YMP/88-18

U.S. DEPARTMENT OF ENERGY

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YUCCA MOUNTAIN

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UNCONTROLLED

# TECHNICAL DATA MANAGEMENT PLAN

DEPARTMENT OF ENERGY · UNITED STATES OF AMERICA ·

**JANUARY 1989**

UNITED STATES DEPARTMENT OF ENERGY
NEVADA OPERATIONS OFFICE/YUCCA MOUNTAIN PROJECT OFFICE

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# TECHNICAL DATA MANAGEMENT PLAN

JANUARY 1989

Prepared by

Science Applications International Corporation
101 Convention Center Drive, Suite 407
Las Vegas, Nevada 89109

Prepared for

U.S. Department of Energy
Nevada Operations Office

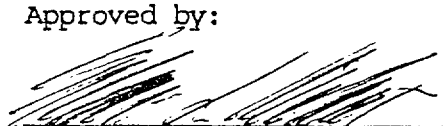
Contract DE-AC08-87NV10576

Prepared by the Yucca Mountain Project participants as part of the Civilian Radioactive Waste Management Program. The Yucca Mountain Project is managed by the Yucca Mountain Project Office of the U.S. Department of Energy (DOE), Nevada Operations Office. The Yucca Mountain Project work is sponsored by the DOE Office of Civilian Radioactive Waste Management (OCRWM).

YUCCA MOUNTAIN PROJECT

TECHNICAL DATA MANAGEMENT PLAN

Approved by:



Carl P. Gertz, Project Manager
Yucca Mountain Project Office

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YUCCA MOUNTAIN PROJECT

TECHNICAL DATA MANAGEMENT PLAN

## 1.0 INTRODUCTION

This plan describes the management of technical data for the Yucca Mountain Project. The Technical Data Base (TDB) and the Reference Information Base (RIB), the two entities that retain and provide access to technical data for the Project, are discussed as the central elements of the technical data management system. This plan also discusses the flow of data between these central elements and the relationships of the TDB and the RIB to participant data-producing activities (Figure 1). Project-level and participant-level procedures needed to implement this plan are shown in Annex 1. The history and content of this data flow will be recorded by the Local Records Centers (LRCs), thus providing a direct interface to the Automated Records System (ARS), which will in turn provide the Project interface to the Licensing Support System (LSS). The Project Technical Data Management Plan is a sub-tier document for implementing the guidelines of the Systems Engineering Management Plan and the Information Resources Management Plan.

The plan describes the responsibilities of TDB and RIB administrative activities and the responsibilities of Project participants in regard to data submittal, documentation, and usage. Further, it describes the activities and functions of the Technical Data Advisory Group (TDAG) and the Technical Data Working Groups (TDWGs) for controlling and enhancing the flow of technical data throughout the Project.

The Technical Data Manager (TDM) is the member of the Yucca Mountain Project Office (Project Office) staff responsible for overall management of technical data for the Project. Technical data must be efficiently made available for Project use and appropriately archived for future reference. The data and supporting information must be documented in a manner that ensures complete traceability as required by the Project's Quality Assurance Program Plan, Records Management Plan, and associated implementing procedures. The TDM has established an advisory group, which is composed of the Project data base administrators and representatives of all participant organizations. This group, the Technical Data Advisory Group (TDAG), assists the TDM in accomplishing management objectives and in coordinating the flow of technical data from participants to the Project data bases. The TDM, with the assistance of the TDAG, may establish working groups to address and resolve specific technical data matters. (See Figure 2 for a diagram of the relationships between the TDM, TDAG, and Technical Systems Advisory Group.)

