE ORGANIZED BY DRILL HOLE

HOLE	TYPE OF DATA	REFERENCE CITATION
-----	-----	-----
	Porosity Values and Test Conditions	USGS OFR 84-491
	Thermal Conductivity Data and Test Conditions	SAND88-0811
	Thermal/Mechanical Stratigraphic Units	SAND88-0624
	Water Elevations and Depths, Dates of Measurements	SAND84-1076
		USGS WRIR 84-4197
USW G-3		
	Bulk Density Values and Test Conditions	USGS OFR 84-552
	Grain Density Values and Test Conditions	USGS OFR 84-552
	Lithologic Unit Depths in Drill Hole	USGS OFR 84-491
	Mineralogical Samples and Test Conditions	USGS OFR 84-491
	Porosity Values and Test Conditions	USGS OFR 84-552
	Laboratory Sonic Velocity Measurements	USGS OFR 84-552
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
USW G-4		
	Bulk Density Values and Test Conditions	SAND87-2380
		SAND88-0811
		UCLR-53795
		USGS OFR 84-552 -
	Saturation Curve-Fit Parameters and Test Conditions	SAND87-2380
	Grain Density Values and Test Conditions	SAND88-0811
		UCLR-53795
		USGS OFR 84-552
	Hydraulic Conductivity Values and Test Conditions	SAND87-2380
	Lithologic Unit Depths in Drill Hole	USGS OFR 84-063
	Matrix Potential Data and Test Conditions	SAND87-2380
	Mineralogical Samples and Test Conditions	LA-10927-MS
		LA-11497-MS
		SAND88-0882
		USGS BULL-1777
		USGS OFR 84-789
	Porosity Values and Test Conditions	SAND88-0811
		UCLR-53795
		USGS OFR 84-552
	Laboratory Sonic Velocity Measurements	USGS OFR 84-552
	Thermal Conductivity Data and Test Conditions	SAND88-0624
	Thermal/Mechanical Stratigraphic Units	SAND84-1076
	Transmissivity Data and Pumping Conditions	USGS WRIR 86-4015
	Well Test Hydraulic Conductivity Measurements	USGS WRIR 86-4015
	Water Elevations and Depths, Dates of Measurements	USGS OFR 84-063
		USGS WRIR 84-4197
	Water Chemical Constituent Values for Drill Holes	USGS OFR 84-063
		USGS OFR 85-484
USW GU-3		
	Bulk Density Values and Test Conditions	SAND87-2380
		SAND88-0811

DATA CURRENTLY AVAILABLE ORGANIZED BY DRILL HOLE

HOLE -----	TYPE OF DATA -----	REFERENCE CITATION -----
	Saturation Curve-Fit Parameters and Test Conditions	USGS OFR 84-552
	Grain Density Values and Test Conditions	SAND87-2380
		SAND88-0811
	Hydraulic Conductivity Values and Test Conditions	USGS OFR 84-552
	Lithologic Unit Depths in Drill Hole	SAND87-2380
	Matrix Potential Data and Test Conditions	USGS OFR 84-491
	Mineralogical Samples and Test Conditions	SAND87-2380
		LA-11497-MS
		SAND88-0882
	Paleomagnetic Data and Test Conditions	USGS OFR 84-491
	Porosity Values and Test Conditions	USGS OFR 85-48
		SAND88-0811
	Laboratory Sonic Velocity Measurements	USGS OFR 84-552
	Thermal Conductivity Data and Test Conditions	USGS OFR 84-552
	Thermal/Mechanical Stratigraphic Units	SAND88-0624
		SAND84-1076
USW H-1		
	Bulk Density Values and Test Conditions	USGS WRIR 84-4032
	Grain Density Values and Test Conditions	USGS WRIR 84-4193
		USGS WRIR 84-4032
	Hydraulic Conductivity Values and Test Conditions	USGS WRIR 84-4193
	Lithologic Unit Depths in Drill Hole	USGS WRIR 84-4032
	Matrix Potential Data and Test Conditions	USGS WRIR 84-4032
	Pore Saturation and Test Conditions	USGS WRIR 84-4193
	Natural-state Porewater Content Percentages	USGS WRIR 84-4032
	Porosity Values and Test Conditions	USGS WRIR 84-4032
		USGS WRIR 84-4193
	Relative Hydraulic Conductivity & Test Conditions	USGS WRIR 84-4193
	Storage Coefficient Values for Well Tests	USGS WRIR 84-4032
	Thermal/Mechanical Stratigraphic Units	SAND84-1076
	Transmissivity Data and Pumping Conditions	USGS WRIR 84-4032
	Well Test Hydraulic Conductivity Measurements	USGS WRIR 84-4032
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4032
		USGS WRIR 84-4197
	Water Chemical Constituent Values for Drill Holes	USGS WRIR 84-4032
		USGS WRIR 84-4267
USW H-3		
	Lithologic Unit Depths in Drill Hole	USGS WRIR 84-4272
	Mineralogical Samples and Test Conditions	LA-11497-MS
	Storage Coefficient Values for Well Tests	USGS WRIR 84-4272
	Thermal/Mechanical Stratigraphic Units	SAND84-1076
	Transmissivity Data and Pumping Conditions	USGS WRIR 84-4272
	Well Test Hydraulic Conductivity Measurements	USGS WRIR 84-4272
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
	Water Chemical Constituent Values for Drill Holes	USGS OFR 85-484



# DATA CURRENTLY AVAILABLE ORGANIZED BY DRILL HOLE

HOLE -----	TYPE OF DATA -----	REFERENCE CITATION -----
USW H-4		
Lithologic Unit Depths in Drill Hole		USGS WRIR 85-4030
Mineralogical Samples and Test Conditions		LA-11497-MS
Percent Water Production in Drill Hole Intervals		USGS WRIR 85-4030
Thermal/Mechanical Stratigraphic Units		SAND84-1076
Transmissivity Data and Pumping Conditions		USGS WRIR 85-4030
Well Test Hydraulic Conductivity Measurements		USGS WRIR 85-4030
Water Elevations and Depths, Dates of Measurements		USGS WRIR 84-4197
		USGS WRIR 85-4030
Water Chemical Constituent Values for Drill Holes		USGS OFR 85-484
		USGS WRIR 85-4030
USW H-5		
Lithologic Unit Depths in Drill Hole		USGS OFR 83-853
Mineralogical Samples and Test Conditions		LA-11497-MS
Thermal/Mechanical Stratigraphic Units		SAND84-1076
Water Elevations and Depths, Dates of Measurements		USGS OFR 83-853
		USGS WRIR 83-4171
		USGS WRIR 84-4197
Water Chemical Constituent Values for Drill Holes		USGS OFR 83-853
		USGS OFR 85-484
USW H-6		
Mineralogical Samples and Test Conditions		LA-11497-MS
Thermal/Mechanical Stratigraphic Units		SAND84-1076
Water Elevations and Depths, Dates of Measurements		USGS OFR 83-856
		USGS WRIR 84-4197
Water Chemical Constituent Values for Drill Holes		USGS OFR 83-856
		USGS OFR 85-484
USW VH-1		
Lithologic Unit Depths in Drill Hole		USGS OFR 82-457
Water Elevations and Depths, Dates of Measurements		USGS WRIR 84-4197
Water Chemical Constituent Values for Drill Holes		USGS OFR 85-484
		USGS WRIR 84-4267
		USGS WRIR 86-4359
USW VH-2		
Lithologic Unit Depths in Drill Hole		USGS OFR 85-475
Water Elevations and Depths, Dates of Measurements		USGS WRIR 84-4197
USW WT-1		
Mineralogical Samples and Test Conditions		LA-11497-MS
Water Elevations and Depths, Dates of Measurements		USGS WRIR 84-4197

DATA CURRENTLY AVAILABLE ORGANIZED BY DRILL HOLE

HOLE -----	TYPE OF DATA -----	REFERENCE CITATION -----
USW WT-10		
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
USW WT-11		
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
USW WT-2		
	Mineralogical Samples and Test Conditions	LA-11497-MS
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
USW WT-7		
	Water Elevations and Depths, Dates of Measurements	USGS WRIR 84-4197
	Bulk Density Values and Test Conditions	SAND88-0811
	Bulk Modulus Data and Test Conditions	SAND86-1131
	Compressive Strength Data and Test Conditions	SAND86-1131
	Elastic Properties (Poisson's Ratio & Young's Modulus)	SAND86-1131
	Parameters for Measured Floods	USGS WRIR 83-4001
	Cross Section Locations for Predicted Floods	USGS WRIR 83-4001
	Flood Predictions (100 yr, 500 yr & Regional Maximum)	USGS WRIR 83-4001
	Grain Density Values and Test Conditions	SAND88-0811
	Lithologic Unit Depths in Drill Hole	SAND89-2270
	Mineralogical Samples and Test Conditions	SAND86-1131
		SAND88-0882
		USGS OFR 84-491
	Permeability and Test Conditions	SAND89-2270
	Paleomagnetic Data and Test Conditions	USGS OFR 85-48
	Porosity Values and Test Conditions	SAND88-0811
		SAND89-2270
	Location Coordinates for Surface Samples	SAND86-1131
		SAND88-0811
		SAND89-2270
		USGS OFR 84-491
		USGS OFR 85-48
	Water Chemical Values for Springs & Non-Drill Hole Wells	USGS WRIR 84-4267

# DATA CURRENTLY AVAILABLE SEPDB ORGANIZED BY PARAMETER

## Bulk Density Values and Test Conditions:

J-13	USGS WRIR 83-4171
UE-25a #1	SAND88-0811
	USGS OFR 81-1338
UE-25b #1	USGS WRIR 84-4253
USW G-1	SAND87-2380
	SAND88-0811
	UCLR-53602
	UCLR-53645
USW G-2	SAND88-0811
USW G-3	USGS OFR 84-552
USW G-4	SAND87-2380
	SAND88-0811
	UCLR-53795
	USGS OFR 84-552
USW GU-3	SAND87-2380
	SAND88-0811
	USGS OFR 84-552
USW H-1	USGS WRIR 84-4032
	USGS WRIR 84-4193
non-core samples	SAND88-0811

## Bulk Modulus Data and Test Conditions:

non-core samples	SAND86-1131
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## Compressive Strength Data and Test Conditions:

USW G-2	SAND85-0703
non-core samples	SAND86-1131

## Saturation Curve-Fit Parameters and Test Conditions:

USW G-1	SAND87-2380
USW G-4	SAND87-2380
USW GU-3	SAND87-2380

## Elastic Properties (Poisson's Ratio & Young's Modulus):

USW G-2	SAND85-0703
non-core samples	SAND86-1131

## Parameters for Measured Floods:

non-core samples	USGS WRIR 83-4001
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## Cross Section Locations for Predicted Floods:

non-core samples	USGS WRIR 83-4001
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DATA CURRENTLY AVAILABLE SEPDB ORGANIZED BY PARAMETER

Flood Predictions (100 yr, 500 yr & Regional Maximum) & Locations:

non-core samples USGS WRIR 83-4001

Grain Density Values and Test Conditions:

J-13	USGS WRIR 83-4171
UE-25a #1	SAND88-0811
	USGS OFR 81-1338
UE-25b #1	USGS WRIR 84-4253
USW G-1	SAND88-0811
	UCLR-53645
USW G-2	SAND88-0811
USW G-3	USGS OFR 84-552
USW G-4	SAND88-0811
	UCLR-53795
	USGS OFR 84-552
USW GU-3	SAND88-0811
	USGS OFR 84-552
USW H-1	USGS WRIR 84-4032
	USGS WRIR 84-4193
non-core samples	SAND88-0811

Hydraulic Conductivity Values and Test Conditions:

J-13	USGS WRIR 83-4171
UE-25b #1	USGS WRIR 84-4253
USW G-1	SAND87-2380
USW G-4	SAND87-2380
USW GU-3	SAND87-2380
USW H-1	USGS WRIR 84-4032

Lithologic Unit Depths in Drill Hole:

J-13	USGS WRIR 83-4171
UE-25b #1	USGS WRIR 84-4253
UE-25p #1	USGS OFR 84-450
	USGS OFR 86-175
USW G-1	USGS OFR 81-1349
USW G-2	USGS OFR 83-732
USW G-3	USGS OFR 84-491
USW G-4	USGS OFR 84-063
USW GU-3	USGS OFR 84-491
USW H-1	USGS WRIR 84-4032
USW H-3	USGS WRIR 84-4272
USW H-4	USGS WRIR 85-4030
USW H-5	USGS OFR 83-853
USW VH-1	USGS OFR 82-457
USW VH-2	USGS OFR 85-475
non-core samples	SAND89-2270

DATA CURRENTLY AVAILABLE SEPDB ORGANIZED BY PARAMETER

Matrix Potential Data and Test Conditions:

USW G-1	SAND87-2380
USW G-4	SAND87-2380
USW GU-3	SAND87-2380
USW H-1	USGS WRIR 84-4193

Mineralogical Samples and Test Conditions:

J-12	LA-11497-MS
J-13	LA-11497-MS
UE-25a #1	LA-11497-MS
	SAND88-0882
	USGS OFR 84-491
UE-25b #1	LA-11497-MS
	USGS BULL-1777
UE-25p #1	LA-11497-MS
USW G-1	LA-11497-MS
	SAND88-0882
	USGS BULL-1777
	USGS OFR 81-1349
	USGS OFR 84-491
USW G-2	LA-11497-MS
	SAND88-0882
	USGS BULL-1777
	USGS OFR 83-732
USW G-3	USGS OFR 84-491
USW G-4	USGS OFR 84-491
	LA-10927-MS
	LA-11497-MS
	SAND88-0882
	USGS BULL-1777
	USGS OFR 84-789
USW GU-3	LA-11497-MS
	SAND88-0882
	USGS OFR 84-491
USW H-3	LA-11497-MS
USW H-4	LA-11497-MS
USW H-5	LA-11497-MS
USW H-6	LA-11497-MS
USW WT-1	LA-11497-MS
USW WT-2	LA-11497-MS
non-core samples	SAND86-1131
	SAND88-0882
	USGS OFR 84-491

Permeability and Test Conditions:

non-core samples	SAND89-2270
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DATA CURRENTLY AVAILABLE SEPDB ORGANIZED BY PARAMETER

Percent Water Production in Drill Hole Intervals:

USW H-4

USGS WRIR 85-4030

Paleomagnetic Data and Test Conditions:

USW GU-3

USGS OFR 85-48

non-core samples

USGS OFR 85-48

Pore Saturation and Test Conditions:

J-13

USGS WRIR 83-4171

UE-25b #1

USGS WRIR 84-4253

USW H-1

USGS WRIR 84-4032

Natural-state Porewater Content Percentages:

J-13

USGS WRIR 83-4171

UE-25b #1

USGS OFR 83-855

USW H-1

USGS WRIR 84-4253

USGS WRIR 84-4032

Porosity Values and Test Conditions:

J-13

USGS WRIR 83-4171

UE-25a #1

SAND88-0811

UE-25b #1

USGS OFR 81-1338

USW G-1

USGS WRIR 84-4253

SAND88-0811

UCLR-53602

UCLR-53645

USW G-2

SAND88-0811

USW G-3

USGS OFR 84-552

USW G-4

SAND88-0811

UCLR-53795

USW GU-3

USGS OFR 84-552

SAND88-0811

USW H-1

USGS OFR 84-552

USGS WRIR 84-4032

non-core samples

USGS WRIR 84-4193

SAND88-0811

SAND89-2270

Relative Hydraulic Conductivity & Test Conditions:

USW H-1

USGS WRIR 84-4193

Location Coordinates for Surface Samples:

non-core samples

SAND86-1131

SAND88-0811

SAND89-2270

USGS OFR 84-491

DATA CURRENTLY AVAILABLE SEPDB ORGANIZED BY PARAMETER

USGS OFR 85-48

Laboratory Sonic Velocity Measurements:

J-13	USGS WRIR 83-4171
UE-25a #1	USGS OFR 81-1338
USW G-3	USGS OFR 84-552
USW G-4	USGS OFR 84-552
USW GU-3	USGS OFR 84-552

Water Chemical Values for Springs & Non-Drill Hole Wells:

non-core samples	USGS WRIR 84-4267
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Storage Coefficient Values for Well Tests:

USW H-1	USGS WRIR 84-4032
USW H-3	USGS WRIR 84-4272

Thermal Conductivity Data and Test Conditions:

USW G-1	SAND88-0624
USW G-2	SAND88-0624
USW G-4	SAND88-0624
USW GU-3	SAND88-0624

Thermal/Mechanical Stratigraphic Units:

UE-25a #1	SAND84-1076
UE-25a #4	SAND84-1076
UE-25a #5	SAND84-1076
UE-25a #6	SAND84-1076
UE-25a #7	SAND84-1076
UE-25b #1	SAND84-1076
USW G-1	SAND84-1076
USW G-2	SAND84-1076
USW G-4	SAND84-1076
USW GU-3	SAND84-1076
USW H-1	SAND84-1076
USW H-3	SAND84-1076
USW H-4	SAND84-1076
USW H-5	SAND84-1076
USW H-6	SAND84-1076

Transmissivity Data and Pumping Conditions:

J-13	USGS WRIR 83-4171
UE-25b #1	USGS WRIR 84-4253
UE-25p #1	USGS WRIR 84-4248
USW G-4	USGS WRIR 86-4015
USW H-1	USGS WRIR 84-4032
USW H-3	USGS WRIR 84-4272
USW H-4	USGS WRIR 85-4030

DATA CURRENTLY AVAILABLE SEPDB ORGANIZED BY PARAMETER

Well Test Hydraulic Conductivity Measurements:

J-13	USGS WRIR 83-4171
UE-25b #1	USGS WRIR 84-4253
USW G-4	USGS WRIR 86-4015
USW H-1	USGS WRIR 84-4032
USW H-3	USGS WRIR 84-4272
USW H-4	USGS WRIR 85-4030

Water Elevations and Depths, Dates of Measurements:

J-11	USGS WRIR 84-4197
J-12	USGS WRIR 84-4197
J-13	USGS WRIR 84-4197
UE-16d	USGS 1543-3
UE-16f	USGS 1543-3
UE-25 WT #12	USGS WRIR 84-4197
UE-25 WT #13	USGS WRIR 84-4197
UE-25 WT #14	USGS WRIR 84-4197
UE-25 WT #15	USGS WRIR 84-4197
UE-25 WT #16	USGS WRIR 84-4197
UE-25 WT #17	USGS WRIR 84-4197
UE-25 WT #3	USGS WRIR 84-4197
UE-25 WT #4	USGS WRIR 84-4197
UE-25 WT #6	USGS WRIR 84-4197
UE-25b #1	USGS WRIR 84-4197
	USGS WRIR 84-4253
UE-25c #1	USGS WRIR 84-4197
UE-25p #1	USGS OFR 84-450
	USGS WRIR 84-4197
	USGS WRIR 84-4248
UE-29a #1	USGS OFR 84-142
UE-29a #2	USGS OFR 84-142
USW G-1	USGS WRIR 84-4197
USW G-2	USGS WRIR 84-4197
USW G-3	USGS WRIR 84-4197
USW G-4	USGS OFR 84-063
	USGS WRIR 84-4197
USW H-1	USGS WRIR 84-4032
	USGS WRIR 84-4197
USW H-3	USGS WRIR 84-4197
USW H-4	USGS WRIR 84-4197
	USGS WRIR 85-4030
USW H-5	USGS OFR 83-853
	USGS WRIR 83-4171
	USGS WRIR 84-4197
USW H-6	USGS OFR 83-856
	USGS WRIR 84-4197
USW VH-1	USGS WRIR 84-4197
USW VH-2	USGS WRIR 84-4197
USW WT-1	USGS WRIR 84-4197
USW WT-10	USGS WRIR 84-4197
USW WT-11	USGS WRIR 84-4197



DATA CURRENTLY AVAILABLE SEPDB ORGANIZED BY PARAMETER

USW WT-2  
USW WT-7

USGS WRIR 84-4197  
USGS WRIR 84-4197

Water Chemical Constituent Values for Drill Holes:

J-12  
J-13

USGS OFR 85-484  
USGS OFR 85-484  
USGS WRIR 83-4171

UE-16d  
UE-16f  
UE-17a  
UE-25b #1

USGS 1543-3  
USGS 1543-3  
USGS 1543-4  
USGS OFR 83-855  
USGS OFR 85-484  
USGS WRIR 84-4253  
USGS WRIR 84-4267

UE-25c #1  
UE-25c #2  
UE-25c #3  
UE-25p #1

USGS OFR 85-484  
USGS OFR 85-484  
USGS OFR 85-484  
USGS OFR 85-484  
USGS WRIR 84-4248

UE-29a #1  
UE-29a #2

USGS OFR 84-142  
USGS OFR 84-142  
USGS OFR 85-484  
USGS WRIR 84-4267

USW G-4

USGS OFR 84-063  
USGS OFR 85-484

USW H-1

USGS WRIR 84-4032  
USGS WRIR 84-4267

USW H-3  
USW H-4

USGS OFR 85-484  
USGS OFR 85-484  
USGS WRIR 85-4030

USW H-5

USGS OFR 83-853  
USGS OFR 85-484

USW H-6

USGS OFR 83-856  
USGS OFR 85-484

USW VH-1

USGS OFR 85-484  
USGS WRIR 84-4267  
USGS WRIR 86-4359

DATA CURRENTLY AVAILABLE FOR NON-CORE SAMPLES

TYPE OF DATA -----	REFERENCE CITATION -----
Bulk Density Values and Test Conditions	SAND88-0811
Bulk Modulus Data and Test Conditions	SAND86-1131
Compressive Strength Data and Test Conditions	SAND86-1131
Elastic Properties (Poisson's Ratio & Young's Modulus)	SAND86-1131
Parameters for Measured Floods	USGS WRIR 83-4001
Cross Section Locations for Predicted Floods	USGS WRIR 83-4001
Flood Predictions (100 yr, 500 yr & Regional Maximum) & Locations	USGS WRIR 83-4001
Grain Density Values and Test Conditions	SAND88-0811
Lithologic Unit Depths in Drill Hole	SAND89-2270
Mineralogical Samples and Test Conditions	SAND86-1131
	SAND88-0882
	USGS OFR 84-491
Permeability and Test Conditions	SAND89-2270
Paleomagnetic Data and Test Conditions	USGS OFR 85-48
Porosity Values and Test Conditions	SAND88-0811
	SAND89-2270
Location Coordinates for Surface Samples	SAND86-1131
	SAND88-0811
	SAND89-2270
	USGS OFR 84-491
	USGS OFR 85-48
Water Chemical Values for Springs & Non-Drill Hole Wells	USGS WRIR 84-4267

# DRILL HOLES FOR WHICH COORDINATES ARE AVAILABLE

USW Holes -----	UE Holes -----	Seismic Holes -----	Other Holes -----
* USW ES-1	UE-16d	U-25 Seismic #1	J-11
* USW ES-2	UE-16f	U-25 Seismic #10	J-12
USW G-1	UE-17a	U-25 Seismic #11	J-13
USW G-2	* UE-25 G-5	U-25 Seismic #12	PS CAROLYN
USW G-3	UE-25 RF #1	U-25 Seismic #13	PS SANDY
USW G-4	UE-25 RF #10	U-25 Seismic #14	* Test Hole #1
USW GA-1	UE-25 RF #11	U-25 Seismic #15	* Test Hole #10
USW GU-3	UE-25 RF #2	U-25 Seismic #16	* Test Hole #11
* USW GX	UE-25 RF #3	U-25 Seismic #17	* Test Hole #12
* USW GY	UE-25 RF #3B	U-25 Seismic #18	* Test Hole #13
USW H-1	UE-25 RF #4	U-25 Seismic #19	* Test Hole #14
USW H-3	UE-25 RF #5	U-25 Seismic #2	* Test Hole #15
USW H-4	* UE-25 RF #6	U-25 Seismic #20	* Test Hole #2
USW H-5	UE-25 RF #7	U-25 Seismic #21	* Test Hole #3
USW H-6	UE-25 RF #7A	U-25 Seismic #22	* Test Hole #4
* USW H-WEST	UE-25 RF #8	U-25 Seismic #23	* Test Hole #5
USW SP 5A	UE-25 RF #9	U-25 Seismic #24	* Test Hole #6
USW SP 5B	UE-25 TC #1	U-25 Seismic #3	* Test Hole #7
USW UZ-1	UE-25 TC #2	U-25 Seismic #4	* Test Hole #8
USW UZ-13	UE-25 TC #3	U-25 Seismic #5	* Test Pit #1
* USW UZ-2	UE-25 TC #4	U-25 Seismic #6	* Test Pit #2
* USW UZ-3	UE-25 TC1 #1	U-25 Seismic #7	* Test Pit #3
* USW UZ-4	UE-25 TC1 #2	U-25 Seismic #8	* Test Pit #6
* USW UZ-5	UE-25 TC1 #3	U-25 Seismic #9	
USW UZ-6	UE-25 TC1 #4	U-26 Seismic #1	
* USW UZ-6a	UE-25 UZ #4	U-29 Seismic #1	
USW UZ-6s	UE-25 UZ #5	U-30 Seismic #1	
USW UZ-7	UE-25 UZN #1	U-30 Seismic #2	
USW UZ-8	UE-25 UZN #10	U-5 Seismic #1	
* USW UZ-N1	UE-25 UZN #12	U-5 Seismic #2	
USW UZ-N24	UE-25 UZN #13	US-25 Seismic #1	
USW UZ-N25	UE-25 UZN #14	US-25 Seismic #10	
USW UZ-N26	UE-25 UZN #18	US-25 Seismic #11	
* USW UZ-N3	UE-25 UZN #19	US-25 Seismic #12	
USW UZ-N40	UE-25 UZN #2	US-25 Seismic #13	
USW UZ-N41	UE-25 UZN #20	US-25 Seismic #14	
USW UZ-N42	UE-25 UZN #21	US-25 Seismic #15	
USW UZ-N43	UE-25 UZN #22	US-25 Seismic #16	
USW UZ-N44	UE-25 UZN #23	US-25 Seismic #17	
USW UZ-N45	UE-25 UZN #28	US-25 Seismic #18	
USW UZ-N46	UE-25 UZN #29	US-25 Seismic #19	
USW UZ-N47	UE-25 UZN #3	US-25 Seismic #2	
USW UZ-N48	UE-25 UZN #30	US-25 Seismic #20	
USW UZ-N49	UE-25 UZN #4	US-25 Seismic #21	
USW UZ-N50	UE-25 UZN #5	US-25 Seismic #3	
USW UZ-N51	UE-25 UZN #56	US-25 Seismic #4	
USW UZ-N52	UE-25 UZN #6	US-25 Seismic #5	
USW UZ-N65	UE-25 UZN #60	US-25 Seismic #6	
USW UZ-N66	UE-25 UZN #7	US-25 Seismic #7	

