

**Mined Geologic Disposal System (MGDS)
Annotated Outline Skeleton Text
for the Preparation of a License Application**

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Volume I of II

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NOTICE

THIS DOCUMENT CONTAINS TEXT AND PLANNING PACKAGE MATERIAL FOR THE FUTURE DEVELOPMENT OF AN MGDS LICENSE APPLICATION. THIS MATERIAL IS NOT FULLY DEVELOPED, DOES NOT MEET ALL REGULATORY REQUIREMENTS, AND MAY CONTAIN BLANK SPACES WHERE INFORMATION HAS NOT BEEN OBTAINED.

THIS DOCUMENT ALSO CONTAINS STATEMENTS ENCLOSED IN BRACKETS TO HIGHLIGHT THE FACT THAT THESE CONCLUSIONS, ALTHOUGH PREMATURE NOW, WILL ULTIMATELY HAVE TO BE MADE TO DEMONSTRATE REGULATORY COMPLIANCE FOR ANY SITE.

OVERVIEW OF THE ANNOTATED OUTLINE DEVELOPMENT PROCESS

Background

Part 60 of Title 10, Code of Federal Regulations, Disposal of High-Level Radioactive Wastes in Geologic Repositories, specifies the information to be covered in an application for a license to dispose of high-level radioactive waste, including spent nuclear fuel.

One of the regulatory strategies the DOE is using to support the licensing of a geologic repository is the Annotated Outline initiative. The Annotated Outline for the Preparation of a License Application will serve as guidance for the eventual development of the geologic repository License Application.

The Annotated Outline is being prepared on the basis of guidance contained in a Draft Regulatory Guide DG-3003 Format and Content for the License Application for the High-Level Waste Repository.

Annotated Outline Development Process

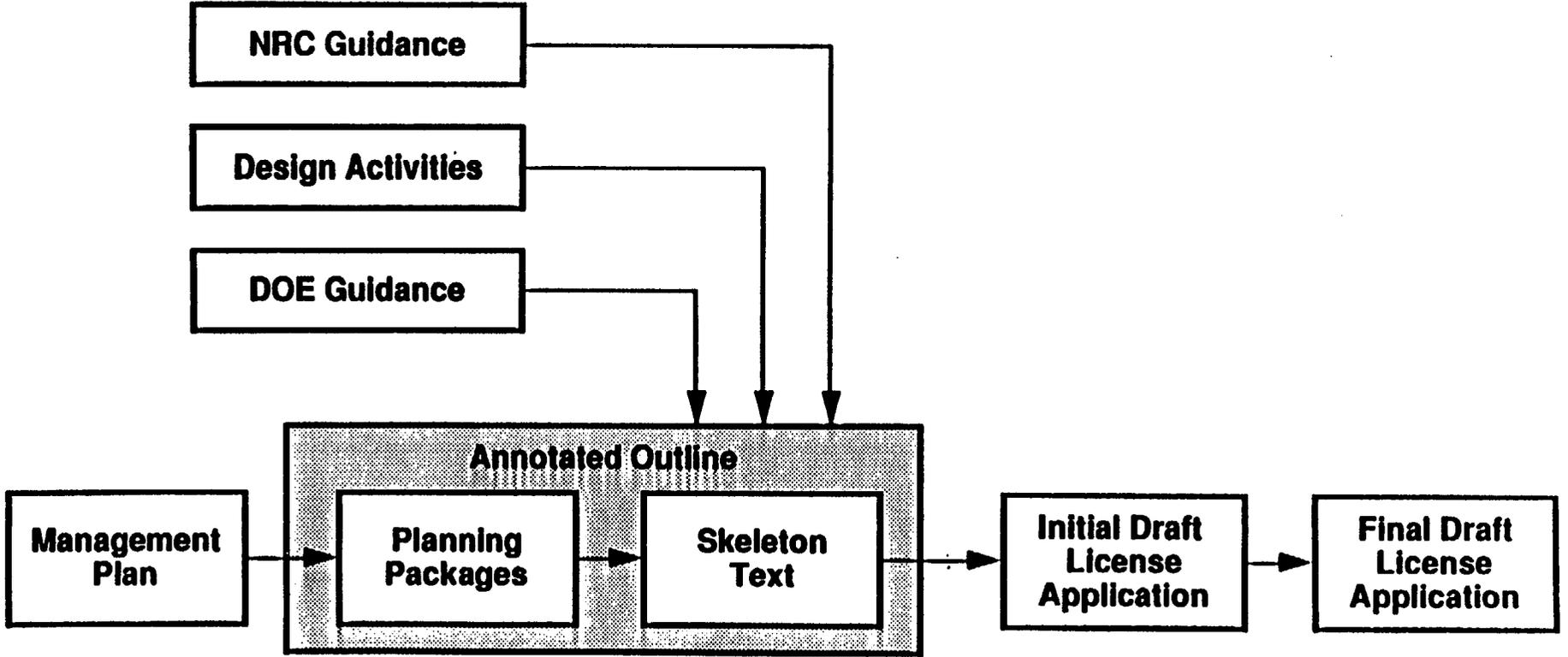
The Annotated Outline development process consists of two phases. Creation of the Annotated Outline Planning Packages is the first phase in the Annotated Outline development process. The Planning Packages are developed by the lead authors designated for each section of the Annotated Outline. Specific forms are utilized to guide the Annotated Outline development process. The authors begin to conceptualize the layout of their respective sections and begin drafting a limited amount of document text as well as identifying required figures and tables. References to be used by the lead authors are also identified. The lead authors then begin to identify information needed from other groups.

The Skeleton Text is the second phase of the Annotated Outline development process. The lead authors begin to write the proposed text and guidance for the future development of a License Application, building upon the Planning Package framework. All the information has not been obtained for the final document; therefore, the Skeleton Text is not fully developed, does not currently meet all regulatory requirements, and may contain blank spaces where the information has not been obtained. As issues are identified that need to be resolved for the successful licensing of the repository, they are also incorporated into the Annotated Outline, as necessary.

Throughout the two phases of Annotated Outline development described above, there will be an iterative process of development, review, and rework. As the repository design effort progresses, more information will become available to incorporate into the Annotated Outline.

Figure 1, Annotated Outline Development Process, illustrates the relationship of the Annotated Outline to the eventual development of the License Application. The relationship of the Annotated Outline Planning Packages to Skeleton Text is also represented.

Figure 1. Annotated Outline Development Process



Planning Package Forms

There are six basic forms used in the development of the Planning Package phase of the Annotated Outline. Examples of the forms can be seen in the various sections of the Annotated Outline. The forms and their use are:

Form 1:	Text
Form 2:	Figures & Tables
Form 3:	References
Form A:	Information Request
Form B:	Information Response
Form C:	Information Request Tracking Log

Each form may not be used for all sections of the Annotated Outline. In general, the Planning Package forms parallel the information contained in the Skeleton Text.

Skeleton Text

When Skeleton Text is developed for a section or chapter of the License Application, it is placed in front of the Planning Packages for the same section. Refer to the Annotated Outline for examples. It is desirable to maintain portions of the Planning Packages with the Skeleton Text to provide an overview of the section and to supplement the information in the Skeleton text.

The Skeleton Text is formatted in the same manner that the License Application will be. Each section of the Skeleton Text will eventually include the following in the sequence given:

- Table of Contents
- List of Tables
- List of Figures
- Section Text
- List References

The Skeleton Text is usually written in the present tense. The purpose of this convention is to avoid major rewrites of the Annotated Outline when work begins on the License Application. For example, the Annotated Outline may state that another document has been written or submitted to the NRC when work has not even started yet on that particular document. The fact that the document has not been developed or submitted to the NRC is usually indicated by placing "[TBD]" (to be developed).

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MGDS Annotated Outline

Chapter 1.0 General Information

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1.0 GENERAL INFORMATION

Pursuant to 10 CFR 60.21, the Department of Energy (DOE) hereby makes application for the necessary license to construct, own, use, and operate a mined geologic repository for the disposal of high-level radioactive waste. This application for the proposed repository contains information as required by 10 CFR 60, and has been prepared in accordance with the guidance provided by Regulatory Guide XX [Number will be inserted when RG is issued.], "Format and Content for the Application for the High-Level Waste Repository", dated XXXX XX, XXXX [Date will be inserted when RG is issued]. The license application consists of the following parts:

- A. The license application which is set out herein
- B. The technical information and safety analysis report required by 10 CFR 60, which is set out in a separate document entitled, "DOE Yucca Mountain High Level Waste repository Safety Analysis Report", **SEL-1A** is forwarded herewith as Chapters 2 through 11, and made a part hereof
- C. The physical security information required by 10 CFR 60 and 10 CFR 73, which is set forth in a separate document entitled "DOE Yucca Mountain High Level Waste repository Physical Security and Safeguards Plan", **SEL-1C** forwarded herewith and made part hereof to be withheld from public disclosure pursuant to 10 CFR 2.790(d)(1)

- D. The emergency planning information required by 10 CFR 60, which is set forth in a separate document entitled "DOE Yucca Mountain High Level Waste Repository Emergency Preparedness Plan", **SEL-1D** forwarded herewith and made a part hereof.

The Final Environmental Impact Statement required by the Nuclear Waste Policy Act, as amended, which is set forth in a separate document entitled "DOE Yucca Mountain High Level Waste Repository Environmental Impact Study", **SEL-1B** is also forwarded herewith to accompany the LA.

On December 22, 1987, the United States Congress enacted the Nuclear Waste Policy Amendments Act of 1987 (NWPA), which directed the DOE to characterize one site as a candidate for the first mined geologic repository for the disposal of high-level radioactive waste. Yucca Mountain, located in Nye County, in southern Nevada approximately 100 miles northwest of Las Vegas (Figure 1.0A) **SEL-2**, has been characterized for development as the first geologic repository for the disposal of high-level radioactive waste. As shown on Figure 1.0A, Yucca Mountain is located on land managed by the Bureau of Land Management (BLM) of the Department of the Interior, Nellis Air Force Base, and the Nevada Test Site (NTS) which has been withdrawn from the public domain and reserved for use by the DOE. [In order to comply with all applicable regulatory requirements, it must be substantiated by supporting information that the proposed facility may be constructed and operated without unreasonable risk to the health and safety of the public.]

The proposed Yucca Mountain repository, hereafter referred to as the repository, will consist of surface facilities that include systems designed, constructed, and tested to receive and prepare the waste for disposal. The waste packaging and handling system that will be used is described in Topical Report **SEL-3A**, dated **SEL-3B**, and was accepted by the Nuclear Regulatory Commission (NRC). Reference Safety Evaluation Report dated ____ which was provided by NRC. Underground facilities have also been designed, and will be constructed and tested for the emplacement of the waste, and will be connected to the surface by ramps and shafts. Upon permanent closure, seals will be constructed for the ramps, shafts, and exploratory bore holes (Figure 1.0B) **SEL-4**. Additionally, see Figure 1.0C **SEL-5**, for a topographical view of the repository. A detailed description and safety analysis for the repository is contained in the Safety Analysis Report (SAR) contained herein.

It is requested that all communications pertaining to the license application be transmitted to **SEL-8A**. It is also requested that a copy of each communication be sent to **SEL-8B**. [Recommend DOE general council, lead project manager for OCRWM, and CRWMS M&O Licensing Manager].

I, [Name of Secretarial Officer], state that on behalf of the Department of Energy; I am authorized to sign and file with Nuclear Regulatory Commission this application and exhibits attached thereto; and that all of the statements contained in such application and exhibits attached thereto and made part thereof are true and correct to the best of my knowledge, information, and belief.

Signature _____

Name

[Insert Office Position]

[Office of Civilian Radioactive Waste Management]

[Department of Energy]

Subscribed and sworn to before me this _____ day of _____ .

Signature _____

Notary Public

My commission expires: _____

1.0.1 Overview of the Proposed repository

Yucca Mountain site characterization began in 1977, when the U.S. Government investigated the possibility of siting a repository at the Nevada Test Site (NTS). The NTS was proposed for the following reasons:

- A. In the southern Nevada area, groundwater does not discharge into rivers that flow into major bodies of surface water
- B. The NTS has geochemical characteristics that are favorable for waste isolation, i.e., retardation of radionuclide migration
- C. The paths of groundwater flow between the repository and the points of groundwater discharge are long
- D. The region is arid causing the rate at which groundwater is recharged to be very low with the potential movement of groundwater, in unsaturated rock, also very low.

To facilitate weapons testing at the NTS, site characterization was limited to the southwestern portion of the NTS and the adjacent land; therefore, three locations were identified for preliminary testing. One of these locations was Yucca Mountain which contained a formation of tuff that appeared to be large enough for a repository. Tuff had not previously been considered as a potential host rock for a repository; therefore, the National Academy of Sciences (NAS) was consulted for its views on investigating the tuff as a host rock. The NAS responded favorably.

The U.S. Geological Survey (USGS) also recommended Yucca Mountain as a potential site, about the same time, based on the results of preliminary explorations at all three locations. In 1980, a formal analysis of 15 potential locations indicated Yucca Mountain was preferred, with several potentially suitable horizons within the mountain. Following the preparation of an environmental assessment, (EA) the Secretary of the DOE nominated Yucca Mountain as one of five sites suitable for characterization, and recommended it be characterized as one of three candidate sites for the repository. This recommendation was approved by the U.S. President. Subsequently, on December 22, 1987, the U.S. Congress enacted the Waste Policy Amendments Acts of 1987, which directed the DOE to characterize only one site, Yucca Mountain. The characterization was completed on SEL-9. [At later date, text will be added for NRC to provide preliminary comments on adequacy of DOE's SCA and waste form proposal for inclusion in LA.]

The Yucca Mountain site is located in Nye County, Nevada, approximately 100 miles by road, northwest of Las Vegas (see Figure 1.0A). As shown in Figure 1.0A, the repository is located on various federal lands: Public lands managed by the BLM; Nellis Air Force Range (withdrawn from the public domain for use by the U.S. Air Force [Department of Defense]), and managed by the BLM; and, the NTS, (withdrawn from the public domain and reserved for use by the DOE). The site lies in the southwest part of the Great Basin, an arid region with linear mountain ranges and intervening valleys. This region receives little precipitation and has sparse vegetation and sparse population. Yucca Mountain is approximately 5000 feet above sea level, 1200 feet above the western edge of Jackass Flats to the east, and more than 1000 feet above the eastern edge of Crater Flats to the west.

Yucca Mountain is part of a group of northern ridges that extend southward from Beatty Wash northwest to U.S. Highway 95 in the Amargosa Desert (Figure 1.0A). Steep slopes of 15 to 30 degrees are found on the western side of Yucca Mountain and along some of the valleys that cut into the more gently sloping (5 to 10 degrees) east side of Yucca Mountain. North of Yucca Mountain is the high terrain of Timber Mountain. Along the west side of Crater Flats, fans of stream deposited sediments extend from valleys that have been cut into Bare Mountain. A few basalt cones and small lava flows are present on the surface of the southern half of Crater Flats. The water table at Yucca Mountain is approximately 2500 feet below the land surface. Due to limited rainfall and a high evaporation rate, there is very little percolation of water downward through the unsaturated rocks above the water table.

1.0.2 General Layout and Design

The repository consists of surface and underground facilities connected by ramps and shafts. Seals have been designed and tested, and will be constructed for the ramps, shafts, and exploratory bore holes when the repository is permanently closed. The repository facilities have been designed to comply with all applicable functional and regulatory requirements. The design of the repository is based upon the waste management program that includes the DOE Monitored Storage Facility located in SEL-11A, licensed by the NRC on SEL-11B.

The surface facilities of the repository have been designed to receive the waste and prepare it for permanent disposal in the underground facility. These facilities are located on the **SEL-12** of Yucca Mountain and consist of central facilities, outlying support facilities, and facilities that provide access and ventilation for the underground repository (Figure 1.0E) **SEL-13**. The central surface facilities area is divided into **SEL-14A** functional areas used for **SEL-14B** [waste receipt and inspection, waste handling operations, and general support facilities?]. The surface facilities are connected to the underground repository through **SEL-15A** ramps and **SEL-15B** shafts [a number of ramps and shafts will be added]. A rail spur and a road will be constructed for waste that will be shipped by rail or truck.

The waste ramp is designed for transporting the waste containers to the underground emplacement area and to provide a fresh air intake for the waste emplacement area. A tuff ramp has been designed for use in the excavation and construction of the underground repository to facilitate removal of mined rock from the repository to the surface where the rock will be stockpiled. Additionally, this ramp has been designed to house the main electrical feeder for the underground facilities and provide the primary exhaust airway for the underground development area. All **SEL-15C** shafts and ramps are located **SEL-15D** [east/west?] of the central surface facilities area. **SEL-15E** of these shafts were used as exploratory shafts during site characterization. These shafts are also used as fresh air intakes for the waste emplacement area, and are described in Chapter 4. Additionally, one of these shafts will be used as an emergency exit from the underground facility.

The underground repository, where the waste will ultimately be emplaced, will be constructed at a depth of approximately 240 to 340 meters [may change with design revisions]. The primary horizon for the repository is in the welded tuff formation of the **SEL-16A** [currently believed to be a Topopah Spring Member]. The boundaries of this area are shown in Figure 1.0E **SEL-16B**. The host rock in the primary area is sufficiently thick over an area large enough to accommodate the equivalent of 70,000 metric tons of heavy metal waste. An area of **SEL-16C** [currently believed to be 2,095] acres is available underground for waste emplacement. The [current] repository [conceptual] design calls for using **SEL-16D** acres [Current plans call for 1,380 acres]. The layout consists of **SEL-17** parallel main entry drifts that would extend southwest through the underground facility to provide access to the waste emplacement areas, called emplacement panels. One of the main drifts has been designed and dedicated to transport waste, another for moving rock and large materials, and another to serve as a main drift ventilation and electrical distribution systems. The primary component of the underground layout is the emplacement panel which is the area excavated for waste package emplacement (or storage). An emplacement panel is approximately **SEL-18A** feet wide and **SEL-18B** feet long and will contain the emplacement drifts, in which boreholes will be drilled **SEL-18C** [vertical or horizontally], for waste emplacement. The development of the waste panels will begin in the **SEL-18D** and progress in a **SEL-18E** direction as shown in **SEL-18F** Figure 1.0F. Waste emplacement operations will be conducted in a programmatic sequence following the order of waste panel development.