The TDB stores technical data in a central location from which they can be accessed in a suitable format for use in Project activities. The TDB is intended to contain data that have been subjected to an appropriate degree of reduction for general Project applications. The TDB has two components, the Site and Engineering Properties Data Base (SEPDB) and the Interactive Graphics Information System (IGIS). This plan and Project Administrative Procedure (AP)-5.2Q, "Technical Information Flow To and From the Yucca Mountain Project Technical Data Base" discuss primarily the operation of the

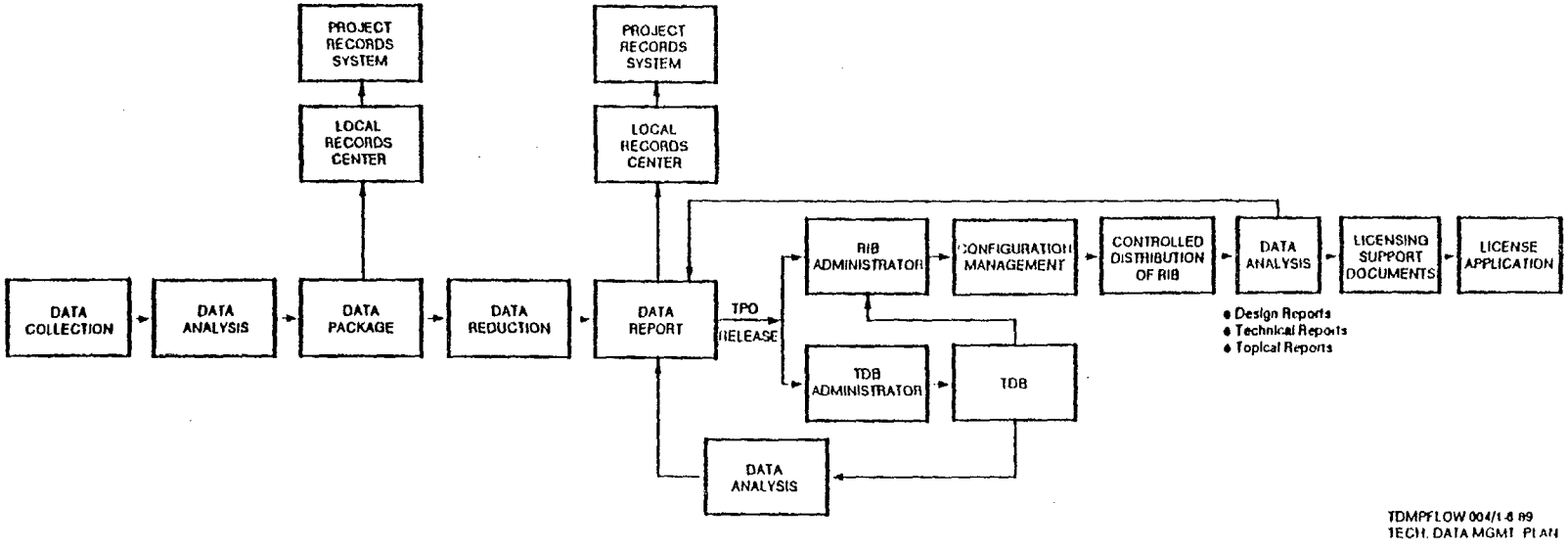



Figure 2. Technical Data Management System Flowchart.