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\* Layout Drill-hole

# DRILL HOLES FOR WHICH COORDINATES ARE AVAILABLE

USW Holes -----	UE Holes -----	Seismic Holes -----	Other Holes -----
USW UZ-N67	UE-25 UZN #8	US-25 Seismic #8	
USW UZ-N68	UE-25 UZN #85	US-25 Seismic #9	
USW UZ-N69	UE-25 UZN #9		
USW UZ-N70	UE-25 UZN #97		
USW UZ-N71	UE-25 UZNC #1		
USW UZ-N72	UE-25 UZNC #2		
USW UZ-N73	UE-25 WT #12		
USW UZ-N74	UE-25 WT #13		
USW UZ-N75	UE-25 WT #14		
USW UZ-N76	UE-25 WT #15		
USW UZ-N77	UE-25 WT #16		
USW UZ-N78	UE-25 WT #17		
USW UZ-N79	UE-25 WT #18		
USW UZ-N80	* UE-25 WT #19		
USW UZ-N81	* UE-25 WT #20		
USW UZ-N82	UE-25 WT #3		
USW UZ-N83	UE-25 WT #4		
USW UZ-N84	UE-25 WT #5		
USW UZ-N86	UE-25 WT #6		
USW UZ-N87	UE-25a #1		
USW UZ-N88	* UE-25a #2		
USW UZ-N89	UE-25a #3		
USW UZ-N90	UE-25a #4		
USW UZ-N93	UE-25a #5		
USW UZ-N94	UE-25a #6		
USW UZ-N95	UE-25a #7		
USW UZ-N96	UE-25b #1		
USW UZ-N98	* UE-25b #2		
* USW UZ4N-2	UE-25c #1		
* USW UZ4N-4	UE-25c #2		
* USW UZ4N-5	UE-25c #3		
USW VH-1	UE-25h #1		
USW VH-2	UE-25p #1		
* USW VH-3	* UE-25pa #1A		
USW WT-1	* UE-25pa #1B		
USW WT-10	UE-29 UZN #91		
USW WT-11	UE-29 UZN #92		
USW WT-2	UE-29a #1		
* USW WT-21	UE-29a #2		
* USW WT-22			
USW WT-7			
* USW WT-8			
* USW WT-9			

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\* Layout Drill-hole

DRILL HOLES FOR WHICH BOTTOM HOLE INFORMATION IS AVAILABLE  
(Bottom Hole Coordinates, Depth)

USW Holes -----	UE Holes -----	Seismic Holes -----	Other Holes -----
USW G-1	UE-16d	U-25 Seismic #1	
USW G-2	UE-16f	U-25 Seismic #10	
USW G-3	UE-17a	U-25 Seismic #11	
USW G-4	UE-25 RF #1	U-25 Seismic #12	
USW GA-1	UE-25 RF #10	U-25 Seismic #13	
USW GU-3	UE-25 RF #11	U-25 Seismic #14	
USW H-1	UE-25 RF #2	U-25 Seismic #15	
USW H-3	UE-25 RF #3	U-25 Seismic #16	
USW H-4	UE-25 RF #3B	U-25 Seismic #17	
USW H-5	UE-25 RF #4	U-25 Seismic #18	
USW H-6	UE-25 RF #5	U-25 Seismic #19	
USW UZ-1	UE-25 RF #7	U-25 Seismic #2	
USW UZ-13	UE-25 RF #7A	U-25 Seismic #20	
USW UZ-6	UE-25 RF #8	U-25 Seismic #21	
USW UZ-6s	UE-25 RF #9	U-25 Seismic #22	
USW UZ-7	UE-25 UZ #4	U-25 Seismic #23	
USW UZ-8	UE-25 UZ #5	U-25 Seismic #24	
USW UZ-N24	UE-25 UZN #1	U-25 Seismic #3	
USW UZ-N25	UE-25 UZN #10	U-25 Seismic #4	
USW UZ-N26	UE-25 UZN #12	U-25 Seismic #5	
USW UZ-N40	UE-25 UZN #13	U-25 Seismic #6	
USW UZ-N41	UE-25 UZN #14	U-25 Seismic #7	
USW UZ-N42	UE-25 UZN #18	U-25 Seismic #8	
USW UZ-N43	UE-25 UZN #19	U-25 Seismic #9	
USW UZ-N44	UE-25 UZN #2	U-26 Seismic #1	
USW UZ-N45	UE-25 UZN #20	U-29 Seismic #1	
USW UZ-N46	UE-25 UZN #21	U-30 Seismic #1	
USW UZ-N47	UE-25 UZN #22	U-30 Seismic #2	
USW UZ-N48	UE-25 UZN #23	U-5 Seismic #1	
USW UZ-N49	UE-25 UZN #28	U-5 Seismic #2	
USW UZ-N50	UE-25 UZN #29	US-25 Seismic #1	
USW UZ-N51	UE-25 UZN #3	US-25 Seismic #10	
USW UZ-N52	UE-25 UZN #30	US-25 Seismic #11	
USW UZ-N65	UE-25 UZN #4	US-25 Seismic #12	
USW UZ-N66	UE-25 UZN #5	US-25 Seismic #13	
USW UZ-N67	UE-25 UZN #56	US-25 Seismic #14	
USW UZ-N68	UE-25 UZN #6	US-25 Seismic #15	
USW UZ-N69	UE-25 UZN #60	US-25 Seismic #16	
USW UZ-N70	UE-25 UZN #7	US-25 Seismic #17	
USW UZ-N71	UE-25 UZN #8	US-25 Seismic #18	
USW UZ-N72	UE-25 UZN #85	US-25 Seismic #19	
USW UZ-N73	UE-25 UZN #9	US-25 Seismic #2	
USW UZ-N74	UE-25 UZN #97	US-25 Seismic #20	
USW UZ-N75	UE-25 UZNC #1	US-25 Seismic #21	
USW UZ-N76	UE-25 UZNC #2	US-25 Seismic #3	
USW UZ-N77	UE-25 WT #12	US-25 Seismic #4	
USW UZ-N78	UE-25 WT #13	US-25 Seismic #5	
USW UZ-N79	UE-25 WT #14	US-25 Seismic #6	
USW UZ-N80	UE-25 WT #15	US-25 Seismic #7	
USW UZ-N81	UE-25 WT #16	US-25 Seismic #8	

DRILL HOLES FOR WHICH BOTTOM HOLE INFORMATION IS AVAILABLE  
(Bottom Hole Coordinates, Depth)

USW Holes -----	UE Holes -----	Seismic Holes -----	Other Holes -----
USW UZ-N82	UE-25 WT #17	US-25 Seismic #9	
USW UZ-N83	UE-25 WT #18		
USW UZ-N84	UE-25 WT #3		
USW UZ-N86	UE-25 WT #4		
USW UZ-N87	UE-25 WT #5		
USW UZ-N88	UE-25 WT #6		
USW UZ-N89	UE-25a #1		
USW UZ-N90	UE-25a #3		
USW UZ-N93	UE-25a #4		
USW UZ-N94	UE-25a #5		
USW UZ-N95	UE-25a #6		
USW UZ-N96	UE-25a #7		
USW UZ-N98	UE-25b #1		
USW VH-1	UE-25c #1		
USW VH-2	UE-25c #2		
USW WT-1	UE-25c #3		
USW WT-10	UE-25h #1		
USW WT-11	UE-25p #1		
USW WT-2	UE-29 UZN #91		
USW WT-7	UE-29 UZN #92		
	UE-29a #1		
	UE-29a #2		

# DRILL HOLES FOR WHICH CORE INFORMATION IS AVAILABLE

(CORE INTERVALS, PERCENT AND RECOVERY DATA)

USW Holes -----	UE Holes -----	Seismic Holes -----	Other Holes -----
USW G-1	UE-25 RF #1		
USW G-2	UE-25 RF #10		
USW G-3	UE-25 RF #11		
USW G-4	UE-25 RF #2		
USW GA-1	UE-25 RF #3		
USW GU-3	UE-25 RF #3B		
USW H-1	UE-25 RF #4		
USW H-3	UE-25 RF #5		
USW H-4	UE-25 RF #7		
USW H-5	UE-25 RF #7A		
USW H-6	UE-25 RF #8		
USW UZ-1	UE-25 RF #9		
USW UZ-13	UE-25 UZ #4		
USW UZ-6	UE-25 UZ #5		
USW UZ-6s	UE-25 UZN #1		
USW UZ-7	UE-25 UZN #10		
USW UZ-8	UE-25 UZN #19		
USW UZ-N24	UE-25 UZN #21		
USW UZ-N25	UE-25 UZN #22		
USW UZ-N26	UE-25 UZN #23		
USW UZ-N40	UE-25 UZN #28		
USW UZ-N41	UE-25 UZN #29		
USW UZ-N42	UE-25 UZN #30		
USW UZ-N43	UE-25 UZN #85		
USW UZ-N44	UE-25 UZN #97		
USW UZ-N45	UE-25 WT #12		
USW UZ-N46	UE-25 WT #13		
USW UZ-N47	UE-25 WT #14		
USW UZ-N48	UE-25 WT #15		
USW UZ-N49	UE-25 WT #16		
USW UZ-N70	UE-25 WT #18		
USW UZ-N74	UE-25 WT #3		
USW UZ-N75	UE-25 WT #4		
USW UZ-N90	UE-25 WT #6		
USW UZ-N98	UE-25a #4		
USW VH-1	UE-25a #5		
USW VH-2	UE-25a #6		
USW WT-1	UE-25a #7		
USW WT-10	UE-25b #1		
USW WT-11	UE-25c #1		
USW WT-2	UE-25c #2		
USW WT-7	UE-25c #3		
	UE-25h #1		
	UE-25p #1		
	UE-29 UZN #91		
	UE-29 UZN #92		
	UE-29a #1		
	UE-29a #2		

HOLE HISTORIES SUBMITTED TO THE SEPDB

NNWSI Hole Histories UE-25 WT #3, UE-25 WT #4, UE-25 WT #5, UE-25 WT #6, UE-25 WT #12, UE-25 WT #13, UE-25 WT #14, UE-25 WT #15, UE-25 WT #16, UE-25 WT #17, UE-25 WT #18, USW WT-1, USW WT-2, USW WT-7, USW WT-10, USW WT-11, DOE/NV/10322-10

NNWSI Hole Histories UE-25 RF #1, UE-25 RF #2, UE-25 RF #3, UE-25 RF #3B, UE-25 RF #4, UE-25 RF #5, UE-25 RF #7, UE-25 RF #7A, UE-25 RF #8, UE-25 RF #9, UE-25 RF #10, UE-25 RF #11, DOE/NV/10322-11

NNWSI Hole Histories UE-29a #1, UE-29a #2, DOE/NV/10322-12

NNWSI Hole History UE-25b #1, DOE/NV/10322-13

NNWSI Hole Histories UE-25c #1, UE-25c #2, UE-25c #3, DOE/NV/10322-14

NNWSI Hole History UE-25h #1, DOE/NV/10322-15

NNWSI Hole History UE-25p #1, DOE/NV/10322-16

NNWSI Hole Histories USW VH-1, USW VH-2, DOE/NV/10322-17

NNWSI Hole Histories USW H-1, USW H-3, USW H-4, USW H-5, USW H-6, DOE/NV/10322-18

NNWSI Hole Histories USW G-1, USW G-2, USW G-3, USW G-4, USW GA-1, USW GU-3, DOE/NV/10322-19

NNWSI Hole Histories USW UZ-1, UE-25 UZ#4, UE-25 UZ #5, USW UZ-6, USW US-6s, USW UZ-7, USW UZ-8, USW UZ-13, DOE/NV/10322-20

NNWSI Hole Histories, Unsaturated Zone - Neutron Holes, 76 Boreholes drilled between May 1984 and February 1986, DOE/NV/10322-21

NNWSI 51 Seismic Hole Histories, DOE/NV/10322-25

NNWSI Hole Histories UE-25a #1, UE-25a #3, UE-25a #4, UE-25a #5, UE-25a #6, UE-25a#7, DOE/NV/10322-9



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**APPENDIX B**

## BULK DENSITY

### TABLE DESCRIPTION: Bulk Density Values and Test Conditions

#### PARAMETERS

- Bulk density value for the sample
- Unit of measure for bulk density data (g/cm\*\*3)

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

#### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Sample temperature and units of measure during test
- Sample pressure and units of measure during test
- Sample length and units of measure of sample tested
- Sample diameter and units of measure of sample tested
- Sample mass and units of measure of sample tested
- Saturation state of sample during test

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## BULK MODULUS

### TABLE DESCRIPTION: Bulk Modulus Data and Test Conditions

#### PARAMETERS

- Numerical value for bulk modulus
- Unit of measure for bulk modulus data (GPa, ...)

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

#### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Sample temperature and units of measure during test
- Sample length and units of measure of sample tested
- Confining pressure of sample during test
- Sample diameter and units of measure of sample tested
- Drainage condition of sample during test
- Pore pressure conditions of sample during test
- Saturation state of sample during test
- Strain rate during test (per sec,...)

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## BOTTOM HOLE COORDINATES

TABLE DESCRIPTION: Nevada Plane Coordinates for Bottom of Surveyed Drill Holes

### PARAMETERS

- Total depth of hole in feet
- Total vertical depth of hole in feet (will be  $\leq$  total depth)

### LOCATION INFORMATION

- Nevada state-plane coordinates for bottom of hole or sample (measured in feet)
- Nevada state-plane coordinates for bottom of hole or sample (measured in feet)

### TEST CONDITIONS

- Date of survey
- Bottom hole survey type

### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document



## COMPRESSIVE STRENGTH

### TABLE DESCRIPTION: Compressive Strength Data and Test Conditions

#### PARAMETERS

- Numerical value for compressive strength
- Unit of measure for compressive strength data (MPa, )

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

#### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Sample temperature and units of measure during test
- Sample length and units of measure of sample tested
- Sample diameter and units of measure of sample tested
- Confining pressure of sample during test
- Pore pressure conditions of sample during test
- Drainage condition of sample during test
- Axial strain at which sample failed
- Unit of measure for axial strain data (milli, ...)
- Strain rate during test (per sec,...)
- Saturation state of sample during test

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## CORE INFORMATION

TABLE DESCRIPTION: Core Information, Intervals and Percent Recovery

### PARAMETERS

- Length of cored interval
- Units for cored, recovered, and interval fields
- Percent of recovered core to cored length (%)
- Length of actual recovery of core in interval

### LOCATION INFORMATION

- Drill hole name for the data
- Location of top of cored interval (measured in feet)
- Location of bottom of core interval (measured in feet)

### TEST CONDITIONS

- Identification number for section of core

### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## CURVE FIT

### TABLE DESCRIPTION: Saturation Curve-Fit Parameters and Test Conditions

#### PARAMETERS

- van Genuchten curve-fit parameter, alpha
- Unit of measure for alpha data (per meter, ...)
- Standard error for alpha
- van Genuchten curve-fit parameter, beta
- Standard error for beta
- Residual saturation of sample
- Standard error for residual saturation

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

#### TEST CONDITIONS

- Number of points in sample
- Analysis method used to determine parameter value

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## ELASTIC PROPERTIES

TABLE DESCRIPTION: Elastic Properties (Poisson's Ratio & Young's Modulus)

### PARAMETERS

- Poisson's ratio for the sample (no units)
- Numerical value for Young's modulus
- Unit of measure for Young's Modulus data (GPa, lb/sq ft, ...)

### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Sample temperature and units of measure during test
- Sample length and units of measure of sample tested
- Sample diameter and units of measure of sample tested
- Confining pressure of sample during test
- Pore pressure conditions of sample during test
- Drainage condition of sample during test
- Axial strain at which sample failed
- Unit of measure for axial strain data (/sec)
- Strain rate during test (per sec, ...)
- Saturation state of sample during test

### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## MEASURED FLOODS

### TABLE DESCRIPTION: Parameters for Measured Floods

#### PARAMETERS

- Maximum discharge of water
- Unit of measure for maximum discharge data (ex. cfs for cubic feet per second)

#### LOCATION INFORMATION

- Location of flood event measurement
- Latitude of x\_section (ex. 36 deg 3 min)
- Longitude of x\_section (ex. 116 deg 24 min)

#### TEST CONDITIONS

- Date of actual flood event
- Range in altitude of drainage basin, usually the feet above sea level (ex. 3000 - 6080 ft)
- Drainage basin area above location
- Unit of measure for drainarea (ex. mi\*\*2 for square miles)

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## FLOOD PREDICTIONS

TABLE DESCRIPTION: Flood Predictions (100 yr, 500 yr & Regional Maximum) & Locations

### PARAMETERS

- Estimated peak discharge
- Unit of measure for estimated peak discharge data (ex. cfs for cubic feet per second)
- Mean velocity of flood event (ex. 7.2 ft/sec)

### LOCATION INFORMATION

- Unique name for each cross-section location
- Name of river bed or wash
- Latitude of x\_section (ex. 36 deg 3 min)
- Longitude of x\_section (ex. 116 deg 24 min)
- Mean elevation of contributing drainage basin

### TEST CONDITIONS

- Type of flood (100 yr, 500 yr, regional max, ...)
- Cross-sectional area below water surface (ex. 11,000 sq. ft)
- Cross-sectional distance between channel banks at water surface (ex. 1,530 ft)
- Vertical distance from water surface to deepest point in cross-section (ex. 4.1 ft)
- Contributing drainage basin area above cross-section (ex. 256 mi\*\*2 for square miles)
- Analysis method for calculating predictions (ex. forty mile wash study, statewide relations, SCS method,  $482 \times (\text{drainarea}^{**0.565})$ ,  $2200 \times (\text{drainarea}^{**0.571})$ , Crippen & Bue boundary curve, ...)

### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## GRAIN DENSITY

### TABLE DESCRIPTION: Grain Density Values and Test Conditions

#### PARAMETERS

- Grain Density value for the sample
- Unit of measure for grain density data (g/cm\*\*3)

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

#### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Sample temperature and units of measure during test
- Sample pressure and units of measure during test
- Sample length and units of measure of sample tested
- Sample diameter and units of measure of sample tested
- Sample mass and units of measure of sample tested

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## DRILL HOLE COORDINATES

TABLE DESCRIPTION: Drill Hole Locations, Surveys and Status

### LOCATION INFORMATION

- Drill hole name for the data
- Nevada state-plane coordinates for top of hole (measured in feet)
- Nevada state-plane coordinates for top of hole (measured in feet)
- Elevation above sea level of drill-hole
- Elevation at top of casing (measured in feet)

### TEST CONDITIONS

- Date of survey
- Status of drillhole's construction

### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ).  
TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document



## HYDRAULIC CONDUCTIVITY

### TABLE DESCRIPTION: Hydraulic Conductivity Values and Test Conditions

#### PARAMETERS

- Hydraulic Conductivity for the sample
- Unit of measure for hydraulic conductivity data

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

#### TEST CONDITIONS

- Test id if multiple tests on the same interval or sample were taken
- Testing method used to determine parameter value
- Sample temperature and units of measure during test
- Direction of measurement (horizontal, vertical)
- Sample pressure and units of measure during test
- Confining pressure of sample during test
- Sample length and units of measure of sample tested
- Sample diameter and units of measure of sample tested

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
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- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## LITHOLOGIC UNITS

### TABLE DESCRIPTION: Lithologic Unit Depths in Drill Hole

#### PARAMETERS

- Stratigraphic unit name or rock type with the name of the stratigraphic unit above it for the interval described (ex. Bedded Tuff below Prow Pass Member)
- Depth in hole to top of lithologic-unit interval
- Depth in hole to bottom of lithologic-unit interval
- Unit of measure for the interval (ft or m)

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## MATRIX POTENTIAL

### TABLE DESCRIPTION: Matrix Potential Data and Test Conditions

#### PARAMETERS

- Matric Potential Value for the sample
- Unit of measure for matric potential data
- Range of the amount, such as >, <, trace or interval top, if amount is given as a range of values, for the matricpot value

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

#### TEST CONDITIONS

- Sample temperature and units of measure during test
- Test number of multiple tests on the same interval or sample
- Sample pressure and units of measure during test
- Testing method used to determine parameter value
- Quantity of water present in the voids
- Sample length and units of measure of sample tested
- Sample diameter and units of measure of sample tested
- Unit of measure for quantity of water present in voids - (d for dimensionless)

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## MINERALOGY

### TABLE DESCRIPTION: Mineralogical Samples and Test Conditions

#### PARAMETERS

- Name of the mineral, oxide or constituent reported
- Numerical amount of the constituent
- Unit that constituent is reported in (%)
- Uncertainty in reported data value

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole to top of mineralogy\_unit interval
- Depth in hole to bottom of mineralogy\_unit interval
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

#### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Type of analysis
- Cross-reference to the comments in the mineralsmp table
- Testing method used to determine parameter value
- Type of material tested (mineral, whole rock, ...)
- Comments on material or various tests

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## PERMEABILITY

### TABLE DESCRIPTION: Permeability and Test Conditions

#### PARAMETERS

- Permeability of the sample
- Unit of measure for permeability data

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

#### TEST CONDITIONS

- Test id if multiple tests on the same interval or sample were taken
- Testing method used to determine parameter value
- Sample temperature and units of measure during test
- Sample pressure and units of measure during test
- Sample length and units of measure of sample tested
- Sample diameter and units of measure of sample tested
- Direction of measurement (horizontal, vertical)

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## WATER PRODUCTION

### TABLE DESCRIPTION: Percent Water Production in Drill Hole Intervals

#### PARAMETERS

- Percent water production value for the interval
- Unit of measure for percent water production data

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Top of depth interval which measurement represents
- Bottom of depth interval which measurement represents
- Unit of measure for the interval (ft or m)

#### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Date measurement was performed
- Amount of deviation from best fit of test analysis
- Amount of water pumped for the test
- Rate at which water was pumped from the test well

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## PALEOMAGNETIC

### TABLE DESCRIPTION: Paleomagnetic Data and Test Conditions

#### PARAMETERS

- Average declination of remanence (water reference mark)
- Numerical value for intensity of remanence
- Average inclination of remanence (water reference mark)
- Inclination of remanence relative to reference mark
- Unit of measure for the average declination and inclination data (degrees, ...)
- Unit of measure for the intensity data (Amp/m, ...)
- Declination of remanence relative to reference mark
- Unit of measure for the declination and inclination data (degrees, ...)

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

#### TEST CONDITIONS

- Declination of the reference mark
- Test number of multiple tests on the same interval or sample
- Alternating field demagnetization prior to test
- Paleomagnetic orientation of the reference mark
- Half angle of the cone of 95% confidence
- Alternating field demagnetization levels used
- Fisher precision parameter
- Testing method used to determine parameter value

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## PORE SATURATION

### TABLE DESCRIPTION: Pore Saturation and Test Conditions

#### PARAMETERS

- Value for the natural state pore saturation of the sample
- Unit of measure for the pore saturation data (%)

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

#### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Sample temperature and units of measure during test
- Sample pressure and units of measure during test
- Sample length and units of measure of sample tested
- Sample diameter and units of measure of sample tested

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ).  
TBD indicates no QAPP was in place.
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- Page number where value appears in reference document
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## PORE WATER CONTENT

TABLE DESCRIPTION: Natural-state Porewater Content Percentages

### PARAMETERS

- Natural-state water content for total sample
- Unit of measure for the natural state water content data (cc/cc, vol %, wt %)

### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Sample temperature and units of measure during test
- Sample pressure and units of measure during test
- Sample length and units of measure of sample tested
- Sample diameter and units of measure of sample tested

### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
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- Page number where value appears in reference document
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## POROSITY

### TABLE DESCRIPTION: Porosity Values and Test Conditions

#### PARAMETERS

- Porosity value for the sample
- Unit of measure for porosity data (% , )

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

#### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Sample temperature and units of measure during test
- Sample pressure and units of measure during test
- Sample length and units of measure of sample tested
- Sample diameter and units of measure of sample tested
- Sample mass and units of measure of sample tested

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TED indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## RELATIVE HYDRAULIC CONDUCTIVITY

TABLE DESCRIPTION: Relative Hydraulic Conductivity & Test Conditions

### PARAMETERS

- Relative Hydraulic Conductivity Value for the sample
- Unit of measure for relative hydraulic conductivity data

### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Sample temperature and units of measure during test
- Sample pressure and units of measure during test
- Sample length and units of measure of sample tested
- Sample diameter and units of measure of sample tested
- Direction of measurement (horizontal, vertical)

### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## SAMPLE LOCATIONS

TABLE DESCRIPTION: Location Coordinates for Surface Samples

### LOCATION INFORMATION

- Sample identification number
- Location of sample
- Nevada State Plane Coordinates (easting) (measured in feet)
- Nevada State Plane Coordinates (northing) (measured in feet)
- Altitude above sea level of the sample
- Unit of measure for the altitude (ft, m or gl for ground level)

### TEST CONDITIONS

- Date sample was taken
- Method of obtaining the sample's location

### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal in which the sample was first reported.

## SONIC VELOCITY

### TABLE DESCRIPTION: Laboratory Sonic Velocity Measurements

#### PARAMETERS

- Sonic Velocity Value for the sample
- Unit of measure for sonic velocity data

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

#### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Sample temperature and units of measure during test
- Sample pressure and units of measure during test
- Sample length and units of measure of sample tested
- Sample diameter and units of measure of sample tested
- Direction of measurement (horizontal, vertical)

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
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## SPRING WATER CHEMISTRY

### TABLE DESCRIPTION: Water Chemical Values for Springs & Non-Drill Hole Wells

#### PARAMETERS

- Name of the chemical constituent being reported
- Numerical amount of the constituent
- Unit that chemical constituent data (mg/l, mcrS/cm)

#### LOCATION INFORMATION

- Spring or location name for the data
- Location of spring or non-drill hole well
- Either the depth interval which sample represents or 'surface'

#### TEST CONDITIONS

- Comments related to reported constituent or units
- Date water sample was collected
- Testing method used to determine parameter value
- Spring temperature at time sample was collected
- Discharge rate of spring at time sample was collected
- Water-bearing rock zone for the spring
- Altitude above sea level of the spring or non-drill hole well
- Unit of measure for the altitude (ft, m)

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
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## STORAGE COEFFICIENT

TABLE DESCRIPTION: Storage Coefficient Values for Well Tests

### PARAMETERS

- Storage coefficient value for the interval (unitless)

### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Top of depth interval which measurement represents
- Bottom of depth interval which measurement represents
- Unit of measure for the interval (ft or m)

### TEST CONDITIONS

- Testing method used to determine parameter value
- Method of analysis for storage coefficient value

### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## THERMAL CONDUCTIVITY

### TABLE DESCRIPTION: Thermal Conductivity Data and Test Conditions

#### PARAMETERS

- Numerical value for thermal conductivity
- Unit of measure for thermal conductivity data (W/mK, ..)