Waste emplacement will begin after **SEL-19A** panels have been completely developed. This method will provide a safe distance between development mining and waste emplacement operations to protect the development personnel from exposure to radiation. The waste packages have been designed to be placed **SEL-19B** [vertically/horizontally] in boreholes drilled into the floors/walls of the emplacement panels as shown in **SEL-19C** Figure 1.0G. A description of the borehole and emplacement techniques is contained in Chapters 4 and 5.

Two independent ventilation systems have been designed to serve the underground repository. One will satisfy ventilation needs for the development and construction of the repository and the other will satisfy ventilation needs for waste emplacement operations. The basic layout of the ventilation system (Figure 1.0H **SEL-20A**) consists of **SEL-20B** shafts, **SEL-20C** ramps, and **SEL-20D** main airways emplacement areas on each side of the main airways and a perimeter airway that will encircle the repository. A detailed description of the ventilation system is contained in Chapter 4.

Tunnel boring machines **SEL-21A** (TBMs) were used to excavate the waste and tuff ramps as part of the Exploratory Studies Facility (ESF). TBMs will also be used for long-drive drifts, the waste main, and the perimeter drift. Drilling and blasting will be used to excavate the shorter drifts. Waste emplacement boreholes will be excavated using a **SEL-21B**. A detailed description of these plans and methods is contained in Chapter 5.

Waste will be retrievable for the emplacement period plus 50 years at any time after the start of waste emplacement. Following the waste emplacement period, which is scheduled for **SEL-22A** years, the caretaker period of **SEL-22B** years will begin. During both of these periods, tests will be conducted to confirm the repository is performing as designed. At the end of the caretaker period, the repository will be prepared for permanent closure. Plans for backfilling and sealing are contained in Chapter 5. Surface facilities will be decontaminated and dismantled, as required. The site will then be returned to its natural state as provided in the reclamation plan. A plan for permanent closure of the repository and decontamination and dismantlement of surface facilities has been provided as an attachment to this report.

The waste package design is comprised of the waste form and the container. The waste package, like the site and the repository, is an element of the repository system, and is the principal engineered barrier. The waste package is designed to meet the requirements of 10 CFR 60. Figure 1.0I **SEL-23A** is a general drawing of the components that constitute the waste package. Chapter 5 provides a detailed description of the waste package as accepted by the NRC in Topical Report **SEL-23B**. Reference SER dated ____ provided by NRC. The waste form will be either spent fuel from commercial reactors, both pressurized water (PWR) and boiling water (BWR) types, or high-level waste from defense or commercial sources. The spent fuel will be **SEL-24A** [consolidated at the repository or before shipment and/or disposed of as intact assemblies]. The spent fuel from PWRs will be greater than **SEL-24B** years old and spent fuel from BWRs will be greater than **SEL-24C** years old. A description of the spent fuel, its burn-up

time at discharge, its nominal burn-up time, and the thermal output calculation methods is contained in Chapter 5.

The waste container with spent fuel has been designed so the gamma dose rate at the outer surface of the container will be approximately **SEL-24D** Rads per hour. The neutron dose rate on the outer surface of the container will be approximately **SEL-24E** neutrons per square centimeter. Spent fuel packages have been designed for thermal decay rates as low as **SEL-24F** kilowatts and as high as **SEL-24F** kilowatts. The high level waste from both commercial and defense sources will be in the form of borosilicate glass solidified in stainless steel canisters. The high level waste containers have been designed for thermal decay rates that will range between **SEL-25A** kilowatts depending on the source and age of the wastes in the glass matrix. A description of the thermal output calculation methods is contained in Chapter 5.

The gamma dose rate on the surface of the container will be approximately **SEL-25B** Rads per hour, and the neutron dose rate at the surface of the container will be approximately **SEL-25C**. The disposal container for both waste forms is a **SEL-26A**. Figure 1.0J **SEL-26B** provides a general drawing of the waste forms in the appropriate disposal containers. After the waste is loaded into the disposal container, it will be filled with an inert gas **SEL-26C** to provide a non-oxidizing environment, and the top will then be welded shut. The top of the container has a fixture for lifting and lowering the container. A loaded container will weigh from **SEL-26D** to **SEL-26D** pounds depending on the quantity and type of waste. The containers for spent fuel will contain components/compartments to maintain the spent fuel in a stable position for

container loading. These mechanisms have been designed to accommodate **SEL-26E** [the different types of spent fuel, and to accommodate consolidated and non-consolidated fuel].

The partially saturated portion of the **SEL-27A** tuff, as shown in Figure 1.0K, **SEL-27B** will provide a waste emplacement environment acceptable for the permanent storage and long-term performance of the waste package. The pressure exerted on the disposal containers has been calculated to be approximately **SEL-27C** pounds per square inch. There will be no hydrostatic pressure because the repository is above the water table, and the waste packages will not be subject to loads induced by potential creeping of the rock. The potential water available for corrosion of containers and the dissolution of the waste package or form is limited to very small amounts **SEL-27D**. A detailed description of the physical conditions in the waste emplacement environment is contained in Chapter 5.

[The proposed site, facility design, plans for construction, operation, and permanent closure have been shown to meet the requirements set forth in the previously mentioned regulatory documents, and have been demonstrated to meet all requirements of an optimum selection with an acceptable level of risk with respect to the health and safety of the public.]

REFERENCES

- 1.0A Nuclear Regulatory Commission, 10 CFR 60, Code of Federal Regulations, 1986, Title 10, "Energy," Part 60, "Disposal of High Level Waste in Geologic Repositories," U.S. Government Printing Office, Washington, D.C.
- 1.0B Department of Energy, Office of Civilian Radioactive Waste Management, 1988, "Yucca Mountain Site Characterization Plan," DOE/RW-0199, Washington, D.C.
- 1.0C Nuclear Waste Policy Act, 1983, "Nuclear Waste Policy Act of 1982," Public Law 97-425, 42 USC 10101-10225, Washington, D.C.
- 1.0D Nuclear Waste Policy Amendments Act, 1987, "Nuclear Waste Policy Amendments Act of 1987," H.R. 3545, Washington, D.C.
- 1.0E Department of Energy, Office of Civilian Radioactive Waste Management, 1988, "Yucca Mountain Site Characterization Plan Overview," DOE/RW-0199, Washington, D.C.
- 1.0F Department of Energy, Yucca Mountain Project Office, 1990, "Yucca Mountain Site Characterization Plan Overview," YMP/90-33, Washington, D.C.

**MGDS Annotated Outline Planning Package
Form 1: Text**

Date: 4/17/92

1. Section No. & Title: **1.0 GENERAL INFORMATION**

2. Lead Author & Phone No. Marshall Weaver (702) 794-1871

3. First Phase Planning Package Due: 6/21/91

Second Phase Planning Package Due: 10/18/91

First Phase Skeleton Draft Due: 12/30/91

Second Phase Skeleton Draft Due: 3/15/92

4. Plan Approved: W.R. Griffin 8/27/91
(Licensing Mgr & Lead Author)

5. Section Summary (Approximately 100 Words):

This section provides an introduction to the License Application. It includes a general description of the high-level waste repository and an overview of the proposed project. A description is given of the location, the general layout and design of the repository, and supporting information for the license application.

6. Opening Statement:

The proposed site for the high-level waste repository has been studied and characterized. It has been substantiated by supporting information, that the proposed facility may be constructed and operated at the candidate location without unacceptable adverse effects on the public.

7. Main Body Outline:

- Introduction to the report
- General description of the repository
- Overview of the proposed project
- Description of the location (see Figure 1.0A)
- General layout and design
- Supporting information for the license application.

8. Conclusion:

The proposed site, facility design, and plans for construction, operation, and permanent closure, have been shown to be an optimum selection, with an acceptable level of risk to the public.

9. Support Authors & Their Assignments:

**MGDS Annotated Outline Planning Package
Form 2: Figures & Tables**

Date: 4/17/92

Section No. & Title: **1.0 GENERAL INFORMATION**

Lead Author & Phone No. Marshall Weaver (702) 794-1871

A. Figure No. 1.0A

Caption: **General Location of Yucca Mountain Site in Southern Nevada**

Content:

Map showing location relative to Las Vegas, State Boundary, Nellis AFB, NTS, BLM land, etc. Probably the existing map Figure 2-3 from the SCP will satisfy this.

B. Figure No. 1.0B

Caption: **General Map of Site Surface and Underground Facilities**

Content:

Map showing repository site, both above ground and underground facilities and interconnection, i.e., ramps, railroad, tuff pile, etc.

C. Figure No. 1.0C

Caption: **Topographical Map of Site Surface and Underground Facilities**

Content:

See SEL-5, Form A, No. 4.

D. Figure No. 1.0D

Caption: **General Map of Repository Site Relative to Las Vegas**

Content:

See SEL-10, Form A, No. 4.

E. Figure No. 1.0E

Caption: **General Drawing of Central Facilities**

Content:

See SEL-13, Form A, No.4.

F. Figure No. 1.0F

Caption: **General Drawing of Waste Emplacement Boreholes**

Content:

See SEL-18, Form A, No. 4.

G. Figure No. 1.0G

Caption: **General Drawing of Waste Emplacement Boreholes**

Content:

General drawing showing location, dimensions, orientation of boreholes.

H. Figure No. 1.0H

Caption: **General Drawing of Underground Facility Ventilation System**

Content:

See SEL-20, Form A, No. 4.

I. Figure No. 1.0I

Caption: **General Drawing of Waste Package and Components**

Content:

Need drawing of package showing components with dimensions, materials, and how package and waste fit together.

J. Figure No. 1.0J

Caption: **General Drawing of Waste Forms in Disposal Containers**

Content:

Drawing to show high-level waste and spent fuel disposal containers, dimensions, orientation, material, etc. SEL-26, Form A, No.4.

K. Figure No. 1.0K

Caption: **General Drawing of Topopah Tuff and Waste Emplacement Area**

Content:

Need drawing of rock formation depicting where waste emplacement will be located with respect to Topopah and Calico Hills.

**MGDS Annotated Outline Planning Package
Form 3: References**

Date: 4/17/92

Section No. & Title: **1.0 GENERAL INFORMATION**

Lead Author & Phone No.: Marshall Weaver (702) 794-1871

Instructions: List all books, articles, or other references that are expected to be used for the section. Indicate whether references are draft or final and whether they are publicly available (i.e., published). Refer to the Writer's Guide, Appendix D of the Annotated Outline Management Plan for guidance on formatting reference information.

1.

2.

3.

4.

5.

6.

7.

8.

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **SEL-1**
 2. Section no. & title: **1.0 GENERAL INFORMATION**
 3. Lead author & phone no. **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
 - 1A Need DOE name for SAR**
 - 1B DOE name for Environmental Report**
 - 1C Need DOE name for Security Plan**
 - 1D Need DOE name for Emergency Plan.**
 7. What is the information needed for?
Section 1.0.
 8. What group is the probable information supplier?
DOE HQ.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-
11. Response by (name):
 12. Response date:
 13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **SEL-2**
2. Section no. & title: **1.0 GENERAL INFORMATION**
3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:

A drawing of the U.S. identifying the NTS, NAFB, and BLM lands in southern Nevada. Included should be an enlargement of the area identifying Yucca Mountain with the boundary of the repository identified.

7. What is the information needed for?

Figure 1.0A.

8. What group is the probable information supplier?

Conceptual Design Report - Jim Clark.

9. When is the information needed?

TBD.

10. What kind of related information is already available in references, etc.?

SCP Overview Figure 2-3 is an example of the drawing needed.

-
11. Response by (name):
 12. Response date:
 13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **SEL-3**
 2. Section no. & title: **1.0 GENERAL INFORMATION**
 3. Lead author & phone no. **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
3A Name of Waste Package System/Topical Report
3B Date NRC approved.
 7. What is the information needed for?
Section 1.0.
 8. What group is the probable information supplier?
Waste Package Design Group.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-
11. Response by (name):
 12. Response date:
 13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **SEL-4**
2. Section no. & title: **1.0 GENERAL INFORMATION**
3. Lead author & phone no. **S. E. LeRoy (702) 794-7836**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:

Drawing to be used as Figure 1.0-B in License Application to provide a general description of the repository site, both above ground and underground facilities and their interconnection, i.e., ramps, railroad, tuff pile, major buildings, etc.

7. What is the information needed for?

Figure 1.0B.

8. What group is the probable information supplier?

Design Group - Jim Clark.

9. When is the information needed?

TBD.

10. What kind of related information is already available in references, etc.?

SCP overview Figure 3.1 is an example of the drawing needed.

-
11. Response by (name):

12. Response date:

13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **SEL-5**
2. Section no. & title: **1.0 GENERAL INFORMATION**
3. Lead author & phone no. **S. E. LeRoy (702) 794-7836**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**

6. Type of information needed:

Drawing to be used as Figure 1.0-C in License Application to provide a topographical view of Yucca Mountain depicting the aboveground and underground facilities. This drawing should also include a contour interval legend.

7. What is the information needed for?

Figure 1.0C.

8. What group is the probable information supplier?

Design Group - Jim Clark.

9. When is the information needed?

TBD.

10. What kind of related information is already available in references, etc.?

Reference SCP overview Figure 3.2 is an example of the drawing needed.

-
11. Response by (name):

12. Response date:

13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **SEL-8**
2. Section no. & title: **1.0 GENERAL INFORMATION**
3. Lead author & phone no. **S. E. LeRoy (702) 794-7836**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:
8A DOE Contact for NRC Licensing Application
8B DOE also needs to identify others to receive NRC License Application correspondence.
Note: Recommend DOE copy General Council, Lead PM for OCRWM, and CRWMS M&O Licensing Manager.
7. What is the information needed for?
General information section of the License Application.
8. What group is the probable information supplier?
DOE HQ.
9. When is the information needed?
TBD.
10. What kind of related information is already available in references, etc.?
None identified.

-
11. Response by (name):
 12. Response date:
 13. Response:

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **SEL-9**
 2. Section no. & title: **1.0.1 OVERVIEW OF PROPOSED REPOSITORY**
 3. Lead author & phone no: **S. E. LeRoy 702-794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
Date Site Characterization is completed.
 7. What is the information needed for?
Section 1.0.1.
 8. What group is the probable information supplier?
YMPO - DOE HQ.
 9. When is the information needed?
Prior to License Application submittal date.
 10. What kind of related information is already available in references, etc.?
None identified.
-

11. Response by (name):
12. Response date:
13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **SEL-11**
 2. Section no. & title: **1.0.1 DESCRIPTION OF PROPOSED REPOSITORY**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
11A - Need location of MRS
11B - Date MRS is licensed.
 7. What is the information needed for?
Section 1.0.1.
 8. What group is the probable information supplier?
MRS Siting Group and DOE HQ.
 9. When is the information needed?
Prior to License Application submittal date.
 10. What kind of related information is already available in references, etc.?
None identified.
-

11. Response by (name):
12. Response date:
13. Response:

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **SEL-12**
 2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
Need location of surface facilities, i.e., east face, west slope of Yucca Mountain.
 7. What is the information needed for?
General information section of License Application
 8. What group is the probable information supplier?
Design Group - Jim Clark.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-

11. Response by (name):
12. Response date:
13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **SEL-13**
 2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
Drawing of surface facilities.
 7. What is the information needed for?
Figure 1.0E.
 8. What group is the probable information supplier?
Design Group - Jim Clark
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
Figure 3-5 of SCP overview is example of drawing needed.
-

11. Response by (name):
12. Response date:
13. Response:

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **SEL-14**
 2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
14A - Number of functional areas in the central surface facility
14B - Need to identify the activities to be performed in the surface facilities, i.e., waste receipt, inspection, segregation, etc.
 7. What is the information needed for?
Section 1.0.2.
 8. What group is the probable information supplier?
Design Group - Jim Clark.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-
-

11. Response by (name):
12. Response date:
13. Response:

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **SEL-15**
 2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
15A - Number of ramps in the repository
15B - Number of shafts in the repository
15C - Same as 15A
15D - Need location of shafts
15E - Need identification of shaft(s) used for exploratory studies.
 7. What is the information needed for?
Section 1.0.2.
 8. What group is the probable information supplier?
Design Group - Jim Clark
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-

11. Response by (name):
12. Response date:
13. Response:

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **SEL-16**
 2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
16A - Identification of repository emplacement area and location in Yucca Mountain
16B - Need drawing identifying boundary of emplacement areas
16C - Number of acres available for emplacement of waste
16D - Number of acres called for in conceptual design.
 7. What is the information needed for?
Section 1.0.2.
 8. What group is the probable information supplier?
Design Group - Jim Clark.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-
-

11. Response by (name):
12. Response date:
13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **SEL-17**
 2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
Need description or number of main entry drifts that will extend into underground facility.
 7. What is the information needed for?
Section 1.0.2.
 8. What group is the probable information supplier?
Design Group - Jim Clark.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-

11. Response by (name):
12. Response date:
13. Response:

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **SEL-18**
 2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGNS. E. L**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
18A - Need width of emplacement panels
18B - Need length of emplacement panels
18C - Need to know if vertical or horizontal boreholes will be used for emplacement
18D - Date(s) when emplacement panel excavation will occur
18E - Direction (SW, NW, NE, ITC.) panels will progress
18F - General drawing of waste emplacement panels.
 7. What is the information needed for?
General information section of License Application.
 8. What group is the probable information supplier?
Design Group - Jim Clark.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-

11. Response by (name):
12. Response date:
13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **SEL-19**
2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:
19A - Need date when waste emplacement will begin
19B - Need decisions as to whether vertical or horizontal waste emplacement will be utilized
19C - Need general drawing of waste emplacement boreholes.
7. What is the information needed for?
General information section of License Application.
8. What group is the probable information supplier?
Design Group - Jim Clark.
9. When is the information needed?
TBD.
10. What kind of related information is already available in references, etc.?
None identified.