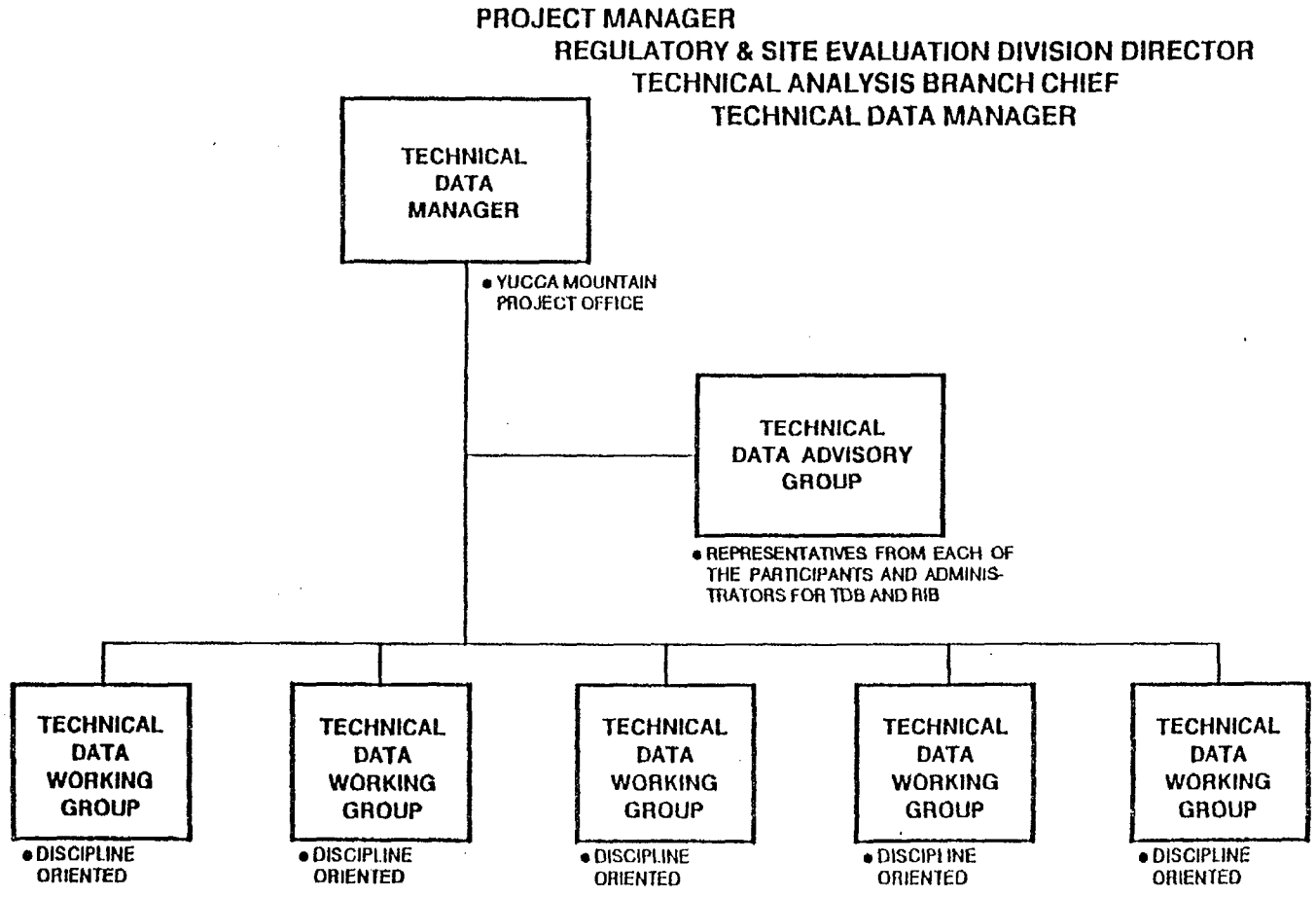



Figure 2. Technical Data Management System.

SEPDB as the numerical data base used to store technical data for the Project. The IGIS is a computer-aided graphics system that is primarily used to generate graphic representations of site data.

The RIB, which communicates baselined technical data and information to the Project, draws on the TDB and other sources for its content (Figure 1). The RIB not only serves to identify specific technical data as being under baseline change control, but also provides information derived from the analysis and interpretation of technical data.

The scope of the Technical Data Management Plan is limited to technical data generated or used for Project activities. Guidance on Project planning relevant to technical data is provided in the Site Characterization Plan, Systems Engineering Management Plan, subsystem requirements documents, and other Project documents. Requirements of other Project plans and procedures, including document review and control; quality assurance; software quality assurance; baseline change control; and configuration, records, and regulatory management, are included implicitly in this plan and should be consulted for specific details. Analysis and interpretations of data associated with the management of technical data are also subject to these requirements.