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Depth in hole from which sample originates
- Unit of measure for depth (ft, m)

#### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Sample temperature and units of measure during test
- Sample length and units of measure of sample tested
- Sample diameter and units of measure of sample tested
- Pore pressure conditions of sample during test
- Pore fluid used for sample saturation
- Confining pressure of sample during test
- Saturation state of sample during test

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)



## STRATIGRAPHIC

### TABLE DESCRIPTION: Thermal/Mechanical Stratigraphic Units

#### PARAMETERS

- Stratigraphic unit name or rock type with the name of the stratigraphic unit above it for the interval described (ex. UO, TCw, PTn)
- Depth in hole to top of thermal/mechanical stratigraphic-unit interval
- Depth in hole to bottom of thermal/mechanical stratigraphic-unit interval
- Unit of measure for the interval (ft or m)

#### LOCATION INFORMATION

- Drill hole name for the data

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## TRANSMISSIVITY

### TABLE DESCRIPTION: Transmissivity Data and Pumping Conditions

#### PARAMETERS

- Transmissivity value for the interval
- Unit of measure for transmissivity data

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Top of depth interval which measurement represents
- Bottom of depth interval which measurement represents
- Unit of measure for the interval (ft or m)

#### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Method of analysis for transmissivity value
- Test episode if several tests are grouped into episodes
- Date water sample was collected
- Rate at which water was pumped from the test well
- Amount of water pumped for the test
- Amount of deviation from best fit of test analysis

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## WELL HYDRAULIC CONDUCTIVITY

### TABLE DESCRIPTION: Well Test Hydraulic Conductivity Measurements

#### PARAMETERS

- Well test hydraulic conductivity value for the interval
- Unit of measure for the well hydraulic conductivity data

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Top of depth interval which measurement represents
- Bottom of depth interval which measurement represents
- Unit of measure for the interval (ft or m)

#### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Method of analysis for conductivity value
- Test episode if several tests are grouped into episodes
- Date water sample was collected
- Rate at which water was pumped from the test well
- Amount of water pumped for the test

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## WATER LEVEL

### TABLE DESCRIPTION: Water Elevations and Depths, Dates of Measurements

#### PARAMETERS

- Date of water level measurement
- Value used to correct down-hole run to true run
- Depth to water, true vertical if depth correction is specified. If surface altitude is given depth is depth of water below land surface.
- Altitude of water surface above sea level
- Depth of drill hole from which samples originated
- Altitude of land surface at the well
- Unit of measure for sample

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Top of interval that the level represents
- Bottom of interval that the level represents
- Source of the land-surface altitude

#### TEST CONDITIONS

- Test number of multiple tests on the same interval or sample
- Testing method used to determine parameter value
- Measurement access for reported value (i.e., composite, tube 1, upper, lower)

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## DRILL HOLE WATER CHEMISTRY

### TABLE DESCRIPTION: Water Chemical Constituent Values for Drill Holes

#### PARAMETERS

- Name of the chemical constituent or physical property
- Numerical amount or value of the constituent or physical property
- Unit of measure for the constituents (mg/l, pCu/l)
- Uncertainty in reported data value

#### LOCATION INFORMATION

- Drill hole name for the data
- Sample identification number
- Top of depth interval which sample represents
- Bottom of depth interval which sample represents
- Depth in hole from which sample originates
- Unit of measure for the interval (ft or m)

#### TEST CONDITIONS

- Cross-reference to the comments in the wtrsumm table
- Date water sample was collected
- Testing method used to determine parameter value
- Type of analysis
- Sample temperature and units of measure during test
- Quantity of water pumped before sample was taken
- Well interval temperature when sample was collected
- Length of pre-sample pumping in units of time
- Discharge rate of pre-sample pumping

#### SEPDB TRACKING INFORMATION

- QA level of the data-gathering activity under approved YMP/QAPP (QA or NQ). TBD indicates no QAPP was in place.
- Data authorization number assigned each TPO data submittal
- Page number where summary information appears in reference document
- Page number where value appears in reference document
- Specifies location of reference in participant's data archive (PDA)

## **APPENDIX C**

# EXAMPLE OF SEPDB DATA COMPILATION

## INTERNAL EXPANSION EXPERIMENTAL DATA COMPILATION FORM FOR THE TPO SERIES

### PART 1. SAMPLE LOCATION AND IDENTIFICATION

SAMPLE ID Perp. A SAMPLE ORIGIN UE-25001  
 SAMPLE SECTE (CL) 100.0 TEST NO. 1

### PART 2. PARAMETERS

TABLE 8. THERMAL DATA

		HEATING CURVE DATA					
TEMPERATURE RANGE DURING HEATING	°C	23-30	30-100	100-190	190-200	200-230	230-260
	°F	77-122	122-212	212-302	302-392	392-462	462-572
LINEAR THERMAL EXPANSION COEFFICIENT DURING HEATING ( $10^{-6}^{\circ}\text{C}^{-1}$ ) <sub>0</sub>		0.3	0.6	13.6	16.6	20.6	N/C
		N/D	N/D	N/D	N/D	N/D	N/A
ESTIMATED EXPERIMENTAL UNCERTAINTY ( $10^{-6}^{\circ}\text{C}^{-1}$ ) <sub>0</sub>		0.3	0.3	0.3	0.3	0.3	N/A
PORE PRESSURE (MPa)							

		COOLING CURVE DATA					
TEMPERATURE RANGE DURING COOLING	°C	300-230	230-200	200-190	190-100	100-30	30-23
	°F	572-462	462-392	392-302	302-212	212-122	122-77
LINEAR THERMAL EXPANSION COEFFICIENT DURING COOLING ( $10^{-6}^{\circ}\text{C}^{-1}$ ) <sub>0</sub>		N/C	N/C	N/C	N/C	N/C	N/C
		N/A	N/A	N/A	N/A	N/A	N/A
ESTIMATED EXPERIMENTAL UNCERTAINTY ( $10^{-6}^{\circ}\text{C}^{-1}$ ) <sub>0</sub>		N/A	N/A	N/A	N/A	N/A	N/A
		N/A	N/A	N/A	N/A	N/A	N/A
PORE PRESSURE (MPa)							

### PART 3. EXPERIMENT CONDITIONS

EXPERIMENT TECHNIQUE Dual Push Rod Dilatometer

SAMPLE LENGTH (mm)	SAMPLE DIA (mm)	SAMPLE WIDTH (mm)	SAMPLE THICKNESS (mm)	PRETEST SAMPLE MASS (g)	POSTTEST SAMPLE MASS (g)
2.55	N/A	0.3	0.3	N/D	N/D

HEATING RATE (°C/min)	COOLING RATE (°C/min)	TYPE OF ATMOSPHERE	DRAINED OR UNDRAINED	CONTAINING PRESSURE (MPa)	INITIAL SAMPLE SATURATION	TYPE OF PORE FLUID
1	N/D	Air	Undrained	0.1	Natural-state	N/A

### PART 4. REFERENCE AND SUPPORTING INFORMATION

QA LEVEL OF DATA- TBD SXL TPO  
 GATHERING ACTIVITY TBD DATA-SET ID 91/L010-2/1/76

SXL DATA REPORT NUMBER SAJ008-1981

THIS DCY COMPLETED BY Berry Schwartz 0312 1/23/88  
Same SXL Div. Date

6. To obtain thermal expansion coefficients in units of  $10^{-6}^{\circ}\text{C}^{-1}$ , multiply by 8/0.

### COMMENTS

N/A = not applicable, N/C = not compiled, N/D = no data available, TBD = to be determined.

Rev 0113.

# EXAMPLE OF SEPDB PRODUCT (DATA REPORT)

## WORK REQUEST

### YMP SITE & ENGINEERING PROPERTIES DATA BASE (SEPDB)

Send to:  
SEPDB Data Base Administrator  
Sandia National Laboratories  
Technical Projects Division, 6316  
P. O. Box 5800  
Albuquerque, NM 87185  
Telephone: (505 or FTS) 846-0304 or 846-8178

Request Number: 250  
Date Received: 5/24/91  
Product QA Level: D  
Data QA Level: TBD

TO BE COMPLETED BY REQUESTOR:

Name: Stephen J Bauer Signature: [Signature]  
Organization: SNL - 6316 Date: 5/24/91  
Address: SAC Telephone: 846 9645

Work Requested - Attach additional explanations, sketches, and example listing, if appropriate: UNIAxIAL and BIAXIAL strength data with elastic properties  
Requested Data QA Level: 1) A

For all units at same spot  
please provide test method, sample descriptions - length, hole ID etc  
also any other information such as priority.

TO BE COMPLETED BY DATA BASE PERSONNEL

Type: Data Entry ☐ Product Request ☒ Other ☐  
Accepted By: [Signature] Date: 5/24/91  
Assigned To: [Signature] Date: 5/24/91  
Verified By: [Signature] Date: 6/7/91  
Approved By: [Signature] Date: 6/7/91

Product Numbers, or Accession Numbers:

SEP0093

File - 6310 41/12131/1.41/NQ

Number of attachments: 0

WORK:1/90



June 7, 1971

INITIAL AND TRIAXIAL STRENGTH DATA FOR MILL SCALE 0-3

SEPT PRODUCT NUMBER: SEPDB03

# EXAMPLE OF SEPDB PRODUCT (DATA REPORT)

DEPTH (ft)	CE SAMPLE ID	COMPRESSIVE STRENGTH (psi)	AXIAL STRENGTH (psi)	POTENTIAL RATIO (psi)	YOUNG'S MODULUS (psi)	AXIAL STRENGTH (psi)	PRO ID	PERCENTAGE DENSITY (%)	MOISTURE DENSITY (g/cm <sup>3</sup> )	NATURAL MOISTURE DENSITY (g/cm <sup>3</sup> )	GRAIN DENSITY (g/cm <sup>3</sup> )	OROLOGIC STRATIGRAPHY	THEORETICAL MOISTURE DENSITY
797.00	02-1777.0-1	103.0	2.7	0.20	37.1	2.7	1	2.00	2.350	2.370	2.400	TM	TW-1
797.00	02-1777.0-2	123.0	2.2	0.21	39.9	2.2	2	4.00	2.350	2.370	2.400	TM	TW-1
797.00	02-1777.0-3	162.0	2.8	0.25	43.3	2.8	A	4.00	2.340	2.360	2.400	TM	TW-1
797.00	02-1777.0-4	130.0	2.6	0.26	39.6	2.6	B	3.00	2.340	2.360	2.400	TM	TW-1
816.00	02-1718.0-1	160.0	2.3	0.24	37.0	2.3	A	3.00	2.340	2.360	2.400	TM	TW-1
948.00	02-1718.0-2	137.0	2.3	0.26	40.0	2.3	A	0.00	2.310	2.330	2.310	TM	TW-1
948.00	02-1718.0-3	167.0	2.6	0.20	42.0	2.6	A	10.00	2.300	2.300	2.300	TM	TW-1
948.00	02-1718.0-4	113.0	2.0	0.26	41.9	2.0	B	0.00	2.300	2.370	2.400	TM	TW-1
948.00	02-1718.0-5	117.0	2.2	0.24	42.1	2.2	B	0.00	2.300	2.370	2.400	TM	TW-1
949.00	02-1719.0-1	230.0	6.2	0.19	39.6	6.2	C	7.00	2.300	2.370	2.400	TM	TW-1
949.00	02-1719.0-2	130.0	2.6	0.20	40.0	2.6	A	7.00	2.300	2.370	2.400	TM	TW-1
949.00	02-1719.0-3	210.0	4.0	0.21	44.3	4.0	B	0.00	2.310	2.370	2.310	TM	TW-1
949.00	02-1719.0-4	137.0	2.1	0.24	34.7	2.1	B	0.00	2.300	2.360	2.300	TM	TW-1
1297.00	02-1297.0-1	2.0	1.4	-	-	-	A	22.00	1.940	2.160	2.400	TM	TW-1
1297.00	02-1297.0-2	7.0	2.0	-	-	-	B	24.00	1.900	2.160	2.300	TM	TW-1
1320.00		-	-	-	-	-	-	11.46	2.240	-	2.350	TM	TW-2
1320.00		-	-	-	-	-	-	16.21	2.210	-	2.200	TM	TW-2
1341.00	02-1341.0-1	61.0	4.7	0.11	22.1	4.7	A	10.00	2.240	2.340	2.400	TM	TW-2
1341.00	02-1341.0-2	73.0	4.1	0.17	22.6	4.1	C	10.00	2.210	2.340	2.310	TM	TW-2
1341.00	02-1341.0-3	64.0	4.1	-	22.7	4.1	B	10.00	2.230	2.360	2.310	TM	TW-2
1341.00	02-1341.0-4	61.0	3.7	-	23.4	3.7	E	12.00	2.210	2.330	2.250	TM	TW-2
1377.10	02-1377.1-1	170.0	5.6	0.17	33.9	5.6	A	9.00	2.300	2.390	2.300	TM	TW-2
1377.10	02-1377.1-2	97.0	6.3	0.10	10.0	6.3	C	14.00	2.200	2.370	2.310	TM	TW-2
1377.10	02-1377.1-3	175.0	6.1	0.17	31.0	6.1	B	9.00	2.200	2.370	2.300	TM	TW-2
1377.10	02-1377.1-4	94.0	5.0	0.19	20.5	5.0	E	12.00	2.200	2.350	2.300	TM	TW-2
1380.00		-	-	-	-	-	24	19.10	2.104	2.204	2.402	TM	TW-2
1387.00	02-1387.0-1	145.0	6.1	0.20	35.9	6.1	B	9.00	2.294	2.390	2.394	TM	TW-2
1387.00	02-1387.0-2	153.0	5.3	0.16	33.3	5.3	B	7.00	2.230	2.390	2.350	TM	TW-2
1400.00		-	-	-	-	-	26	16.70	2.107	2.400	2.310	TM	TW-2
1400.70		-	-	-	-	-	272	13.20	2.204	2.304	2.242	TM	TW-2
1413.00		-	-	-	-	-	274	14.20	2.191	2.326	2.253	TM	TW-2
1424.10		-	-	-	-	-	28	11.10	2.201	2.402	2.207	TM	TW-2
1424.10		-	-	-	-	-	29	11.10	2.204	2.319	2.213	TM	TW-2
1424.10		-	-	-	-	-	30	16.00	2.204	2.323	2.437	TM	TW-2
1444.00	02-1444.0-1	22.0	9.0	-	-	-	-	-	-	-	-	TM	TW-3
1444.00	02-1444.0-2	27.0	9.0	-	-	-	-	-	-	-	-	TM	TW-3
1444.00	02-1444.0-3	53.0	4.6	-	-	-	-	-	-	-	-	TM	TW-3
1449.00	02-1449.0-1	60.0	9.8	-	-	-	-	-	-	-	-	TM	TW-3
1449.00	02-1449.0-2	22.0	9.9	0.24	6.3	2.9	A	4.00	2.270	2.310	2.240	TM	TW-3
1449.00	02-1449.0-3	27.0	4.6	0.10	0.5	4.0	-	-	-	-	-	Bedded buff below TM	Chis
1449.00	02-1449.0-4	29.0	2.3	0.10	10.2	2.3	-	-	-	-	-	Bedded buff below TM	Chis
1449.00	02-1449.0-5	27.0	9.2	-	11.2	2.2	-	-	-	-	-	Bedded buff below TM	Chis
1449.00	02-1449.0-6	23.0	9.4	0.22	11.0	2.4	-	-	-	-	-	Bedded buff below TM	Chis
1449.00	02-1449.0-7	23.0	9.3	0.23	11.2	2.3	-	-	-	-	-	Bedded buff below TM	Chis
1449.00	02-1449.0-8	23.0	4.8	0.11	11.1	2.3	-	-	-	-	-	Bedded buff below TM	Chis

NOTES: CE SAMPLE ID are the sample identification associated with the compressive strength, poreness ratio and young's modulus fields.

PRO SAMPLE ID are the sample identification associated with the poreness, bulk density and grain density fields.

(C) AXIAL STRENGTH is the axial strength for compressive strength. (S) AXIAL STRENGTH is the axial strength for poreness ratio and young's modulus.

- indicates no data was submitted. TM is Geologic Stratigraphy field stands for Tappan Spring Number.

June 6, 1991

SEIROS PRODUCT NUMBER: SEP0003

SUPPORTING COMPRESSIONIVE STRESS DATA FOR DRILL HOLE UMW 0-2

DATA AUTHORIZATION NUMBER: DA0000

SUBMITTAL CITATION NUMBER: SAND03-0703

REMITTAL TITLE: Uniaxial and Triaxial Compression Test Series on the Topopah Spring Member from UMW 0-2,

Yucca Mountain, Nevada

DATA QA LEVEL: EQ

DEPTH (ft.)	SAMPLE ID	COMPRESSIONIVE AXIAL		CONFINING PRESSURE	STRAIN RATE DURING TEST	SAMPLE LENGTH	SAMPLE DIAMETER	PAGE NO	LOCAL RECORD CENTER NUMBER
		STRESS (ksi)	STRESS (milli)						
797.00	G3-797.0-1	143.0	3.7	0	1e-05 /sec	101.7 mm	50.0 mm	9,17	31/L03-2/30/04
797.00	G3-797.0-2	125.0	3.3	0	1e-05 /sec	101.7 mm	50.0 mm	9,17	31/L03-2/30/04
797.00	G3-797.0-4	143.0	3.6	0	1e-05 /sec	50.9 mm	25.3 mm	9,17	31/L03-2/30/04
797.00	G3-797.0-8	130.0	3.4	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
816.40	G3-816.0-4	140.0	3.3	0	1e-05 /sec	50.9 mm	25.3 mm	9,17	31/L03-2/30/04
948.40	G3-948.0-4	147.0	4.6	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
948.40	G3-948.0-8	115.0	3.0	0	1e-07 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
948.40	G3-948.0-C	137.0	3.3	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
948.40	G3-948.0-D	117.0	3.2	0	1e-07 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
949.00	G3-949.0-C	220.0	6.2	0	1e-05 /sec	50.7 mm	25.3 mm	9,17	31/L03-2/30/04
949.00	G3-949.0-4	130.0	3.6	0	1e-05 /sec	50.0 mm	25	9,17	31/L03-2/30/04
949.00	G3-949.0-8	210.0	4.0	0	1e-05 /sec	50.0 mm	25	9,17	31/L03-2/30/04
949.00	G3-949.0-D	137.0	3.3	0	1e-05 /sec	101.7 mm	50.0 mm	9,17	31/L03-2/30/04
1297.40	G3-1297.0-A	3.0	1.4	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1297.40	G3-1297.0-B	7.0	3.4	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1361.30	G3-1361.0-A	85.0	4.7	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1361.30	G3-1361.0-C	73.0	4.1	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1361.30	G3-1361.0-D	66.0	4.1	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1361.30	G3-1361.0-E	61.0	3.7	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1379.10	G3-1379.0-A	170.0	5.6	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1379.10	G3-1379.0-C	97.0	6.3	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1379.10	G3-1379.0-D	175.0	6.1	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1379.10	G3-1379.0-E	96.0	5.0	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1387.00	G3-1387.0-B	165.0	6.1	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1387.00	G3-1387.0-D	135.0	5.5	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1446.00	G3-1446.0-B	23.0	3.0	10	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1446.00	G3-1446.0-C	27.0	3.0	10	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1446.00	G3-1446.0-D	60.0	3.3	10	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1459.20	G3-1459.0-A	23.0	4.6	10	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1459.20	G3-1459.0-B	23.0	3.0	10	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1723.05	G3-1723.05-A	23.0	4.0	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1723.05	G3-1723.05-C	29.0	3.5	0	1e-07 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1740.00	G3-1740.0-A	20.0	3.4	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1740.00	G3-1740.0-C	23.0	3.2	0	1e-07 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1740.00	G3-1740.0-D	33.0	3.3	0	1e-05 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04
1740.00	G3-1740.0-E	20.0	4.3	0	1e-07 /sec	50.0 mm	25.3 mm	9,17	31/L03-2/30/04

NOTE: The following are global values for the entire report:

TEST TYPE: constant strain rate

TEST TEMPERATURE: ambient

PORE PRESSURE: ambient

STRAINING CONDITION: drained

June 4, 1991

SEIUS PRODUCT NUMBER: SEI0003

SUPPORTING ELASTIC PROPERTIES DATA FOR DRILL HOLE UHM 0-2

DATA AUTHORIZATION NUMBER: D40008  
 SERIAL CATALOG NUMBER: S4003-0783  
 SERIAL TITLE: Uniaxial and Triaxial Compression Test Series on the Topograph Spring Member from UHM 0-2,  
 Tucson Mountain, Nevada  
 DATA QA LEVEL: EQ

DEPTH (ft)	SAMPLE ID	YOUNG'S MODULUS (GPa)	POISSON'S RATIO	AXIAL STRESS (cal11)	STRAIN RATE DURING TEST	SAMPLE LENGTH	SAMPLE DIAMETER	PAGE NO	LOCAL RECORD CENTER NUMBER
777.00	03-777.0-1	37.1	0.20	2.7	10-03 /sec	101.7 mm	25.0 mm	9.17	31/L02-3/30/84
777.00	03-777.0-2	39.9	0.21	2.3	10-03 /sec	101.7 mm	25.0 mm	9.17	31/L02-3/30/84
777.00	03-777.0-3	42.3	0.23	3.0	10-03 /sec	20.9 mm	25.3 mm	9.17	31/L02-3/30/84
777.00	03-777.0-4	39.6	0.20	3.4	10-03 /sec	20.9 mm	25.3 mm	9.17	31/L02-3/30/84
818.40	03-818.4-A	37.0	0.21	3.3	10-03 /sec	20.9 mm	25.2 mm	9.17	31/L02-3/30/84
940.40	03-940.4-A	42.0	0.20	4.6	10-03 /sec	20.9 mm	25.3 mm	9.17	31/L02-3/30/84
940.40	03-940.4-B	41.9	0.20	3.0	10-07 /sec	20.9 mm	25.2 mm	9.17	31/L02-3/30/84
940.40	03-940.4-C	49.0	0.20	3.3	10-03 /sec	20.9 mm	25.3 mm	9.17	31/L02-3/30/84
940.40	03-940.4-D	42.1	0.20	3.2	10-07 /sec	20.9 mm	25.3 mm	9.17	31/L02-3/30/84
940.40	03-940.4-E	38.6	0.19	6.2	10-03 /sec	20.9 mm	25.3 mm	9.17	31/L02-3/30/84
940.40	03-940.4-F	40.3	-	2.6	10-03 /sec	20.9 mm	25.3 mm	9.17	31/L02-3/30/84
940.40	03-940.4-G	44.3	0.21	4.0	10-03 /sec	20.9 mm	25.3 mm	9.17	31/L02-3/30/84
940.40	03-940.4-H	34.7	0.20	3.1	10-03 /sec	101.7 mm	25.9 mm	9.17	31/L02-3/30/84
1361.30	03-1361.3-A	22.1	0.11	4.7	10-03 /sec	20.0 mm	23.3 mm	9.17	31/L02-3/30/84
1361.30	03-1361.3-B	22.0	0.17	4.1	10-03 /sec	20.0 mm	23.3 mm	9.17	31/L02-3/30/84
1361.30	03-1361.3-C	22.7	-	4.1	10-03 /sec	20.0 mm	23.3 mm	9.17	31/L02-3/30/84
1361.30	03-1361.3-D	23.6	-	3.7	10-03 /sec	20.0 mm	23.3 mm	9.17	31/L02-3/30/84
1379.10	03-1379.1-A	32.9	0.17	3.0	10-03 /sec	20.0 mm	23.3 mm	9.17	31/L02-3/30/84
1379.10	03-1379.1-B	10.0	0.10	6.3	10-03 /sec	20.0 mm	23.3 mm	9.17	31/L02-3/30/84
1379.10	03-1379.1-C	31.0	0.17	6.1	10-03 /sec	20.9 mm	25.2 mm	9.17	31/L02-3/30/84
1379.10	03-1379.1-D	30.3	0.19	3.0	10-03 /sec	20.0 mm	25.3 mm	9.17	31/L02-3/30/84
1397.00	03-1397.0-A	33.9	0.20	6.1	10-03 /sec	20.0 mm	25.3 mm	9.17	31/L02-3/30/84
1397.00	03-1397.0-B	33.3	0.16	3.3	10-03 /sec	20.9 mm	25.3 mm	9.17	31/L02-3/30/84
1723.03	03-1723.03-A	6.3	0.24	3.9	10-03 /sec	20.0 mm	23.3 mm	9.17	31/L02-3/30/84
1723.03	03-1723.03-B	0.3	0.10	4.0	10-03 /sec	20.9 mm	25.3 mm	9.17	31/L02-3/30/84
1740.00	03-1740.0-A	10.3	0.10	2.3	10-07 /sec	20.0 mm	23.3 mm	9.17	31/L02-3/30/84
1740.00	03-1740.0-B	11.0	0.22	3.4	10-03 /sec	20.9 mm	25.3 mm	9.17	31/L02-3/30/84
1740.00	03-1740.0-C	11.2	-	3.2	10-07 /sec	20.9 mm	25.3 mm	9.17	31/L02-3/30/84
1740.00	03-1740.0-D	11.2	0.23	3.3	10-03 /sec	20.0 mm	23.3 mm	9.17	31/L02-3/30/84
1740.00	03-1740.0-E	11.1	0.11	4.3	10-07 /sec	20.0 mm	23.3 mm	9.17	31/L02-3/30/84

NOTE: The following are global values for the entire report:

TEST TYPE: constant strain rate  
 TEST TEMPERATURE: ambient  
 COMPRESSION PRESSURE: 0  
 PORE PRESSURE: ambient  
 DRAINAGE CONDITION: drained  
 SATURATION STATE: saturated

June 6, 1991

SEPS PRODUCT NUMBER: SEP0003

SUPERFUND REMEDIATION DATA FOR DRILL HOLE DWM 0-2

DATA IDENTIFICATION NUMBER: DAW0043  
 SUBMITTAL CITATION NUMBER: DAW000-0111  
 SUBMITTAL TITLE: Density and Porosity Data for Tests from the Unsaturated Zone at Yucca Mountain, Nevada  
 DATA QA LEVEL: 100