-
11. Response by (name):
 12. Response date:
 13. Response:

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **SEL-20**
 2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
20A - Need general drawing of underground facility ventilation system
20B - Need number of shafts in underground facility
20C - Need number of ramps in underground facility
20D - Need number of main airways in underground facility.
 7. What is the information needed for?
Section 1.0.2, and Figure 1.0H.
 8. What group is the probable information supplier?
Design Group - Jim Clark.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-
-

11. Response by (name):
12. Response date:
13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **SEL-21**
 2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
21A - Need determination as to what type of excavating technique will be used for waste and tuff ramps, long drives, waste main, and perimeter drift
21B - Need to know technique that will be used for emplacement boreholes.
 7. What is the information needed for?
Section 1.0.2.
 8. What group is the probable information supplier?
Mining Contractor - REECO.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-
-

11. Response by (name):
12. Response date:
13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **SEL-22**
 2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
22A - Need number of years planned for waste emplacement
22B - Need number of years caretaker period will last and beginning date.
 7. What is the information needed for?
General information section of license Application.
 8. What group is the probable information supplier?
Design Group - Jim Clark.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-
-

11. Response by (name):
12. Response date:
13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **SEL-23**
2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:
23A - Need general drawing of waste package and components
23B - Need information on topical report for waste package, name, date, submittal/approval dates.
23C - Need SER approval date.
7. What is the information needed for?
Section 1.0.2, and Figure 1.0I.
8. What group is the probable information supplier?
Design Group - Jim Clark.
9. When is the information needed?
TBD.
10. What kind of related information is already available in references, etc.?
None identified.

-
11. Response by (name):
 12. Response date:
 13. Response:

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **SEL-24**
 2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
24A - Need to know whether fuel will be consolidated or not
24B - Need limit on minimum age of PWR spent fuel or disposal
24C - Need information on topical report for waste package, name, date, submittal/approval dates
24D - Need spent fuel gamma dose on outer surface of container
24E - Need spent fuel neutron dose on outer surface of container
24F - Kilowatt thermal decay rate for spent fuel packages, hi t low.
 7. What is the information needed for?
Section 1.0.2.
 8. What group is the probable information supplier?
Sandai National Lab.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-

11. Response by (name):
12. Response date:
13. Response:

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **SEL-25**
 2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
25A - Need thermal kilowatt thermal decay rates for high level waste packages
25B - Need gamma dose rate on surface of container for waste package
25C - Need neutron dose rate on surface of container for high level waste package.
 7. What is the information needed for?
Section 1.0.2.
 8. What group is the probable information supplier?
Design Group - Jim Clark.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-

11. Response by (name):
12. Response date:
13. Response:

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **SEL-26**
 2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
26A - Need description of disposal container, dimensions, materials
26B - Need general drawing of waste forms in disposal containers
26C - Need to know which gas(es) will be used to pressurize container as oxidizing inhibitor
26D - Need to know what type of mechanisms will be used inside container for each type of waste for shielding, stability, etc.
 7. What is the information needed for?
General information section of License Application.
 8. What group is the probable information supplier?
Design Group - Jim Clark.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-
-

11. Response by (name):
12. Response date:
13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **SEL-27**
 2. Section no. & title: **1.0.2 GENERAL LAYOUT AND DESIGN**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
27A - Need names of unsaturated rock that will be used for waste environment, i.e., Calico Hills, Topopah
27B - Need general drawing of rock formations depicting where the waste emplacement environment will be located with respect to the various formations in 27A
27C - Need to know pressure that will be exerted upon waste container
27D - Need to know the amount of water waste environment will be exposed to.
 7. What is the information needed for?
Section 1.0.2.
 8. What group is the probable information supplier?
Design Group - Jim Clark.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None identified.
-

11. Response by (name):
12. Response date:
13. Response:

MGDS Annotated Outline Information Need Form
Form B: Information Response

Date:4/17/92

1. Section No. & Title: **1.0 GENERAL INFORMATION**
2. Person Supplying Information:
3. Phone No.:
4. Lead Author (Requester): Marshall Weaver (702) 794-1871

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log No. on this form should be identical to the Log No. of the Information Request Form.

5. Response by Information Supplier:

Note: Attach additional sheets if necessary.

MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date:

Lead Author:

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
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Section 1.1 General Facility Description

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LIST OF TABLES

LIST OF FIGURES

1.1 GENERAL FACILITY DESCRIPTION

This section presents a general description of the high-level nuclear waste (HLW) repository including its location, general layout and design.

Note: This section essentially is an executive summary of the project. Items discussed in this section will be detailed in other sections. As these sections are developed, the text in this section will be more fully developed.

1.1.1 Site Description

Note: This section will be developed when the proposed facility design is completed.

1.1.1.1 General Description

Note: This section will present a general description of the site location.

1.1.1.2 Geologic Setting

Note: This section will present a synopsis of the of the geologic setting, and will be developed after Section 3.1 is prepared.

1.1.1.3 Geologic Repository Operations Area (GROA)

Note: This section will present a summary of the Geologic Repository Operations Area, and will be written after Section 4.0 has been developed so as to provide sufficient details on the proposed design.

1.1.1.4 Boundaries

1.1.1.4.1 Natural Boundaries

1.1.1.4.2 Manmade Boundaries

1.1.1.5 Site Features

1.1.1.6 Engineered Barriers

1.1.1.7 Roads

Note : This section will present a brief description and location map(s) of the roads. Details of the roads system will be developed in Section 4.1.1.8, Onsite Transportation System.

1.1.1.8 Transportation Link

1.1.1.9 Natural System

Note: This section will present a very brief summary of the natural system characteristics, and will be prepared after Section 3.1 is developed.

[General Discussion]

1.1.1.9.1 Geology

1.1.1.9.2 Hydrology

1.1.1.9.3 Geochemistry

1.1.1.9.4 Meteorology and Climate

1.1.2 Design of Major Structures

1.1.2.1 Above Ground Structures

1.1.2.1.1 Permanent

1.1.2.1.2 Temporary

1.1.2.2 Below Ground

1.1.2.2.1 Permanent

1.1.2.2.2 Temporary

1.1.3 Summary of Activities ("Plans")

1.1.3.1 Operation

1.1.3.2 Decommissioning

1.1.3.3 Permanent Closure

REFERENCES

**MGDS Annotated Outline Planning Package
Form 1: Text**

Date: 4/17/92

1. Section No. & Title: **1.1 GENERAL FACILITY DESCRIPTION**

2. Lead Author & Phone No. Clem Goewert
(702) 794-1859

3. First Phase Planning Package Due: 6/21/91

Second Phase Planning Package Due: 10/18/91

First Phase Skeleton Draft Due: 1/30/92

Second Phase Skeleton Draft Due: 3/15/92

4. Plan Approved: W.R. Griffin 8/27/91
(Licensing Mgr & Lead Author)

5. Section Summary (Approximately 100 Words):

This section presents a general description of the high-level nuclear waste (HLW) repository including its location, general layout and design.

6. Opening Statement:

[Same as summary].

7. Main Body Outline: See attached.

8. Conclusion:

The proposed site, facility design, and plans for construction, operation, and permanent closure have been shown to be an optimum selection, with an acceptable level of risk to the public.

9. Support Authors & Their Assignments:

7. Main Body Outline (Continued)

1.1 General Facility Description

1.1.1 Site Description

1.1.1.1 General Description (4.0)

Utilize map in Figure 1.2A include site location.

1.1.1.2 Geologic Setting (3.0) Figure 1.2F

1.1.1.3 Geologic Repository Operations Area (GROA) (4.1)

Utilize plot plan in Figure 1.2B.

1.1.1.4 Boundaries

1.1.1.4.1 Natural Boundaries (3.0)

Utilize map (and/or drawings) in Figure 1.2C.

1.1.1.4.2 Manmade Boundaries (4.1)

Discuss purposes of boundaries. Utilize map and drawings in Figures 1.2D, and 1.2H.

1.1.1.5 Site Features

1.1.1.6 Engineered Barriers (5.1), Figure 1.2H

1.1.1.7 Roads (4.1.1)

Utilize maps in Figures 1.2A and 1.2E.

1.1.1.8 Transportation Links (4.1.1)

Utilize maps in Figure 1.2A and 1.2E.

7. Main Body Outline (Continued)

1.1.1.9 Natural System

General discussion of outstanding features.

1.1.1.9.1 Geology (3.1.1), Figure 1.2F

1.1.1.9.2 Hydrology (3.1.2), Figure 1.2G

1.1.1.9.3 Geochemistry (3.1.3), Table 1.2C

1.1.1.9.4 Meteorology (3.1.4), Table 1.2B, Figure 1.2J
and Climate (3.1.4)

1.1.2 Design of Major Structures, Figure 1.2B, 1.2I

1.1.2.1 Above Ground (4.1.1)

1.1.2.1.1 Permanent

1.1.2.1.2 Temporary

1.1.2.2 Below Ground (4.1.2, 4.1.3)

1.1.2.2.1 Permanent

1.1.2.2.2 Temporary

1.1.3 Summary of Activities ["Plans"]

1.1.3.1 Operation (7.0)

1.1.3.2 Decommissioning (4.1.1.11, 4.1.2.6)

1.1.3.3 Permanent Closure (4.1.3.9)

Section No. & Title: **1.1 GENERAL FACILITY DESCRIPTION**

Lead Author & Phone No. Clem Goewert
(702) 794-1859

A. Figure No. 1.2A

Caption: **High-Level Waste Repository Site**

Content: State map-

Location of site
Roads (improved, unimproved) and transportation links (rail lines, air access, etc.)
Show site boundary, Nevada test site, Bureau of Land Management, Nellis Air Force Base range, etc.

[CJG-2]

B. Figure No. 1.2E

Caption: **High-Level Waste Repository Site**

Content: County map
Site location
Roads and Transportation Links

[CJG-4]

C. Figure No. 1.2B

Caption: **Site Plot Plan**

Content: Layout of GROA

Differentiate permanent and temporary facilities, include underground and above ground structures.

[CJG-5]

MGDS Annotated Outline Planning Package
Form 2: Figures & Tables

Date: 4/17/92

Section No. & Title: **1.1 GENERAL FACILITY DESCRIPTION**

Lead Author & Phone No. Clem Goewert
(702) 794-1871

A. Figure No. 1.2C

Caption: **Natural Site Boundaries**

Content: Natural site boundaries: drawings or maps

Include longitudinal cross section through proposed repository showing natural boundaries.

[CJG-6]

B. Figure No. 1.2D

Caption: **Manmade Boundaries**

Content: Manmade boundaries: drawings or maps

[CJG-1]

C. Table No. 1.2A

Title: **Site Structures**

Content: Listing of site structures (reference to Safety Analysis Section with detailed description).

[CJG-3]

Section No. & Title: **1.1 GENERAL FACILITY DESCRIPTION**

Lead Author & Phone No. Clem Goewert
(702) 794-1871

A. Figure No. **1.2F**

Caption: **Geologic Setting**

Content: Geologic Map showing surface (bedrock) geology, include relief (contours).

B. Figure No. **1.2G**

Caption: **Hydrologic Features**

Content: Surface map (drainage) and cross section (unsaturated zone, saturated zone, direction of flow in aquifer with estimated rate, aquatards, playas). This will probably be a double figure, showing the same area with about a ten mile radius (map) and linear extent of the same distance along the axis of maximum flow (cross section).

C. Figure No. **1.2H**

Caption: **Engineered Barriers**

Content: Two views (top and cross section).
Sufficient area coverage to show all manmade barriers related to the repository, perhaps isometric graphic, also. Consider inset (or additional figure) showing wasteform encapsulation, containers, and packaging.

MGDS Annotated Outline Planning Package
Form 2: Figures & Tables

Date: 4/17/92

Section No. & Title: **1.1 GENERAL FACILITY DESCRIPTION**

Lead Author & Phone No. Clem Goewert
 (702) 794-1871

A. Figure No. 1.2I

Caption: **Structures**

Content: Drawing of surface and sub-surface structures. Either in one composite figure, or if needed, to clearly show structures, additional figure(s).

B. Figure No. 1.2J

Caption: **Wind Rose**

Content: Show wind rose - or change reference in text to other section showing same.

C. Table No. 1.2B

Caption: **Meteorological Features**

Content:

Meteorological Features

Feature	Strength	Frequency of Occurrence	Comments
Tornado	220 mph	Once every 310 years	No adverse impact (monitoring equipment adequately protected)
Thunder Storm	2 inch/hr	Once every 2 years	Enhanced drainage features (manmade). See Section__.
Hurricane	80 mph+	Once every 50 years	-----
Hail	Golf balls+	Once every 40 years	-----
Snow	16 inches or more/hr	Once every 20 years	-----
Snow	2 feet or more accumulation	Once every 15 years	-----

MGDS Annotated Outline Planning Package
Form 2: Figures & Tables

Date: 4/17/92

Section No. & Title: **1.1 GENERAL FACILITY DESCRIPTION**

Lead Author & Phone No. Clem Goewert
(702) 794-1871

A. Table No. 1.2C

Title: **Geochemical Features**

Content:

Feature	Impact on Repository?	Discussion
Zeolite	Yes	Absorbs radionuclides, etc.

B. Figure No.

Caption:

Content:

C. Figure No.

Caption:

Content:

**MGDS Annotated Outline Planning Package
Form 3: References**

Date: 4/17/92

Section No. & Title: **1.1 GENERAL FACILITY DESCRIPTION**

Lead Author & Phone No. Marshall Weaver (702) 794-1871

Instructions: List all books, articles, or other references that are expected to be used for the section. Indicate whether references are draft or final, and whether they are publicly available (i.e., published). Refer to the Writer's Guide, Appendix D of the Annotated Outline Management Plan for guidance on formatting reference information.

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MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **CJG-1**
2. Section no. & title: **1.1 GENERAL FACILITY DESCRIPTION**
3. Lead author & phone no: **Clem Goewert (702) 794-1859**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:
Map or drawings with man made boundaries.
7. What is the information needed for?
Manmade boundaries: Figure 1.2D.
8. What group is the probable information supplier?
Surface facilities design group (lead author for Section 4.1).
9. When is the information needed?
10. What kind of related information is already available in references, etc.?

-
11. Response by (name):
 12. Response date:
 13. Response:

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **CJG-2**
2. Section no. & title: **1.1 GENERAL FACILITY DESCRIPTION**
3. Lead author & phone no: **Clem Goewert (702) 794-1859**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:
Map location of site, including roads and other transportation links.
7. What is the information needed for?
State Map: Figure 1.2A.
8. What group is the probable information supplier?
Surface facilities design group (lead author for Section 4.1).
9. When is the information needed?
10. What kind of related information is already available in references, etc.?

-
11. Response by (name):
 12. Response date:
 13. Response:

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **CJG-3**
2. Section no. & title: **1.1 GENERAL FACILITY DESCRIPTION**
3. Lead author & phone no: **Clem Goewert (702) 794-1859**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:
List of structures on site.
7. What is the information needed for?
Table 1.2A.
8. What group is the probable information supplier?
Surface facilities design group (lead author for Section 4.1).
9. When is the information needed?
10. What kind of related information is already available in references, etc.?

-
11. Response by (name):
 12. Response date:
 13. Response:

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **CJG-4**
2. Section no. & title: **1.1 GENERAL FACILITY DESCRIPTION**
3. Lead author & phone no: **Clem Goewert (702) 794-1871**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:
Map location of site, including roads and other transportation links.
7. What is the information needed for?
County map: Figure 1.2E.
8. What group is the probable information supplier?
Surface facilities design group (lead author for Section 4.1).
9. When is the information needed?
10. What kind of related information is already available in references, etc.?

-
11. Response by (name):
 12. Response date:
 13. Response:

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **CJG-5**
2. Section no. & title: **1.1 GENERAL FACILITY DESCRIPTION**
3. Lead author & phone no: **Clem Goewert (702) 794-1859**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:
Plot plan of GROA with structures identified.
7. What is the information needed for?
Plot plan: Figure 1.2B.
8. What group is the probable information supplier?
Surface facilities design group (lead author for Section 4.1).
9. When is the information needed?
10. What kind of related information is already available in references, etc.?

-
11. Response by (name):
 12. Response date:
 13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **CJG-6**
2. Section no. & title: **1.1 GENERAL FACILITY DESCRIPTION**
3. Lead author & phone no: **Clem Goewert (702) 794-1859**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:
Map or drawings with natural site boundaries.
7. What is the information needed for?
Natural boundaries: Figure 1.2C.
8. What group is the probable information supplier?
Surface facilities design group (lead author for Section 4.1).
9. When is the information needed?
10. What kind of related information is already available in references, etc.?

-
11. Response by (name):
 12. Response date:
 13. Response:

MGDS Annotated Outline Information Need Form
Form B: Information Response

Date: 4/17/92

1. Section No. & Title:
2. Person Supplying Information:
3. Phone No.:
4. Lead Author (Requester): Marshall Weaver (702) 794-1871

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log No. on this form should be identical to the Log No. of the Information Request Form.

5. Response by Information Supplier:

Note: Attach additional sheets if necessary.

MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date:

Lead Author:

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
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MGDS Annotated Outline

Section 1.2 Basis for Licensing Authority

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1.2 BASIS FOR LICENSE AUTHORITY

Pursuant to Section 8(c) of the Nuclear Waste Policy Act of 1982, (42 USC 10107), the Department of Energy (DOE), as an applicant for a license to construct and operate a Mined Geologic Disposal Site (MGDS) is subject to federal law and Nuclear Regulatory Commission (NRC) regulations applicable to the siting and construction of an MGDS, and the transfer, possession, and disposal of high-level radioactive waste. The following is a chronological history of how the responsibility of final disposition of high-level waste was assigned to the DOE, and how the NRC received licensing authority for high-level waste.