## 2.0 PROJECT-LEVEL IMPLEMENTATION AND COORDINATION

This section describes the two types of groups established to coordinate the management of Project technical data among the participant organizations. Subsection 3.1 defines the responsibilities of the TDM with respect to technical data management. The TDAG, discussed in Subsection 3.2, brings together representatives of the participants to assist the TDM in resolving general data management concerns. The TDWGs, discussed in Subsection 3.3, are organized on an ad hoc and generally temporary basis to handle more specific technical data questions. Relationships between the TDM, TDAG, and TDWGs are shown in Figure 2 of this plan.

### 2.1 Technical Data Manager

The TDM is appointed by the Director of the Regulatory and Site Evaluation Division of the Project Office and is responsible for managing technical data and information for the Project. The TDM chairs the TDAG and is responsible for establishing TDWGs, as needed, to resolve data needs within specific technical areas.

### 2.2 Technical Data Advisory Group

The TDAG meets on a regular basis to advise and assist the TDM on matters concerning Project technical data and information. This group is chaired by the TDM, and includes administrators of the TDB and RIB and representatives from each participant organization. Primary goals of the TDAG are to assist in the development of an effective system for managing Project technical data flow and to develop the TDB and RIB as accessible sources of Project technical data.

## 2.3 Technical Data Working Groups

The TDM, with input from the TDAG, establishes TDWGs to resolve specific technical data concerns. Participant personnel with expertise and responsibilities relevant to the subject are requested by the TDM to serve on these groups. The working groups are intended to facilitate communication between data users, data providers, and the administrators of the RIB and TDB, and to stimulate the flow of needed data to the TDB and RIB. TDWGs are usually formed on a temporary basis to consider data needs within specific technical areas.

TDWGs define criteria for data proposed as input for the TDB and the RIB. These criteria include establishing the level of reduction, format, method of transmission of the data, and other criteria that may be established by the TDM. The TDWGs may have additional review responsibility for data and information proposed for input to the RIB, if so directed by the TDM.

# 3.0 TECHNICAL DATA BASE

The TDB is a centralized, accessible source of Project technical data maintained as a computer data base. To be effective, technical data must be submitted to, and incorporated into, the TDB in a timely manner. Procedural details regarding the flow of data for the Project to the TDB are the subject of Project AP-5.2Q, "Technical Information Flow To and From the Yucca Mountain Project Technical Data Base." In addition, Sandia National Laboratories (SNL) will have a procedure subordinate to AP-5.2Q that describes its responsibilities for administering the TDB. All participants will develop procedures for the transfer of technical data from their organization to the TDB (Annex 1). Subsection 4.1 describes interactions and processes that occur at the Project level; Subsection 4.2 discusses the responsibilities of individual participants in support of the TDB.

## 3.1 Project-Level TDB Process

At the Project level, some of the functions of the TDB administrative activity are to coordinate data input, manage the central data base operation, and produce output products from the data base in response to user requests. As a member of the TDAG, the TDB administrator participates in TDAG discussions concerning the flow of technical data to the TDB, identifies the need for forming TDWGs to consider TDB-related matters, and helps establish relationships between participant activities, the RIB, and the TDB. Considerable precaution is taken to appropriately verify and document all processing of technical data.

As part of input processing, and to minimize the introduction of errors into the TDB, TDB staff members will coordinate their efforts with those of data providers. These interactions should be an inherent part of planning data-producing activities. TDWGs may be established to define the data criteria described in Subsection 3.3, to assist in obtaining and submitting information to the TDB, and to address other matters as requested by the TDM.

Similarly, in developing output, interaction with data users ensures that an appropriate and useful product is prepared. Although hard-copy records of data transmissions will be employed to ensure quality assurance traceability, data transfer via computer media is available and may better suit the purposes of the user. This process is more fully described in Project AP-5.2Q and applicable SNL operating procedures. For the purposes of traceability, the processing of data for the TDB is fully documented through regular submittals by the TDB staff to the appropriate LRC and to the Project Central Records Facility (CRF).