DEPTH (ft.)	SAMPLE ID	POROSITY (%)	TEST TYPE	TEST TEMPERATURE	TEST PRESSURE	PAGE NO	LOCAL RECORD CENTER NUMBER
797.0	1		matrix, 100(250-280)/ND	ambient	ambient	C-4	31/L03-3/30/04
797.0	2	4.00	matrix, 100(250-280)/ND	ambient	ambient	C-4	31/L03-3/30/04
797.0	A	4.00	matrix, 100(250-280)/ND	ambient	ambient	C-3	31/L03-3/30/04
797.0	B	3.00	matrix, 100(250-280)/ND	ambient	ambient	C-3	31/L03-3/30/04
815.4	A	3.00	matrix, 100(250-280)/ND	ambient	ambient	C-3	31/L03-3/30/04
840.4	A	0.00	matrix, 100(250-280)/ND	ambient	ambient	C-3	31/L03-3/30/04
840.4	B	10.00	matrix, 100(250-280)/ND	ambient	ambient	C-6	31/L03-3/30/04
840.4	B	0.00	matrix, 100(250-280)/ND	ambient	ambient	C-6	31/L03-3/30/04
849.4	C	7.00	matrix, 100(250-280)/ND	ambient	ambient	C-7	31/L03-3/30/04
849.4	A	7.00	matrix, 100(250-280)/ND	ambient	ambient	C-7	31/L03-3/30/04
849.4	B	0.00	matrix, 100(250-280)/ND	ambient	ambient	C-8	31/L03-3/30/04
849.4	B	0.00	matrix, 100(250-280)/ND	ambient	ambient	C-8	31/L03-3/30/04
1397.6	A	21.00	matrix, 100(250-280)/ND	ambient	ambient	C-9	31/L03-3/30/04
1397.6	B	24.00	matrix, 100(250-280)/ND	ambient	ambient	C-9	31/L03-3/30/04
1324.3		11.46	matrix, 100(250-280)/ND	ambient	ambient	C-10	31/L03-3/30/04
1339.0		16.31	matrix, 100(250-280)/ND	ambient	ambient	C-10	31/L03-3/30/04
1341.3	A	10.00	matrix, 100(250-280)/ND	ambient	ambient	C-11	31/L03-3/30/04
1341.3	C	10.00	matrix, 100(250-280)/ND	ambient	ambient	C-11	31/L03-3/30/04
1341.3	B	10.00	matrix, 100(250-280)/ND	ambient	ambient	C-12	31/L03-3/30/04
1341.3	E	12.00	matrix, 100(250-280)/ND	ambient	ambient	C-12	31/L03-3/30/04
1379.1	A	9.00	matrix, 100(250-280)/ND	ambient	ambient	C-13	31/L03-3/30/04
1379.1	C	14.00	matrix, 100(250-280)/ND	ambient	ambient	C-13	31/L03-3/30/04
1379.1	B	9.00	matrix, 100(250-280)/ND	ambient	ambient	C-14	31/L03-3/30/04
1379.1	E	12.00	matrix, 100(250-280)/ND	ambient	ambient	C-14	31/L03-3/30/04
1398.4	24	19.10	matrix, 100(250-280)/ND	ambient	ambient	C-15	31/L03-3/30/04
1398.4	25	11.00	matrix, 100(250-280)/ND	ambient	ambient	C-15	31/L03-3/30/04
1397.0	B	9.00	matrix, 100(250-280)/ND	ambient	ambient	C-16	31/L03-3/30/04
1397.0	B	7.00	matrix, 100(250-280)/ND	ambient	ambient	C-16	31/L03-3/30/04
1400.0	26	14.70	matrix, 100(250-280)/ND	ambient	ambient	C-17	31/L03-3/30/04
1400.7	27A	14.20	matrix, 100(250-280)/ND	ambient	ambient	C-17	31/L03-3/30/04
1400.7	27B	15.20	matrix, 100(250-280)/ND	ambient	ambient	C-18	31/L03-3/30/04
1413.9	28	11.10	matrix, 100(250-280)/ND	ambient	ambient	C-18	31/L03-3/30/04
1424.1	29	11.10	matrix, 100(250-280)/ND	ambient	ambient	C-19	31/L03-3/30/04
1429.3	30	16.00	matrix, 100(250-280)/ND	ambient	ambient	C-19	31/L03-3/30/04
1439.3	A	4.00	matrix, 100(250-280)/ND	ambient	ambient	C-20	31/L03-3/30/04

June 6, 1991

SEILOS PRODUCT NUMBER: SEP00013

**SUPPORTING BULK DENSITY DATA FOR DRILL HOLE URM 0-2**

DATA AUTHORIZATION NUMBER: DA00412  
 SUBMITTAL CITATION NUMBER: SAND00-0011  
 SUBMITTAL TITLE: Density and Porosity Data for Tuffs from the Unstratified Zone at Tuzo Mountain, Nevada  
 DATA QA LEVEL: 100

DEPTH (ft)	SAMPLE ID	BULK DENSITY (g/cm <sup>3</sup> )	SATURATION STATE	TEST TYPE	TEST TEMPERATURE	TEST PRESSURE	SAMPLE MASS	PAGE NO	LOCAL RECORD CENTER NUMBER
797.0	1	2.350	dry	colliper	ambient	ambient	483.69 g	C-4	31/L02-3/30/84
797.0	1	2.370	saturated	colliper	ambient	ambient	489.21 g	C-4	31/L02-3/30/84
797.0	2	2.350	dry	colliper	ambient	ambient	481.50 g	C-4	31/L02-3/30/84
797.0	2	2.370	saturated	colliper	ambient	ambient	489.03 g	C-4	31/L02-3/30/84
797.0	A	2.340	dry	colliper	ambient	ambient	59.07 g	C-3	31/L02-3/30/84
797.0	A	2.360	saturated	colliper	ambient	ambient	60.71 g	C-3	31/L02-3/30/84
797.0	B	2.360	dry	colliper	ambient	ambient	60.12 g	C-3	31/L02-3/30/84
797.0	B	2.370	saturated	colliper	ambient	ambient	60.07 g	C-3	31/L02-3/30/84
810.4	A	2.340	dry	colliper	ambient	ambient	59.09 g	C-3	31/L02-3/30/84
810.4	A	2.370	saturated	colliper	ambient	ambient	60.00 g	C-3	31/L02-3/30/84
940.4	A	2.310	dry	colliper	ambient	ambient	50.09 g	C-3	31/L02-3/30/84
940.4	A	2.370	saturated	colliper	ambient	ambient	60.04 g	C-3	31/L02-3/30/84
940.4	B	2.280	dry	colliper	ambient	ambient	57.90 g	C-4	31/L02-3/30/84
940.4	B	2.300	saturated	colliper	ambient	ambient	60.30 g	C-4	31/L02-3/30/84
940.4	D	2.270	dry	colliper	ambient	ambient	50.40 g	C-4	31/L02-3/30/84
940.4	D	2.370	saturated	colliper	ambient	ambient	60.41 g	C-4	31/L02-3/30/84
949.4	C	2.300	dry	colliper	ambient	ambient	50.53 g	C-7	31/L02-3/30/84
949.4	C	2.370	saturated	colliper	ambient	ambient	60.34 g	C-7	31/L02-3/30/84
949.0	A	2.350	dry	colliper	ambient	ambient	59.33 g	C-7	31/L02-3/30/84
949.0	A	2.310	dry	colliper	ambient	ambient	61.10 g	C-7	31/L02-3/30/84
949.0	B	2.370	saturated	colliper	ambient	ambient	50.06 g	C-8	31/L02-3/30/84
949.0	B	2.370	saturated	colliper	ambient	ambient	60.03 g	C-8	31/L02-3/30/84
949.0	D	2.300	dry	colliper	ambient	ambient	475.61 g	C-8	31/L02-3/30/84
949.0	D	2.300	saturated	colliper	ambient	ambient	492.02 g	C-8	31/L02-3/30/84
1397.6	A	1.910	dry	colliper	ambient	ambient	49.20 g	C-9	31/L02-3/30/84
1397.6	A	2.100	saturated	colliper	ambient	ambient	50.03 g	C-9	31/L02-3/30/84
1397.6	B	1.900	dry	colliper	ambient	ambient	40.06 g	C-9	31/L02-3/30/84
1397.6	B	2.140	saturated	colliper	ambient	ambient	54.76 g	C-9	31/L02-3/30/84
1398.3		2.210	dry	immersion	ambient	ambient	73.99 g	C-10	31/L02-3/30/84
1398.3		2.370	dry	immersion	ambient	ambient	77.630 g	C-10	31/L02-3/30/84
1399.0		2.120	dry	immersion	ambient	ambient	43.016 g	C-10	31/L02-3/30/84
1399.0		2.200	dry	immersion	ambient	ambient	46.260 g	C-10	31/L02-3/30/84
1399.0	A	2.240	dry	colliper	ambient	ambient	57.01 g	C-11	31/L02-3/30/84
1399.0	A	2.340	saturated	colliper	ambient	ambient	57.72 g	C-11	31/L02-3/30/84
1399.0	C	2.210	dry	colliper	ambient	ambient	57.59 g	C-11	31/L02-3/30/84
1399.0	C	2.360	saturated	colliper	ambient	ambient	60.12 g	C-11	31/L02-3/30/84
1399.0	D	2.260	dry	colliper	ambient	ambient	57.67 g	C-12	31/L02-3/30/84
1399.0	D	2.360	saturated	colliper	ambient	ambient	60.11 g	C-12	31/L02-3/30/84
1399.0	E	2.210	dry	colliper	ambient	ambient	54.70 g	C-12	31/L02-3/30/84
1399.0	E	2.370	saturated	colliper	ambient	ambient	59.43 g	C-12	31/L02-3/30/84
1399.1	A	2.300	dry	colliper	ambient	ambient	50.59 g	C-13	31/L02-3/30/84
1399.1	A	2.370	saturated	colliper	ambient	ambient	60.01 g	C-13	31/L02-3/30/84
1399.1	C	2.150	dry	colliper	ambient	ambient	55.15 g	C-13	31/L02-3/30/84

NOTE: Sample Length and Sample Diameter not given for URM 0-2.

# EXAMPLE OF SEPDB PRODUCT (DATA REPORT)

SEP0013

SUPPLYING BULK DENSITY DATA FOR DRILL BITS USED 0-3

DEPTH (ft)	SAMPLE ID	BULK DENSITY (g/cm <sup>3</sup> )	SATURATION STATE	TEST TYPE	TEST TEMPERATURE	TEST PRESSURE	LAWS MASS	PAGE NO	LOCAL RECORD CENTER NUMBER
1379.1	C	2.399	saturated	caliper	ambient	ambient	50.00 g	C-13	31/L03-3/30/04
1379.1	D	2.200	dry	caliper	ambient	ambient	57.00 g	C-14	31/L03-3/30/04
1379.1	E	2.376	saturated	caliper	ambient	ambient	60.19 g	C-16	31/L03-3/30/04
1379.1	E	2.330	dry	caliper	ambient	ambient	54.92 g	C-16	31/L03-3/30/04
1379.1	E	2.350	saturated	caliper	ambient	ambient	59.05 g	C-16	31/L03-3/30/04
1380.4	24	2.104	dry	immersion	ambient	ambient	47.043 g	C-13	31/L03-1/10/03
1380.4	24	2.204	saturated	immersion	ambient	ambient	51.047 g	C-13	31/L03-1/10/03
1381.6	25	2.304	dry	immersion	ambient	ambient	132.967 g	C-13	31/L03-1/10/03
1381.6	25	2.300	saturated	immersion	ambient	ambient	139.424 g	C-13	31/L03-1/10/03
1387.0	B	2.300	dry	caliper	ambient	ambient	50.70 g	C-16	31/L03-3/30/04
1387.0	B	2.300	saturated	caliper	ambient	ambient	60.00 g	C-16	31/L03-3/30/04
1387.0	D	2.320	dry	caliper	ambient	ambient	59.35 g	C-16	31/L03-3/30/04
1387.0	D	2.400	saturated	caliper	ambient	ambient	61.23 g	C-16	31/L03-3/30/04
1400.0	26	2.107	dry	immersion	ambient	ambient	141.117 g	C-17	31/L03-1/10/03
1400.0	26	2.278	saturated	immersion	ambient	ambient	173.375 g	C-17	31/L03-1/10/03
1400.7	27A	2.191	dry	immersion	ambient	ambient	70.409 g	C-17	31/L03-1/10/03
1400.7	27A	2.324	saturated	immersion	ambient	ambient	75.123 g	C-17	31/L03-1/10/03
1400.7	27B	2.156	dry	immersion	ambient	ambient	66.377 g	C-18	31/L03-1/10/03
1400.7	27B	2.204	saturated	immersion	ambient	ambient	70.914 g	C-18	31/L03-1/10/03
1413.9	28	2.301	dry	immersion	ambient	ambient	74.039 g	C-18	31/L03-1/10/03
1413.9	28	2.403	saturated	immersion	ambient	ambient	82.404 g	C-18	31/L03-1/10/03
1424.1	29	2.326	dry	immersion	ambient	ambient	109.724 g	C-19	31/L03-1/10/03
1424.1	29	2.319	saturated	immersion	ambient	ambient	112.799 g	C-19	31/L03-1/10/03
1429.5	30	2.264	dry	immersion	ambient	ambient	131.315 g	C-19	31/L03-1/10/03
1429.5	30	2.315	saturated	immersion	ambient	ambient	140.370 g	C-19	31/L03-1/10/03
1439.3	A	2.270	dry	caliper	ambient	ambient	57.76 g	C-20	31/L03-3/30/04
1439.3	A	2.310	saturated	caliper	ambient	ambient	50.03 g	C-20	31/L03-3/30/04

June 6, 1991

SEIPE PRODUCT NUMBER: SEIPE0093

# SUPPORTING GRAIN DENSITY DATA FOR DRILL HOLE USW 0-2

DATA AUTHORIZATION NUMBER: DA0042  
 SUBMITTAL CITATION NUMBER: DA0000-0011  
 SUBMITTAL TITLE: Density and Porosity Data for Tuffs from the Unrestricted Zone at Twin Mountains, Nevada  
 DATA QA LEVEL: YES

DEPTH (m)	SAMPLE ID	GRAIN DENSITY (g/cm <sup>3</sup> )	TEST TYPE	TEST TEMPERATURE	TEST PRESSURE	SAMPLE MASS	PAGE NO	LOCAL RECORD CENTER NUMBER
797.0	1	2.400	GD = DSD/11 + DSD - S20)	ambient	ambient		C-4	51/L02-3/30/84
797.0	2	2.430	GD = DSD/11 + DSD - S20)	ambient	ambient		C-4	51/L02-3/30/84
797.0	A	2.440	GD = DSD/11 + DSD - S20)	ambient	ambient		C-3	51/L02-3/30/84
797.0	B	2.430	GD = DSD/11 + DSD - S20)	ambient	ambient		C-3	51/L02-3/30/84
810.4	A	2.430	GD = DSD/11 + DSD - S20)	ambient	ambient		C-3	51/L02-3/30/84
940.4	A	2.310	GD = DSD/11 + DSD - S20)	ambient	ambient		C-3	51/L02-3/30/84
940.4	B	2.330	GD = DSD/11 + DSD - S20)	ambient	ambient		C-4	51/L02-3/30/84
940.4	B	2.490	GD = DSD/11 + DSD - S20)	ambient	ambient		C-4	51/L02-3/30/84
940.4	C	2.470	GD = DSD/11 + DSD - S20)	ambient	ambient		C-4	51/L02-3/30/84
949.0	A	2.310	GD = DSD/11 + DSD - S20)	ambient	ambient		C-7	51/L02-3/30/84
949.0	B	2.310	GD = DSD/11 + DSD - S20)	ambient	ambient		C-8	51/L02-3/30/84
949.0	B	2.300	GD = DSD/11 + DSD - S20)	ambient	ambient		C-8	51/L02-3/30/84
1297.0	A	2.490	GD = DSD/11 + DSD - S20)	ambient	ambient		C-9	51/L02-3/30/84
1297.0	B	2.300	GD = DSD/11 + DSD - S20)	ambient	ambient		C-9	51/L02-3/30/84
1297.0	B	2.330	GD = DSD/11 + DSD - S20)	ambient	ambient		C-9	51/L02-3/30/84
1297.0	B	2.330	GD = DSD/11 + DSD - S20)	ambient	ambient	44.672 g	C-10	51/L02-3/30/84
1297.0	B	2.330	GD = DSD/11 + DSD - S20)	ambient	ambient	44.813 g	C-10	51/L02-3/30/84
1341.0	A	2.490	GD = DSD/11 + DSD - S20)	ambient	ambient		C-11	51/L02-3/30/84
1341.0	C	2.310	GD = DSD/11 + DSD - S20)	ambient	ambient		C-11	51/L02-3/30/84
1341.0	B	2.310	GD = DSD/11 + DSD - S20)	ambient	ambient		C-12	51/L02-3/30/84
1341.0	E	2.250	GD = DSD/11 + DSD - S20)	ambient	ambient		C-12	51/L02-3/30/84
1379.1	A	2.330	GD = DSD/11 + DSD - S20)	ambient	ambient		C-13	51/L02-3/30/84
1379.1	B	2.300	GD = DSD/11 + DSD - S20)	ambient	ambient		C-13	51/L02-3/30/84
1379.1	C	2.310	GD = DSD/11 + DSD - S20)	ambient	ambient		C-13	51/L02-3/30/84
1379.1	B	2.310	GD = DSD/11 + DSD - S20)	ambient	ambient		C-14	51/L02-3/30/84
1379.1	E	2.330	GD = DSD/11 + DSD - S20)	ambient	ambient		C-14	51/L02-3/30/84
1390.4	24	2.602	GD = DSD/11 + DSD - S20)	ambient	ambient	24.398 g	C-15	51/L02-3/30/84
1392.0	23	2.594	GD = DSD/11 + DSD - S20)	ambient	ambient	29.897 g	C-15	51/L02-3/30/84
1397.0	B	2.330	GD = DSD/11 + DSD - S20)	ambient	ambient		C-16	51/L02-3/30/84
1397.0	B	2.310	GD = DSD/11 + DSD - S20)	ambient	ambient		C-16	51/L02-3/30/84
1600.0	24	2.328	GD = DSD/11 + DSD - S20)	ambient	ambient	29.131 g	C-17	51/L02-3/30/84
1600.7	27A	2.323	GD = DSD/11 + DSD - S20)	ambient	ambient	24.809 g	C-17	51/L02-3/30/84
1600.7	27B	2.302	GD = DSD/11 + DSD - S20)	ambient	ambient	27.134 g	C-18	51/L02-3/30/84
1613.0	20	2.307	GD = DSD/11 + DSD - S20)	ambient	ambient	27.204 g	C-18	51/L02-3/30/84
1624.1	29	2.315	GD = DSD/11 + DSD - S20)	ambient	ambient	29.031 g	C-19	51/L02-3/30/84
1620.3	20	2.027	GD = DSD/11 + DSD - S20)	ambient	ambient	29.514 g	C-19	51/L02-3/30/84
1630.2	A	2.340	GD = DSD/11 + DSD - S20)	ambient	ambient		C-20	51/L02-3/30/84

NOTE: Sample Length and Sample Diameter not given for USW 0-2.

SEPDB-C10



**SEPDB-C11**

**THE GEOGRAPHIC  
INFORMATION SYSTEM  
COMPONENT OF THE  
YMP TECHNICAL DATA BASE**

**(GENISES)**

**THE GEOGRAPHIC NODAL INFORMATION  
STUDY AND EVALUATION SYSTEM**

**QUARTERLY REPORT**

**BY  
GENISES STAFF**

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## 1.0 INTRODUCTION

The Geographic Information System (GIS) component of the Technical Data Base is under development by the Remote Sensing Laboratory (RSL) operated by EG&G Energy Measurements, Inc. (EG&G/EM). The purpose of the Geographic Nodal Information Study and Evaluation System (GENISES) is to provide a repository for technical data that are best characterized by spatial or geographic (map-oriented) features.

Chapter 2 describes the primary types of data currently held by EG&G/EM RSL and provides reference information on the sources of GENISES data. This information is presented in the form of two tables.

Chapter 3 discusses the significant activities during the previous quarter, including data added to the database, requested and delivered products, and the status of the EG&G/EM RSL YMP Support Office.

Chapter 4 describes major activities scheduled for the upcoming quarter, including plans for equipping the YMP Support Office, the development plan for the GENISES database, and design plans for the revised Site Atlas Map Portfolio.

The YMP GENISES Work Request form is provided in Appendix GENISES-A. This form is to be used when requesting information products from the GENISES database.

## 2.0 DATABASE CONTENTS

### 2.1 Types of Data Currently Held

As mentioned previously, GENISES contains spatial and geographic data associated with the Yucca Mountain site. These data are summarized in Table 2-1. This table has been organized to present data layer types or themes, listings of the types of attribute or descriptive data associated with each data layer, and an index number that indicates the reference or data source from which associated GENISES information was taken. This listing is not comprehensive; rather, it is intended to provide GENISES users with an understanding of the primary thematic data layers contained in the database.

TABLE 2-1 TYPES OF DATA CURRENTLY IN THE GENISES DATABASE

ADMINISTRATIVE DATA

- 01 LAND OWNERSHIP (1:100,000 scale source data)  
Land Status
- 02 POLITICAL AND ADMINISTRATIVE BOUNDARIES (1:2,000,000 scale source data;  
entire US digital database)  
Political (national, state and country boundaries); Administrative  
(national parks, forests, wilderness areas, Indian and Military  
reservations).
- 03 POLITICAL AND ADMINISTRATIVE BOUNDARIES (1:100,000 scale source data;  
entire US digital database)  
Political (national, state and county boundaries); Administrative  
(national parks, forests, wilderness areas, Indian and Military  
reservations).
- 04 POLITICAL AND ADMINISTRATIVE BOUNDARIES (1:24,000 scale source data)  
Political (national, state and county boundaries); Administrative  
(national parks, forests, wilderness areas, Indian and Military  
reservations).
- 05 PUBLIC LAND SURVEY SYSTEM (PLSS)  
Township, Range, Section
- 06 PUBLIC LAND SURVEY SYSTEM (PLSS) (1:24,000 scale source data)  
Township, Range, Section
- 07 7.5' USGS TOPOGRAPHIC QUADRANGLE DLG AVAILABILITY INDEX  
Name, USGS reference no., Year published, Year revised, contour  
interval, availability of: PLSS, boundaries, hydrography,  
hypsography, transportation, and DEM.
- 08 ORTHOPHOTO SHEETS INDEX MAP (1:6,000 scale source data)  
Sheet number, scale, date of photography.
- 09 ORTHOPHOTO SHEETS INDEX MAP (1:12,000 scale source data)  
Sheet number, scale, date of photography.
- 10 BLM LAND WITHDRAWAL BOUNDARY  
Boundary, area, perimeter

TABLE 2-1 TYPES OF DATA CURRENTLY IN THE GENISES DATABASE

- 
- 11 GEOGRAPHIC NAMES INFORMATION SYSTEM (Entire US digital database)  
Names found on USGS maps.
- 12 LODE MINING CLAIM (1:6,000 scale source data)  
Boundary, area, perimeter, claim, ID.
- 13 DEMOGRAPHIC DATA (1:100,000 scale source data; entire US digital database)  
Populated places, census tract, census block

INFRASTRUCTURE DATA

- 14 TRANSPORTATION FEATURES (1:2,000,000 scale source data; entire US digital database)  
Roads and trails, railroads and airfields.
- 15 TRANSPORTATION FEATURES (1:100,000 scale source data; entire US digital database)  
Roads and trails, railroads and airfields.
- 16 TRANSPORTATION FEATURES (1:24,000 scale source data)  
Roads, trails, railroads, pipelines, transmission lines.

SITE CHARACTERIZATION ACTIVITIES

- 17 EXISTING ACTIVITIES  
Activity ID, source, elevation, activity type, depth, core requirement, drainage
- 18 PROPOSED ACTIVITIES  
Activity ID, source, elevation, activity type, depth, core requirement, year.
- 19 CONCEPTUAL CONTROLLED AREA BOUNDARY  
Boundary, area, perimeter, name
- 20 CONCEPTUAL PERIMETER DRIFT  
Boundary, area, perimeter, name



TABLE 2-1 TYPES OF DATA CURRENTLY IN THE GENISES DATABASE

21 SUBSURFACE ACCESS DRIFTS AND RAMPS

Length

22 EXPLORATORY STUDIES FACILITIES (1:2,400 scale source map)

Facility Names

23 CORE AREA BOUNDARY

Boundary, area, perimeter, name

24 DISTURBANCE FEATURES

Roads, Pads, Other

PHYSIOGRAPHIC DATA

25 GEOFEATURES (1:250,000 scale source data)

Name

26 ELEVATION CONTOURS (1:2,400 scale source data; 2 foot interval)

isoline value

27 ELEVATION CONTOURS (1:6,000 scale source data; 10 foot interval)

isoline value

28 ELEVATION CONTOURS (1:24,000 scale source data; 20 foot interval)

isoline value

29 ELEVATION CONTOURS (1:40,000 scale source data; 40 foot interval)

isoline value

30 ELEVATION CONTOURS (1:5,000 scale source data; 2 meter interval)

isoline value

31 ELEVATION CONTOURS (1:100,000 scale source data; 50 meter interval)

isoline value

32 DIGITAL ELEVATION MODEL (DEM) (1:250,000 scale source data)

Surface elevation

TABLE 2-1 TYPES OF DATA CURRENTLY IN THE GENISES DATABASE

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33 DIGITAL ELEVATION MODEL (DEM) (1:24,000 scale source data)

Surface elevation

34 DIGITAL ELEVATION MODEL (DEM) (1:12,000 scale source data)

Surface elevation

35 DIGITAL ELEVATION MODEL (DEM) (1:6,000 scale source data)

Surface elevation

36 SEISMIC REFRACTION STUDIES

Length, ID, shot point locations,

37 SEISMIC REFLECTION STUDIES

Length, ID

38 GEOELECTRIC SURVEY AREAS

Area, type of survey

39 GEOELECTRIC TRAVERSES

Type of traverse, length, sounding locations

40 RESISTIVITY SOUNDINGS

Location

#### GEOLOGIC DATA

41 FAULTS (1:12,000 and 1:24,000 scale source data)

Locational certainty, fault movement

42 FRACTURES (1:12,000 and 1:24,000 scale source data)

Strike

43 FRACTURE SETS (1:12,000 and 1:24,000 scale source data)

Strike

44 TECTONIC BRECCIA (1:12,000 and 1:24,000 scale source data) Location

TABLE 2-1 TYPES OF DATA CURRENTLY IN THE GENISES DATABASE

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45	BEDROCK ALLUVIUM CONTACT (1:12,000 and 1:24,000 scale source data)
	Bedrock/alluvium, area, perimeter
61	URANIUM SERIES DATING
	Station ID
66	G-TUNNEL
	Activity ID, Elevation
68	SEISMIC MONITORING STATIONS
	Station #, Elevation
69	SEISMIC MONITORING NETWORK
	Site Designator, Site Name
70	SEISMIC REFRACTION SHOTPOINT AND GEOPHONE
	Shotpoint ID, Geophone ID
71	MAGNETIC AIR AND GROUND TRAVERSES
	Magnetic contours, traverse ID, traverse length, maxima, minima
72	MAGNETIC SURVEY
	Magnetic contours, traverse ID, traverse length, maxima, minima
73	GRAVITY STATIONS
	Station ID, Elevation
74	MAGNETOMETRIC RESISTIVITY SURVEY
	ID, orientation
HYDROGRAPHIC DATA	
46	HYDROGRAPHY (1:2,000,000 scale source data; entire US digital database)
	Streams, water bodies
47	HYDROGRAPHY (1:100,000 scale source data; entire US digital database)
	Streams, water bodies
48	HYDROGRAPHY (1:24,000 scale source data)
	Streams, water bodies

TABLE 2-1 TYPES OF DATA CURRENTLY IN THE GENISES DATABASE

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- 49 FLOOD PRONE AREAS (1:24,000 scale source data)  
Limits of Inundation
- 50 FLOODPLAIN CROSS-SECTION (1:24,000 scale source data)  
USGS Cross-section
- 51 DRAINAGE BASINS (1:24,000 scale source data)  
Drainage Basin Divide
- 52 HYDROGRAPHIC REGIONS AND BASINS (1:750,000 scale source data)  
Basins, subbasins
- 53 MONITORING SITES/STATIONS  
Site identification, monitoring type, site ID, buffers
- 54 POTENTIOMETRIC CONTOURS  
Isoline value
- 62 FOSSIL WOODRAT MIDDEN LOCALITIES  
Elevation
- 63 PALEOCLIMATE TEMPERATURE AND PRECIPITATION  
Station ID, Elevation
- 64 SPRINGS AND WELLS  
Station ID, Elevation
- 65 GROUNDWATER RECHARGE MONITORING STATIONS  
Activity ID, Elevation
- 67 GROUNDWATER OBSERVATION WELLS  
Site ID, Elevation, Well Depth, Casing Diameter

BIOLOGIC DATA

- 55 BIOLOGICAL STUDY AREAS  
Area ID
- 56 DESERT TORTOISE TRANSECTS

TABLE 2-1 TYPES OF DATA CURRENTLY IN THE GENISES DATABASE

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	Biology ID, study area, year, length, presence of sign
57	SMALL MAMMAL TRAPLINES
	Trapline ID
58	PROPOSED LAGOMORPH TRANSECTS
	Transect, length, ID
59	PROPOSED SCENT STATION ROUTES
	Transect, length, ID
60	ECOLOGICAL SAMPLING PLOTS
	Area, ID
76	RAVEN SURVEY ROUTES
	Raven Survey Stop ID
INDEX MAPS	
75	BEDROCK GEOLOGY, SURFACE GEOLOGY, AEROMAGNETIC SURVEYS, GRAVITY SURVEYS
	Index map ID

## 2.2 Database References

GENISES information is available to YMP participating organizations and, on approval by the YMP Project Office, to outside parties. Access to or development of specific information products may be obtained by completing a YMP GENISES Work Request (see Appendix GENISES-A). Table 2-2 is a listing of GENISES reference citations. These citations identify GENISES information sources.