An amendment to the Atomic Energy Act of 1946, identified as the Atomic Energy Act of 1954, initiated the establishment of policies to:

- A. Assist and foster research and development, and encourage maximum scientific and industrial progress
- B. Disseminate unclassified scientific and technical information to encourage scientific and industrial progress
- C. Provide government control of the possession, use, and production of atomic energy and special nuclear material owned by the government and others, as to make maximum contribution to the common defense and security, and enforce agreements with nations and groups of nations for the control of atomic weapons

- D. Encourage widespread participation in the research and utilization of atomic energy for peaceful purposes to the maximum extent possible, consistent with the common defense and security, and with concern for the health and safety of the public
- E. Provide a program for international cooperation to pursue the benefits of peaceful applications of atomic energy
- F. Provide a program of administration to fulfill the requirements of the Act, and to keep the Congress informed if further legislative action is required on their part.

The Energy Reorganization Act of 1974 as amended abolished the Atomic Energy Commission and repealed Sections 21 and 22 of the Atomic Energy Act of 1954, as amended (U.S.C. 2031 and 2032). All other functions, with the exception of certain items related to regulatory authority discussed further in this section, were transferred to the newly established Energy Research and Development Administration. Pursuant to Sections 202(1) through (4) all licensing and regulatory functions of the Atomic Energy Commission were transferred to NRC for liquid metal fast breeder reactors, demonstration nuclear reactors, and facilities for the receipt and storage of high-level radioactive waste, and for retrievable subsurface storage facilities. Later, pursuant to the Nuclear Waste Policy Act of 1982, this authority was extended to DOE high-level waste disposal facilities. The NRC's Office of Nuclear Reactor Regulation was established to license and provide regulatory oversight of facilities and materials licensed under the Atomic Energy Act of 1954. The NRC's Office of Nuclear Material Safety and Safeguards was established to provide regulatory oversight for activities associated with the processing, transport, and handling of nuclear materials and to review safety and safeguards of facilities and materials licensed under the Atomic Energy Act of 1954, as amended.

The Department of Energy Organization Act of 1977, established the DOE as an executive branch within the Federal government to promote the general welfare by ensuring a coordinated and effective administration of Federal energy policy and programs. Among the purposes of this Act was to:

- A. Address the increasing shortage of non-renewable energy resources
- B. Decrease the dependence of the U.S. on foreign energy supplies
- C. Assure that a strong national energy program is established to meet future energy demands
- D. Assume responsibility for energy policy, regulation, research and development
- E. Provide a comprehensive, centralized coordination and control of energy supply and conservation programs
- F. Advance the goals of restoring, protecting, and enhancing environmental quality, and ensure that public health and safety is maintained.

The Nuclear Waste Policy Amendments Act (NWPAA) of 1982 provided for the development of repositories for the disposal of high-level radioactive waste and spent nuclear fuel, and established a program for the research, development, and demonstration regarding the disposal of high-level radioactive waste and spent nuclear fuel.

Congress found that a national problem had been created by the accumulation of spent nuclear fuel from nuclear reactors, radioactive waste from nuclear fuel reprocessing, radioactive waste from medical research and testing, and other sources. Subtitle A of the Act assigned the Federal government the responsibility to provide permanent disposal of high-level radioactive waste and

spent nuclear fuel. The costs of such disposal would be the responsibility of the generators and owners of such waste and spent fuel. The owners would also have the responsibility to provide and carry the costs of interim storage until such waste is accepted by the Secretary of Energy for permanent disposal. Subtitle A requires the Secretary of Energy to establish a schedule for the siting, construction, and operation of high-level radioactive waste repositories that will provide assurance that the public and environment be adequately protected. Five candidate sites were to be established.

Subsequently, the Nuclear Waste Policy Amendments Act of 1987 (42 USC 10101) redirected the nuclear waste program. This amendment designated Yucca Mountain as the only candidate site for the DOE to expend characterization efforts upon. Accordingly, the Secretary of Energy directed the DOE to complete the site characterization of Yucca Mountain. Following completion of the characterization of the site, the DOE has prepared and submitted this License Application.

REFERENCES

MGDS Annotated Outline Planning Package
Form 1: Text

Date: 4/17/92

1. Section No. & Title: **1.2 BASIS FOR LICENSING AUTHORITY**
2. Lead Author & Phone No. Marshall Weaver (702) 794-1871
3. First Phase Planning Package Due: 6/21/91
Second Phase Planning Package Due: 10/18/91
First Phase Skeleton Draft Due: 12/30/91
Second Phase Skeleton Draft Due: 3/15/92

4. Plan Approved: W.R. Griffin 8/27/91
(Licensing Mgr & Lead Author)

5. Section Summary (Approximately 100 Words):

This section specifies the basis for licensing authority.

6. Opening Statement:

The DOE is subject to Federal law and NRC regulations applicable to the proposed high-level waste repository.

7. Main Body Outline:

1.2 BASIS FOR LICENSING AUTHORITY

- Atomic Energy Act of 1954, as amended
- Energy Reorganization Act of 1974, as amended
- Nuclear Waste Policy Act of 1982, as amend
- 10 CFR 60.

8. Conclusion:

This License Application and its supporting documents are responsive to the requirements specified in the basis for Licensing Authority as delineated in this section.

9. Support Authors & Their Assignments:

MGDS Annotated Outline Planning Package
Form 2: Figures & Tables

Date: 4/17/92

Section No. & Title: **1.2 BASIS FOR LICENSING AUTHORITY**

Lead Author & Phone No. Marshall Weaver (702) 794-1871

A. Figure No. 1.2A

Caption: **Basis for Licensing Authority-Evolution and Hierarchy of Documents**

Content:

B. Figure/Table No.

Caption/Title:

Content:

C. Figure/Table No.

Caption/Title:

Content:

MGDS Annotated Outline Planning Package
Form 3: References

Date: 4/17/92

Section No. & Title: **1.2 BASIS FOR LICENSING AUTHORITY**

Lead Author & Phone No. Marshall Weaver (702) 794-1871

Instructions: List all books, articles, or other references that are expected to be used for the section. Indicate whether references are draft or final, and whether they are publicly available (i.e., published). Refer to the Writer's Guide, Appendix D of the Annotated Outline Management Plan for guidance on formatting reference information.

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MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number:
2. Section no. & title: **1.2 BASIS FOR LICENSING AUTHORITY**
3. Lead author & phone no: **Marshall Weaver (702) 794-1871**
4. Information request date: **2/21/92**
5. Work location:
6. Type of information needed:

7. What is the information needed for?

8. What group is the probable information supplier?

9. When is the information needed?

10. What kind of related information is already available in references, etc.?

-
11. Response by (name):
 12. Response date:
 13. Response:

MGDS Annotated Outline Information Need Form
Form B: Information Response

Date: 4/17/92

1. Section No. & Title: **1.2 BASIS FOR LICENSING AUTHORITY**
2. Person Supplying Information:
3. Phone No.:
4. Lead Author (Requester): Marshall Weaver (702) 794-1871

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log No. on this form should be identical to the Log No. of the Information Request Form.

5. Response by Information Supplier:

Note: Attach additional sheets if necessary.

MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date:

Lead Author:

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
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MGDS Annotated Outline

Section 1.3 Schedules

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1.3 SCHEDULES

Skeleton Text Has Not Been Developed For This Section

REFERENCES

MGDS Annotated Outline Planning Package
Form 1: Text

Date: 4/17/92

1. Section No. & Title: **1.3 SCHEDULES**
2. Lead Author & Phone No. Jim Tiapale (702) 794-1831
by Bill Leonard, placeholder
3. First Phase Planning Package Due: 6/21/91
Second Phase Planning Package Due: 10/18/91
First Phase Skeleton Draft Due: 12/30/91
Second Phase Skeleton Draft Due: 3/15/92
4. Plan Approved: W.R. Griffin 8/27/91
(Licensing Mgr & Lead Author)

5. Section Summary (Approximately 100 Words):

This section presents the proposed schedules for construction, operation, receipt of waste, first emplacement of waste, and permanent closure of the high-level waste repository. [Coordinate with 7.7].

6. Opening Statement:

The proposed schedule for key phases of activities associated with the high-level waste repository is presented in this section.

7. Main Body Outline:

1.3 SCHEDULES

- Proposed schedules for construction (See Figure 1.3A)
- Proposed schedule for operations (See Figure 1.3B)
- Proposed schedule for receipt of waste (See Figure 1.3C)
- Proposed schedule for first emplacement of waste (See Figure 1.3D)
- Proposed schedule for permanent closure (See Figure 1.3E)
- Proposed overall schedule (See Figure 1.3F)
- Time requirements information from the Nuclear Waste Policy Act, as amended
- Information from DOE's mission plans
- Information from DOE's project decision schedules.

8. Conclusion:

The schedules represent realistic, achievable milestones for accomplishing key activities in a safe manner.

9. Support Authors & Their Assignments:

**MGDS Annotated Outline Planning Package
Form 2: Figures & Tables**

Date: 4/17/92

Section No. & Title: **1.3 SCHEDULES**

Lead Author & Phone No. Jim Tiapale (702) 794-1831
by Bill Leonard, placeholder

A. Figure No. 1.3A

Caption: **Proposed Schedule for Construction**

Content:

Graphic representation of proposed schedule for construction, including prerequisite activities, material controls, quality controls, and certification(s) of completion/useability.

B. Figure No. 1.3B

Caption: **Proposed Schedule for Operations**

Content:

Graphic representation of proposed schedule for operations, including prerequisite activities, training and qualification of personnel, etc.

C. Figure No. 1.3C

Caption: **Proposed Schedule for Receipt of Waste**

Content:

Graphic representation of proposed schedule for receipt of waste, including prerequisite activities, completion and certification of waste container/packaging, transportation mode, surface facilities and repository, receipt and handling procedures (including quality control).

**MGDS Annotated Outline Planning Package
Form 2: Figures & Tables**

Date: 4/17/92

Section No. & Title: **1.3 SCHEDULES**

Lead Author & Phone No. Jim Tiapale (702) 794-1831
by Bill Leonard, placeholder

A. Figure No. **1.3D**

Caption: **Proposed Schedule for First Emplacement of Waste**

Content:

Graphic representation of proposed schedule for first emplacement of waste, including prerequisite activities.

B. Figure No. **1.3E**

Caption: **Proposed Schedule for Permanent Closure**

Content:

Graphic representation of proposed schedule for permanent closure of the repository, including prerequisite activities, acceptability of monitoring results, decontamination, and decommissioning of surface activities other than security and monitoring.

C. Figure No. **1.3F**

Caption: **Proposed Overall Schedule**

Content:

Graphic representation of proposed schedule for all activities associated with the repository, including completion and acceptance of design, permitting and licensing, construction, operation, decontamination, closure, and decommissioning.

**MGDS Annotated Outline Planning Package
Form 3: References**

Date: 4/17/92

Section No. & Title: **1.3 SCHEDULES**

Lead Author & Phone No.: Jim Tiapale (702) 794-1831
by Bill Leonard, placeholder

Instructions: List all books, articles, or other references that are expected to be used for the section. Indicate whether references are draft or final and whether they are publicly available (i.e., published). Refer to the Writer's Guide, Appendix D of the Annotated Outline Management Plan for guidance on formatting reference information.

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MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number:
2. Section no. & title: **1.3 SCHEDULES**
3. Lead author & phone no: **Jim Tiapale (702) 794-1831; Bill Leonard, placeholder**
4. Information request date: **2/21/92**
5. Work location:
6. Type of information needed:
7. What is the information needed for?
8. What group is the probable information supplier?
9. When is the information needed?
10. What kind of related information is already available in references, etc.?

-
11. Response by (name):
 12. Response date:
 13. Response:

**MGDS Annotated Outline Information Need Form
Form B: Information Response**

Date: 4/17/92

1. Section No. & Title: **1.3 SCHEDULES**
2. Person Supplying Information:
3. Phone No.:
4. Lead Author (Requester): Jim Tiapale (702) 794-1831
by Bill Leonard, placeholder

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log No. on this form should be identical to the Log No. of the Information Request Form.

5. Response by Information Supplier:

Note: Attach additional sheets if necessary.

MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date:

Lead Author:

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
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MGDS Annotated Outline

Section 1.4 Certification of Safeguards

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1.4 CERTIFICATION OF SAFEGUARDS

Skeleton Text Has Not Been Developed For This Section [WJL-1]

REFERENCES

MGDS Annotated Outline Planning Package
Form 1: Text

Date: 4/17/92

1. Section No. & Title: **1.4 CERTIFICATION OF SAFEGUARDS**

2. Lead Author & Phone No. Marshall Weaver
(M.D. Ceraldi 704-382-1655)

3. First Phase Planning Package Due: 6/21/91

Second Phase Planning Package Due: 10/18/91

First Phase Skeleton Draft Due: 12/30/91

Second Phase Skeleton Draft Due: 3/15/92

4. Plan Approved: W.R. Griffin 8/27/91
(Licensing Mgr & Lead Author)

5. Section Summary (Approximately 100 Words):

This section is unique in that the details of Safeguards to physically protect the facility are exempt from disclosure to the public in accordance with 10 CFR 2.790(d). A separate submittal includes such items as area and facility maps detailing locations of safeguards, individual safeguards system descriptions, and evaluations of the adequacy of the safeguards in relation to the specific site. For purposes of the MGDS Safety Analysis Section and public disclosure, this section certifies that the resultant MGDS facility will be comparable to similar DOE surface facilities. These comparable facilities are identified in this section.

6. Opening Statement:

The Safeguards needed to protect the MGDS from intrusion, sabotage, and destructive acts are described along with the Physical Security Plan (Section 1.5) in a separate submittal.

7. Main Body Outline:

1.4 Certification of Safeguards

• See opening statement.

8. Conclusion:

In accordance with 10 CFR 2.790(d), disclosure of information relating to security and facility safeguards may be withheld from the public. This section states this fact, and then it certifies that the resultant facility will contain adequate safeguards and protective security commensurate with other similar DOE surface facilities.

9. Support Authors and Their Assignments

M.D. Ceraldi (DE & S)

**MGDS Annotated Outline Planning Package
Form 2: Figures & Tables**

Date: 4/17/92

Section No. & Title:

Lead Author & Phone No.

A. Figure/Table No.

Caption/Title:

Content:

B. Figure No.

Caption:

Content:

C. Figure No.

Caption:

Content:

D. Figure No.

Caption:

Content:

MGDS Annotated Outline Planning Package
Form 3: References

Date: 4/17/92

Section No. & Title: **1.4 CERTIFICATION OF SAFEGUARDS**

Lead Author & Phone No. **Bill Leonard, placeholder for TBD**
(702) 794-1821

Instructions: List all books, articles, or other references that are expected to be used for the section. Indicate whether references are draft or final and whether they are publicly available (i.e., published). Refer to the Writer's Guide, Appendix D of the Annotated Outline Management Plan for guidance on formatting reference information.

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MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **WJL-1**
2. Section no. & title: **1.4 CERTIFICATION OF SAFEGUARDS**
3. Lead author & phone no: **W. J. Leonard (702) 794-1821**
placeholder for TBD
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:

Names and locations of DOE surface facilities whose established safeguards programs offer protection against radiological sabotage that are considered to be suitable at the Yucca Mountain GROA.

7. What is the information needed for?
YMP Licensing Application section 1.4.
8. What group is the probable information supplier?
DOE OCRWM office of systems and compliance (RW-30).
9. When is the information needed?
10. What kind of related information is already available in references, etc.?

-
11. Response by (name):
 12. Response date:
 13. Response:

MGDS Annotated Outline Information Need Form
Form B: Information Response

Date: 4/17/92

1. Section No. & Title: **1.4 CERTIFICATION OF SAFEGUARDS**
2. Lead Author & Phone No. **Bill Leonard, placeholder for TBD
(702) 794-1821**
3. Phone No.:
4. Lead Author (Requester): **Marshall Weaver (702) 794-1871**

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log No. on this form should be identical to the Log No. of the Information Request Form.

5. Response by Information Supplier:

Note: Attach additional sheets if necessary.

MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date:

Lead Author:

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
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MGDS Annotated Outline

Section 1.5 Physical Security Plan

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1.5 PHYSICAL SECURITY PLAN

The Physical Security Plan for the Yucca Mountain Mined Geologic Repository addresses physical security planning, safeguards contingency planning, design for physical security and security guard training pursuant to 10 CFR 60.21(b)(3) to address the requirement that the physical security plan be comparable to other DOE surface facilities to promote common defense and security. The plan encompasses: **SEL-28**

- A. The physical security organization
- B. Selection and training of personnel for security purposes
- C. Communications systems for security
- D. Provisions for monitoring the status of vital equipment
- E. Provisions for access controls to the facility including physical barriers and means of detecting unauthorized intrusions
- F. Arrangements with law enforcement authorities for assistance in responding to any security threat
- G. Nuclear material control and accounting program.

The plan is withheld from public disclosure, protected, and controlled in accordance with 10 CFR 2.790(d), and 10 CFR 73.21. The Physical Security Plan has been submitted with the license application and made a part thereof.

REFERENCES

- 1.5A Nuclear Regulatory Commission, 10 CFR, Code of Federal Regulations, 1986, Title 10, "Energy", Part 60. "Disposal of High Level Waste in Geologic Repositories," U.S. Government Printing Office, Washington, D.C.
- 1.5B Nuclear Regulatory Commission, 10 CFR, Code of Federal Regulations, 1986, Title 10, "Energy", Part 50, "Domestic Licensing of Production and Utilization Facilities", U.S. Government Printing Office, Washington, D.C.
- 1.5C Nuclear Regulatory Commission, 10 CFR, Code of Federal Regulations, 1986, Title 10, "Energy", Part 2, "Rules of Practice for Domestic Licensing Proceedings", U.S. Government Printing Office, Washington, D.C.