## 3.2 Participant Responsibilities for the TDB

Data must be promptly submitted to the TDB in order to ensure their timely availability for use in other Project activities. To prepare and submit data efficiently, cooperative and coordinated efforts between participant staff and the TDB staff are necessary and can be assisted through the TDAG and the TDWGs. Early, informal communication between data providers and the TDB staff can improve the efficiency of this process.

The Principal Investigator of a data-producing activity is responsible for obtaining and providing the data, with supporting information, to the Project as described in Project AP-5.2Q and other relevant Project requirements. Quantitative technical data that characterize the properties of the proposed repository site are the principal output that result from data-producing activities for the TDB. The bulk of these data are rock properties; however, other properties, including meteorological, groundwater, and construction material, are also covered by this plan.

The Technical Project Officer (TPO) of each organization is responsible for ensuring the validity and reliability of technical data. This responsibility includes all appropriate review, preparation, and archival of relevant supporting documentation and the satisfaction of quality assurance requirements. Some pre-analysis of data may be needed, but the release of data to the TDB is expected to precede full analysis and publication and minimize delays in providing the data for Project use.

The TPO is responsible for determining data acceptability and qualification and for authorizing the timely release of technical data and associated supporting information to the TDB. Planning of a data-producing activity should incorporate criteria for the timely release of technical data to the TDB for use in other Project activities. Each participant organization shall implement procedures as required to comply with Project AP-5.2Q. These procedures will include requirements to ensure that records of participant interactions with the TDB are submitted to the Project ARS. The requirements for the periodic reporting of data, given in AP-5.2Q, must consider the interests of both data providers and data users; a reporting schedule should be described in the associated Project study plans and engineering plans.

## 3.3 Allowable Use of Data From the Technical Data Base

Technical data are made available for Project use as they are approved and released by individual participant organizations and entered into the technical data base. The data may then be used for calculations and analyses

conducted within the Project. Technical data that are identified for entry into the technical element of the Project baseline will be submitted as a change to the RIB (Section 5) and, following approval, identified by the RIB.

Reports of data and information from the technical data base will include an indication of the quality assurance level associated with that data. It will be the responsibility of the user to ensure that such use is consistent with the limitations imposed by quality assurance.

Data provided directly to persons or organizations outside the Project will be accompanied by the following disclaimer:

> These data are being provided in accordance with agreements to provide data to interested parties as soon as practical after their collection. Provision of the data should not be construed as any form of endorsement by the U.S. Department of Energy (DOE) of the application or use of the data by parties outside the DOE.

## 4.0 REFERENCE INFORMATION BASE

The RIB is the primary Project source of baselined technical data and information (Figure 1). It is disseminated as a controlled document that is revised periodically through the controlled distribution of update page sets. The RIB, which represents a compendium of current Project understanding of site characteristics, design configuration,and performance assessment results, will evolve through the time of license application and into the period of performance confirmation. Project AP-5.3Q, "Information Flow into the Project Reference Information Base," provides important Project mechanisms for rapidly processing changes and corrections to the Project technical baseline, for establishing internal consistency of data usage among activities, for checking that proposed changes are valid and traceable, and for establishing improved communication across provider/user interfaces.

Subsection 5.1 discusses participant interactions and processes regarding the RIB at the Project level, and Subsection 5.2 describes participant responsibilities toward the RIB. Procedural details regarding the flow of technical data with respect to the RIB are the subject of Project AP-5.3Q. In addition, SNL will have a procedure subordinate to Project AP-5.3Q that describes SNL responsibilities for administering the RIB. All participants will develop implementing procedures, as necessary, for the control of their interactions with the RIB development and administrative activity (Annex 1).

These procedures will include requirements to ensure that records of participant interactions with the RIB are submitted to the Project ARS.