TABLE 2-2 REFERENCE AND SOURCE CITATIONS FOR GENISES DATA

REF	(*)	REFERENCE
01		U.S. Bureau of Land Management, 1978. "Surface Management Status Map", Beatty Quadrangle, Nevada-California, 1:100,000 Scale Series (Planimetric).
02		U.S. Geological Survey, National Mapping Program, 1970. "National Atlas of the United States of America", Digital Line Graphs at 1:2,000,000 scale.
03		U.S. Department of Commerce, Bureau of the Census, 1990. "Topologically Integrated Geographic Encoding and Referencing System - TIGER database. Digital database for the entire US containing political and administrative boundaries at a 1:100,000 scale.
04		U.S. Geological Survey, National Mapping Program. "Digital Line Graphs from 1:24,000 Scale Maps", Boundaries. Beatty Mountain, Nevada, 1987, Provisional. East of Beatty Mountain, Nevada, 1987, Provisional. Topopah Spring NW, Nevada, 1961. Topopah Spring, Nevada, 1961. Carrara Canyon, Nevada, 1981, Provisional. Crater Flat, Nevada, 1986, Provisional. Busted Butte, Nevada, 1961, Photo-revised 1983. Jackass Flats, Nevada, 1961, Photo-revised 1983. Ashton, Nevada, 1987, Provisional. Big Dune, Nevada, 1986, Provisional. Amargosa Valley, Nevada, 1961, photo-revised 1983. Striped Hills, Nevada, 1961, photo-revised 1983.
05		Rautman, C., 1987. Sandia National Laboratories, IGIS product number CAL0194.
06		U.S. Geological Survey, National Mapping Program. "Digital Line Graphs from 1:24,000 Scale Maps", U.S. Public Land Survey System. Beatty Mountain, Nevada, 1987, Provisional. East of Beatty Mountain, Nevada, 1987, Provisional. Topopah Spring NW, Nevada, 1961. Topopah Spring, Nevada, 1961. Carrara Canyon, Nevada, 1981, Provisional. Crater Flat, Nevada, 1986, Provisional. Busted Butte, Nevada, 1961, Photo-revised 1983. Jackass Flats, Nevada, 1961, Photo-revised 1983. Ashton, Nevada, 1987, Provisional. Big Dune, Nevada, 1986, Provisional. Amargosa Valley, Nevada, 1961, photo-revised 1983. Striped Hills, Nevada, 1961, photo-revised 1983.
07		A 1:24,000 scale 7.5' topographic quadrangle index map has been prepared for an area covering the Nevada Test Site and Yucca Mountain Site Characterization Project. The index map also shows the availability of digital line graph data (DLG), which is updated quarterly with information provided by the USGS National Mapping Division. 1:24,000 scale DLG layers include: transportation, hydrography, boundaries, hypsography, and public land survey system. Digital Elevation Model (DEM) files are also available.
(*)		Reference Number correlates with Reference Number cited in Table 2.1 Types of Data Currently Being Stored in the GENISES.

TABLE 2-2 REFERENCE AND SOURCE CITATIONS FOR GENISES DATA

- 08 1:6,000 scale orthophotographs were generated in 1991 for an area covering the Repository Block Area. An index map has been prepared as a GIS coverage to show the areal extent and sheet boundaries for these orthophotographs. This index can also be used to identify the ten foot elevation contour maps and digital elevation models.
- 09 1:12,000 scale orthophotographs were generated in 1991 for an area covering the near-field study area. An index map has been prepared as a GIS coverage to show the areal extent and sheet boundaries for these orthophotographs. This index can also be used to identify the twenty foot elevation contour maps and digital elevation models.
- 10 Proposed Bureau of Land Management withdrawal boundary provided by Phil Ralphs (9-9-88). Boundaries delineated on a copy of a Public Land Survey System map with portions of sections identified.
- 11 U.S. Geological Survey. "Geographic Names Information System". This database contains digital files on more than 2 million place names and features in the US - from towns, schools, reservoirs, and parks to streams, valleys, springs and ridges. Each State file contains the names found on USGS topographic maps. For each geographic name listed, there are 15 descriptive elements, such as the descriptive name, type of feature, geographic coordinates and the name of the topographic map containing the feature.
- 12 Perchetti, A.J., 1988. "Lode Mining Claim Map", 1:6,000 scale drawing showing Yucca # 11 - 27 Unpatented Lode Mining Claims.
- 13 U.S. Department of Commerce, Bureau of the Census, 1990. "Topologically Integrated Geographic Encoding and Referencing System - TIGER database. Digital database for the entire US containing demographic features at a 1:100,000 scale.
- 14 U.S. Geological Survey, 1970. "National Atlas of the United States of America", Digital Line Graphs at 1:2,000,000 scale.
- 15 U.S. Department of Commerce, Bureau of the Census, 1990. "Topologically Integrated Geographic Encoding and Referencing System - TIGER database. Digital database for the entire US containing transportation features at a 1:100,000 scale.
- 16 U.S. Geological Survey, National Mapping Program. "Digital Line Graphs from 1:24,000 Scale Maps", Transportation. Beatty Mountain, Nevada, 1987, Provisional. East of Beatty Mountain, Nevada, 1987, Provisional. Topopah Spring NW, Nevada, 1961. Topopah Spring, Nevada, 1961. Carrara Canyon, Nevada, 1981, Provisional. Crater Flat, Nevada, 1986, Provisional. Busted Butte, Nevada, 1961, Photo-revised 1983. Jackass Flats, Nevada, 1961, Photo-revised 1983. Ashton, Nevada, 1987, Provisional. Big Dune, Nevada, 1986, Provisional. Amargosa Valley, Nevada, 1961, photo-revised 1983. Striped Hills, Nevada, 1961, photo-revised 1983.



TABLE 2-2 REFERENCE AND SOURCE CITATIONS FOR GENISES DATA

- 17 U.S. Department of Energy, 1986. "NNWSI Drill Hole Map", prepared by Holmes and Narver, Inc.; Drawing Number JS-025-001-C2, Rev. 2; 1:12,000 scale. (Used as a location/identifier cross-check source).
- U.S. Department of Energy, 1985. "Regional NNWSI Map", prepared by Holmes and Narver, Inc.; Drawing Number JS-025-002-C1; 1:48,000 scale. (Used as a location/identifier cross-check source).
- U.S. Department of Energy, 1988. "Yucca Mountain Project Site Atlas", YMP/88-21.
- Fenix and Scisson, 1986. "NNWSI Hole Histories UE-25a #1, UE-25a #3, UE-25a #4, UE-25a #5, UE-25a #6, UE-25a #7", DOE/NV/10322-9.
- Fenix and Scisson, 1986. "NNWSI Hole Histories UE-25 WT #3, UE-25 WT #4, UE-25 WT #5, UE-25 WT #6, UE-25 WT #12, UE-25 WT #13, UE-25 WT #14, UE-25 WT #15, UE-25 WT #16, UE-25 WT #17, UE-25 WT #18, USW WT-1, USW WT-2, USW WT-7, USW WT-10, USW WT-11", DOE/NV/10322-10.
- Fenix and Scisson, 1986. "NNWSI Hole Histories UE-25 RF #1, UE-25 RF #2, UE-25 RF #3, UE-25 RF #3B, UE-25 RF #4, UE-25 RF #5, UE-25 RF #7, UE-25 RF #7A, UE-25 RF #8, UE-25 RF #9, UE-25 RF #10, UE-25 RF #11", DOE/NV/10322-11.
- Fenix and Scisson, 1986. "NNWSI Hole Histories UE-29a #1 and UE-29a #2", DOE/NV/10322-12.
- Fenix and Scisson, 1986. "NNWSI Hole History UE-25b #1", DOE/NV/10322-13.
- Fenix and Scisson, 1986. "NNWSI Hole Histories UE-25c #1, UE-25c #2, UE-25c #3, DOE/NV/10322-14. Fenix and Scisson, 1986. "NNWSI Hole History UE-25-h #1", DOE/NV/10322-15.
- Fenix and Scisson, 1986. "NNWSI Hole History UE-25p #1", DOE/NV/10322-16.
- Fenix and Scisson, 1986. "NNWSI Hole Histories USW VH-1 and USW VH-2", DOE/NV/10322-17.
- Fenix and Scisson, 1987. "NNWSI Hole Histories USW H-1, USW H-3, USW H-4, USW H-5, and USW H-6", DOE/NV/10322-18.
- Fenix and Scisson, 1987. "NNWSI Hole Histories USW G-1, USW G-2, USW G-3, USW G-4, USW GA-1, USW GU-3", DOE/NV/10322-19.
- Fenix and Scisson, 1987. "NNWSI Hole Histories UWS UZ-1, UE-25 UZ #4, UE-25 UZ #5, USW UZ-6, USW UZ-6s, USW UZ-7, USW UZ-8, USW UZ-13", DOE/NV/10322-20.
- Fenix and Scisson, 1987. "NNWSI Hole Histories, Unsaturated Zone - Neutron Holes, 76 Boreholes Drilled Between May 1984 and February 1986", DOE/NV/10322-21.

TABLE 2-2 REFERENCE AND SOURCE CITATIONS FOR GENISES DATA

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- Fenix and Scisson, 1987. "NNWSI 51 Seismic Hole Histories", DOE/NV/10322-25.
- 18 U.S. Department of Energy, 1985. "Regional NNWSI Map", prepared by Holmes and Narver, Inc.; Drawing Number JS-025-002-C1; 1:48,000 scale. (Used as a location/identifier cross-check source).
- U.S. Department of Energy, 1988. "Yucca Mountain Project Surface-based Investigations Plan", Volumes 1-4, YMP/88-25.
- 19 Sandia National Laboratories, 1986. "Conceptual Controlled Area Boundary", IGIS Drawing Number CAL0166.
- 20 Sandia National Laboratories, 1986. "Nuclear Waste Repository in Tuff, Subsurface Facility Conceptual Design, General Underground Facility Layout, Drainage Configuration and Vertical Emplacement", SNL Drawing Number R07003A.
- 21 U.S. Department of Energy, 1991. "Subsurface Access Drifts" prepared by Raytheon Services of Nevada; Drawing Number YMP-025-1-MING-MI01.
- 22 U.S. Department of Energy, 1987. "ESF Overall Site Plan -Layout No. 8", prepared by Holmes and Narver, Inc.; Drawing Number SK-025-002-C14, 1:2,400 scale drawing. Manually digitized. 23 Rautman, C., 1987. Sandia National Laboratories, IGIS product number CAL0194.
- 24 U.S. Geological Survey, 1956 and 1976 1:24,000 scale 7.5' topographic quadrangle and 1986 1:24,000 orthophoto maps:  
  
Bare Mountain, NE Bare Mountain, SE Big Dune, NE Topopah Spring, NW Topopah Spring, SW Lathrop Wells,  
  
EG&G Energy Measurements, Inc. aerial photography flown at a scale of 1:24,000 in July 1986 and September 1987.
- 25 Boundaries of geofeatures and their names were interpreted from U.S. Geological Survey 1:250,000 scale maps. Caliente, NV;UT, 1954, Revised 1970 Death Valley, CA;NV, 1954, Revised 1970 Goldfield, NV;CA, 1954, Revised 1970 Kingman, AZ;NV;CA, 1954, Revised 1969 Las Vegas, NV;AZ;CA, 1954, Revised 1969 Trona, CA, 1954, Revised 1970
- 26 U.S. Geological Survey, 1986. "Greater Exploratory Shaft Area, Yucca Mountain, NV", 1:2,400 scale (2 foot elevation contour interval); produced by USGS Branch of Astrogeology, Flagstaff, Arizona for the U.S. Department of Energy.

TABLE 2-2 REFERENCE AND SOURCE CITATIONS FOR GENISES DATA

- 27 Digital elevation contours (10 foot intervals) were generated in 1991 for an area covering the Repository Block Area. An index map has been prepared to show the areal extent and sheet boundaries for these contour maps.
  
- 28 U.S. Geological Survey, National Mapping Program. "Digital Line Graphs from 1:24,000 Scale Maps", Hypsography (20 foot elevation contours). Topopah Spring NW, Nevada, 1961. Topopah Spring, Nevada, 1961. Crater Flat, Nevada, 1986, Provisional. Busted Butte, Nevada, 1961, Photo-revised 1983. Jackass Flats, Nevada, 1961, Photo-revised 1983. Ashton, Nevada, 1987, Provisional. Big Dune, Nevada, 1986, Provisional. Amargosa Valley, Nevada, 1961, photo-revised 1983. Striped Hills, Nevada, 1961, photo-revised 1983.
  
- Digital elevation contours at twenty foot intervals were generated in 1991 for an area covering the near-field study area. An index map has been prepared to show the areal extent and sheet boundaries for these contour maps.
  
- 29 U.S. Geological Survey, National Mapping Program. "Digital Line Graphs from 1:24,000 Scale Maps", Hypsography (40 foot elevation contours). Beatty Mountain, Nevada, 1987, Provisional. East of Beatty Mountain, Nevada, 1987, Provisional. Carrara Canyon, Nevada, 1981, Provisional.
  
- 30 U.S. Geological Survey, 1985. "Topographic Maps of Yucca Mountain Area, Nye County, Nevada", 1:5,000 scale (two meter elevation contours); produced by USGS Branch of Astrogeology for the U.S. Department of Energy.
  
- 31 U.S. Geological Survey 30 x 60 Minute Series Topographic Quadrangle Map, 1986, 1:100,000 Scale Metric, Beatty, Nevada-California; Contour interval 50 meters (manually digitized).
  
- 32 U.S. Geological Survey, "1:250,000 Scale Digital Elevation Model (DEM) Data", produced by the Defense Mapping Agency, 10 x 10 blocks:  
 Caliente, NV;UT, 1954, Revised 1970 Death Valley, CA;NV, 1954, Revised 1970 Goldfield, NV;CA, 1954, Revised 1970 Las Vegas, NV;AZ;CA, 1954, Revised 1969
  
- 33 U.S. Geological Survey, "1:24,000 Scale 7.5-minute Digital Elevation Model Data", 30 meter UTM spacing. Beatty Mountain, Nevada, 1987, Provisional. East of Beatty Mountain, Nevada, 1987, Provisional. Topopah Spring NW, Nevada, 1961. Topopah Spring, Nevada, 1961. Carrara Canyon, Nevada, 1981, Provisional. Crater Flat, Nevada, 1986, Provisional. Busted Butte, Nevada, 1961, Photo-revised 1983. Jackass Flats, Nevada, 1961, Photo-revised 1983. Ashton, Nevada, 1987, Provisional. Big Dune, Nevada, 1986, Provisional. Striped Hills, Nevada, 1961, photo-revised 1983.
  
- 34 Digital elevation models were generated for the near-field study area (1:12,000 scale) from the 1991 orthophotograph process. The DEM has approximately a 250 foot grid.

TABLE 2-2 REFERENCE AND SOURCE CITATIONS FOR GENISES DATA

- 35 Digital elevation models were generated for the Repository Block area (1:6,000 scale) from the 1991 orthophotograph process. The DEM has approximately a 160 foot grid.
- 36 Ackermann, H.D., W.D. Mooney, D.B. Snyder and V.D. Sutton, 1988. "Preliminary Interpretation of Seismic Refraction and Gravity Studies West of Yucca Mountain, Nevada and California", in Carr, M.D. and J.C. Yount (eds), "Short Contributions to the Geology and Hydrology of a Potential Nuclear Waste Site at Yucca Mountain, Southern Nevada", U.S. Geological Survey Bulletin 1790, p. 23-33.  
  
Hoffman, L.R. and W.D. Mooney, 1983. "A Seismic Study of Yucca Mountain and Vicinity, Southern Nevada: Data Report and Preliminary Results", U.S. Geological Survey Open File Report 83-588, 50 pages, 1 plate.  
  
Pankratz, L. W., 1982. "Reconnaissance Seismic Refraction Studies at Calico Hills, Wahmonie, and Yucca Mountain: Southwest Nevada Test Site, Nye County, Nevada". USGS-OFR-82-478, Figure 8.
- 37 McGovern, T.F., 1983. "Evaluation of Seismic Reflection Studies in the Yucca Mountain Area, Nevada Test Site". USGS-OFR-83-912, Figure 1A.  
  
Serpa, L., B. de Voogd, L. Wright, J. Willemin, J. Oliver, E. Hauser, and B. Troxel, 1988. "Structure of the Central Death Valley Pull-Apart Basin from COCORP Profiles in the Southern Great Basin", Geological Survey of America Bulletin, V. 100, P. 1437-1450.
- 38 Hoover, D.B., W.F. Hanna, L.A. Anderson, V.J. Flanigan, and L.W. Pankratz, 1982. "Geophysical Studies of the Syncline Ridge Area Nevada Test Site, Nye County, Nevada", U.S. Geological Survey Open File Report 82-145.  
  
Hoover, D.B., M.P. Chornack, K.H. Nervick, and M.M. Broker, 1982. "Electrical Studies at the Proposed Wahmonie and Calico Hills Nuclear Waste Sites, Nevada Test Site, Nye County, Nevada", U.S. Geological Survey Open File Report 82-446.
- 39 Senterfit, R.M., D.B. Hoover, and M.P. Chornack, 1982. "Resistivity Sounding Investigation by the Schlumberger Method in the Yucca Mountain and Jackass Flats Area, Nevada Test Site, Nevada", U.S. Geological Survey Open File Report 82-1043. Smith, C., and H.P. Ross, 1982. "Interpretation of Resistivity and Induced Polarization Profiles with Sever Topographic Effects, Yucca Mountain Area, Nevada Test Site, Nevada", U.S. Geological Survey Open File Report 82-182.  
  
Ross, H.P., and J. Lunbeck, 1978. "Interpretation of Resistivity and Induced Polarization Profiles, Calico Hills and Yucca Mountain Areas, Nevada Test Site", University of Utah Research Institute Report ESI-UURI-8.

TABLE 2-2 REFERENCE AND SOURCE CITATIONS FOR GENISES DATA

- Frischknecht, F.C. and P.V. Raab, 1984. "Time Domain Electromagnetic Soundings at the Nevada Test Site, Nevada", Geophysics, V. 49, N. 7, July 1984, P. 981-992.
- 40 Greenhaus, M.R. and C.J. Zablocki, 1982. "A Schlumberger Resistivity Survey of the Amargosa Desert, Southern Nevada", U.S. Geological Survey Open File Report 82-897.
- 41 Scott, R.B., and J. Bonk, 1984. "Preliminary Geologic Map of Yucca Mountain, Nye County, Nevada With Geologic Cross Sections". USGS-OFR-84-494, 1:12,000 scale.
- Christiansen, R.L. and P.W. Lipman, 1965. "Geologic Map of the Topopah Spring NW Quadrangle, Nye County, Nevada", U.S. Geological Survey Geologic Quadrangle Map GQ-444, Scale 1:24,000. Not all faults are digitized for this map.
- Lipman, P.W. and E.J. McKay, 1965. "Geologic Map of the Topopah Spring SW Quadrangle, Nye County, Nevada". U.S. Geological Survey Geologic Quadrangle Map GQ-439, Scale 1:24,000. Not all faults are digitized for this map.
- 42 Scott, R.B., and J. Bonk, 1984. "Preliminary Geologic Map of Yucca Mountain, Nye County, Nevada With Geologic Cross Sections". USGS-OFR-84-494, 1:12,000 scale.
- 43 Scott, R.B., and J. Bonk, 1984. "Preliminary Geologic Map of Yucca Mountain, Nye County, Nevada With Geologic Cross Sections". USGS-OFR-84-494, 1:12,000 scale.
- 44 Scott, R.B., and J. Bonk, 1984. "Preliminary Geologic Map of Yucca Mountain, Nye County, Nevada With Geologic Cross Sections". USGS-OFR-84-494, 1:12,000 scale.
- 45 Scott, R.B., and J. Bonk, 1984. "Preliminary Geologic Map of Yucca Mountain, Nye County, Nevada With Geologic Cross Sections". USGS-OFR-84-494, 1:12,000 scale.
- 46 U.S. Geological Survey, 1970. "National Atlas of the United States of America", Digital Line Graphs at 1:2,000,000 scale. 47 U.S. Department of Commerce, Bureau of the Census, 1990. "Topologically Integrated Geographic Encoding and Referencing System - TIGER database. Digital database for the entire US containing hydrographic features at a 1:100,000 scale.
- 48 U.S. Geological Survey, National Mapping Program. "Digital Line Graphs from 1:24,000 Scale Maps", Hydrography. Beatty Mountain, Nevada, 1987, Provisional. East of Beatty Mountain, Nevada, 1987, Provisional. Topopah Spring NW, Nevada, 1961. Topopah Spring, Nevada, 1961. Carrara Canyon, Nevada, 1981, Provisional. Crater Flat, Nevada, 1986, Provisional. Busted Butte, Nevada, 1961, Photo-revised 1983. Jackass Flats, Nevada, 1961, Photo-revised 1983. Ashton, Nevada, 1987, Provisional. Big Dune, Nevada, 1986, Provisional. Amargosa Valley, Nevada, 1961, photo-revised 1983.

TABLE 2-2 REFERENCE AND SOURCE CITATIONS FOR GENISES DATA

Striped Hills, Nevada, 1961, photo-revised 1983.

- 49 United States Geological Survey, 1983. "Map Showing Approximate Flood Prone Areas, Fortymile Wash And Its Principal Southwestern Tributaries, Nevada Test Site, Southern Nevada". From Water Resources Investigation Report 83-4001 (Plate 1); Hydrology mapped by R.R. Squires and R.L. Young, 1982.
- 50 United States Geological Survey, 1983. "Map Showing Approximate Flood Prone Areas, Fortymile Wash And Its Principal Southwestern Tributaries, Nevada Test Site, Southern Nevada". From Water Resources Investigation Report 83-4001 (Plate 1); Hydrology mapped by R.R. Squires and R.L. Young, 1982.
- 51 United States Geological Survey, 1983. "Map Showing Approximate Flood Prone Areas, Fortymile Wash And Its Principal Southwestern Tributaries, Nevada Test Site, Southern Nevada". From Water Resources Investigation Report 83-4001 (Plate 1); Hydrology mapped by R.R. Squires and R.L. Young, 1982.
- 52 Division of Water Resources, State Engineers Office, 1971. Compiled by F.E. Rush, B.R. Scott, A.S. Van Denburgh and B.J. Vasey. "State of Nevada Water Resources and Inter-Basin Flows". An area covering from 117o 00' 00" 36o 00' 00" to 115o 00' 00" 38o 00' 00" was manually digitized.
- 53 Proposed water-level monitoring and spring-discharge monitoring site locations were derived from coordinate data as reported by Walker and Eakin, 1963; Thordarson, 1967; Johnston, 1968; and Dudley and Larson, 1976.
- 54 Waddell, R.K., J.H. Robison, and R.K. Blankennagel, 1984. "Hydrology of Yucca Mountain and Vicinity, Nevada-California, Investigation Results Through Mid-1983". U.S. Geological Survey Water Resources Division Report 84-4267, Plate 3 "Potentiometric Map of Candidate Area and Geologic Section, Nevada-California".
- 55 EG&G Energy Measurements, Inc., Environmental Sciences Department, 1989. "Tortoise Sign Location Map", EG&G/EM-NTS-EES-MAP-360.
- 56 Collins, E., and T.P. O'Farrell, 1985. "1984 Biotic Studies of Yucca Mountain, Nevada Test Site, Nye County, Nevada". U.S. Department of Energy Topical Report, EG&G/EM Santa Barbara Operations Report No. 1183-2057.
- O'Farrell, T.P. and E. Collins, 1984. "1983 Biotic Studies of Yucca Mountain, Nevada Test Site, Nye County, Nevada". U.S. Department of Energy Topical Report, EG&G/EM Santa Barbara Operations Report No. 10282-2031.
- O'Farrell, T.P. and E. Collins, 1983. "1982 Biotic Survey of Yucca Mountain, Nevada Test Site, Nye County, Nevada". U.S. Department of Energy Topical Report, EG&G/EM Santa Barbara Operations Report No. 10282-2004.