1. Section No. & Title: **1.5 PHYSICAL SECURITY PLAN**

2. Lead Author & Phone No. Marshall Weaver
(M.D. Ceraldi 704-382-1655)

3. First Phase Planning Package Due: 6/21/91

Second Phase Planning Package Due: 10/18/91

First Phase Skeleton Draft Due: 12/30/91

Second Phase Skeleton Draft Due: 3/15/92

4. Plan Approved: W.R. Griffin 8/27/91
(Licensing Mgr & Lead Author)

5. Section Summary (Approximately 100 Words):

The Physical Security Plan, Section 1.4, Certification Of Safeguards, consists of elements which, by the nature of their sensitivity, may be withheld from public disclosure. The actual Security Plan, including sabotage scenarios and appropriate security responses and contingency plans will be submitted under the same document as Section 1.4. This section will, however, described the Nuclear Material Control and Accounting Program and how it interfaces with the Security Plan in a manner such that sensitive information is not compromised.

6. Opening Statement:

The Physical Security Plan needed to protect the MGDS from intrusion, sabotage, and destructive acts, is described along with the Certification of Safeguards (Section 1.4) in a separate submittal.

7. Main Body Outline:

1.5 Physical Security Plan - Opening Statement repeated.

1.5.1 Nuclear Material Control and Accounting Program (NMC&AP)

- General description of NMC&AP
- Standards for Quality Assurance of records
- Qualifications for personnel responsible for program implementation and oversight
- Audits of records
- Archiving of records.

8. Conclusion:

In accordance with 10 CFR 2.790(d), disclosure of information relating to security and facility safeguards may be withheld from the public. This section states this fact and then describes in adequate detail the Nuclear Material Control and Accounting Program (NMC&AP) to a degree of detail, regulatory sufficient, which will not compromise the security of the facility by public disclosure.

9. Support Authors and Their Assignments

M.D. Ceraldi (DE & S)

**MGDS Annotated Outline Planning Package
Form 2: Figures & Tables**

Date: 4/17/92

Section No. & Title: **1.5 PHYSICAL SECURITY PLAN**

Lead Author & Phone No. Bill Leonard, placeholder for TBD
(702) 794-1871

A. Figure/Table No.

Caption/Title:

Content:

B. Figure/Table No.

Caption/Title:

Content:

C. Figure/Table No.

Caption/Title:

Content:

**MGDS Annotated Outline Planning Package
Form 3: References**

Date 2/21/91

Section No. & Title: **1.5 PHYSICAL SECURITY PLAN**

Lead Author & Phone No. Bill Leonard, placeholder for TBD
(702) 794-1871

Instructions: List all books, articles, or other references that are expected to be used for the section. Indicate whether references are draft or final and whether they are publicly available (i.e., published). Refer to the Writer's Guide, Appendix D of the Annotated Outline Management Plan for guidance on formatting reference information.

1.

2.

3.

4.

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8.

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number: **SEL-28**
 2. Section no. & title: **1.5 PHYSICAL SECURITY PLAN**
 3. Lead author & phone no: **S. E. LeRoy (702) 794-7836**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
 7. What is the information needed for?
 8. What group is the probable information supplier?
 9. When is the information needed?
 10. What kind of related information is already available in references, etc.?
-
11. Response by (name):
 12. Response date:
 13. Response:

MGDS Annotated Outline Information Need Form
Form B: Information Response

Date: 4/17/92

1. Section No. & Title: **1.5 PHYSICAL SECURITY PLAN**
2. Person Supplying Information:
3. Phone No.:
4. Lead Author (Requester): **Marshall Weaver (702) 794-1871**

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log No. on this form should be identical to the Log No. of the Information Request Form.

5. Response by Information Supplier:

Note: Attach additional sheets if necessary.

MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date:

Lead Author:

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
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MGDS Annotated Outline

Section 1.6 Site Characterization Program Review

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1.6 SITE CHARACTERIZATION PROGRAM REVIEW

1.6.1 Site Characterization Work Conducted

This section summarizes the site characterization work conducted at the Yucca Mountain site. The characterization was conducted for the purposes of developing the design for the repository and the waste package; demonstrating the suitability of the site for a repository; preparing an environmental impact statement; and obtaining from the NRC an authorization to construct the repository via this license application.

The Site Characterization Plan (SCP), reference 1.6A was developed in accordance with the requirements of the NWPA and the regulations promulgated by the NRC in Title 10, Code of Federal Regulations, Part 60 (10 CFR). The SCP includes a description of the Yucca Mountain site, a conceptual design for the repository, a description of the packaging to be used for the waste to be emplaced in the repository, and a description of the planned site characterization.

The SCP is divided into two parts. Part A of the SCP consists of Chapters 1 to 7, and provides a description of the site, the waste package, and the repository design. Part B consists of Chapter 8 and presents the DOE's plans for the site characterization program.

During site characterization at the Yucca Mountain site, the DOE reported every six months to the NRC, as well as to the governor and the legislature of the state of Nevada, on the nature and

extent of site characterization activities, the information developed from such activities, and the progress on waste form and waste package research and development. These reports included the results of site characterization studies, the identification of new issues, plans for additional studies to resolve new issues, the identification of decision points reached, and modifications to schedules where appropriate. The reports also described progress in developing the repository design, noting when key design parameters or features depend on the results of site characterization will be established.

The Site Characterization Plan (SCP)(DOE/RW-0199) was issued on December 28, 1988. The public comment period for the SCP expired on June 1, 1989. The DOE received comments from the NRC on July 31, 1989, and from the state of Nevada on May 30, 1989, and September 1, 1989. Comments were also received from other federal agencies, interested parties, and the general public. All SCP comments were evaluated, and responses to the comments have been made. Formal responses to their comments have been published for the following organizations:

- California Energy Commission
- Environmental Protection Agency
- Edison Electric Institute
- U. S. Department of Interior
- State Of Nevada
- Lincoln County Board of Commissioners.

The reports which present these responses to comments on the SCP are listed with references for this section.

1.6.1.1 Summary of Site Characterization Work

This subsection summarizes the DOE's site characterization program actually conducted at the Yucca Mountain Site.

NOTE: Work to be conducted as described in the SCP and its study plans will be summarized here. Those summaries will be revised to reflect actual work performed after it is completed.

1.6.1.1.1 Site Program (SCP Section 8.3.1)

The site program was designed and performed to acquire the information about the site that is needed to resolve the design and performance issues.

1.6.1.1.1.1 Geohydrology (SCP Section 8.3.1.2)

This section presents a summary of the site characterization of the regional and local geohydrology. The program was developed and designed to understand the present and expected geohydrologic characteristics of each of the saturated and unsaturated flow regimes, and of the gaseous and water-vapor flow processes.

1.6.1.1.1.1 Investigation: Studies to provide a description of the regional hydrologic system (SCP Sec. 8.3.1.2.1)

1.6.1.1.1.1.1 Study: Characterization of the meteorology for the regional hydrology

A. Activity: Precipitation and meteorological monitoring. (SCP Sec. 8.3.1.2.1.1.1)

The precipitation and meteorological monitoring study was conducted to provide site specific information on precipitation at and near the network streamflow measurement sites.

The parameters for the study are as follows:

- Precipitation amounts
- Surface temperatures
- Atmospheric pressure and pressure variability
- Relative humidity and diurnal humidity cycles and a seasonal variability
- Incoming and outgoing short wave radiation and its diurnal and seasonal variability
- Wind speed and direction and diurnal, seasonal, and storm-specific variability

The activities conducted to collect these parameters include: [To be added]

1.6.1.1.1.1.2 Study: Characterization of runoff and streamflow (SCP Sec. 8.3.1.2.1.2)

- A. Activity: Surface runoff monitoring
- B. Activity: Transport of debris by severe runoff (SCP Sec. 8.3.1.2.1.2.2)

1.6.1.1.1.1.3 Study: Characterization of the regional ground-water flow system (SCP Sec. 8.3.1.1.1.3)

- A. Activity: Assessment of the regional hydrogeological data needs in the saturated zone. (SCP Sec. 8.3.1.2.1.3.1)

D. Activity: Evaporatranspiration studies (SCP Sec. 8.3.1.2.3.4).

1.6.1.1.1.1.4 Study: Regional hydrologic system synthesis and modeling (SCP Sec. 8.3.1.1.1.4).

A. Activity: Conceptualization of regional hydrologic flow models (SCP Sec. 8.3.1.1.1.4.1)

B. Activity: Subregional two-dimensional areal hydrologic modeling (SCP Sec. 8.3.1.2.1.4.2)

C. Activity: Subregional two-dimensional cross section hydrologic modeling (SCP Sec. 8.3.1.2.1.4.3)

D. Activity: Regional three-dimensional hydrologic modeling (SCP Sec. 8.3.1.2.1.4.4).

1.6.1.1.1.2 Investigation: Studies to provide a description of the unsaturated zone hydrologic system at the site. (SCP Sec. 8.3.1.2.2)

1.6.1.1.1.2.1 Study: Characterization of unsaturated-zone infiltration (SCP Sec. 8.3.1.2.2.1)

- A. Activity: Characterization of hydrologic properties of surficial materials (SCP Sec. 8.3.1.2.2.1.1)
- B. Activity: Evaluation of natural infiltration (SCP Sec. 8.3.1.2.2.1.2)
- C. Activity: Evaluation of artificial infiltration (SCP Sec. 8.3.1.2.2.1.3).

1.6.1.1.1.2.2 Study: Water movement tracer tests using chloride and chlorine-36 measurements of percolation at Yucca Mountain (SCP Sec. 8.3.1.2.2.2).

- A. Activity: Matrix hydrologic properties testing (SCP 8.3.1.2.2.3.1)
- B. Activity: Site vertical borehole studies (SCP Sec. 8.3.1.2.2.3.2)
- C. Activity: Solitario Canyon horizontal borehole study (SCP Study 8.3.1.2.2.3).

1.6.1.1.1.2.3 Study: Characterization of Yucca Mountain percolation in the unsaturated zone exploratory facility study (SCP Sec. 8.3.1.2.2.4).

- A. Activity: Intact-fracture test in the exploratory studies facility (ESF) SCP Sec. 8.3.1.2.2.4.1)
- B. Activity: Percolation tests in the ESF (SCP Sec. 8.3.1.2.2.4.2)
- C. Activity: Bulk-permeability test in the ESF (SCP Sec. 8.3.1.2.2.4.3)
- D. Activity: Radial borehole tests in the ESF (SCP Sec. 8.3.1.2.2.4.4)
- E. Activity: Excavation effects test in the ESF SCP Sec. 8.3.1.2.2.4.5)
- F. Activity: Calico Hills testing in the ESF (SCP Sec. 8.3.1.2.2.4.6)
- G. Activity: Perched water test in the ESF (SCP Sec. 8.3.1.2.2.4.7)
- H. Activity: Hydrochemistry tests in the ESF (SCP Sec. 8.3.1.2.2.4.8)
- I. Activity: Multi purpose borehole testing (SCP Sec. 8.3.1.2.2.4.9)
- J. Activity: Hydrologic properties of major faults encountered on main test level of the exploratory studies facility (SCP 8.3.1.2.2.4.10).

1.6.1.1.1.2.4 Study: Diffusion tests on the ESF (SCP Sec. 8.3.2.2.5)

- A. Activity: Diffusion tests in the ESF (SCP Sec. 8.3.1.2.2.5.1)

1.6.1.1.1.2.5 Study: Characterization of gaseous-phase movement in the saturated zone (SCP Sec. 8.3.1.2.2.6).

- A. Activity: Gaseous-phase circulation study (SCP Sec.8.3.1.2.2.6.1)

1.6.1.1.1.2.6 Study: Hydrochemical characterization of the unsaturated zone (SCP Sec. 8.3.1.2.2.7)

- A. Activity: Gaseous-phase chemical investigations (SCP Sec. 8.3.1.2.2.7.1)
- B. Activity: Aqueous-phase chemical investigations (SCP Sec. 8.3.1.2.2.7.2).

1.6.1.1.1.2.7 Study: Fluid Flow in Unsaturated Fractured Rock (SCP Sec. 8.3.1.2.8).

- A. Activity: Development of conceptual and numerical models of fluid flow in unsaturated,

fractured rock (SCP Sec. 8.3.1.2.2.8.1).

- B. Activity: Validation of conceptual and numerical models of fluid flow through unsaturated, fractured rock (SCP Sec. 8.3.1.2.2.8.2)

1.6.1.1.1.2.8 Study: Site Unsaturated-zone Modeling and Synthesis (SCP Sec. 8.3.1.2.2.9)

- A. Activity: Conceptualization of the unsaturated zone hydrogeologic system (SCP Sec. 8.3.1.2.2.9.1)
- B. Activity: Selection, development, and testing of hydrologic-modeling computer codes (SCP Sec. 8.3.1.2.2.9.2)
- C. Activity: Simulation of the natural hydrogeological system (SCP Sec. 8.3.1.2.2.9.3)
- D. Activity: Stochastic modeling and uncertainty analysis (SCP Sec. *3.1.2.2.9.4)
- E. Activity: Site unsaturated zone integration and synthesis (SCP 8.3.1.2.2.9.5).

1.6.1.1.1.3 Investigation: Studies to provide a description of the saturated zone hydrologic systems (SCP Sec. 8.3.1.2.3)

1.6.1.1.1.2 Geochemistry (SCP 8.3.1.3)

1.6.1.1.1.2.1 Investigation: Studies to provide information on water chemistry within the potential emplacement horizon and along flow paths (SCP Sec. 8.3.1.3.1)

1.6.1.1.1.2.2 Investigation: Studies to provide information on mineralogy, petrology, and rock chemistry within the potential emplacement horizon and along flow paths (SCP Sec. 8.3.1.3.2)

1.6.1.1.1.2.3 Investigation: Studies to provide information required on stability of minerals and glasses (SCP Sec. 8.3.1.3.3)

1.6.1.1.1.2.4 Investigation: Studies to provide the information required on radionuclide retardation by sorption processes along flow paths to the accessible environment (SCP Sec. 8.3.1.3.4)

1.6.1.1.1.2.5 Investigation: Studies to provide the information required on radionuclide retardation by precipitation processes along flow paths to accessible environment (SCP Sec. 8.3.1.3.5)

1.6.1.1.1.2.6 Investigation: Studies to provide the information on radionuclide retardation by dispersive, diffusive, and advective transport processes along flow paths to the accessible environment (SCP Sec. 8.3.1.3.6)

1.6.1.1.1.2.7 Investigation: Studies to provide the information required on radionuclide retardation by all processes along flow paths to the accessible environment (SCP Sec. 8.3.1.3.7)

1.6.1.1.1.2.8 Investigation: Studies to provide the required information on retardation of gaseous radionuclides along flow paths to the accessible environment (SCP Sec. 8.3.1.3.8)

1.6.1.1.1.3 Rock Characteristics (SCP Sec. 8.3.1.4)

1.6.1.1.1.3.1 Investigation: Studies to develop an integrated drilling program and integration of geophysical activities (SCP Sec. 8.3.1.4.1)

1.6.1.1.1.3.2 Investigation: Studies on the geologic framework of the Yucca Mountain Site (SCP Sec. 8.3.1.4.2)

1.6.1.1.1.3.3 Investigation: Investigation of three dimensional models of rock characteristics at the repository site (SCP Sec. 8.3.1.4.3)

1.6.1.1.1.4 Climate Program (SCP Section 8.3.1.5)

1.6.1.1.1.4.1 Investigation: Studies to provide the information required on nature and rates of change in climatic conditions to predict future climates (SCP Sec. 8.3.1.5.1)

1.6.1.1.1.4.2 Investigation: Studies to provide the information required on the potential effects of future climatic conditions on hydrologic characteristics (SCP Sec. 8.3.1.5.2)

1.6.1.1.1.5 Erosion (SCP Sec. 8.3.1.6)

1.6.1.1.1.5.1 Investigation: Studies to determine to determine present locations and rates of surface erosion (SCP Sec. 8.3.1.6.1)

1.6.1.1.1.5.2 Investigation: Potential effects of future climatic conditions on locations and rates of erosion (SCP Sec. 8.3.1.6.2)

1.6.1.1.1.5.3 Investigation: Studies to provide the information required to determine the potential effects of future tectonic activity on locations and rates of erosion (SCP Sec. 8.3.1.6.3)

1.6.1.1.1.5.4 Investigation: Potential effects of erosion on hydrologic, geochemical, and rock characteristics (SCP Sec. 8.3.1.6.4)

1.6.1.1.1.6 Rock Dissolution (SCP Section 8.3.1.7)

1.6.1.1.1.6.1 Investigation: Rates of dissolution of crystalline and noncrystalline components in tuff (SCP Sec. 8.3.1.7.1)

1.6.1.1.1.7 Tectonics (SCP Section 8.3.1.8)

1.6.1.1.1.7.1 Investigation: Studies to provide information required on direct releases resulting from volcanic activity (SCP Sec. 8.3.1.8.1)

1.6.1.1.1.7.2 Investigation: Studies to provide information required on rupture of waste packages due to tectonic events (SCP Sec. 8.3.1.8.2)

1.6.1.1.1.7.3 Investigations: Studies to provide information required on changes in unsaturated and saturated zone hydrology due to tectonic events (SCP Sec.8.3.1.8.3)

1.6.1.1.1.7.4 Investigation: Studies to provide information required on changes in rock geochemical properties resulting from tectonic processes (SCP Sec. 8.3.1.8.4)

1.6.1.1.1.7.5 Investigation: Studies to provide the information required by the analysis and assessment investigations of the tectonics program (SCP Sec. 8.3.1.8.5)

1.6.1.1.1.8 Human Interference (SCP Section 8.3.1.9)

1.6.1.1.1.8.1 Investigation: Studies to provide the information required on natural phenomena and human activities that might degrade surface markers and monuments (SCP Sec. 8.3.1.9.1)