### 4.1 Project-Level RIB Process

Technical data and information presented in the RIB are selected for their importance to users and for the technical baseline. The technical data and information to be included in the RIB will be used to support the various analyses necessary for site characterization and environmental and

socioeconomic evaluations, develop the configuration of the engineered subsystems, conduct performance assessment activities, and provide information for the development of Project positions on the resolution of technical issues. The RIB draws on and provides points of contact to other Project resources, including the TDB, interface control drawings, and other documents. All technical data and information in the RIB are accompanied by descriptive information that concisely communicates the sources of information, the details of any subsequent manipulation or interpretation of data, the intended uses and limitations of the technical data and information, and quality assurance information. The RIB will specifically identify information that is of sufficient quality to allow its use in license application design or final procurement and construction design.

Proposed RIB changes must be rapidly processed for the most efficient and effective use for Project activities. Changes proposed for the RIB undergo a development and review process before they are submitted to the technical baseline. As a member of the TDAG, the RIB administrator participates in TDAG discussions of the coordinated flow of Project technical data to the RIB as changes to the technical element of the Project baseline. Baseline changes will be submitted in accordance with the Project Configuration Management Plan and Project AP-3.3Q, "Change Control." Project AP-5.3Q will describe the process of preparing changes to the RIB prior to the baseline change control process described in Project AP-3.3Q. Baseline change consideration and the dissemination of approved baseline changes must also be conducted efficiently in order to meet this goal.

The TDWGs, described in Subsection 3.3, are an important part of the RIB development and review process. These groups will bring together data users and providers to identify and supply initial input for the RIB and, if necessary, to further develop and review candidate information items. These activities will be coordinated by the RIB administrator.

Supporting information for the RIB change control and development process is fully documented through regular submittals to the LRC at SNL and the Project CRF.

## 4.2 Participant Responsibilities for the RIB

The RIB is intended to be a user-driven document; its principal users are participant staff members who should keep the RIB administrator apprised of their reference information needs.

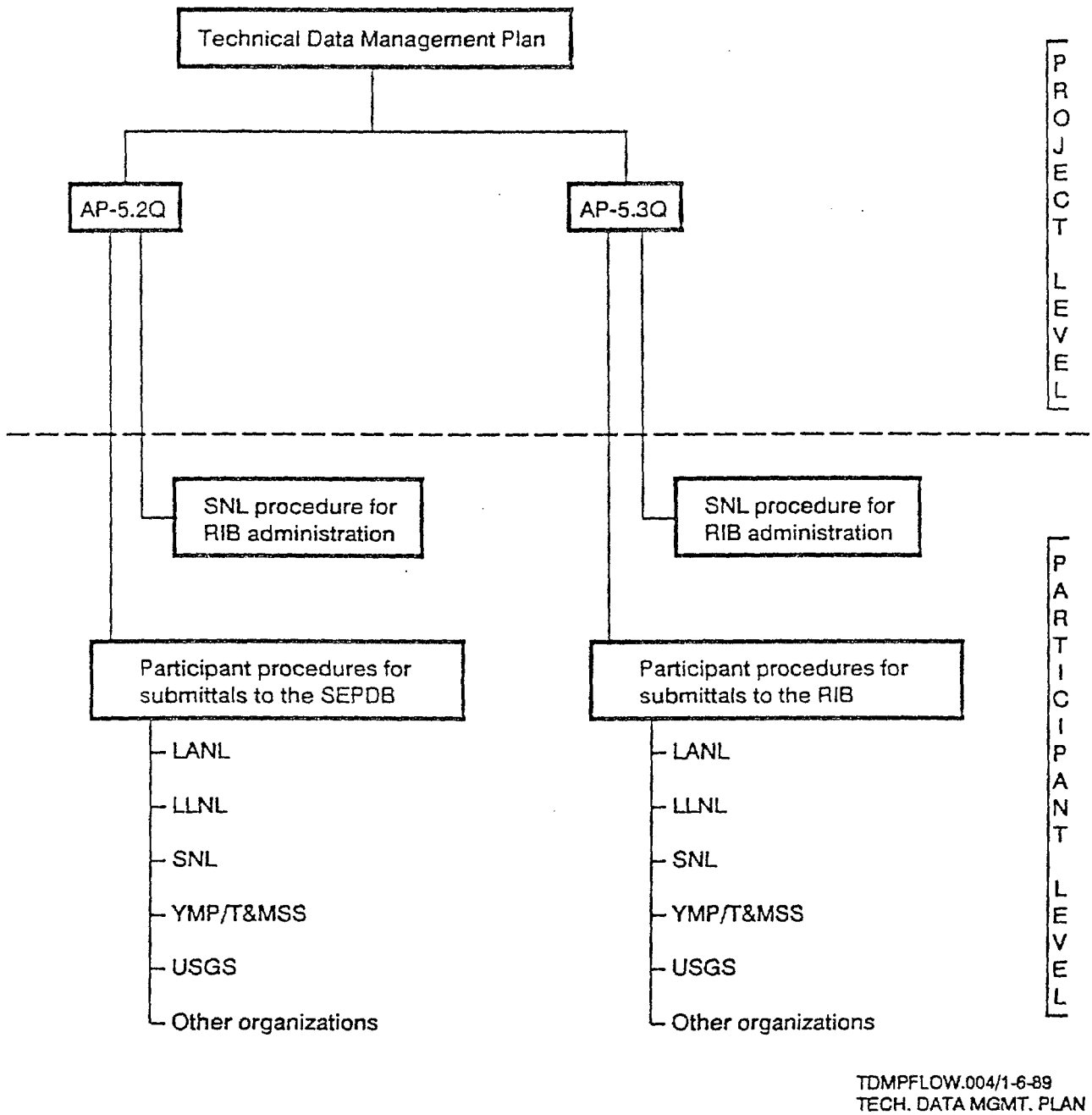
Once a proposed change to the RIB has been identified for further development, technical staff resources are contacted to assist the RIB development staff in processing the change. Efforts are made to minimize the impact on participant staff members; however, the broad scope of the RIB requires that the responsibility for the technical adequacy and accuracy of individual RIB information items remain with the individuals who have the technical expertise and who are responsible for specific technical areas within the Project.