TABLE 2-2 REFERENCE AND SOURCE CITATIONS FOR GENISES DATA

- EG&G Energy Measurements, Inc., Environmental Sciences Department, 1989.  
"Tortoise Sign Location Map", EG&G/EM-NTS-EES-MAP-360.
- 57 Science Applications International Corporation, 1988. Small mammal trapline sampling locations were provided by J.K Prince. Locations were drafted onto a full scale (1:12,000 scale) copy of the Scott and Bonk, 1984 preliminary geologic map of Yucca Mountain.
- 58 EG&G Energy Measurements, Inc, Environmental Studies Department, 1989.  
"Proposed Lagomorph Transect Cluster A & B Locations for Yucca Mountain Project", drafted onto USGS 1:24,000 scale 7.5' topographic quadrangle, Busted Butte, Nev.
- EG&G Energy Measurements, Inc, Environmental Studies Department, 1989.  
"Proposed Lagomorph Transect Cluster C Locations for Yucca Mountain Project", drafted onto USGS 1:24,000 scale 7.5' topographic quadrangle, Crater Flat, Nev.
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"Proposed Scent-Station Route C and Locations for Yucca Mountain Project", drafted onto USGS 1:24,000 scale 7.5' topographic quadrangle, Crater Flat, Nev.
- 60 U.S. Department of Energy. 1991. Yucca Mountain Site Characterization Project Environmental Field Activity Plan for Terrestrial Ecosystems. Draft Report No. YMP/91-41.
- 61 Szabo, B.J., W.J. Carr, and W.C. Gottschall. 1981. Uranium Thorium Dating of Quaternary Carbonate Accumulations in the Nevada Test Site Region, Southern Nevada. U.S. Geological Survey Open-File Report 81-119. 35p.
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- 62 Spaulding, W.G. 1983. Vegetation and Climates of the Last 45,000 Years in the Vicinity of the Nevada Test Site, South-Central Nevada. U.S. Geological Survey Open-File Report 83-535. 199p.
- 63 Spaulding, W.G. 1983. Vegetation and Climates of the Last 45,000 Years in the Vicinity of the Nevada Test Site, South-Central Nevada. U.S. Geological Survey Open-File Report 83-535. 199p.
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TABLE 2-2 REFERENCE AND SOURCE CITATIONS FOR GENISES DATA

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- 65 Henne, M.S. 1982. The Dissolution of Rainier Mesa Volcanic Tuffs and its Application to the Analyses of the Groundwater Environment. Unpublished MS thesis, University of Nevada, Reno.
  - Russell, C. Hydrological Investigations of Flow in Fractured Tuff, Rainier Mesa, Nevada Test Site. Desert Research Institute, Water Resources Center Report No. 40572.
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  - 66 Ramirez, A.L. and W.D. Daily. 1984. Preliminary Evaluation of Alterant Geophysical Tomography in Welded Tuff. Lawrence Livermore National Laboratory Report UCID-20289, 39p.
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  - 67 Czarnecki, J.B. 1987. Research Files Dealing with the Regional Groundwater Flow System Investigations. U.S. Geological Survey unpublished data.
  - 68 Lee, J. Computer data files dealing with seismic monitoring data associated with weapons testing at the NTS, Sandia National Laboratory, unpublished data Seismic Monitoring Network
  - 69 Rogers, A.M., S.C. Harmsen, W.J. Carr, and W. Spence. 1983. Southern Great Basin Seismological Data Report for 1981 and Preliminary Data Analysis. U.S. Geological Survey Open-File Report 83-669. 240p.
  - 70 Hoffman, L.R. and W.D. Mooney. 1983. A seismic Study of Yucca Mountain and Vicinity, Southern Nevada: Data Report and Preliminary Results. U.S. Geological Survey Open-File Report 83-588. 1 plate, 50p.
  - Sutton, V.D. 1985. Data Report for the 1985 Seismic Refraction Experiment at Yucca Mountain and Vicinity, Southwestern Nevada. U.S. Geological Survey Open-File Report 85-591, 17 plates, 96p.
  - 71 Bath, G.D. and C.E. Jahren. 1985. Investigations of an Aeromagnetic Anomaly on West Side of Yucca Mountain, Nye County, Nevada. U.S. Geological Survey Open-File Report 85-459, 24 p.
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TABLE 2-2 REFERENCE AND SOURCE CITATIONS FOR GENISES DATA

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- 73 Harris, R.N., D.A. Ponce, D.L. Healey, and H.W. Oliver. 1989. Principal Facts for About 16,000 Gravity Stations in the Nevada Test Site and Vicinity. U.S. Geological Survey Open-File Reports 89-682A, 89-682B, 89-682C.
- 74 Fitterman, D.V. 1982. Magnetometric Resistivity Survey Near Fortymile Wash, Nevada Test Site, Nevada. U.S. Geological Survey Open-File Report 82-401, 27p.
- 75 Glanzman, V.M. 1991. Bibliography of Publications Related to the Yucca Mountain Site Characterization Project Prepared by U.S. Geological Survey Personnel Through April 1991. U.S. Geological Survey Open-File Report 91-341. 52p.
- 76 Mueller, J. 1991. EG&G/EM Santa Barbara Operations Yucca Mountain Biological Resources Monitoring Program Annual Report, FY91. p. 45-48.

### 3.0 SIGNIFICANT ACTIVITIES THIS QUARTER

#### 3.1 Data Added During 7/91 - 12/91:

PARTICIPANT	CITATION	TITLE
EG&G/EM	60	Ecological Sampling Plots
USGS	61	Uranium Series Dating
USGS	62	Fossil Woodrat Midden Locations
USGS	63	Paleoclimate Data
DRI	64	Springs and Wells Data
DRI	65	Groundwater Recharge Monitoring Stations
LLNL/SNL	66	G-Tunnel Locations
USGS	67	Groundwater Observation Wells
SNL	68	Seismic Monitoring Stations
USGS	69	Seismic Monitoring Network
USGS	70	Seismic Refraction Shotpoint and Geophone Locations
USGS	71	Magnetic Air and Ground Traverses
USGS	72	Magnetic Survey
USGS	73	Gravity Station locations
USGS	74	Magnetometric Resistivity Survey Locations
USGS	75	Index maps for bedrock geology, surface geology, aeromagnetic surveys and gravity surveys
EG&G	76	Raven Survey Routes

#### 3.2 Requested and Delivered Products (7/91 - 12/91)

PRODUCT NUMBER	TITLE	REQUESTOR
YMP-90-009.1	Meteorological Monitoring Sites	Handy/USGS
YMP-90-022.2	YMP Existing Drillholes	Handy/USGS
YMP-90-027.1	Existing Drilling Program	Handy/USGS

YMP-90-028.1	Proposed Drilling Program	Handy/USGS
YMP-90-030.1	Potentiometric Map of YMP and Vicinity	Handy/USGS
YMP-90-056.1	1:6,000 Scale Orthophoto Sheet Index	Handy/USGS
YMP-91-001.1	YMP Flood-Prone Areas	Handy/USGS
YMP-91-008.2	1:6,000 & 1:12,000 Scale Orthophoto Index	Handy/USGS
YMP-91-025.1	YMP Existing Drillholes and Subsurface Access Drifts	Stanley/RSN
YMP-91-026.1	YMP Proposed Drillholes and Subsurface Access Drifts	Stanley/RSN
YMP-91-031.1	YMP Regional Area Map	Wadkins/SAIC
YMP-91-032.1	YMP Site Map	Wadkins/SAIC
YMP-91-033.1	YMP Calico Hills Level Plan	Baird/SAIC
YMP-91-034.1	YMP Potential Repository Level Plan	Baird/SAIC
YMP-91-031.1	YMP Regional Area Map	Wadkins/SAIC
YMP-91-032.1	YMP Site Map	Wadkins/SAIC
YMP-91-035.1	Exploratory Studies Facility	Wadkins/SAIC
YMP-91-008.1	1:12,000 Scale Orthophoto Index	Newbury/YMPO
YMP-91-008.2	1:12,000 & 1:6,000 Scale Orthophoto Index	Newbury/YMPO
YMP-91-008.3	1:6,000 Scale Orthophoto Index	Newbury/YMPO
YMP-91-031.1	YMP Regional Area Map	Wadkins/SAIC
YMP-91-032.1	YMP Site Map	Wadkins/SAIC
YMP-91-043.2	Subsurface Facility Conceptual Design Drillhole Interference	White/YMPO
YMP-91-030.4	YMP Existing Drillholes	White/YMPO
YMP-91-033.2	YMP Calico Hills Level Plan	Baird/SAIC
YMP-91-034.4	YMP Potential Repository Level Plan	Baird/SAIC
YMP-91-022.1	YMP Existing Drillholes	Davis/SAIC
YMP-91-023.1	YMP Proposed Drillholes	Davis/SAIC

YMP-91-008.2	1:12,000 & 1:6,000 Scale Orthophoto Index	Davis/SAIC
YMP-91-025.1	Existing Drillholes	Davis/SAIC
YMP-91-026.1	Proposed Drillholes	Davis/SAIC
YMP-91-037.1	YMP Areas of Interest	Cikanek/Harza
YMP-91-038.1	Proposed Excavations, SNL Midway Valley Studies	Sullivan/YMPO
YMP-91-031.1	YMP Regional Area Map	Wadkins/SAIC
YMP-91-032.1	YMP Site Map	Wadkins/SAIC
YMP-91-033.2	YMP Calico Hills Level Plan	Baird/SAIC
YMP-91-034.2	YMP Potential Repository Level Plan	Baird/SAIC
YMP-91-001.3	YMP Flood-prone Areas	Fasano/SAIC
YMP-91-008.3	YMP 1:6,000 Scale Orthophoto Index	Tipton/SNL
YMP-91-030.1	Potentiometric Map of Yucca Mountain and Vicinity	Shenk/SAIC
YMP-91-008.2	1:12,000 & 1:6,000 Scale Orthophoto Index	Distel/M&O
YMP-91-011.1		Distel/M&O
YMP-91-020.1	YMP Existing Activities	Distel/M&O
YMP-91-021.1	YMP Proposed Activities	Distel/M&O
YMP-91-025.1	YMP Existing Drillholes and Subsurface Access Drifts	Distel/M&O
YMP-91-026.1	YMP Proposed Drillholes and Subsurface Access Drifts	Distel/M&O
YMP-91-008.1	1:12,000 Scale Orthophoto Index	Beck/USGS
YMP-91-008.2	1:12,000 and 1:6,000 Scale Orthophoto Index	Beck/USGS
YMP-91-008.3	1:6,000 Scale Orthophoto Index	Beck/USGS
YMP-91-057.4	Regional Water Level and Spring Discharge Monitoring Sites (mylar)	Fasano/SAIC
YMP-91-039.1	YMP Environmental Sampling Locations	Ostler/EG&G

	and Existing Activities	
YMP-91-040.1	YMP Environmental Sampling Locations and Proposed Activities	Ostler/EG&G
YMP-91-041.1	YMP Environmental Sampling Locations	Ostler/EG&G
YMP-91-039.1	YMP Environmental Sampling Locations and Existing Activities	Pysto/SAIC
YMP-91-040.1	Environmental Sampling Locations and Proposed Activities	Pysto/SAIC
YMP-91-041.1	YMP Environmental Sampling Locations	Pysto/SAIC
YMP-91-039.1	YMP Environmental Sampling Locations and Existing Activities	Ryder/YMPO
YMP-91-040.1	YMP Environmental Sampling Locations and Proposed Activities	Ryder/YMPO
YMP-91-041.1	YMP Environmental Sampling Locations	Ryder/YMPO
YMP-91-042.1	YMP Subsurface Facility Conceptual Design Drillhole Interference	Newbury/YMPO
YMP-91-041.1	YMP Environmental Sampling Locations	Newbury/YMPO
YMP-91-025.1	YMP Existing Drillholes and Subsurface Access Drifts	Oliver/LANL
YMP-91-026.1	YMP Proposed Drillholes and Subsurface Access Drifts	Oliver/LANL
YMP-91-043.1	YMP Subsurface Facility Conceptual Design Drillhole Interference	Newbury/YMPO
YMP-91-042.1	YMP Subsurface Facility Conceptual Design Drillhole Interference	Distel/M&O
YMP-91-043.1	YMP Subsurface Facility Conceptual Design Drillhole Interference	Distel/M&O
YMP-91-055.1	YMP Existing Trench Locations	Davis/YMPO
YMP-91-044.1	YMP Regional Area Map	Wadkins/SAIC
YMP-91-045.1	YMP Site Map	Wadkins/SAIC
YMP-91-046.1		Fasano/SAIC
YMP-91-025.1	YMP Existing Drillholes and Subsurface Access Drifts	White/YMPO

YMP-91-026.1	YMP Proposed Drillholes and Subsurface Access Drifts	White/YMPO
YMP-91-045.1	YMP Site Map	Guerin/LATA
YMP-91-046.1		Guerin/LATA
YMP-91-043.1	YMP Subsurface Facility Conceptual Design Drillhole Interference	Braun/MACTEC
YMP-91-037.1	YMP Areas of Interest	Cikanek/HARZA
YMP-90-058.1	Figure 1	Beck/USGS
YMP-90-045.2	Figure 2	Beck/USGS
YMP-90-059.1	Figure 3	Beck/USGS
YMP-90-046.2	Figure 4	Beck/USGS
YMP-90-060.1	Figure 5	Beck/USGS
YMP-91-039.2	YMP Environmental Sampling Locations and Existing Activities	Ostler/EG&G Ryder/YMPO Pysto/SAIC
YMP-91-040.2	YMP Environmental Sampling Locations and Proposed Activities	Ostler/EG&G Ryder/YMPO Pysto/SAIC
YMP-91-041.2	YMP Environmental Sampling Locations	Ostler/EG&G Ryder/YMPO Pysto/SAIC
YMP-91-026.1	YMP Proposed Drillholes and Subsurface Access Drifts	Nance/SAIC
YMP-91-025.1	YMP Existing Drillholes and Subsurface Access Drifts	Sullivan/DOE
YMP-91-026.1	YMP Proposed Drillholes and Subsurface Access Drifts	Sullivan/DOE
YMP-91-026.1	YMP Basemap	Roberson/DOE
YMP-91-025.1	YMP Existing Drillholes and Subsurface Access Drifts	Baird/SAIC
YMP-91-025.1	YMP Existing Drillholes and Subsurface Access Drifts	Brodski/DOE
YMP-91-026.1	YMP Proposed Drillholes and Subsurface Access Drifts	Brodski/DOE

YMP-91-025.1	YMP Existing Drillholes and Subsurface Access Drifts	Beckett/EG&G
YMP-91-026.1	YMP Proposed Drillholes and Subsurface Access Drifts	Beckett/EG&G
YMP-91-039.2	YMP Environmental Sampling Locations and Existing Activities	Distel/M&O
YMP-91-040.2	YMP Environmental Sampling Locations and Proposed Activities	Distel/M&O
YMP-91-041.2	YMP Environmental Sampling Locations	Distel/M&O
YMP-91-041.2	YMP Environmental Sampling Locations	Nance/SAIC
YMP-91-039.2	YMP Environmental Sampling Locations and Existing Activities	Pysto/SAIC
YMP-91-030.1	YMP Potentiometric Map of Yucca Mountain and Vicinity	Newbury/YMPO
YMP-91-056.1	Water Table Boreholes	Newbury/YMPO
YMP-91-055.1	1:12,000 Scale Geology from Scott and Bonk, Midway Valley	Coppage/RSN
YMP-91-061.1	Basemap for Six Month Update Publication	Bjerstedt/YMPO
YMP-91-062.1	YMP Location of Proposed Volcanic Exploratory Drillholes	Morley/LANL
YMP-91-005.1	Roads Approved for Use Based on Completed Desert Tortoise Surveys	Bessent/RSN
YMP-91-025.1	Existing Drillholes and Subsurface Access Ramps	Kistler/EG&G
YMP-91-026.1	Proposed Drillholes and Subsurface Access Ramps	Kistler/EG&G
YMP-91-005.1	Roads Approved for Use Based on Completed Desert Tortoise Surveys	Pysto/SAIC
YMP-91-039.2	YMP Environmental Sampling Locations and Existing Activities	Pysto/SAIC
YMP-91-040.2	YMP Environmental Sampling Locations and Proposed Activities	Pysto/SAIC
YMP-91-041.2	Environmental Sampling Locations	Pysto/SAIC
YMP-91-062.1	YMP Location of Proposed Volcanic	Morley/LANL

# Exploratory Drillholes (REV)

YMP-90-037.1	Primary and Secondary Areas for the Debris-Transport Activity	Simms/SAIC
YMP-89-013.1	YMP Site Meteorological & Precipitation Streamflow Monitoring Networks	Simms/SAIC
YMP-91-073.1	YMP Existing and Proposed Drillholes within 5000 ft. Buffer of UE-25 VSP-2 (UZ-16) and USW UZP-6	Newbury/YMP
YMP-91-045.3	Complete-record and Crest Stage-partial Record Station Locations	Johnson/USGS
YMP-91-046.3	Precipitation Gaging Station Locations	Johnson/USGS
YMP-91-060.2	Weather Service Nuclear Support Office and Precipitation Gaging Station Locations	Johnson/USGS
YMP-91-057.1	1:6,000 Scale Geology from Scott and Bonk with Existing Drillholes, Midway Valley North	Coppage/RSN
YMP-91-058.1	1:6,000 Scale Geology from Scott and Bonk with Existing Drillholes, Midway Valley South	Coppage/RSN
YMP-91-068.1	Top of Prow Pass Tuff (South)	Fridrich/YMPO
YMP-91-069.1	Top of Calico Hills Tuff (South)	Fridrich/YMPO
YMP-91-070.1	Top of Topopah Springs Tuff (South)	Fridrich/YMPO
YMP-91-071.1	Base of Tiva Canyon Tuff (South)	Fridrich/YMPO
YMP-91-072.1	Base of Caprock of the Tiva Canyon Tuff (South)	Fridrich/YMPO
YMP-90-045.3	Complete Record and Crest Stage Partial Record Stations	Johnson/USGS
YMP-91-075.1	YMP, Tortoise Study Areas	Rautenstrauch/EG&G
NTS-90-027.1	Northern Extent of Tortoise Sign	Rautenstrauch/EG&G
YMP-91-076.1	YMP, Existing Drillholes and Trenches within One Mile Radius Buffer of UE-25 VSP-2 (UZ-16)	Pysto/SAIC
YMP-91-053.1	YMP, New Activities This Report	Bjerstedt/YMPO
YMP-91-061.1	YMP, New Activities This Report (Near Field)	Bjerstedt/YMPO



YMP-91-074.1	YMP, Desert Tortoise Sightings During FY91	Rautenstrauch/EG&G
YMP-91-008.2	1:12,000 & 1:6,000 Scale Orthophoto Index	Fahy/BofR
YMP-91-081.1	Radiological Studies	Cox/EG&G
YMP-91-082.1	Ecological Studies	Cox/EG&G
YMP-91-049.1	YMP, Existing Drillholes 1978-1986	Bjerstedt/YMPO
YMP-91-050.1	YMP, Proposed Drillholes in Site Characterization Plan	Bjerstedt/YMPO
YMP-91-079.1	Yucca Mountain Raven Survey Routes	Mueller/EG&G
YMP-91-080.1	Control Raven Survey Routes	Mueller/EG&G
YMP-91-077.1	Tortoise Sightings Along Roads at Yucca Mountain	Rautenstrauch/EG&G
YMP-91-045.3	Complete Record and Crest Stage Partial Record Station and Station Number	Handy/USGS
YMP-91-046.3	Precipitation Gaging Station and Site Identification	Handy/USGS
YMP-91-049.1	Existing Drillholes	Handy/USGS
YMP-91-050.1	Proposed Drillholes	Handy/USGS
YMP-91-054.1	20-foot Topographic Contour Map	Handy/USGS
YMP-91-055.1	1:12,000 Scale Geology Map from Scott and Bonk, Midway Valley	Handy/USGS
YMP-91-056.1	Water Table Boreholes	Handy/USGS
YMP-91-057.1	1:6,000 Scale Geology from Scott and Bonk with Existing Drillholes; Midway Valley North	Handy/USGS
YMP-91-058.1	1:6,000 Scale Geology from Scott and Bonk with Existing Drillholes; Midway Valley South	Handy/USGS
YMP-91-059.1	Environmental Sampling Locations and Existing Activities	Handy/USGS
YMP-91-060.1	Environmental Sampling Locations with 200 Meter Buffer and Proposed Activities	Handy/USGS

YMP-91-060.2	Weather Service Nuclear Support Office and Precipitation Gaging Station and Site Identification	Handy/USGS
YMP-91-061.1	Basemap for Six Month Update Publication	Handy/USGS
YMP-91-062.1	Location of Proposed Volcanic Exploratory Drillholes	Handy/USGS
YMP-91-073.1	Existing and Proposed Drillholes within 500 ft. Buffer of UE-25 VSP-2 (UZ-16) and USW UZP-6	Handy/USGS
YMP-91-063.1	Top of the Prow Pass Tuff (North)	Handy/USGS
YMP-91-064.1	Top of the Calico Hill Tuff (North)	Handy/USGS
YMP-91-065.1	Top of the Topopah Springs Tuff (North)	Handy/USGS
YMP-91-066.1	Base of the Tiva Tuff (North)	Handy/USGS
YMP-91-067.1	Base of the Cap of the Tiva Canyon Tuff (North)	Handy/USGS
YMP-91-073.1	YMP Existing and Proposed Drillholes within 500 ft. Buffer of UE-25 VSP-2 (UZ-16) and USW USP-6	Lugo/SAIC

### 3.3 EG&G/EM RSL YMP Support Office

During this quarter the EG&G/EM RSL YMP Support Office was established at the Valley Bank Center, 101 Convention Center Drive. The YMP Support Office staff includes: Elaine Ezra (Office Manager), Jim Beckett (TDB Administrator), Dave Brickey (Geoscience Task Leader), Barbara Kistler (Site Atlas Task Leader) and Steve Kowalkowski (Analyst). Susan Rohde (Map Coordinator) coordinates the YMP map production activities conducted at the RSL Nellis Facility.

The YMP Support Office will allow easy access to the GENISES database by Project participants. Analysts trained in spatial analysis will be available to facilitate interactive sessions for Participants not well versed in GIS technology.

## 4.0 UPCOMING MAJOR ACTIVITIES

### 4.1 EG&G/EM RSL YMP Support Office

The YMP Support Office baseline computer hardware/software has been received and will be fully implemented during the next quarter. Two UNIX workstations with ARC/INFO and INGRES software packages have been installed and are operational. A large format digitizing tablet has also been installed and is operating. The large format B&W plotting device has been received, and will be installed and integrated into the system during the next quarter.

### 4.2 The Geographic Nodal Information Study and Evaluation System (GENISES) Database.

The Development Plan for the GENISES database will be drafted. The Development Plan addresses the approach and schedule for the following database design phases: Needs Assessment; Conceptual Design; Physical Design; Pilot Study; Implementation; and Operational. The GENISES pilot study was initiated and will be completed during the next quarter.

### 4.3 Site Atlas Map Portfolio

A revised version of the YMP Site Atlas is currently underway. A design for the Site Atlas Map Portfolio has been completed. The first version of the Site Atlas map portfolio will be completed during the next quarter.

**APPENDIX GENISES-A**

**YMP GENISES WORK REQUEST  
FORM**

BLANK WORK REQUEST FORM



YMP GENISES WORK REQUEST

SEND TO:

GENISES Technical Database Administrator  
RSL YMP Support Office  
EG&G Energy Measurements, Inc.  
P.O. Box 1912, M/S V-02  
Las Vegas, Nevada 89125  
Telephone: FTS 544-7448 FAX: FTS 544-7469

To be completed by GENISES Database Personnel:

Request No: \_\_\_\_\_  
Job No: \_\_\_\_\_  
Date requested: \_\_\_\_\_

TO BE COMPLETED BY THE REQUESTOR:

DATE: \_\_\_\_\_

NAME \_\_\_\_\_ SIGNATURE \_\_\_\_\_

ORGANIZATION: \_\_\_\_\_ TELEPHONE: \_\_\_\_\_

ADDRESS \_\_\_\_\_

PURPOSE OF REQUESTED DATA: \_\_\_\_\_

IS THE PRODUCT QUALITY-AFFECTING? \_\_\_\_\_ DATE DUE \_\_\_\_\_

COMMENTS (If the request is for copies of existing maps or reports, the requestor should provide the EG&G EM map reference number located in the lower right corner of all map products. If this is a request for a new product or modification to an existing product, please describe desired product or modification and include any QA requirements, drawings, maps, or listings, as appropriate.)

PRODUCT FORMAT:

HARDCOPY: \_\_\_\_\_ NUMBER OF COPIES: \_\_\_\_\_ MAP SIZE OR SCALE: \_\_\_\_\_

DIGITAL: \_\_\_\_\_ OS: \_\_\_\_\_ FILE FORMAT: \_\_\_\_\_ MEDIA: \_\_\_\_\_

To be completed by GENISES Database Personnel

RECEIVED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

ASSIGNED TO: \_\_\_\_\_ DATE: \_\_\_\_\_

VERIFIED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

APPROVED BY: \_\_\_\_\_ DATE: \_\_\_\_\_

PRODUCT OR ACCESSION NUMBERS: \_\_\_\_\_

VM50-001

WHITE: Original

YELLOW: MRSD Copy

PINK: Analyst Copy

GOLDENROD: Originator Record Copy

GENISES-A1

# **THE GEMBOCHS DATABASE AND SOFTWARE LIBRARY**

## **YMP-TDB QUARTERLY REPORT**

**JAMES W. JOHNSON AND SUZANNE R. LUNDEEN**

**EARTH SCIENCES DEPARTMENT, L-219  
LAWRENCE LIVERMORE NATIONAL LABORATORY  
LIVERMORE, CA 94550**

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APPENDIX D: GEMBOCHS Audit Table: DATAO Suite R9 to R10	GEMBOCHS-D1

## Overview of the GEMBOCHS Database and Software Library

The GEMBOCHS (Geologic and Engineering Materials: Bibliography Of Chemical Species) database contains compositional and thermodynamic data for over 2000 chemical species, including virtually all endemic and potential contaminant species relevant to Yucca Mountain. These data, retrieved from an extensive literature search during the past decade (Appendix A), represent a fundamental component of our ability to quantitatively predict the chemical consequences of irreversible fluid-rock reactions that may occur within the post-emplacement repository environment at Yucca Mountain. Other fundamental components of this predictive capability include the various theoretical models used to represent (1) the thermodynamic behavior of chemical species as a function of temperature (T) and pressure (P), (2) the equilibrium distribution of elemental mass among coexisting species as a function of T, P, and bulk composition, and (3) the redistribution of this mass among these species as a function of imposed chemical and/or thermal disequilibrium. Each of these successive models is inherently dependent upon each of its predecessors: e.g., the calculations involved in model (3) require as input the results of models (1)-(2), which in turn are dependent on GEMBOCHS data. The Database Development Task at LLNL maintains and develops GEMBOCHS as well as an extensive software library, which includes a suite of routines that implement model (1) above. The EQ3/6 Code Development Task, also at LLNL, maintains and develops the EQ3/6 software package, which facilitates practical application of models (2) and (3) to address geochemical problems.

GEMBOCHS is a relational database that resides in the Database Development Task's local installation of the Ingres relational database management system. Formal requests for changes or additions to GEMBOCHS can be submitted by contacting the GEMBOCHS database administrator via the standard electronic mail system (see below); such requests require concomitant submittal of a TDIF and Data Transmittal Package in accordance with YMPO AP-5.2Q. These change requests are processed locally using CNGBOCHS, an interactive code that can be viewed as an automated tracking and filing system for the requests as they are reviewed and resolved. Modifications and additions to GEMBOCHS are incorporated locally using DBAPP, an interactive program that interfaces the user with GEMBOCHS tables, permits selected users having password-restricted access to update the tabulated data, and automatically reports these updates to a dedicated audit table.

The software interface between GEMBOCHS and the EQ3/6 modeling package consists of two programs: DDOUT and EQPT. DDOUT accesses data for the user-specified subset of GEMBOCHS species, calculates aqueous dissociation constants for these species as a function of T and P using the theoretical models noted in (1) above, and generates the DATAO file - a formatted ASCII file that contains all data explicitly required by the EQ3/6 package as well as many other data of interest to EQ3/6 users. EQPT reads the DATAO file, fits the aqueous dissociation-constant grids to interpolating polynomials, and writes the calculated polynomial coefficients together with all other required data to the DATA1 file - an unformatted file that is read directly by EQ3 and EQ6.



It is important to emphasize the fact that GEMBOCHS itself cannot be interfaced directly with EQ3/6 or any other alternate geochemical modeling package; a software pipe, DOOUT-EQPT or one of their derivative analogs, is always required. Of course, this requirement is actually advantageous: it ensures the continued versatility and integrity of GEMBOCHS data because (1) GEMBOCHS is not structurally tied to any one geochemical modeling code, (2) DOOUT-EQPT clones that interface GEMBOCHS with new modeling software are readily developed, and (3) GEMBOCHS itself is not modified when generating such clones.