1.6.1.1.1.8.2 Investigation: Studies to provide the information required on present and future value of energy, mineral, land, and groundwater resources (Sec. 8.3.1.9.2)

1.6.1.1.1.8.3 Investigation: Studies to provide the information required on potential effects of exploiting natural resources on hydrologic, geochemical, and rock characteristics (Sec. 8.3.1.9.3)

1.6.1.1.1.9 Population (SCP Section 8.3.1.10)

1.6.1.1.1.10 Land Ownership (SCP Section 8.3.1.11)

1.6.1.1.1.11 Meteorology (SCP Section 8.3.1.12)

1.6.1.1.1.11.1 Investigation: Studies to provide data on regional meteorological conditions (SCP Sec. 8.3.1.12.1)

1.6.1.1.1.11.2 Investigation: Studies to provide data on atmospheric and meteorological phenomena at potential locations of surface facilities (SCP Sec. 8.3.1.12.2)

1.6.1.1.1.11.3 Investigation to provide data on the location of population centers relative to wind patters in the general region of the site (SCP Sec. 8.3.1.12.3)

1.6.1.1.1.11.4 Investigation: Studies to provide data on potential extreme weather phenomena and their recurrence intervals (SCP Sec. 8.3.1.12.4)

1.6.1.1.1.12 Offsite Installation and Operations Program (SCP Section 8.3.1.13)

1.6.1.1.1.12.1 Investigation: Determination of nearby industrial, transportation, and military installations and operations (nuclear and nonnuclear) (SCP Sec. 8.3.1.13.1)

1.6.1.1.1.12.2 Investigation: Potential impacts of nearby installations and operations (SCP Sec. 8.3.1.13.2)

1.6.1.1.13 Surface Characteristics (SCP Section 8.3.1.14)

1.6.1.1.13.1 Investigation: Studies to provide the topographic characteristics of potential locations of surface facilities (SCP Sec. 8.3.1.14.1)

1.6.1.1.13.2 Investigation: Studies to provide soil and rock properties of potential locations of surface facilities (SCP Sec. 8.3.1.14.2)

1.6.1.1.14 Thermal And Mechanical Rock Properties (SCP Section 8.3.1.15)

1.6.1.1.14.1 Studies to provide the required information for spatial distribution of thermal and mechanical properties (SCP Sec. 8.3.1.15.1)

1.6.1.1.14.2 Studies to provide the required information for spatial distribution of ambient stress and thermal conditions (SCP Sec. 8.3.1.15.2)

1.6.1.1.15 Preclosure Hydrology Program (SCP Section 8.3.1.16)

1.6.1.1.15.1 Investigation: Flood recurrence intervals and levels at potential locations surface facilities (SCP Sec. 8.3.1.16.1)

1.6.1.1.15.2 Investigation: Location of adequate water supplies (SCP Sec. 8.3.1.16.2)

1.6.1.1.15.3 Investigation: Ground-water conditions within and above the potential host rock (SCP Sec. 8.3.1.16.3)

1.6.1.1.16 Preclosure Tectonics (SCP Section 8.3.1.17)

1.6.1.1.16.1 Investigation: Studies to provide required information on volcanic activity that could affect repository design or performance (SCP Sec. 8.3.1.17.1)

1.6.1.1.1.16.2 Investigation: Studies to provide required information on fault displacement that could affect repository design or performance (SCP Sec. 8.3.1.17.2)

1.6.1.1.1.16.3 Investigation: Studies to provide required information on vibratory ground motion that could affect repository design or performance (SCP Sec. 8.3.1.17.3)

1.6.1.1.1.16.1 Investigation: Preclosure tectonics data collection and analysis (SCP Sec. 8.3.1.17.4)

1.6.1.1.2 Repository Program (SCP Section 8.3.2)

1.6.1.1.3 Seal Program (SCP Section 8.3.3)

1.6.1.1.4 Waste Package Program (SCP Section 8.3.4)

1.6.1.1.5 Performance Assessment (PA) Program (SCP Section 8.3.5)

1.6.1.2 Differences Between Characterization Work and the SCP

Portions of the site characterization work conducted differed from the work described in the Site Characterization Plan (SCP). These changes were generally the result of additional information providing different direction or design considerations. These changes have been reported semi-annually in progress reports and in the study report. Table 1.6.1A lists the changes in the program. The table identifies the area in the SCP that the work occurred, the cause of the change, and if the change has not been previously reported.

1.6.2 Status of DOE Resolution of NRC Objections

No Skeleton Text Developed.

Table 1.6.1A. SCP PROGRAM CHANGES [CJG-7]

SCP Section	SCP Activity	Change of Activity	Cause of Activity Change	Result of Activity Change	Remarks
8.1.1X					

REFERENCES

- 1.6A DOE (U.S. Department Of Energy), December 1988, Site Characterization Plan, Yucca Mountain Site, Nevada Research and Development Area, Nevada, 8 Volumes, DOE/RW--0199, Washington, DC.
- 1.6B DOE (U.S. Department Of Energy), February 1990, Progress Report on the Scientific Investigation Program for the Nevada Yucca Mountain Site, September 15, 1988 - August 15, 1989, April 16 - September 30, 1989, DOE/RW-0217P, Washington DC.
- 1.6C DOE (US Department of Energy), 1990a. Responses to California Energy Commission Comments on the Site Characterization Plan, YMP90-97, Yucca Mountain Project Office, Las Vegas, 46p.
- 1.6D DOE (U.S. Department of Energy), 1990b. Responses to Lincoln County Board of Commissioners' Comments on the Site Characterization Plan, YMP90-103, Yucca Mountain Project Office , Las Vegas, 11p.
- 1.6E DOE (U.S. Department of Energy), 1990c. Responses to Environmental Protection Agency Comments on the Site Characterization Plan, YMP90-101, Yucca Mountain Project Office, Las Vegas, 16p.
- 1.6F DOE (U.S. Department of Energy), 1990d. Responses to Edison Electric Institute Comments on the Site Characterization Plan, YMP90-99, Yucca Mountain Project Office, Las Vegas, 42p.
- 1.6G DOE (U.S. Department of Energy), 1990e. Responses to U.S. Department of Interior Comments on the Site Characterization Plan, YMP90-98, Yucca Mountain Project Office, Las Vegas, 43p.
- 1.6H NRC (U.S. Nuclear Regulatory Commission), August 1990, NRC Staff Site Characterization, Analysis of the Department of Energy's Site Characterization Plan, Yucca Mountain Site, Nevada, NUREG-1347.

**MGDS Annotated Outline Planning Package
Form 1: Text**

Date: 4/17/92

1. Section No. & Title: **1.6 SITE CHARACTERIZATION PROGRAM REVIEW**

2. Lead Author & Phone No. Clem Goewert
(702) 794-1859

3. First Phase Planning Package Due: 6/21/91

Second Phase Planning Package Due: 10/18/91

First Phase Skeleton Draft Due: 12/30/91

Second Phase Skeleton Draft Due: 3/15/92

4. Plan Approved: W.R. Griffin 8/27/91
(Licensing Mgr & Lead Author)

5. Section Summary (Approximately 100 Words):

This section summarizes site characterization work actually conducted at the site, compares the work done to the work planned, and discusses differences, if any, between the two. In addition, the status of DOE resolution of NRC objections to license application submittals is detailed.

6. Opening Statement:

This summary includes site characterization work actually conducted at the site, compares the work done to the work planned, and discusses differences, if any. The status of DOE resolution of NRC objectives to license application submittals is also discussed.

7. Main Body Outline: See attached.

8. Conclusion:

The site characterization work actually performed at the site was either accomplished as planned or satisfactory rationale is provided to support the variance from the plan. The status of DOE resolution of NRC objections to license application submittals either describes the resolution or satisfactorily explains progress towards resolution.

9. Support Authors & Their Assignments:

7. Main Body Outline (Continued)

1.6 Site Characterization Program Review

1.6.1 Site Characterization Work Conducted

1.6.1.1 Summary of site Characterization Work

1.6.1.1.1 Site Work

1.6.1.1.1.1 Geohydrology

1.6.1.1.1.2 Geochemistry

1.6.1.1.1.3 Rock Characteristics

1.6.1.1.1.4 Climate Program

1.6.1.1.1.5 Erosion

1.6.1.1.1.6 Rock Dissolution

1.6.1.1.1.7 Tectonics

1.6.1.1.1.8 Human Interference

1.6.1.1.1.9 Population

1.6.1.1.1.10 Land Ownership

1.6.1.1.1.11 Meteorology

1.6.1.1.1.12 Offsite Installation and Operations Program

1.6.1.1.1.13 Surface Characteristics

1.6.1.1.1.14 Thermal And Mechanical Properties

1.6.1.1.1.15 Preclosure Hydrology Program

1.6.1.1.1.16 Preclosure Tectonics

1.6.1.1.2 Repository Program

1.6.1.1.3 Seal Program

1.6.1.1.4 Waste Package Program

1.6.1.1.5 Performance Assessment Program

1.6.1.2 Differences Between Characterization Work and the SCP

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **CJG-7**
2. Section no. & title: **1.6.2 DIFFERENCES BETWEEN
CHARACTERIZATION WORK AND THE SCP**
3. Lead author & phone no: **Clem Goewert (702) 794-1859**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:

A summary report on all differences between work performed and work described in the SCP. The information is preferred to be provided in a table. It is recommended that all changes in work described in the SCP be documented and tracked as changes throughout the studies and work.

7. What is the information needed for?

This information is needed in order to meet the reporting requirements in the FCRG Section 1.6.1, Site Characterization Work Conducted. "If the completed work differs from that described in the Site Characterization Plan, semi-annual progress reports, and study plans, DOE should identify the differences and explain why such work differed."

8. What group is the probable information supplier?

9. When is the information needed?

6 months prior to filing the License Application.

10. What kind of related information is already available in references, etc.?

No information is available since only limited site characterization is available.

-
11. Response by (name):

12. Response date:

13. Response:

MGDS Annotated Outline Information Need Form
Form B: Information Response

Date: 4/17/92

1. Section No. & Title: **1.6 SITE CHARACTERIZATION
PROGRAM REVIEW**
2. Person Supplying Information:
3. Phone No.:
4. Lead Author (Requester): **Clem Goewert
(702) 794-1859**

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log No. on this form should be identical to the Log No. of the Information Request Form.

5. Response by Information Supplier:

Note: Attach additional sheets if necessary.

MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date:

Lead Author:

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
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MGDS Annotated Outline

**Section 1.7 Statement of Compliance with the
Performance Objectives of 10 CFR 60 and
Summary of Performance Assessment Results**

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1.7 STATEMENT OF COMPLIANCE WITH THE PERFORMANCE OBJECTIVES OF 10 CFR 60 AND SUMMARY OF PERFORMANCE ASSESSMENT RESULTS	1.7-1

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**1.7 STATEMENT OF COMPLIANCE WITH THE PERFORMANCE
OBJECTIVES OF 10 CFR 60 AND SUMMARY OF PERFORMANCE
ASSESSMENT RESULTS**

The following discussions describe how the repository systems meet the performance objectives of 10 CFR 60.111, 112, and 113. A summary of the performance assessment discussed in Chapter 6 is also provided. **SEL-29**

REFERENCES

1. Section No. & Title: **1.7 STATEMENT OF COMPLIANCE WITH
THE PERFORMANCE OBJECTIVES
OF 10 CFR 60 AND SUMMARY OF
PERFORMANCE ASSESSMENT
RESULTS**

2. Lead Author & Phone No. Bill Leonard, placeholder for TBD
(702) 794-1821

3. First Phase Planning Package Due: 6/21/91
Second Phase Planning Package Due: 10/18/91
First Phase Skeleton Draft Due: 12/30/91
Second Phase Skeleton Draft Due: 3/15/92

4. Plan Approved: W.R. Griffin 8/27/91
(Licensing Mgr & Lead Author)

5. Section Summary (Approximately 100 Words):

This section contains brief discussions, based on the information in the System Analysis sections, Chapters 3 through 6, describing how the repository systems meet the performance objectives contained in 10 CFR 60.112, 113, and 114. It also summarizes the results of the performance assessment in Safety Analysis Section Chapter 6.

6. Opening Statement:

The following discussions describe how the repository systems meet the performance objectives of 10 CFR 60.112, 113, and 114. Also summarized are the results of the performance assessment in Chapter 6.

7. Main Body Outline: See attached.

8. Conclusion:

9. Support Authors and Their Assignments

7. Main Body Outline (Continued)

- Descriptions of how the repository systems meet the performance objectives of 10 CFR 60.112, .113, and .114.
- Overall System Performance
 - Selection of geologic setting assures that releases of radioactive materials to accessible environment following permanent closure meet applicable environmental standards.
 - Design assures that releases of radioactive materials to accessible environment following permanent closure meet applicable environmental standards.
- Engineered Barrier Systems (EBS) Performance
 - Substantially complete containment of high-level wastes within the waste packages for a period not less than 300 years nor more than 1000 years following repository closure
 - Gradual process of radionuclide release from EBS resulting in small fraction released to the geologic setting over long times
 - For disposal in the saturated zone, both the partial and complete filling with ground water of available void spaces in the underground facility have been appropriately considered and analyzed among the anticipated processes and events in designing the engineered barrier system.
 - Containment of high-level waste within the waste packages will be substantially complete for a period TBD by NRC, but not less than 300 years nor more than 1,000 years after permanent closure of the repository.
 - The release rate of any radionuclide from the engineered barrier system following the containment period will not exceed one part in 100,000 per year of the inventory of that radionuclide calculated to be present 1,000 years following permanent closure, or such other fraction of the inventory as may be specified or approved by NRC.

7. Main Body Outline (Continued)

- This requirement does not apply to any radionuclide which is released at a rate less than 0.1% of the calculated total release rate limit.

- Geologic Setting
 - The geologic repository is located so that pre-waste emplacement ground water travel time along the fastest path of likely radionuclide travel from the disturbed zone to the accessible environment shall at least 1,000 years or such other travel time as may be specified or approved by NRC.

- Summary of results of the performance assessment described in Chapter 6.

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **SEL-29**
2. Section no. & title: **1.7 STATEMENT OF COMPLIANCE WITH THE PERFORMANCE OBJECTIVES OF 10 CFR 60 AND SUMMARY OF PERFORMANCE ASSESSMENT RESULTS**
3. Lead author & phone no: **S. E. Leroy (702) 794-7836**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:

Text generated based upon the results of that contained in Chapters 3, 4, 5, and 6. This text should be written to demonstrate the overall theme/approach used throughout the license application. See attachment for example.
7. What is the information needed for?
8. What group is the probable information supplier?

Jim Duguid.
9. When is the information needed?

TBD.
10. What kind of related information is already available in references, etc.?

None identified.

-
11. Response by (name):
 12. Response date:
 13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

Attachment to Information Request Form SEL-29

Example

[The MGDS safety arguments are based upon system components which are shown to be robust using a conservative performance assessment approach. The waste package is shown to exceed the required life of 300 to 1000 years by a factor of 33 to 10. The engineered barrier surrounding the waste package is shown to retard radionuclide transport for ? years should a package fail. The repository has been designed to prevent liquid from contacting the waste package. The natural barrier system has been shown to significantly retard radionuclide migration to the accessible environment under scenarios that could cause premature waste package failure. The multibarrier system has been shown using conservative analyses to provide complete containment, and each component (e.g., the engineered barrier system and the natural barrier system) have been shown to independently meet the requirement of waste containment for 10,000 years. The defense in depth approach is demonstrated throughout this license application.]

MGDS Annotated Outline Information Need Form
Form B: Information Response

Date: 4/17/92

1. Section No. & Title: **1.7 STATEMENT OF COMPLIANCE WITH THE PERFORMANCE OBJECTIVES OF 10 CFR 60 AND SUMMARY OF PERFORMANCE ASSESSEMENT RESULTS**
2. Person Supplying Information:
3. Phone No.:
4. Lead Author (Requester): **Marshall Weaver (702) 794-1871**

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log No. on this form should be identical to the Log No. of the Information Request Form.

5. Response by Information Supplier:

MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date:

Lead Author:

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
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MGDS Annotated Outline

Chapter 2.0 General Information for the Safety Analysis Report

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2.0 GENERAL INFORMATION FOR THE SAFETY ANALYSIS REPORT	2.0-1
2.0.1 Overview And Summary Of MGDS Project	2.0-1
2.0.2 SAR Organization	2.0-1
2.0.3 Supporting Information	2.0-1

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2.0 GENERAL INFORMATION FOR THE SAFETY ANALYSIS REPORT

2.0.1 Overview And Summary Of MGDS Project

2.0.2 SAR Organization

2.0.3 Supporting Information

Skeleton Text Has Not Been Developed For This Section

MGDS Annotated Outline Planning Package
Form 1: Text

Date: 4/17/92

1. Section No. & Title: **2.0 GENERAL INFORMATION FOR THE SAFETY ANALYSIS REPORT**
2. Lead Author & Phone No. T. M. Williamson 702-794-1821
(Marshall Weaver 702-794-1871)
(M.D. Ceraldi 704-382-1655)
3. First Phase Planning Package Due: 6/21/91
Second Phase Planning Package Due: 10/18/91
First Phase Skeleton Draft Due: 12/30/91
Second Phase Skeleton Draft Due: 3/15/92
4. Plan Approved: W.R. Griffin 8/27/91
(Licensing Mgr & Lead Author)

5. Section Summary (Approximately 100 Words):

This section consists of a brief overview and summary of the Mined Geologic Disposal System (MGDS) Project, including the organization of the safety analysis sections, and it will also discuss supporting information for the safety analysis sections. The information presented in this section is general in nature; other safety analysis sections will provide appropriate detail for the license application process. A general description of the MGDS is provided in Section 1.1.