Staff members identified to review proposed input to the RIB must respond in a timely manner to keep the RIB content current with the state of the Project. These reviews are intended to verify the adequacy and validity

of proposed changes; new technical information is more appropriately introduced as a subsequent change. Technical staff members must recognize that, because the RIB is evolutionary in nature, proposed input will not necessarily represent a final Project position but, rather, the best available information at the time. Processing of baseline changes requires a number of steps that contribute to the cumulative delay between the initiation and the final disposition of changes. These delays must be kept to a minimum for the RIB to be used effectively for current Project activities.

### 4.3 Allowable Use of Reference Information Base Data

The baselined technical data identified by the RIB may be used for all Project activities, but are subject to the limitations contained in the descriptive section associated with each RIB Information Item. If the quality of the available data selected from the RIB is inconsistent with the quality of data required for the phase of the Project, those documents that contain such data or are based on such data must explicitly identify the data and cite the specific limitations imposed on the use of the information in the text of the documents.






Annex 1. Plans and Procedures for Yucca Mountain Project Technical Data Management.

APPENDIX A

REFERENCE PLANS AND PROCEDURES

The following plans and procedures are referenced by this plan or are related to the management of technical data for the Project.

| Number | Title |
|---|---|
| AP-2.8 | Monthly Technical Data Transfer Report |
| AP-3.3Q | Change Control |
| AP-5.2Q | Technical Information Flow To and From the Yucca Mountain Project Technical Data Base |
| AP-5.3Q | Information Flow into the Project Reference Information Base |
| NNWSI/88-4 | NNWSI Project Configuration Management Plan |
| NNWSI/88-9 | NNWSI Project Quality Assurance Plan |
| NNWSI/88-15 | NNWSI Project Records Management Plan |
| NNWSI/88-3 | NNWSI Project Systems Engineering Management Plan |
| YMP/89-1 | Information Resources Management Plan |