The following report provides a summary of GEMBOCHS database contents, describes the major programs contained in the GEMBOCHS software library, discusses the use of GEMBOCHS by YMP participants, outlines the procedure by which these participants may request modifications to GEMBOCHS, and tabulates all such modifications incorporated during the 3rd quarter, 1991. First, however, a few words summarizing the association between GEMBOCHS (i.e., the LLNL Database Development Task) and YMP participants that use this database.

#### **The GEMBOCHS-YMP Association**

The LLNL Database Development Task has been funded, at various levels of support, by the YMP and its predecessors (NNWSI, etc.) from FY82 to the present. This continuous funding has reflected the critical, ongoing dependence of other project participants on maintaining and developing GEMBOCHS (which in the past has been referred to as the LLNL Thermochemical Database, MDAIN, etc.). This dependence on GEMBOCHS is primarily through its use with the EQ3/6 modeling package, which has also been funded by these projects. Current YMP-sponsored research activities that depend heavily on the continued availability of GEMBOCHS and EQ3/6 include modeling of ion-exchange processes associated with fluid-zeolite interactions (B. Viani, C. Bruton, LLNL), experimental studies of glass wasteform dissolution (W. Bourcier, LLNL), and numerical simulation of groundwater chemistry at Yucca Mountain within the pre- and potential post-emplacement environment (W. Steinkampf, USGS; M. Ebinger, LANL). Other DOE-sponsored activities that use GEMBOCHS and EQ3/6 extensively include ongoing environmental remediation projects at Fernald, OH (contact: J. Carr, DOE) and Rocky Flats, CO (contact: D. Simonson, DOE) and studies of brine chemistry associated with the WIPP project (contact: L. Brush, DOE).

#### **The GEMBOCHS Database: Summary of Contents**

The particular collection of thermodynamic data and associated regression coefficients (equation-of-state parameters, heat capacity coefficients, etc.) required by a specific geochemical modeling code varies somewhat as a function of the processes being modeled and the theory and equations being used to represent these processes. Nevertheless, there is considerable overlap in the thermodynamic data required to calculate the standard molal thermodynamic properties of species as a function of T and P,

the equilibrium distribution of elemental mass among coexisting phases as a function of T, P, and bulk composition, and the evolution of this distribution as a consequence of chemical and/or thermal perturbation. The GEMBOCHS database contains all of the thermodynamic data and regression parameters required to perform each of these modeling activities using most of the geochemical software packages currently available.

The compositional and thermodynamic data contained in each of the 23 GEMBOCHS tables are listed and briefly defined in the GEMBOCHS Data Dictionary, which is given in Appendix B. For the convenience of those interested in what data are used for each type of chemical species, the following skeletal outline is also provided.

#### Compositional Data for Minerals, Gases, or Aqueous Species

Elemental Composition  
Common Name

#### Reaction Data for Aqueous Dissociation of Minerals, Gases, or Aqueous Species

Reaction Stoichiometry  
Equilibrium Constants  
Pressure, Temperature Conditions  
Standard Molal Gibbs Free Energies of Reaction  
Standard Molal Enthalpies of Reaction  
Standard Molal Entropies of Reaction  
Standard Molal Volumes of Reaction  
Standard Molal Heat Capacities of Reaction  
Parameter Units  
Literature References

#### Thermodynamic Data for Minerals

Standard Molal Gibbs Free Energy of Formation  
Standard Molal Enthalpy of Formation  
Standard Molal Entropy at Reference Pressure (Pr) and Temperature (Tr)  
Standard Molal Volume at Pr, Tr  
Standard Molal Heat Capacity at Pr, Tr  
Molecular Weight  
Heat Capacity Coefficients  
Temperature Limits on Heat Capacity Coefficients  
Standard Molal Enthalpy of Transition  
Standard Molal Entropy of Transition  
Standard Molal Volume of Transition  
Clapeyron Slope  
Parameter Units  
Literature References

### Thermodynamic Data for Gases

- Standard Molal Gibbs Free Energy of Formation
- Standard Molal Enthalpy of Formation
- Standard Molal Entropy at Pr, Tr
- Standard Molal Volume at Pr, Tr
- Standard Molal Heat Capacity at Pr, Tr
- Molecular Weight
- Heat Capacity Coefficients
- Temperature Limits on Heat Capacity Coefficients
- Parameter Units
- Literature References

### Thermodynamic Data for Aqueous Species

- Standard Molal Gibbs Free Energy of Formation
- Standard Molal Enthalpy of Formation
- Standard Molal Entropy at Pr, Tr
- Standard Molal Volume at Pr, Tr
- Standard Molal Heat Capacity at Pr, Tr
- Molecular Weight
- Equation-of-State Coefficients
- Debye-Huckel Parameters
- Ionic Charge
- Electronic Entropy
- Parameter Units
- Literature References

### The GEMBOCHS Software Library: Selections of Relevance to YMP

The database software library facilitates maintenance and development of the GEMBOCHS database and its practical use to address relevant environmental problems via geochemical modeling packages such as EQ3/6. Only those four programs that are directly relevant to the YMP's current use of GEMBOCHS are summarized below.

#### CNGBOCHS

CNGBOCHS is an interactive program that permits on- or off-site GEMBOCHS users having access to the gov electronic mailing domain to submit formal change requests using the standard electronic mail (Email) utility; note that such requests must be accompanied by concomitant submittal of a TDIF and Data Transmittal Package in accordance with AP-5.2Q. CNGBOCHS, which interfaces Email, a dedicated Ingres database (CNGREQ), and the Interleaf desktop publishing package, also provides the local Database Development staff with a convenient tracking and filing system for the process of reviewing, resolving, and verifying resolution of these change requests.

A given Email change request is first filed in CNGREQ; subsequently, its status evolves from "review" to "assigned" to "verification" and finally to "completion". At each stage of this evolution, the responsible party submits their comments or a report of their actions to CNGREQ via an electronic form that interfaces the party with this database. The status of the request then changes, and an Email message indicating this change is sent to all those affected. At any point during this process, the electronic form which summarizes the current disposition of the change request can be printed using the built-in interface to Interleaf.

#### DBAPP

DBAPP is an interactive FORTRAN77-Equiel code that facilitates review of GEMBOCHS data by all local users and modification of these data by selected members of the Database Development staff. DBAPP interfaces the user with GEMBOCHS via an extensive suite of electronic forms. These forms permit any user to browse through GEMBOCHS data, and a smaller set of password-restricted users to modify, augment, or delete these data. The operative status of new species is either "active" or "notused". "Active" species appear in release versions of the DATAO suite for use with EQ3/6 whereas "notused" species are restricted to use within the trial DATAO files used locally. In addition, DBAPP automatically reports all GEMBOCHS updates to a dedicated audit table, which contains the complete modification history of GEMBOCHS.

#### D0OUT

D0OUT is a FORTRAN77-Equiel code that serves as a software pipe between GEMBOCHS and EQPT. D0OUT performs the following functions: (1) retrieves data from GEMBOCHS for the user-specified subset of chemical species (currently, there are five such subsets; these are described below), (2) calculates aqueous dissociation constants for these species from 0 to 100 C at 1.0132 bars and from 100 to 300 C along the H<sub>2</sub>O vaporization boundary using the SUPCRT91 equation of state, CrissCobble extrapolation, or DQUANT method for aqueous species and Cp integration for solids, gases, and liquids, and (3) generates the DATAO file, a formatted ASCII file that contains the dissociation constants, all other data explicitly required for EQ3/6 calculations, and various other species data of interest to EQ3/6 users.

#### EQPT

EQPT is a FORTRAN77 code that serves as a software interface between the DATAO file produced by D0OUT and the EQ3/6 geochemical modeling package. EQPT performs the following functions: (1) reads the DATAO file, (2) fits species dissociation constants to interpolating polynomials, and (3) generates the DATA1 file, an unformatted equivalent of DATAO where species dissociation constants are replaced with their associated polynomial

regression coefficients, and all data not explicitly required for EQ3/6 calculations has been filtered.

Note that although DOOUT and EQPT could be readily consolidated into a single code, there are significant advantages associated with maintaining their independence. Specifically, the present arrangement (1) provides users with a wealth of additional, relevant data not explicitly required by EQ3/6, (2) provides this data in a formatted ASCII file which can be viewed, printed, and edited, (3) provides users with the option of customizing DATA0 files by adding new species or modifying data for existing species, and (4) minimizes EQ3/6 run-time costs associated with reading these large thermodynamic databases by providing these data on an unformatted file that contains only those data explicitly required for the calculations.

#### Use of GEMBOCHS by YMP Participants

In general, YMP participants use the GEMBOCHS database strictly through its association with the EQ3/6 software package. Hence, the typical YMP user's only contact with GEMBOCHS is in the form of the various DATA0 files produced by DOOUT (see above). Five distinct DATA0 files are presently available for use with the current release version (3245.1090) of EQ3/6. This suite of files is listed below:

DATA0 filename	Description	# of species
DATA0.com.R10	Composite database	1834
DATA0.sup.R10	SUPCRT91 database	462
DATA0.nea.R10	NEA/CODATA database	424
DATA0.pit.R10	Pitzer database	488
DATA0.hmw.R10	Harvey-Moller-Weare database	71

Each of these five files is designed to meet specific geochemical modeling needs; for a given EQ3/6 modeling problem, the appropriate DATA0 file is determined on the basis of compositional complexity, required level of internal consistency, and desired formalism for calculating activity coefficients.

The "R10" suffix of a given DATA0 filename refers to the release number of the file. A new suite of DATA0 files having incremented suffixes is generated and released as often as required by modifications and additions to GEMBOCHS.

Access to EQ3/6 and the complete suite of DATA0 files may be obtained by contacting Tom Wolery of LLNL (FTS-532-5789).

#### Procedure for Requesting Modifications or Additions to GEMBOCHS

Anyone having access to the government (gov) domain of the standard

electronic mail network (Email) can request modifications or additions to GEMBOCHS by sending an Email message describing the request to `cngbochs@es33.es.llnl.gov`; the requestor must also submit concomitantly a TDIF and Data Transmittal Package in accordance with AP-5.2Q. To facilitate timely resolution, the subject field of these Email change requests must be assigned the string "GEMBOCHS request", and the following text must contain all information required to resolve the request. Typically, this information will include (1) the requestor's full name and phone number, (2) a complete description of the request (i.e., the error report or request to add data), (3) a summary of all references supporting the request, and if (2) defines an error report, also (4) the specific DATA0 file(s) (including version number) where the error occurs.

Change requestors are notified by CNGBOCHS (via Email) as their requests move from "review" to "assigned" to "verification" to "completion" status.

Those who do not have Email access may request changes by contacting Jim Johnson of LLNL (FTS-543-7352).

#### Modifications and Additions to GEMBOCHS: 3rd Qtr., 1991

The subset of the GEMBOCHS audit table that covers the 3rd Qtr. (1 April 30 June), 1991, is given in Appendix C. This table summarizes all GEMBOCHS modifications that were incorporated during this time. In mid-April, 1991, the R10 suite of DATA0 files was released; Appendix D provides a summary of all modifications and additions that were incorporated between the release of DATA0 suites R9 (mid-January, 1991) and R10.

#### Concluding Remarks

The GEMBOCHS thermodynamic database and its associated software library together represent a comprehensive and versatile package that can be used to quantitatively address a myriad of geochemical modeling problems. Included among these are several ongoing YMP-sponsored studies that specifically address potential environmental concerns associated with the proposed repository at Yucca Mountain.

## **Appendix A**

### **GEMBOCHS REFERENCES**

**GEMBOCHS-A1**

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Appendix B  
GEMBOCHS DATA DICTIONARY

GEMBOCHS-B1



**GEMBOCHS-B2**

## APPENDIX B: GEMBOCHS Data Dictionary

The data dictionary defines each column variable and its valid range of values for each data table in the GEMBOCHS thermodynamic database. Column variables that must be assigned a non-null value are underlined.

---

### Table: AQUEOUS

Aqueous species data.

1 row per species.

#### Aqueous.NAME

Description  
Range

primary key  
Species.NAME where Species.TYPE= aqueous

#### Aqueous.TYPE

Description  
Range

type of aqueous species  
Enumerated:  
basis      strict basis species  
aux        alternate basis species  
aqueous    non-basis species

#### Aqueous.CHG

Description  
Range

ionic charge  
integer

#### Aqueous.ITYPE

Description

Criss-Cobble ion type values, only entered for those species listed by Criss and Cobble (1964a,b)

Range

Enumerated:  
1   simple cations  
2   simple anions and oh-  
3   oxy-anions  
4   acid oxy-anions

#### Aqueous.ACT FLAG

Description

flag for  $O_2(aq)$ ,  $H_2(aq)$ ,  $SiO_2(aq)$  for EQ3/6 activity coefficient formalism  
negative integer

Range

#### Aqueous.SE

Description

internal electronic entropy (cal) used in Criss-Cobble extrapolations for rare earth and lanthanide species  
positive real number

Range

**Aqueous.AZERO**  
Description

ion size parameter used for EQ3/6 BDOT activity  
coefficient formalism data values are entered as listed  
for species in Nordstrom and Munoz (1986,p. 200) after  
Kielland (1937)

Otherwise:

if Aqueous.CHG <1 then = 4.0

+1 then = 4.0

+2 then = 4.5

+3 then = 5.0

+4 then = 5.5

>4 then = 6.0

**Aqueous.BDOT**  
Description  
Range

bdot parameter  
real number

**Aqueous.CP**  
Description  
Range

partial molal heat capacity (cal/mol)  
real number

**Aqueous.SOURCE**  
Description  
Range

data citation  
10 character field

# Table: AUDIT

Documentation for all GEMBOCHS data changes.

0-n rows per species

## Audit.SPECIES

Description  
Range

name of changed species  
Species.NAME

## Audit.TAB

Description  
Range

GEMBOCHS table  
24 character field

## Audit.COL

Description  
Range

GEMBOCHS column  
24 character field

## Audit.OLD\_VAL

Description  
Range

previous data value  
24 character field

## Audit.NEW\_VAL

Description  
Range

new data value  
4 character field

## Audit.UPDATE BY

Description  
Range

DBAPP user name  
24 character field

---

**Audit.DATE CNG**

Description	date update made
Range	24 character field

**Audit.REQUEST BY**

Description	name of person requesting data change
Range	24 character field

**Audit.COMMENTS**

Description	additional comments
Range	64 character field

---

**Table: AUTHORITY**

Contains a list of users authorized to change GEMBOCHS data, and their passwords

1 row per user

**Authority.PERSON**

Description	user name
Range	24 character field

**Authority.PASSWORD**

Description	user's password
Range	24 character hidden field

---

**Table: COMMENTS**

User comments about selected species

0-n rows per species

**Comments.NAME**

Description	species name
Range	24 character field

**Comments.DESRIPTION**

Description	user comments
Range	160 character field

---

**Table: COMPOSITION**

The stoichiometry for each species.

1 - n rows per species.

Composition.NAME

Description

primary key  
Species.NAME

Range

Composition.COEFF

Description

stoichiometric coefficient  
positive real number

Range

Composition.SPECIES

Description

refstate element

Range

if Species.TYPE = ss then  
Mineral.NAME where Mineral.TYPE = solid  
else  
Mineral.NAME where Mineral.STATE = refstate

---

Table: CP

Coefficients for the heat capacity polynomial

0-n rows per solid/liquid/gas

Cp.NAME

Description

primary key  
Species.NAME where  
Species.TYPE = mineral

Range

Cp.SOURCE

Description

primary cited reference  
References.SQUIBB

Range

Cp.UNITS

Description

cited units  
Enumerated:  
cal  
jou

Range

Cp.LIMIT

Description

temperature limit for polynomial (°K)  
positive real number

Range

Cp.T0

Description

constant, T\*\*0 term  
real number

Range

Cp.T1

Description

coefficient, T\*\*1 term  
real number

Range

Cp.T\_1

Description

coefficient, T\*\*-1 term  
real number

Range

<u>Cp.T2</u>	
Description	coefficient, $T^{**2}$ term
Range	real number
<u>Cp.T_2</u>	
Description	coefficient, $T^{*-2}$ term
Range	real number
<u>Cp.T3</u>	
Description	coefficient, $T^{*3}$ term
Range	real number
<u>Cp.T_3</u>	
Description	coefficient, $T^{*-3}$ term
Range	real number
<u>Cp.THALF</u>	
Description	coefficient, $T^{*0.5}$ term
Range	real number
<u>Cp.T_HALF</u>	
Description	coefficient, $T^{*-0.5}$ term
Range	real number
<u>Cp.ERROR</u>	
Description	estimated polynomial error
Range	10 character field

---

Table: CPTRAN

Contains heat capacity transition data

<u>Cp.NAME</u>	
Description	primary key
Range	Species.NAME where Species.TYPE= mineral
<u>Cptran.SOURCE</u>	
Description	primary cited reference
Range	References.SQUIBB
<u>Cptran.DELHTR</u>	
Description	standard molal enthalpy of transition
Range	real number
<u>Cptran.DELSTR</u>	
Description	standard molal entropy of transition
Range	real number
<u>Cptran.SLOPE</u>	
Description	Clapeyron slope
Range	real number
<u>Cptran.VTR</u>	
Description	standard molal volume of transition
Range	real number

---

Table: EOS

Contains SUPCRT EOS data

<u>EOS.NAME</u>	
Description	species name
Range	24 character field
<u>EOS.A1</u>	
Description	EOS coefficient, a1
Range	real number
<u>EOS.A2</u>	
Description	EOS coefficient, a2
Range	real number
<u>EOS.A3</u>	
Description	EOS coefficient, a3
Range	real number
<u>EOS.A4</u>	
Description	EOS coefficient, a4
Range	real number
<u>EOS.C1</u>	
Description	EOS coefficient, c1
Range	real number
<u>EOS.C2</u>	
Description	EOS coefficient, c2
Range	real number
<u>EOS.W</u>	
Description	EOS coefficient, w
Range	real number

Table: GHS

GHS thermodynamic data values.

<u>GHS.NAME</u>	
Description	primary key
Range	Species.NAME
<u>GHS.SOURCE</u>	
Description	reference citation for DELG0,DELH0,SZERO
<u>GHS.UNITS</u>	
Description	defined as follows: cal= kcal/mol for DELG0,DELH0 = cal/mol for SZERO jou= kJ/mol for DELG0,DELH0 = J/mol for SZERO
Range	Enumerated: cal jou

GHS.DELG0	Description	apparent standard molal Gibbs free energy of formation
	Range	real number
GHS.DELH0	Description	apparent standard molal enthalpy of formation
	Range	real number
GHS.S0	Description	conventional or absolute entropy
	Range	real number
GHS.V0	Description	partial molal/molar volume (cm/mol)

---

#### Table: LABELS

User defined species subsets.

0-n rows per species.

##### Labels.NAME

Description	primary key
Range	Species.NAME

##### Labels.TYPE

Description	code to distinguish type of subset
Range	Enumerated:
	est subset identifying estimated data
	sub user defined subset

##### Labels.CLASS

Description	estimated variable or subset name
Range	If Labels.TYPE= est
	then GEMBOCHS column
	else 16 character field

---

#### Table: LOGK

Logk data as a function of temperature.

0-n rows per species

##### LOGK.NAME

Description	primary key
Range	Species.NAME

##### LOGKSOURCE

Description	reference citation for LOGK
Range	References.SQUIBB



**LOGK.TEMP**

Description

measured temperature for LOGK (°C)

Note: if Basic.GFLAG = 3 and Basic.KSOURCE= tpgrid

a Tpgrid.TEMP at 25°C must be entered

positive real number

Range

**LOGK.PRES**

Description

pressure corresponding with temperature in Tpgrid.TEMP

Range

positive real number

**LOGK.LOGK**

Description

LOGK value

Range

real number

---

**Table: Mineral**

Additional data for solid, liquid, gas and solid solutions

1 row per mineral species

**Mineral.NAME**

Description

primary key

Range

Species.NAME where Species.TYPE=mineral

**Mineral.TYPE**

Description

EQ3/6 species type.

Range

Enumerated:

liquid liquid species

solid solid/mineral species

gas gaseous species

ss solid solution

**Mineral.COMPOSITION**

Description

chemical composition of mineral name.

Range

55 character field

**Mineral.ALNAME**

Description

alternate species name

Range

24 character field

**Mineral.VARIETY**

Description

crystalline form of polymorphs

Range

Enumerated:

alpha, beta, gamma, etc.

**Mineral.STATE**

Description

crystalline state of species, identifies hypothetical endmembers of solid solutions, reference state elements, forms of solid solutions, or polymorphs.

Range	Enumerated:
	ideal
	regular
	refstate
	hypothetical
	polymorph

---

**Table: PARAMETERS**

Miscellaneous parameter grids needed for data0 header listing. Parameters include: temperature, pressure, Criss-Cobble parameters, Debye-Huckel constants, solution solution mixing parameters.

**Parameters-NAME**

Description	type of parameter
Range	30 character field
<b>Parameters.ONE</b>	
Description	parameter value
Range	real number
<b>Parameters.TWO</b>	
Description	parameter value
Range	real number
<b>Parameters.THREE</b>	
Description	parameter value
Range	real number
<b>Parameters.FOUR</b>	
Description	parameter value
Range	real number
<b>Parameters.FIVE</b>	
Description	parameter value
Range	real number
<b>Parameters.SIX</b>	
Description	parameter value
Range	real number
<b>Parameters.SEVEN</b>	
Description	parameter value
Range	real number
<b>Parameters.EIGHT</b>	
Description	parameter value
Range	real number
<b>Parameters.NINE</b>	
Description	parameter value
Range	real number
<b>Parameters.TEN</b>	
Description	parameter value
Range	real number

<b>Parameters.ELEVEN</b>	
Description	parameter value
Range	real number
<b>Parameters.TWELVE</b>	
Description	parameter value
Range	real number
<b>Parameters.PITNUM</b>	
Description	order to print in Pitzer output file
Range	integer
<b>Parameters.BDOTNUM</b>	
Description	order to print in Bdot output file
Range	integer
<b>Parameters.HMWNUM</b>	
Description	order to print in HMW output file
Range	integer

---

**Table: REACTION**

Species and coefficients for Data0 RXN and REF RXN.

0-n rows per species.

<u><b>Reaction.NAME</b></u>	
Description	primary key
Range	Species.NAME
<u><b>Reaction.SOURCE</b></u>	
Description	citation of reference reaction (required when Reaction.TYPE=ref)
Range	10 character field
<u><b>Reaction.TYPE</b></u>	
Description	code to distinguish kind of reaction
Range	Enumerated: d0 Data0 RXN ref REF RXN
<u><b>Reaction.COEFF</b></u>	
Description	coefficient associated with Reaction.SPECIES
Range	real number
<u><b>Reaction.SPECIES</b></u>	
Description	component species in the reaction
Range	if Reaction.TYPE= d0 then Aqueous.NAME where Aqueous.TYPE= basis or Aqueous.TYPE= aux else Species.NAME

---

**Table: REFERENCES**

Complete reference citations for all data sources.

**References.SQUIBB**

Description reference citation in SQUIBB format: year,author and  
secondary author: yypri/sec  
Range 10 character field

**References.AUTHOR**

Description author(s), by last name, first initials  
Range 160 character field

**References.YR**

Description year published  
Range positive integer > 1850

**References.YR ALT**

Description designator for multi-year citations  
Range 1 character field, ascending order

**References.TITLE**

Description complete reference title  
Range 300 character field

**References.PUBLISHER**

Description publisher or journal  
Range 80 character field

**References.VOL**

Description volume number  
Range 5 character field

**References.PAGES**

Description page numbers  
Range 1-2 character field

**References.XCOPY**

Description reference copy information  
Range Enumerated:  
yes copy in GEMBOCHS reference library  
no copy not in reference library  
abs abstract in reference library  
ord copy requested

**References.FILE**

Description defined as follows:  
Range Enumerated:  
aux reference not used in data0  
pending possible future reference  
primary current data0 reference

**Table: REFSTATE**

Properties of reference-state elements.

1 row per element

<u>Refstate.NAME</u>	Description	element name in most common form
	Range	Mineral.NAME where Mineral.STATE=refstate
<u>Refstate.SYMBOL</u>	Description	chemical symbol
	Range	2 character field
<u>Refstate.ATNUM</u>	Description	atomic number
	Range	positive integer
<u>Refstate.SOA</u>	Description	Standard Order of Arrangement (Wagman et al., 1983)
	Range	positive integer
<u>Refstate.MWT</u>	Description	molecular weight
	Range	positive real number
<u>Refstate.BASIS</u>	Description	designated basis species for element
	Range	Aqueous.NAME where Aqueous.TYPE=basis

---

Table: SPECIES

Descriptive information about each chemical species

1 row per species.