6. Opening Statement:

The Mined Geologic Disposal System (MGDS) is a U.S. Department of Energy (DOE) project aimed at providing a workable geologic repository for radioactive High Level Waste (HLW) produced by the U.S. domestic commercial nuclear industry and the U.S. defense industries.

7. Main Body Outline:

2.0.1 Overview and Summary of MGDS Project

- Brief history of Project. This gives the reader an appreciation of what follows and sets the tone for the remainder of the safety analysis sections.

7. Main Body Outline (Continued)

2.0.2 SAR Organization

- Breakdown of chapters with a summary of each chapter's content.

2.0.3 Supporting Information

- Description of types of supporting information to be used in the safety analysis sections
- List of various sources
- Reference Sections 2.3 and 2.4 for use of NRC technical positions and requirements for further technical information respectively.
- [The FCRG requests the project description be done in terms of the systems organizational approach of the draft regulatory guide. Use the Catawba FSAR as a guide for this introductory section.]

8. Conclusion:

This section provides introductory material to generally describe the MGDS in terms of program, license application contents, and documentation used to prepare the license application.

9. Support Authors & Their Assignments:

M.D. Ceraldi (DE & S)

**MGDS Annotated Outline Planning Package
Form 2: Figures & Tables**

Date: 4/17/92

Section No. & Title:

**2.0 GENERAL INFORMATION FOR THE
SAFETY ANALYSIS REPORT**

Lead Author & Phone No.

T. M. Williamson 702-794-1821
(Marshall Weaver 702-794-1871)
(M.D. Ceraldi 704-382-1655)

A. Table No./Figure

Title/Caption:

Content:

B. Table No./Figure

Title/Caption:

Content:

C. Table No./Figure

Title/Caption:

Content:

MGDS Annotated Outline Planning Package
Form 3: References

Date: 4/17/92

Section No. & Title: **2.0 GENERAL INFORMATION FOR THE SAFETY
ANALYSIS REPORT**

Lead Author & Phone No. T. M. Williamson 702-794-1821
 (Marshall Weaver 702-794-1871)
 (M.D. Ceraldi 704-382-1655)

Instructions: List all books, articles, or other references that are expected to be used for the section. Indicate whether references are draft or final and whether they are publicly available (i.e., published). Refer to the Writer's Guide, Appendix D of the Annotated Outline Management Plan for guidance on formatting reference information.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

MGDS Annotated Outline Information Need Form
Form A: Information Request

Date: 4/17/92

1. Log number:
2. Section no. & title: **2.0 GENERAL INFORMATION FOR THE
SAFETY ANALYSIS REPORT**
3. Lead author & phone no: **T.M. Williamson (702) 794-1821
Marshall Weaver (702) 794-1871
M.D. Ceraldi (704) 382-1655**
4. Information request date:
5. Work location:
6. Type of information needed:
7. What is the information needed for?
8. What group is the probable information supplier?
9. When is the information needed?
10. What kind of related information is already available in references, etc.?

-
11. Response by (name):
 12. Response date:
 13. Response:

**MGDS Annotated Outline Information Need Form
Form B: Information Response**

Date: 4/17/92

1. Section No. & Title: **2.0 GENERAL INFORMATION FOR THE
SAFETY ANALYSIS REPORT**

2. Person Supplying Information:

3. Phone No.:

4. Lead Author (Requester): Jim Duguid 703-204-8851

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log Number on this form should be identical to the Log Number of the Information Request Form.

5. Response by Information Supplier:

Note: Attach additional sheets if necessary.

**MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log**

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date:

Lead Author:

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
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MGDS Annotated Outline

Section 2.1 Identification of Agents and Contractors

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2.1.3 Operations Agents and Contractors	2.1-2
2.1.4 Consultants and Outside Service Organizations	2.1-2

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2.1B Agents and Contractors Responsible for MGDS Construction	2.1-4
2.1C Agents and Contractors Responsible for MGDS Operations	2.1-5
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2.1B Construction Organization	2.1-8
2.1C Operations Organization	2.1-9

2.1 IDENTIFICATION OF AGENTS AND CONTRACTORS

(SKELETON TEXT HAS NOT BEEN DEVELOPED FOR THIS SECTION)

The prime agents and contractors for the design, construction, and operation of the Mined Geologic Disposal System (MGDS) are identified in this section. Also identified are the principal consultants and outside service organizations, including quality assurance (QA) auditors [if any]. The division of work between agents, contractors, consultants, and outside service organizations is clearly delineated. [FCRG comment concerning applicability of the term "agent".]

2.1.1 Design Agents and Contractors

The design agents and contractors responsible for the MGDS design are identified in Table 2.1A, Agents and Contractors Responsible for MGDS Design. The MGDS design organization is illustrated in Figure 2.1A, Design Organization.

2.1.2 Construction Agents and Contractors

The construction agents and contractors responsible for the MGDS design are identified in Table 2.1B, Agents and Contractors Responsible for MGDS Construction. The MGDS construction organization is illustrated in Figure 2.1B, Construction Organization.

2.1.3 Operations Agents and Contractors

The agents and contractors responsible for the MGDS operations are identified in Table 2.1C, Agents and Contractors Responsible for MGDS Operations. The MGDS operations organization is illustrated in Figure 2.1C, Operations Organization.

2.1.4 Consultants and Outside Service Organizations

The consultants and outside service organizations are identified in Table 2.1D, Consultants and Outside Service Organizations.

Table 2.1A. Agents and Contractors Responsible for MGDS Design

Agent/Contractor	Address	Technical Work Area
	TMW-1	

Table 2.1B. Agents and Contractors Responsible for MGDS Construction

Agent/Contractor	Address	Technical Work Area
	TMW-2	

Table 2.1C. Agents and Contractors Responsible for MGDS Operations

Agent/Contractor	Address	Technical Work Area
	TMW-3	

Table 2.1D. Consultants and Outside Service Organizations

Agent/Contractor	Address	Technical Work Area
	TMW-4	

Figure 2.1A. Design Organization

TMW-5

2.1-7

Figure 2.1B. Construction Organization

TMW-6

2.1-8

Figure 2.1C. Operations Organization

TMW-7

2.1-9

Section No. & Title: **2.1 IDENTIFICATION OF AGENTS AND CONTRACTORS**

Lead Author & Phone No. T.M. Williamson (702) 794-1821
 Marshall Weaver (702) 794-1871

A. Figure No. **2.1A**

Caption: **Design Organization**

Content: Organization chart for design, including principal area of responsibility.

B. Table No. **2.1A**

Title: **Agents and Contractors Responsible for MGDS Design**

Content: This table shows the prime agents and contractors during design. It will delineate the division of technical work areas between each.

C. Table No. **2.1B**

Title: **Agents and Contractors Responsible for MGDS Construction**

Content: This table shows the prime agents and contractors during construction. It will delineate the division of technical work areas between each.

Section No. & Title: **2.1 IDENTIFICATION OF AGENTS AND CONTRACTORS**

Lead Author & Phone No. T.M. Williamson (702) 794-1821
 Marshall Weaver (702) 794-1871

A. Table No. 2.1C

Title: **Agents and Contractors Responsible for MGDS Operations**

Content: This table shows the prime agents and contractors during construction. It will delineate the division of technical work areas between each.

B. Figure No. 2.1B

Caption: **Construction Organization**

Content: Organization chart for construction, including principal area of responsibility.

C. Figure No. 2.1C

Caption: **Operation Organization**

Content: Organization chart for operation, including principal area of responsibility .

Section No. & Title: **2.1 IDENTIFICATION OF AGENTS AND CONTRACTORS**

Lead Author & Phone No. Marshall Weaver (702) 794-1871

A. Table No. 2.1D

Title: **Consultants and Outside Service Organizations**

Content: This table will show the outside service organizations during design. It will delineate the division of technical work areas between each.

B. Table No.

Title:

Content:

C. Table No.

Title:

Content:

MGDS Annotated Outline Planning Package
Form 3: References

Date: 4/17/91

Section No. & Title: **2.1 IDENTIFICATION OF AGENTS AND CONTRACTORS**

Lead Author & Phone No.: T.M. Williamson 702- 794-1821
Marshall Weaver 702-794-1871

Instructions: List all books, articles, or other references that are expected to be used for the section. Indicate whether references are draft or final, and whether they are publicly available (i.e., published). Refer to the Writer's Guide, Appendix D of the Annotated Outline Management Plan for guidance on formatting reference information.

1. [M&O believes that the DOE has done some analysis on this subject. We need to find out where it is documented.]
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **TMW-1**
 2. Section no. & title: **2.1 IDENTIFICATION OF AGENTS AND CONTRACTORS**
 3. Lead author & phone no: **T. M. Williamson (702) 794-1821**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
Company names, addresses, and technical scope of work for all agents and contractors involved in MGDS design.
 7. What is the information needed for?
SAR Section 2.1.
 8. What group is the probable information supplier?
M&O.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None.
-

11. Response by (name):
12. Response date:
13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **TMW-2**
 2. Section no. & title: **2.1 IDENTIFICATION OF AGENTS AND CONTRACTORS**
 3. Lead author & phone no: **T. M. Williamson (702) 794-1821**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
Company names, addresses, and technical scope of work for all agents and contractors involved in MGDS construction.
 7. What is the information needed for?
SAR Section 2.1.
 8. What group is the probable information supplier?
M&O.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None.
-

11. Response by (name):
12. Response date:
13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **TMW-3**
 2. Section no. & title: **2.1 IDENTIFICATION OF AGENTS AND CONTRACTORS**
 3. Lead author & phone no: **T. M. Williamson (702) 794-1821**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
Company names, addresses, and technical scope of work for all agents and contractors involved in MGDS operations.
 7. What is the information needed for?
SAR Section 2.1.
 8. What group is the probable information supplier?
M&O.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None.
-

11. Response by (name):
12. Response date:
13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **TMW-4**
2. Section no. & title: **2.1 IDENTIFICATION OF AGENTS AND CONTRACTORS**
3. Lead author & phone no: **T. M. Williamson (702) 794-1821**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:
Company names, addresses, and technical scope of work for all consultants and outside service organizations involved in MGDS design, construction, and operations.
7. What is the information needed for?
SAR Section 2.1.
8. What group is the probable information supplier?
M&O.
9. When is the information needed?
TBD.
10. What kind of related information is already available in references, etc.?
None.

-
11. Response by (name):
 12. Response date:
 13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **TMW-5**
 2. Section no. & title: **2.1 IDENTIFICATION OF AGENTS AND CONTRACTORS**
 3. Lead author & phone no: **T. M. Williamson (702) 794-1821**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
Organization chart for all agents and contractors involved in MGDS design.
 7. What is the information needed for?
SAR Section 2.1.
 8. What group is the probable information supplier?
M&O.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None.
-

11. Response by (name):
12. Response date:
13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **TMW-6**
 2. Section no. & title: **2.1 IDENTIFICATION OF AGENTS AND CONTRACTORS**
 3. Lead author & phone no: **T. M. Williamson (702) 794-1821**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
Organization chart for all agents and contractors involved in MGDS construction.
 7. What is the information needed for?
SAR Section 2.1.
 8. What group is the probable information supplier?
M&O.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None.
-
-

11. Response by (name):
12. Response date:
13. Response:

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **TMW-7**
 2. Section no. & title: **2.1 IDENTIFICATION OF AGENTS AND CONTRACTORS**
 3. Lead author & phone no: **T. M. Williamson (702) 794-1821**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
Organization chart for all agents and contractors involved in MGDS operations.
 7. What is the information needed for?
SAR Section 2.1.
 8. What group is the probable information supplier?
M&O.
 9. When is the information needed?
TBD.
 10. What kind of related information is already available in references, etc.?
None.
-
-

11. Response by (name):
12. Response date:
13. Response:

MGDS Annotated Outline Information Need Form
Form B: Information Response

Date: 4/17/92

1. Section No. & Title: **2.1 IDENTIFICATION OF AGENTS AND CONTRACTORS**
2. Person Supplying Information:
3. Phone No.:
4. Lead Author (Requester): T. M. Williamson (702) 794-1821

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log No. on this form should be identical to the Log No. of the Information Request Form.

5. Response by Information Supplier:

Note: Attach additional sheets if necessary.

**MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log**

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date: February 8, 1992

Lead Author: T.M. Williamson 702-794-1821

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
TMW-1	2.1	TBD	
TMW-2	2.1	TBD	
TMW-3	2.1	TBD	
TMW-4	2.1	TBD	
TMW-5	2.1	TBD	
TMW-6	2.1	TBD	
TMW-7	2.1	TBD	

MGDS Annotated Outline

Section 2.2 Material Incorporated by Reference

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2.2 MATERIAL INCORPORATED BY REFERENCE

Skeleton Text Has Not Been Developed For This Section

MGDS Annotated Outline Planning Package
Form 1: Text

Date: 4/17/92

1. Section No. & Title: **2.2 MATERIAL INCORPORATED BY REFERENCE**
2. Lead Author & Phone No. T.M. Williamson (702) 794-1821
Marshall Weaver (702) 794-1871
3. First Phase Planning Package Due: 6/21/91
Second Phase Planning Package Due: 10/18/91
First Phase Skeleton Draft Due: 12/30/91
Second Phase Skeleton Draft Due: 3/15/92
4. Plan Approved: W.R. Griffin 8/27/91
(Licensing Mgr & Lead Author)
5. Section Summary (Approximately 100 Words):

This section provides a list of all topical and issue-resolution reports that are incorporated by reference as part of the safety analysis report (SAR). Included in this section are references to non-proprietary summary descriptions of the general content of reports proposed to be withheld from public disclosure pursuant to 10CFR2.790(b) as propriety documents.
6. Opening Statement:
7. Main Body Outline:

Identify scope of reports.
Define terms: topical or issue-resolution reports
proprietary reports
Explain referencing system
Explain summarization requirements (summary required for test and analysis reports, and reports submitted in connection with other applications).
Refer to Table 2.2A
8. Conclusion:
9. Support Authors & Their Assignments:

Section No. & Title: **2.2 MATERIAL INCORPORATED BY REFERENCE**

Lead Author & Phone No. T.M. Williamson (702)-794-1821
Marshall Weaver (702) 794-1871

A. Table No. **2.2A**

Title: **Referenced Topical and Issue-Resolution Reports**

Content:

B. Figure/Table No.

Caption/Title:

Content:

C. Figure/Table No.

Caption/Title:

Content:

**MGDS Annotated Outline Planning Package
Form 3: References**

Date: 4/17/92

Section No. & Title: **2.2 MATERIAL INCORPORATED BY REFERENCE**

Lead Author & Phone No. T. M. Williamson 702-794-1821
 (Marshall Weaver 702-794-1871)
 (M.D. Ceraldi 704-382-1655)

Instructions: List all books, articles, or other references that are expected to be used for the section. Indicate whether references are draft or final and whether they are publicly available (i.e., published). Refer to the Writer's Guide, Appendix D of the Annotated Outline Management Plan for guidance on formatting reference information.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **TMW-8**
 2. Section no. & title: **2.2 MATERIAL INCORPORATED BY REFERENCE**
 3. Lead author & phone no: **T. M. Williamson (702) 794-1821
Marshall Weaver (702) 794-1871**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
Table 2.2A entry data for all applicable references.
 7. What is the information needed for?
**SAR Section 2.2: Ensure all reports filed separately with NRC in support of the
MGDS SAR are identified.**
 8. What group is the probable information supplier?
All section lead authors must identify referenced material.
 9. When is the information needed?
 10. What kind of related information is already available in references, etc.?
**Licensing Support System (LSS) should contain information. (Integrate LSS format
and Table 2.2A format.)**
-
-

11. Response by (name):
12. Response date:
13. Response:

**MGDS Annotated Outline Information Need Form
Form B: Information Response**

Date: 4/17/92

1. Section No. & Title: **2.2 MATERIAL INCORPORATED BY REFERENCE**

2. Person Supplying Information:

3. Phone No.:

4. Lead Author (Requester):

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log Number on this form should be identical to the Log Number of the Information Request Form.

5. Response by Information Supplier:

Note: Attach additional sheets if necessary.

**MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log**

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date:

Lead Author:

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
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MGDS Annotated Outline

Section 2.3 Use of NRC Technical Positions

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2.3.2 Justification of Exceptions	2.3-1
2.3.3 DOE Conformance to NRC Technical Positions	2.3-1
2.3.4 NRC Regulatory Guide Compliance Program	2.3-1

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2.3 USE OF NRC TECHNICAL POSITIONS

2.3.1 Definition of Applicable NRC Technical Positions

2.3.2 Justification of Exceptions

2.3.3 DOE Conformance to NRC Technical Positions

2.3.4 NRC Regulatory Guide Compliance Program

Skeleton Text Has Not Been Developed For This Section

1. Section No. & Title: **2.3 USE OF NRC TECHNICAL POSITIONS**

2. Lead Author & Phone No. T.M. Williamson (702) 794-1821
Marshall Weaver (702) 794-1871

3. First Phase Planning Package Due: 6/21/91

Second Phase Planning Package Due: 10/18/91

First Phase Skeleton Draft Due: 12/30/91

Second Phase Skeleton Draft Due: 3/15/92

4. Plan Approved: W.R. Griffin 8/27/91
(Licensing Mgr & Lead Author)

5. Section Summary (Approximately 100 Words):

This section indicates the extent to which DOE uses all applicable NRC technical positions. Those positions are identified, as are the applicable safety analysis sections. Exceptions to NRC technical positions are identified.

6. Opening Statement:

This section describes and justifies the extent to which DOE uses NRC technical positions.

7. Main Body Outline:

2.3 USE OF NRC TECHNICAL POSITIONS

2.3.1 Introduction and Definition of what constitutes an applicable NRC technical position (or conversely, what does not)

2.3.2 Explanation of how exceptions are justified. Use of table versus text in the safety analysis sections

2.3.3 Description of Table 2.3-A

2.3.4 Description of Program for ensuring compliance with applicable NRC regulatory guides including those issued or revised during and after license process.