APPENDIX B

DEFINITIONS

| | |
|---|---|
| CRF | Central Records Facility; the Project entity that manages and archives Project records. |
| Data | Technical data for the Project are provided by data-producing activities that are conducted by Project participants. For the purposes of this plan, technical data are broadly defined as the scientific and engineering data and information that are used in support of site characterization, design, performance assessment, licensing, and regulatory compliance activities for the Project. |
| Data-Producing Activities | Scientific or engineering activities, whether site characterization, design, or performance assessment, that provide technical data and information for the Project. |
| Data Provider | A general term for Project staff members who are engaged in data-producing activities and who provide input to the TDB and the RIB. |
| Data User | A general term for Project staff members who require technical data and information to conduct their activities. |
| RIB Administrator | The SNL staff member responsible for administering the RIB. |
| TDB Administrator | The SNL staff member responsible for administering the TDB. |
| IGIS | Interactive Graphics Information System; one of two components of the TDB. The IGIS is primarily an analysis tool for the manipulation, analysis, and display of graphics-based information (e.g., a base map showing the location of the civil land survey grid or the locations of Project drillholes). |
| LRC | Local Records Center; the LRC of each Project participant is used to collect and manage local Project records and to transmit them to the Project Central Records Facility. |
| Participant | Primary organizations involved in the Project, including the Project Office. Participants include EG&G/Energy Measurements, Fenix & Scisson, Inc., Holmes & Narver, Inc., Los Alamos National Laboratory, Lawrence Livermore National Laboratory, Mac Technical Services, Reynolds |

| | |
|---|---|
| | Electrical & Engineering Company, Inc., Sandia National Laboratories, the United States Geological Survey, and the Technical and Management Support Services (T&MSS) contractor to the Project Office. |
| PI | Principal Investigator; the person who has technical responsibility for a particular technical task. |
| RIB | Reference Information Base. The RIB is a Project-approved and Project-baselined document that is placed under controlled distribution and that provides summary data and information pertaining to the Project. It is a dynamic, evolving document that represents the best available Project-endorsed technical information at any point in time and is closely related to the systematic control of change that is a basic function of configuration management. The RIB contains (or shall contain) the reference site, design, performance, and socioeconomic and environmental information about the proposed Mined Geologic Disposal System at Yucca Mountain. The information will be used within the Project to support the various analyses necessary for site characterization, environmental evaluation, design, and performance assessment. The RIB will provide Project staff members with internally consistent values for use in their various activities. The RIB is developed and maintained by SNL under Work Breakdown Structure element 1.2.1.3.3. |
| SEPDB | Site and Engineering Properties Data Base; a computerized data base directed toward the storage and retrieval primarily of objective, physical properties and related information derived from geotechnical studies of the proposed Yucca Mountain repository site. The SEPDB deals principally with information that is tabular in form. |
| Supporting Documentation | Documentation that is associated with the processing of technical data and information and that is necessary to ensure that quality assurance traceability requirements are adequately satisfied. |
| TDAG | Technical Data Advisory Group; a group established at the Project level, under the direction of the TDM, to provide guidance on the flow of technical data from the participants to the TDB and RIB. Chaired by the TDM, membership includes the administrators of the RIB and TDB, representatives of all participants, and others as directed by the TDM. |
| TDB | Technical Data Base; the central Project source of technical data. The TDB consists of two components, the SEPDB and the IGIS. |

| | |
|---|---|
| TDM | Technical Data Manager; the Project Office staff member responsible for managing technical data for the Project. |
| TDWGs | Technical Data Working Groups; working groups formed under the direction of the TDM to address and resolve specific, usually short-term, technical data matters. These small groups are composed of representatives from appropriate participant organizations having responsibilities related to the specific purpose for which a group is formed. |
| TPO | Technical Project Officer; the individual responsible for managing each participant organization's activities for the Project. |
| TDAG | Technical Data Advisory Group; a group consisting of technical representatives from each Project participant and a QA representative. The TDAG provides advice and guidance on matters of technical data and information management. The TDAG is chaired by the Technical Data Manager. |