<u>Species-NAME</u>	Description	unique species name.
	Range	24 character field
<u>Species-TYPE</u>	Description	species type.
	Range	Enumerated: aqueous basis, auxiliary or non-basis aqueous species mineral solid, liquid, gas or solid solution species
<u>Species.DATE</u>	Description	date of entry/last data change
	Range	dd-mm-yy

---

---

Table: THERMO

Shows what data exists for each species

<u>Thermo.NAME</u>	
Description	primary key
Range	Species.NAME
<u>Thermo.STATUS</u>	
Description	output status
Range	Enumerated:
	active
	notused
<u>Thermo.SOURCE</u>	
Description	data source
Range	References.SQUIBB
<u>Thermo.GFLAG</u>	
Description	data selection flag for D0OUT LOGK calculations
Range	Enumerated:
	0 incomplete data
	1 use GHS.DELG0
	2 use GHS.DELH0 and GHS.SZERO
	3 use LOGK data
	4 use urt data
	..5 use CP data

---

Table: URT

Contains URT data

<u>URT.NAME</u>	
Description	species name
Range	24 character field
<u>URT.SOURCE</u>	
Description	data source
Range	10 character field
<u>URT.URT</u>	
Description	chemical potential (u/RT)
Range	real number

Appendix C  
GEMBOCHS AUDIT TABLE  
3rd Quarter, 1991

GEMBOCHS-C1

GEMBOCHS-C2



Appendix C: GEMBOCHS Audit Table: 3rd Qtr., 1991

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
*****					
Species: al(oh)4-					
species	status	notused	active	4/11/91	Johnson
Comments: replace deactivated supcrt species					
*****					
Species: clinoptilolite-hy-ca					
species	name		clinoptilolite	4/8/91	
Comments: added to test new clino					
basic	delg0	-4547.780	-4601.627	5/1/91	Viani
Comments: recalculated for hy					
*****					
Species: clinoptilolite-hy-cs					
species	name		clinoptilolite	4/8/91	
Comments: added as test set for Viani					
basic	delg0	-4568.686	-4315.573	5/1/91	Viani
Comments: recalculated for hy					
*****					
Species: clinoptilolite-hy-k					
species	name		clinoptilolite	4/8/91	
Comments: added as test case for Viani					
basic	delg0	-4558.181	-4376.834	5/1/91	Viani
Comments: recalculated for hy					
*****					
Species: clinoptilolite-hy-na					
species	name		clinoptilolite	4/12/91	
Comments: added for Viani to test					
basic	delg0	-4535.926	-4546.476	5/1/91	Viani
Comments: recalculated for hy					

TABLE	COLUMN	OLD VALUE	NEW VALUE	DATE	REQUESTER
*****					
Species: clinoptilolite-hy-sr					
species	name		clinoptilolite	4/12/91	
Comments: added as new test set for Viani					
basic	delg0	-4552.547	-4731.276	5/1/91	Viani
Comments: recalculated for hy					
*****					
Species: clinoptilolite-ss#1					
species	name		clinoptilolite	4/12/91	Viani
Comments: new test case					
*****					
Species: fe(oh)2(aq)					
species	status	notused	active	4/11/91	Johnson
Comments: replace deactivated supcrt species					
*****					
Species: fe(oh)3-					
species	status	notused	active	4/11/91	Johnson
Comments: replace deactivated supcrt species					
*****					
Species: koh(aq)					
tpgrid	logk	0.000 0.000	25.000 14.460	4/11/91	Johnson
Comments: replaces deactivated supcrt species					
basic	delg0	-104423.000	-104.500	4/11/91	Johnson
Comments: replaces deactivated supcrt species					
basic	igflg	4	3	4/11/91	Johnson
Comments: replaces deactivated supcrt species					
basic	delh0	-113197.000	500.000	4/11/91	Johnson
Comments: replaces deactivated supcrt species					
basic	szer0	26.180	500.000	4/11/91	Johnson

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
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Comments: replaces deactivated supcrt species

species	status	notused	active	4/11/91	Johnson
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Comments: replaces deactivated supcrt species

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Species: koh(aq)#1

tpgrid	logk	25.000 14.460	25.000 500.000	4/11/91	Johnson
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Comments: new data0 species

basic	delg0	-104.500	-104423.000	4/11/91	Johnson
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Comments: new output species

basic	delh0	500.000	-113197.000	4/11/91	Johnson
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Comments: new output species

basic	szer0	500.000	26.180	4/11/91	Johnson
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Comments: new output species

basic	igflg	3	4	4/11/91	Johnson
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Comments: new output species

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Species: ni(oh)2(aq)

species	status	notused	active	4/11/91	Johnson
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Comments: replace deactivated supcrt species

\*\*\*\*\*

Species: ni(oh)3-

species	status	notused	active	4/11/91	Johnson
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Comments: replace deactivated supcrt species

\*\*\*\*\*

Species: znoh+

tpgrid	logk	150.000 -6.060	150.000 -6.060	4/11/91	Johnson
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Comments: exchanged with deactivated supcrt species

tpgrid	logk	0.000 0.000	25.000 -8.960	4/11/91	Johnson
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Comments: exchanged with deactivated supcrt species

GEMBOCHS-C5

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
basic	igflg	4	3	4/11/91	Johnson
Comments: replace deactivated supcrt species					
basic	delg0	-79726.000	500.000	4/11/91	Johnson
Comments: replace deactivated supcrt species					
basic	delh0	-82539.000	500.000	4/11/91	Johnson
Comments: replace deactivated supcrt species					
basic	szer0	25.000	500.000	4/11/91	Johnson
Comments: replace deactivated supcrt species					
species	status	notused	active	4/11/91	Johnson
Comments: replace deactivated supcrt species					

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Species: znch+#1

basic	delg0	500.000	-79726.000	4/11/91	Johnson
Comments: deactivated, made into test species					
basic	delh0	500.000	-82539.000	4/11/91	Johnson
Comments: deactivated, made into test species					
basic	szer0	500.000	25.000	4/11/91	Johnson
Comments: deactivated, made into test species					
basic	igflg	3	4	4/11/91	Johnson
Comments: deactivated, made into test species					
tpgrid	logk	100.000 -6.990	100.000 500.00	4/11/91	Johnson
Comments: exchange with supcrt data0 species					
tpgrid	logk	150.000 -6.060	150.000 500.00	4/11/91	Johnson
Comments: exchange with supcrt data0 species					
tpgrid	logk	200.000 -5.330	200.000 500.00	4/11/91	Johnson
Comments: exchange with supcrt data0 species					
tpgrid	logk	25.000 -8.960	25.000 500.000	4/11/91	Johnson
Comments: exchange with supcrt data0 species					
tpgrid	logk	250.000 -4.740	250.000 500.00	4/11/91	Johnson
Comments: exchange with supcrt data0 species					
tpgrid	logk	300.000 -4.250	300.000 500.00	4/11/91	Johnson
Comments: exchange with supcrt data0 species					

GEMBOCHS-C6

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
tpgrid	logk	350.000 -3.840	350.000 500.00	4/11/91	Johnson
Comments: exchange with supcrt data0 species					
tpgrid	logk	60.000 -7.930	60.000 500.000	4/11/91	Johnson
Comments: exchange with supcrt data0 species					

Appendix D  
GEMBOCHS AUDIT TABLE  
DOOUT Suite R9 to R10

GEMBOCHS-D1

GEMBOCHS-D2

Appendix D: GEMBOCHS Audit Table: DOOUT Suite R9 to R10

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
*****					
Species: ag(co3)2—					
basic	delg0	-236889.000	-236890.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delh0	-304197.000	-304200.000	2/19/91	Johnson
Comments: new supcrt data					
*****					
Species: agcl(aq)					
basic	delg0	-17454.000	-17450.000	2/15/91	
Comments:					
basic	delh0	-18269.000	-18270.000	2/15/91	
Comments:					
*****					
Species: agcl2-					
basic	delg0	-51562.000	-51560.000	2/15/91	Johnson
Comments: new supcrt data					
basic	delh0	-61126.000	-61130.000	2/15/91	Johnson
Comment: new supcrt data					
*****					
Species: agcl3-					
basic	delh0	-105943.000	-105940.000	2/20/91	Johnson
Comments: new supcrt data					
basic	delg0	-82709.000	-82710.000	2/20/91	Johnson
Comments: new supcrt data					
*****					
Species: agcl4-					
basic	delg0	-112277.000	-112280.000	2/20/91	Johnson
Comments: new supcrt data					
basic	delh0	-142218.000	-142220.000	2/20/91	Johnson



<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
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Comments: new supcrt data

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Species: agco3-

basic	delg0	-111434.000	-111430.000	2/19/91	Johnson
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Comments: new supcrt data

basic	delh0	-141596.000	-141600.000	2/19/91	Johnson
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Comments: new supcrt data

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Species: agno3(aq)

basic	delh0	-23854.000	-23090.000	2/20/91	Johnson
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Comments: new supcrt data

basic	delg0	-7806.000	-7810.000	2/20/91	Johnson
-------	-------	-----------	-----------	---------	---------

Comments: new supcrt data

basic	szer0	52.750	50.000	2/20/91	Johnson
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Comments: new supcrt data

\*\*\*\*\*

Species: al(oh)4-

species	status	notused	active	4/11/91	Johnson
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Comments: replace deactivated supcrt species

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Species: alo2-

species	status	active	notused	2/19/91	Johnson
---------	--------	--------	---------	---------	---------

Comments: not in supcrt 1991 manuscript

\*\*\*\*\*

Species: bac1+

basic	delg0	-164727.000	-164730.000	2/20/91	Johnson
-------	-------	-------------	-------------	---------	---------

Comments: new supcrt data

basic	delh0	-165774.000	-165770.000	2/20/91	Johnson
-------	-------	-------------	-------------	---------	---------

Comments: new supcrt data

GEMBOCHS-D4

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
*****					
Species: baco3(aq)					
basic	delh0	-285848.000	-285850.000	2/19/91	Johnson
Comments: new supcrt data					
*****					
Species: baf+					
basic	delg0	-201124.000	-201120.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delh0	-206511.000	-206510.000	2/19/91	Johnson
Comments: new supcrt data					
*****					
Species: bahco3+					
species	status	active	notused	2/19/91	Johnson
Comments: not in supcrt 1991 manuscript					
*****					
Species: cac1+					
basic	delg0	-162548.000	-162550.000	2/20/91	Johnson
Comments: new supcrt data					
basic	delh0	-169248.000	-169250.000	2/20/91	Johnson
Comments: new supcrt data					
*****					
Species: cac12(aq)					
basic	delh0	-211062.000	-211060.000	2/20/91	Johnson
Comments: new supcrt data					
*****					
Species: caco3(aq)					
basic	delg0	-262848.000	-262850.000	2/19/91	Johnson
Comments: new supcrt data					

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
basic	delh0	-287391.000	-287390.000	2/19/91	Johnson
Comments: new supcrt data					

\*\*\*\*\*

Species: caf+

basic	delg0	-200388.000	-200390.000	2/15/91	Johnson
Comments: new supcrt data					

basic	delh0	-208597.000	-208600.000	2/15/91	Johnson
Comments: new supcrt data					

\*\*\*\*\*

Species: cahco3+

basic	delg0	-273834.000	-273830.000	2/19/91	Johnson
Comments: new supcrt data					

\*\*\*\*\*

Species: caso4(aq)

basic	delg0	-312925.000	-312930.000	2/19/91	Johnson
Comments: new supcrt data					

basic	delh0	-345905.000	-345900.000	2/19/91	Johnson
Comments: new supcrt data					

\*\*\*\*\*

Species: clinoptilolite-hy-ca

species name	clinoptilolite	4/8/91
Comments: added to test new clino		

\*\*\*\*\*

Species: clinoptilolite-hy-cs

species name	clinoptilolite	4/8/91
Comments: added as test set for Viani		

\*\*\*\*\*

Species: clinoptilolite-hy-k

GEMBOCHS-D6

TABLE	COLUMN	OLD VALUE	NEW VALUE	DATE	REQUESTER
species	name		clinoptilolite	4/8/91	
Comments: added as test case for Viani					
*****					
Species: clinoptilolite-hy-na					
species	name		clinoptilolite	4/12/91	
Comments: added for Viani to test					
*****					
Species: clinoptilolite-hy-sr					
species	name		clinoptilolite	4/12/91	
Comments: added as new test set for Vaini					
*****					
Species: clinoptilolite-ss#1					
species	name	clinoptilolite	clinoptilolite	4/12/91	Viani
Comments: new test case					
*****					
Species: cooh+					
species	status	active	notused	2/19/91	Johnson
Comments: not in 1991 supcrt database					
*****					
Species: csbr(aq)					
basic	delh0	-87792.000	-88090.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delgo	-93912.000	-94210.000	2/19/91	Johnson
Comments: new supcrt data					
basic	szero	59.300	58.800	2/19/91	Johnson
Comments: new supcrt data					
*****					
Species: cscl(aq)					

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
basic	delg0	-99943.000	-100900.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delh0	-98344.000	-100950.000	2/19/91	Johnson
Comments: new supcrt data					

\*\*\*\*\*

Species: csi(aq)

basic	delh0	-73329.000	-76840.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delg0	-81982.000	-82480.000	2/19/91	Johnson
Comments: new supcrt data					
basic	szero	63.300	61.300	2/19/91	Johnson
Comments: new supcrt data					

\*\*\*\*\*

Species: fe(ch3coo)2(aq)

basic	delg0	-201792.000	-201800.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delh0	-259123.000	-259100.000	2/19/91	Johnson
Comments: new supcrt data					

Species: fe(oh)2(aq)

species	status	notused	active	4/11/91	Johnson
Comments: replace deactivated supcrt species					

\*\*\*\*\*

Species: fe(oh)3-

species	status	notused	active	4/11/91	Johnson
Comments: replace deactivated supcrt species					

\*\*\*\*\*

Species: fech3coo+

basic	delg0	-111892.000	-111900.000	2/19/91	Johnson
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GEMBOCHS-D8

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
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Comments: new supcrt data

basic	delh0	-139042.000	-139060.000	2/19/91	Johnson
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Comments: new supcrt data

\*\*\*\*\*

Species: fecl+

basic	delg0	-53031.000	-53030.000	2/15/91	Johnson
-------	-------	------------	------------	---------	---------

Comments: new supcrt data

basic	delh0	-61264.000	-61260.000	2/15/91	Johnson
-------	-------	------------	------------	---------	---------

Comments: new supcrt data

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Species: fecl2(aq)

basic	delh0	-100233.000	-100370.000	2/20/91	Johnson
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Comments: new supcrt data

basic	szer0	-4.730	-4.220	2/20/91	Johnson
-------	-------	--------	--------	---------	---------

Comments: new supcrt data

basic	delg0	-81156.000	-81280.000	2/20/91	Johnson
-------	-------	------------	------------	---------	---------

Comments: new supcrt data

\*\*\*\*\*

Species: feo(aq)

species	status	active	notused	2/19/91	Johnson
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Comments: not in supcrt 1991 manuscript

\*\*\*\*\*

Species: feoh+

species	status	active	notused	2/19/91	Johnson
---------	--------	--------	---------	---------	---------

Comments: not in supcrt 1991 database

\*\*\*\*\*

Species: h3sio4-

species	status	active	notused	2/15/91	Johnson
---------	--------	--------	---------	---------	---------

Comments: doppleganger species

GEMBOCHS-D9

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
*****					
Species: hfeo2-					
species	status	active	notused	2/19/91	Johnson
Comments: not in supcrt 1991 manuscript					
*****					
Species: hnio2-					
species	status	active	notused	2/19/91	Johnson
Comments: not in supcrt 1991 manuscript					
*****					
Species: hpbo2-					
species	status	active	notused	2/19/91	Johnson
Comments: not in supcrt 1991 manuscript					
*****					
Species: hsio3-					
basic	delh0	-271879.0001	-271880.000	2/19/91	Johnson
Comments: new supcrt clata					
*****					
Species: hzno2-					
species	status	active	notused	2/19/91	Johnson
Comments: not in supcrt 1991 manuscript					
*****					
Species: kbr(aq)					
basic	delh0	-86317.000	-86320-000	2/19/91	Johnson
Comments: new supcrt data					
basic	delg0	-90006.000	-90010.000	2/19/91	Johnson
Comments: new supcrt data					

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATA</u>	<u>REQUESTER</u>
*****					
Species: kcl(aq)					
basic	deh0	-96012.000	-96810.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delg0	-96051.000	-96850.000	2/19/91	Johnson
Comments: new supcrt data					
*****					
Species: khso4(aq)					
basic	delg0	-245800.000	-246550.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delho	-269870.000	-270540.000	2/19/91	Johnson
Comments: new supcrt data					
basic	szer0	56.030	56.310	2/19/91	Johnson
Comments: new supcrt data					
*****					
Species: ki(aq)					
basic	delh0	-71676.000	-71680.000	2/19/91	Johnson
Comments: new supcrt data					
*****					
Species: koh(aq)					
species	status	active	notused	2/19/91	Johnson
Comments: not in supcrt 1991 manuscript					
tpgrid	logk	0.000 0.000	25.000 14.460	4/11/91	Johnson
Comments: replaces deactivated supcrt species					
basic	delg0	-104423.000	-104.500	4/11/91	Johnson
Comments: replaces deactivated supcrt species					
basic	igflg	4	3	4/11/91	Johnson
Comments: replaces deactivated supcrt species					
basic	delh0	-113197.000	500.000	4/11/91	Johnson
Comments: replaces deactivated supcrt species					



<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
basic	szer0	26.180	500.000	4/11/91	Johnson
Comments: replaces deactivated supcrt species					
species	status	notused	active	4/11/91	Johnson
Comments: replaces deactivated supcrt species					

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Species: koh(aq)#1

tpgrid	logk	25.000	14.460	25.000	500.000	4/11/91	Johnson
Comments: new data0 species							
basic	delg0	-104.500		-104423.000		4/11/91	Johnson
Comments: new output species							
basic	delh0	500.000		-113197.000		4/11/91	Johnson
Comments: new output species							
basic	szer0	500.000		26.180		4/11/91	Johnson
Comments: new output species							
basic	igflg	3		4		4/11/91	Johnson
Comments: new output species							

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Species: kso4-

basic	delh0	-276978.000		-276980.000		2/19/91	Johnson
Comments: new supcrt data							

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Species: licl(aq)

basic	delh0	-105675.000		-105680.000		2/19/91	Johnson
Comments: new supcrt data							
basic	delg0	-99252.000		-99250.000		2/19/91	Johnson
Comments: new supcrt data							

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Species: mgcl+

basic	delg0	-139707.000		-139700.000		2/15/91	Johnson
Comments: new supcrt data							

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
basic	delh0	-150992.000	-151440.000	2/15/91	Johnson
Comments: new supcrt data					

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Species: mgco3(aq)

basic	delg0	-238759.000	-238760.000	2/9/91	Johnson
Comments: new supcrt data					
basic	delh0	-270571.000	-270570.000	2/19/91	Johnson
Comments: new supcrt data					

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Species: mgf+

basic	delg0	-177687.000	-177690.000	2/15/91	Johnson
Comments: new supcrt data					
basic	delh0	-189975.000	-190950.000	2/15/91	Johnson
Comments: new supcrt data					
basic	szer0	-24.800	-28.070	2/15/91	Johnson
Comments: new supcrt data					

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Species: mghco3+

basic	delg0	-250202.000	-250200.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delh0	-275752.000	-275750.000	2/19/91	Johnson
Comments: new supcrt data					

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Species: mgoh+

species	status	active	notused	2/19/91	Johnson
Comments: not in supcrt 1991 manuscript					

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Species: mncl+

basic	delg0	-86288.000	-86290.000	2/20/91	Johnson
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<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTOR</u>
Comments: new supcrt data					
basic	delh0	-88284.000	-88280.000	2/20/91	Johnson
Comments: new supcrt data					
*****					
Species: mnso4(aq)					
basic	delg0	-235637.000	-235640.000	2/20/91	Johnson
Comments: new supcrt data					
basic	delh0	-266748.000	-266750.000	2/20/91	Johnson
Comments: new supcrt data					
*****					
Species: nabr(aq)					
basic	delh0	-84828.000	-84830.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delg0	-85606.000	-85610.000	2/19/91	Johnson
Comments: new supcrt data					
*****					
Species: naf(aq)					
basic	delg0	-128567.000	-128570.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delh0	-135862.000	-135860.000	2/19/91	Johnson
Comments: new supcrt data					
*****					
Species: nahsio3(aq)					
basic	delg0	-307142.000	-307140.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delh0	-332745.000	-332740.000	2/19/91	Johnson
Comments: new supcrt data					
*****					
Species: nai(aq)					

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
basic	delh0	-69282.000	-69280.000	2/19/91	Johnson
Comments: new supcrt data					

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Species: ni(oh)2(aq)

species	status	notused	active	4/11/91	Johnson
Comments: replace deactivated supcrt data					

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Species: ni(oh)3-

species	status	notused	active	4/11/91	Johnson
Comments: replace deactivated supcrt species					

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Species: niCl+

basic	delg0	-40915.000	-40920.000	2/15/91	Johnson
Comments: new supcrt data					

basic	delh0	-51397.000	-51400.000	2/15/91	Johnson
Comments: new supcrt data					

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Species: nio(aq)

species	status	active	notused	2/19/91	Johnson
Comments: not in supcrt 1991 manuscript					

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Species: nioH+

species	status	active	notused	2/19/91	Johnson
Comments: not in supcrt 1991 manuscript					

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Species: pb(ch3coo)2(aq)

basic	delg0	-187024.000	-187020.000	2/20/91	Johnson
Comments: new supcrt data					

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
basic	delh0	-187024.000	-187020.000	2/10/91	Johnson
Comments: new supcrt data					
*****					
Species: pbch3coo+					
basic	delh0	-115209.000	-115210.000	2/20/91	Johnson
Comments: new supcrt data					
basic	delg0	-97314.000	-97320.000	2/20/91	Johnson
Comments: new supcrt data					
*****					
Species: pbcl+					
basic	delh0	-38626.000	-38630.000	2/15/91	Johnson
Comments: new supcrt data					
basic	delg0	-39054.000	-39050.000	2/15/91	Johnson
Comments: new supcrt data					
*****					
Species: pbcl2(aq)					
basic	delg0	-71197.000	-71200.000	2/15/91	Johnson
Comments: new supcrt data					
basic	delh0	-77702.000	-77700.000	2/15/91	Johnson
Comments: new supcrt data					
*****					
Species: pbcl3-					
basic	delg0	-102153.000	-102150.000	2/15/91	Johnson
Comments: new supcrt data					
basic	delh0	-118274.000	-117700.000	2/15/91	Johnson
Comments: new supcrt data					
basic	szer0	57.000	59.000	2/15/91	Johnson
Comments: new supcrt data					
*****					

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
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Species: pbcl4—

basic	delg0	-133259.000	-133260.000	2/20/91	Johnson
Comments: new supcrt data					
basic	delh0	-161231.000	-161230.000	2/20/91	Johnson
Comments: new supcrt data					

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Species: pbo(aq)

species	status	active	notused	2/19/91	Johnson
Comments: not in supcrt 1991 manuscript					

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Species: pboh+

species	status	active	notused	2/19/91	Johnson
Comments: not in supcrt 1991 manuscript					

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Species: rbbr(aq)

basic	delh0	-85727.000	-85730.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delg0	-91006.000	-91010.000	2/19/91	Johnson
Comments: new supcrt data					

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Species: rbcl(aq)

basic	delh0	-96751.000	-96800.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delg0	-97815.000	-97870.000	2/19/91	Johnson
Comments: new supcrt data					

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Species: rbf(aq)

basic	delg0	-135454.000	-136450.000	2/19/91	Johnson
Comments: new supcrt data					

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
basic	delh0	-138577.000	-139710.000	2/19/91	Johnson
Comments: new supcrt data					
basic	szero	32.000	31.600	2/19/91	Johnson
Comments: new supcrt data					

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Species: rbi(aq)

basic	delh0	-71716.000	-71920.000	2/29/91	Johnson
Comments: new supcrt data					
basic	delg0	-79200.000	-79100.000	2/19/91	Johnson
Comments: new supcrt data					
basic	szer0	57.300	56.300	2/19/91	Johnson
Comments: new supcrt data					

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Species: srcl+

basic	delg0	-165798.000	-165800.000	2/20/91	Johnson
Comments: new supcrt data					
basic	delh0	-169785.000	-169790.000	2/20/91	Johnson
Comments: new supcrt data					

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Species: srco3(aq)

basic	delg0	-264858.000	-264860.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delh0	-288617.000	-288620.000	2/19/91	Johnson
Comments: new supcrt data					

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Species: srf+

basic	delg0	-202291.000	-202290.000	2/19/91	Johnson
Comments: new supcrt data					
basic	delh0	-210669.000	-210670.000	2/19/91	Johnson
Comments: new supcrt data					

TABLE	COLUMN	OLD VALUE	NEW VALUE	DATE	REQUESTER
*****					
Species: srhco3+					
species	status	active	notused	2/19/91	Johnson
Comments: not in supcrt 1991 manuscript					
*****					
Species: zn(ch3coo)2(aq)					
species	name	zn(ch3coo)2(aq) 2/21/91			
Comments:					
*****					
species: zn(ch3coo)3-					
species	name	zn(ch3coo)3- 2/21/91			
Comments:					
*****					
Species: znch3coo+					
species	name	znch3coo+ 2/21/91			
Comments:					
*****					
Species: zncl+					
basic	delh0	-66539.000	-66240.000	2/15/91	Johnson
Comments: new supcrt data					
basic	delg0	-66852.000	-66850.000	2/15/91	Johnson
Comments: new supcrt data					
basic	szer0	2.000	23.000	2/15/91	Johnson
Comments: new supcrt data					
*****					
Species: zncl2(aq)					
basic	delh0	-109084.000	-109080.000	2/15/91	Johnson
Comments: new supcrt data					



<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
basic	delg0	-98299.000	-98300.000	2/15/91	Johnson
Comments: new supcrt data					

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Species: zncl3-

basic	delg0	-129037.000	-129310.000	2/20/91	Johnson
Comments: new supcrt data					
basic	delh0	-151061.000	-151060.000	2/20/91	Johnson
Comments: new supcrt data					
basic	szer0	31.590	25.000	2/20/91	Johnson
Comments: new supcrt data					

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Species: zncl4-

basic	delg0	-162170.000	-161890.000	2/20/91	Johnson
Comments: new supcrt data					
basic	delh0	-198456.000	-195200.000	2/20/91	Johnson
Comments: new supcrt data					
basic	szer0	26.000	36.000	2/20/91	Johnson
Comments: new supcrt data					

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Species: zno(aq)

species	status	active	notused	2/19/91	Johnson
Comments: not in supcrt 1991 manuscript					

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Species: zno2-

species	status	active	notused	2/19/91	Johnson
Comments: not in supcrt 1991 manuscript					

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Species: znoh+

species	status	acvtive	notused	2/19/91	Johnson
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GEMBOCHS-D20

TABLE	COLUMN	OLD VALUE	NEW VALUE	DATE	REQUESTER
Comments: not in supcrt 1991 manuscript					
tpgrid	logk	150.000 -6.060	150.000 -6.060	4/11/91	Johnson
Comments: exchanged with deactivated supcrt species					
tpgrid	logk	0.000 0.000	25.000 -8.960	4/11/91	Johnson
Comments: exchanged with deactivated supcrt species					
basic	igflg	4	3	4/11/91	Johnson
Comments: replace deactivated supcrt species					
basic	delg0	-79726.000	500.000	4/11/91	Johnson
Comments: replace deactivated supcrt species					
basic	delh0	-82539.000	500.000	4/11/91	Johnson
Comments: replace deactivated supcrt species					
basic	szer0	25.000	500.000	4/11/91	Johnson
Comments: replace deactivated supcrt species					
species	status	notused	active	4/11/91	Johnson
Comments: replace deactivated supcrt species					

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Species: znoh+#1

basic	delg0	500.000	-79726.000	4/11/91	Johnson
Comments: deactivated, made into test species					
basic	delh0	500.000	-82539.000	4/11/91	Johnson
Comments: deactivated, made into test species					
basic	szer0	500.000	25.000	4/11/91	Johnson
Comments: deactivated, made into test species					
basic	igflg	3	4	4/11/91	Johnson
Comments: deactivated, made into test species					
tpgrid	logk	100.000 -6.990	100.000 500.00	4/11/91	Johnson
Comments: exchange with supcrt data0 species					
tpgrid	logk	150.000 -6.060	150.000 500.00	4/11/91	Johnson
Comments: exchange with supcrt data0 species					
tpgrid	logk	200.000 -5.330	200.000 500.00	4/11/91	Johnson
Comments: exchange with supcrt data0 species					
tpgrid	logk	25.000 -8.960	25.000 500.000	4/11/91	Johnson
Comments: exchange with supcrt data0 species					

<u>TABLE</u>	<u>COLUMN</u>	<u>OLD VALUE</u>	<u>NEW VALUE</u>	<u>DATE</u>	<u>REQUESTER</u>
tpgrid	logk	250.000 -4.740	250.000 500.00	4/11/91	Johnson
Comments: exchange with supcrt data0 species					
tpgrid	logk	300.000 -4.250	300.000 500.00	4/11/91	Johnson
Comments: exchange with supcrt data0 species					
tpgrid	logk	350.000 -3.840	350.000 500.00	4/11/91	Johnson
Comments: exchange with supcrt data0 species					
tpgrid	logk	60.000 -7.930	60.000 500.000	4/11/91	Johnson
Comments: exchange with supcrt data0 species					