8. Conclusion:

DOE conforms to NRC technical positions to the extent required to meet the requirements of 10 CFR 60 and other sections of 10 CFR as they apply to geologic repositories.

9. Support Authors & Their Assignments:

Mark Ceraldi (DE & S)

MGDS Annotated Outline Planning Package
Form 2: Figures & Tables

Date: 4/17/92

Section No. & Title: **2.3 USE OF NRC TECHNICAL POSITIONS**

Lead Author & Phone No. T. M. Williamson (702)-1821
Marshall Weaver (702) 794-1871

A. Table No. 2.3A

Title: **DOE Conformance to NRC Technical Positions**

Content:

Technical Position Number	Title	Revision	Applicable (yes/no)	Applicable SAR Section(s)	Exceptions Identify	Justification Summarize
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B. Figure/Table No.

Caption/Title:

Content:

C. Figure/Table No.

Caption/Title:

Content:

**MGDS Annotated Outline Planning Package
Form 3: References**

Date: 4/17/92

Section No. & Title: **2.3 USE OF NRC TECHNICAL POSITIONS**

Lead Author & Phone No.: T.M. Williamson (702) 794-1821
Marshall Weaver, 702-794-1871

Instructions: List all books, articles, or other references that are expected to be used for the section. Indicate whether references are draft or final, and whether they are publicly available (i.e., published). Refer to the Writer's Guide, Appendix D of the Annotated Outline Management Plan for guidance on formatting reference information.

1. [M&O believes that the DOE has done some analysis on this subject. We need to find out where it is documented.]
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **TMW-9**
2. Section no. & title: **2.3 USE OF NRC TECHNICAL POSITIONS**
3. Lead author & phone no: **T. M. Williamson (702) 794-1821
Marshall Weaver (702) 794-1871**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**

6. Type of information needed:

Listing of all NRC technical positions with following: TP number, title, revision; expected applicable Safety Analysis Section number, and that section's lead author.

7. What is the information needed for?

To ensure that lead authors properly address compliance with NRC technical positions.

8. What group is the probable information supplier?

Licensing group.

9. When is the information needed?

9/1/91.

10. What kind of related information is already available in references, etc.?

LSS.

11. Response by (name):

12. Response date:

13. Response:

MGDS Annotated Outline Information Need Form
Form B: Information Response

Date: 4/17/92

1. Section No. & Title: **2.3 USE OF NRC TECHNICAL POSITIONS**
2. Person Supplying Information: T.M. Williamson 702-794-1821
Marshall Weaver (702) 794-1871
3. Phone No.:
4. Lead Author (Requester):

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log No. on this form should be identical to the Log No. of the Information Request Form.

5. Response by Information Supplier:

Note: Attach additional sheets if necessary.

**MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log**

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date:

Lead Author:

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
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MGDS Annotated Outline

Section 2.4 Requirements for Further Technical Work

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2.4.1 Technical Information Not Supplied	2.4-1
2.4.2 Technical Information Development Programs	2.4-1

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2.4 REQUIREMENTS FOR FURTHER TECHNICAL INFORMATION

2.4.1 Technical Information Not Supplied

2.4.2 Technical Information Development Programs

Skeleton Text Has Not Been Developed For This Section

REFERENCES

MGDS Annotated Outline Planning Package
Form 1: Text

Date: 4/17/92

1. Section No. & Title: **2.4 REQUIREMENTS FOR FURTHER TECHNICAL INFORMATION**

2. Lead Author & Phone No. T.M. Williamson 702-794-1821
Marshall Weaver 702-794-1871

3. First Phase Planning Package Due: 6/21/91

Second Phase Planning Package Due: 10/18/91

First Phase Skeleton Draft Due: 12/30/91

Second Phase Skeleton Draft Due: 3/15/92

4. Plan Approved: W.R. Griffin 8/27/91
(Licensing Mgr & Lead Author)

5. Section Summary (Approximately 100 Words):

This section identifies, describes, and discusses those safety features or components for which further technical information is required in support of MGDS license issuance, but is not supplied in the Safety Analysis Sections at the time of its submittal. The reason such information was not reasonably available is explained. The section also summarizes special technical information development programs undertaken to establish the final design and/or demonstrate the conservatism of the design. The section further discusses any programs that will be conducted during operation to demonstrate the acceptability of contemplated future changes in design or operation.

6. Opening Statement:

This section identifies and explains technical information required to support the issuance of a license for the MGDS, but which has not been submitted with the Safety Analysis Sections.

7. Main Body Outline:

See attached.

8. Conclusion:

The foregoing discussion justifies why information is not reasonably available to submit with these Safety Analysis sections, but which does not adversely impact the issuance of a license for the MGDS.

9. Support Authors & Their Assignments:

7. Main Body Outline: (Continued)

2.4.1 Technical Information Not Supplied (see Table 2.4A)

2.4.2 Technical Information Development Programs (see Table 2.4B)

Table 2.4B identifies the Safety Analysis section reference for TIDP discussion. This discussion includes:

- Affected safety feature or components
- Program description. Provide sufficient detail to show how the information will be obtained
- Describe specific technical information which must be obtained to demonstrate acceptable resolution of the TIDP
- Discuss (a) design alternatives or (b) operational restrictions if results of the TIDP do not demonstrate acceptable resolution of the TIDP
- If a reference is made to material incorporated by reference (see Safety Analysis Section 2.2), discuss applicability of each technical information development item to the repository.

**MGDS Annotated Outline Planning Package
Form 2: Figures & Tables**

Date: 4/17/92

Section No. & Title: **2.4 REQUIREMENTS FOR FURTHER TECHNICAL INFORMATION**

Lead Author & Phone No. T.M. Williamson 702-794-1821
Marshall Weaver 702-794-1871

A. Table No. 2.4A

Title: **Technical Information Not Supplied with the Safety Analysis Sections**

Content:

<u>Item</u>	<u>Technical Information</u>	<u>Explanation</u>
	Identify	Explain why such information is not reasonably available

B. Table No. 2.4B

Title: **Technical Information Development Programs**

Content:

<u>Item</u>	<u>Program Title</u>	<u>Type (Note 1)</u>	<u>Information To Be Obtained (Note 2)</u>	<u>SAR Reference For Program Discussion</u>	<u>Schedule for Completion (Note 3)</u>
-------------	----------------------	----------------------	--	---	---

Note 1: Program

<u>Type</u>	<u>Description</u>
A	Required to determine adequacy of new design
B	Used to demonstrate margin of conservatism of a proven design
C	Conducted during operations to demonstrate the acceptability of contemplated future changes in design or operation
D	Other

Note 2: This is information to be obtained to demonstrate acceptable resolution of the technical information development program (TDIP).

Note 3: Scheduled date for repository operation startup is TBD

**MGDS Annotated Outline Planning Package
Form 3: References**

Date: 4/17/92

Section No. & Title: **2.4 REQUIREMENTS FOR FURTHER TECHNICAL
INFORMATION**

Lead Author & Phone No.: T. M. Williamson 702-794-1821
Marshall Weaver 702-794-1871

Instructions: List all books, articles, or other references that are expected to be used for the section. Indicate whether references are draft or final, and whether they are publicly available (i.e., published). Refer to the Writer's Guide, Appendix D of the Annotated Outline Management Plan for guidance on formatting reference information.

1.

2.

3.

4.

5.

6.

7.

8.

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **TMW-10**
 2. Section no. & title: **2.4 REQUIREMENTS FOR FURTHER TECHNICAL INFORMATION**
 3. Lead author & phone no: **T. M. Williamson (702) 794-1821
Marshall Weaver (702) 794-1871**
 4. Information request date: **2/21/92**
 5. Work location: **M&O - Las Vegas**
 6. Type of information needed:
Identify information for Tables 2.4A and 2.4B.
 7. What is the information needed for?
Safety Analysis Section 2.4. Identification of information needed to support the issuance of a MGDS license.
 8. What group is the probable information supplier?
All lead authors.
 9. When is the information needed?
 10. What kind of related information is already available in references, etc.?
-

11. Response by (name):
12. Response date:
13. Response:

MGDS Annotated Outline Information Need Form
Form B: Information Response

Date: 4/17/92

1. Section No. & Title: **2.4 REQUIREMENTS FOR FURTHER TECHNICAL INFORMATION**
2. Person Supplying Information:
3. Phone No.: 702-794-1821
4. Lead Author (Requester): T.M. Williamson

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log No. on this form should be identical to the Log No. of the Information Request Form.

5. Response by Information Supplier:

Note: Attach additional sheets if necessary.

**MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log**

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date:

Lead Author:

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
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MGDS Annotated Outline

Section 2.5 Radioactive Materials

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2.5 RADIOACTIVE MATERIALS

Skeleton Text Has Not Been Developed For This Section

REFERENCES

**MGDS Annotated Outline Planning Package
Form 1: Text**

Date: 4/17/92

1. Section No. & Title: **2.5 RADIOACTIVE MATERIALS**
2. Lead Author & Phone No. T.M. Williamson 702-794-1821
Marshall Weaver as placeholder for Bill Cole (JAI)
703-934-2449
3. First Phase Planning Package Due: 6/21/91
Second Phase Planning Package Due: 10/18/91
First Phase Skeleton Draft Due: 12/30/91
Second Phase Skeleton Draft Due: 3/15/92
4. Plan Approved: W.R. Griffin 8/27/91
(Licensing Mgr & Lead Author)
5. Section Summary (Approximately 100 Words):

This section provides a description of the kind, amount, and specifications of the radioactive material proposed to be received and possessed at the geologic repository operations area.
6. Opening Statement:
7. Main Body Outline:

[Consider description of radioactive material in emplaced configuration if different from received configuration.]
8. Conclusion:
9. Support Authors & Their Assignments:

MGDS Annotated Outline Planning Package
Form 2: Figures & Tables

Date: 4/17/92

Section No. & Title: **2.5 RADIOACTIVE MATERIALS**

Lead Author & Phone No. T.M. Williamson 702-794-1821
Bill Cole (JAI) 703-934-2449

A. Table No. **2.5"X"**

Title: **Radioactive Material Specifications - Type "N"**

Content:

Similar to Table 2.5B for each type of material

B. Table No. **2.5A**

Title: **Radioactive Material to be Received and Possessed at the Geologic Repository Operations Area**

Content:

<u>Type</u>	<u>Amount</u>	<u>Specification</u>	<u>Other Non-Specification Information</u>
1		Table 2.5B	
2		Table 2.5C	
3		Table 2.5D	
.		.	
.		.	
.		.	

C. Table No. **2.5B**

Title: **Radioactive Material Specifications - Type 1**

Content: Itemize specification values. Typical items for spent fuel could be:

Burnup, max
Original enrichment, max
Individual nuclide concentration, max
Heat generation, max
Fuel defects, max.

**MGDS Annotated Outline Planning Package
Form 3: References**

Date: 4/17/92

Section No. & Title: **2.5 RADIOACTIVE MATERIALS**

Lead Author & Phone No.: T.M. Williamson 702-794-1821
Bill Cole 703-934-2449

Instructions: List all books, articles, or other references that are expected to be used for the section. Indicate whether references are draft or final, and whether they are publicly available (i.e., published). Refer to the Writer's Guide, Appendix D of the Annotated Outline Management Plan for guidance on formatting reference information.

1. [Oak Ridge has done considerable work on this subject. They keep a data base and have done some publishing.]

2. [The M&O waste acceptance people may have reference on this.]

- 3.

- 4.

- 5.

- 6.

- 7.

- 8.

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **TMW-11**
2. Section no. & title: **2.5 RADIOACTIVE MATERIALS**
3. Lead author & phone no: **T. M. Williamson (702) 794-1821
Bill Cole (JAI) (703) 934-2449**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:
Waste form specifications for material in emplaced configuration.
7. What is the information needed for?
Safety Analysis Section 2.5 describes radioactive material to be received and possessed at the GROA. This material may not be in the same configuration as received.
8. What group is the probable information supplier?
M&O Waste Package Design Group - P. C. Childress.
9. When is the information needed?
10. What kind of related information is already available in references, etc.?

-
11. Response by (name):
 12. Response date:
 13. Response:

**MGDS Annotated Outline Information Need Form
Form B: Information Response**

Date: 4/17/92

1. Section No. & Title: **2.5 RADIOACTIVE MATERIALS**
2. Person Supplying Information:
3. Phone No.:
4. Lead Author (Requester):

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log No. on this form should be identical to the Log No. of the Information Request Form.

5. Response by Information Supplier:

Note: Attach additional sheets if necessary.

MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date:

Lead Author:

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
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MGDS Annotated Outline

Section 2.6 License Specifications

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2.6 LICENSE SPECIFICATIONS

Skeleton Text Has Not Been Developed For This Section

REFERENCES

1. Section No. & Title: **2.6 LICENSE SPECIFICATIONS**

2. Lead Author & Phone No. T.M. Williamson 702-794-1821
Marshall Weaver 702-794-1871
(M.D. Ceraldi 704-382-1655)

3. First Phase Planning Package Due: 6/21/91

Second Phase Planning Package Due: 10/18/91

First Phase Skeleton Draft Due: 12/30/91

Second Phase Skeleton Draft Due: 3/15/92

4. Plan Approved: W.R. Griffin 8/27/91
(Licensing Mgr & Lead Author)

5. Section Summary (Approximately 100 Words):

This section identifies and justifies those variables, conditions, or other items that are probable subjects of license specifications. Justification is provided for the selection of those variables, conditions, or other items.

6. Opening Statement:

This section identifies and justifies those variables, conditions, or other items DOE determines to be probable subjects of license specifications.

7. Main Body Outline:

2.6 LICENSE SPECIFICATIONS

2.6.1 Scope

2.6.2 Define "Probable Subject of License Specification."

2.6.3 Define "Variable"/"Condition"

Variable - parameter such as temperature, water level, radioactivity level,
which is subject to variation

Condition - State of operation of facility or system.

7. Main body Outline (Continued)

2.6.4 Justification System

An operational analysis is performed in order to justify variables and conditions, which will result in determination of operating parameter boundaries. In the case of a repository operations facility, as opposed to an operating nuclear station, protection systems are utilized for containing and maintaining the spent fuel, versus containing high pressure, high temperature radioactive fluids and producing electricity.

As part of this analysis, a series of block diagrams categorizing events and system responses is created to allow determination of hardware and functional requirements of each system. Once the required actions of the systems have been identified, requirements and restrictions are established for system hardware to ensure that the required actions can be achieved within the redundancy goals set for the system or action.

Required action to be taken, should a protection requirement not be met is determined by considering the associated unacceptable results.

The requirements obtained by the above described method are then simplified into license specifications, which encompass the operational requirements, but are specific enough to be readily used by facility operations and management.

8. Conclusion:

The variables, conditions, and other items identified and justified above can result in an operating envelope which protects the health and safety of the public and DOE workers.

9. Support Authors & Their Assignments:

See Information Requests

M.D. Ceraldi (DE & S)

Section No. & Title: **2.6 LICENSE SPECIFICATIONS**

Lead Author & Phone No. T.M. Williamson 702-794-1821
Marshall Weaver 702-794-1871

A. Table No. **2.6A**

Title: **License Specification Variables**

Content: Variables which are probable subjects of license specifications

<u>Item</u>	<u>Description</u>	<u>Value</u>		<u>Justification</u>		
		<u>Nominal</u>	<u>Lower Limit</u>	<u>Upper Limit</u>	<u>Summary</u>	<u>Ref SAR Section</u>

B. Table No. **2.6B**

Title: **License Specification Conditions**

Content:

Conditions which are probable subjects of license specifications.

- Duplicate of 2.6A -

C. Table No. **2.6C**

Title: **License Specification Parameters**

Content:

Other parameters which are probable subject of license specifications.

- Duplicate of 2.6A -

**MGDS Annotated Outline Planning Package
Form 3: References**

Date: 4/17/91

Section No. & Title: **2.6 LICENSE SPECIFICATIONS**

Lead Author & Phone No.: T.M. Williamson 702-794-1821
Marshall Weaver 702-794-1871

Instructions: List all books, articles, or other references that are expected to be used for the section. Indicate whether references are draft or final, and whether they are publicly available (i.e., published). Refer to the Writer's Guide, Appendix D of the Annotated Outline Management Plan for guidance on formatting reference information.

1.

2.

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6.

7.

8.

**MGDS Annotated Outline Information Need Form
Form A: Information Request**

Date: 4/17/92

1. Log number: **TMW-12**
2. Section no. & title: **2.6 LICENSE SPECIFICATIONS**
3. Lead author & phone no: **T. M. Williamson (702) 794-1821
Marshall Weaver (702) 794-1871**
4. Information request date: **2/21/92**
5. Work location: **M&O - Las Vegas**
6. Type of information needed:
Proposed variables, conditions, or other items that are probable subjects of license specifications.
7. What is the information needed for?
To propose a set of license specifications acceptable to DOE.
8. What group is the probable information supplier?
All section lead authors.
9. When is the information needed?
10. What kind of related information is already available in references, etc.?

-
11. Response by (name):
 12. Response date:
 13. Response:

**MGDS Annotated Outline Information Need Form
Form B: Information Response**

Date: 4/17/92

1. Section No. & Title: **2.6 LICENSE SPECIFICATIONS**
2. Person Supplying Information:
3. Phone No.:
4. Lead Author (Requester):

Instructions: Information suppliers may use this form to communicate information that has been requested by lead authors via Information Request Forms. The Log No. on this form should be identical to the Log No. of the Information Request Form.

5. Response by Information Supplier:

Note: Attach additional sheets if necessary.

**MGDS Annotated Outline Information Need Form
Form C: Information Request Tracking Log**

Date: 4/17/92

Note: This is a recommended format for a manual tracking system. Other tracking methods such as a simple computer data base are also acceptable.

Date:

Lead Author:

<u>Log No.</u>	<u>Section</u>	<u>Date Issued</u>	<u>Date Response Received</u>
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