

U.S. DEPARTMENT OF ENERGY

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YUCCA MOUNTAIN PROJECT

YUCCA MOUNTAIN PROJECT EXPLORATORY SHAFT FACILITY TITLE I DESIGN

SUMMARY REPORT

VOLUME 4A

APPENDICES



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

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Appendix A

1. Generic Requirements for a Mined Geologic Disposal System, Appendix E (OGR/B-2).
2. Generic Requirements for Exploratory Shaft Facility (ESF) Design, Construction, and Operations, Appendix E (OGR/B-2).
3. Design Basis Document, Holmes & Narver, Inc.
4. Basis for Design, Fenix and Scisson, Inc.
5. The Nevada Nuclear Waste Storage Investigations Reference Information Base.
6. Exploratory Shaft Facility Technical Element and Interface Control Procedure (NNWSI AP-5.6Q).
7. Yucca Mountain Project, Exploratory Shaft Facility Title I 100 Percent Technical Assessment Review Record Memorandum, (YMP/88-19A).

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Generic Requirements for Exploratory Shaft Facility (ESF)

Design, Construction, and Operations

Appendix E (OGR/B-2)

APPENDIX E

GENERIC REQUIREMENTS FOR EXPLORATORY SHAFT FACILITY (ESF)
DESIGN, CONSTRUCTION, AND OPERATIONS

APPENDIX E

GENERIC REQUIREMENTS FOR EXPLORATORY SHAFT FACILITY (ESF)
DESIGN, CONSTRUCTION, AND OPERATIONS

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A. PREFACE

Appendix E presents the Exploratory Shaft Facility (ESF) generic requirements that shall be the basis for design, procurement, construction, and operations. The requirements, criteria, and constraints specified herein will ensure program consistency and compatibility among the Projects ~~in order~~ to facilitate the achievement of program objectives and policies. Project Offices shall use this Appendix E to develop site-specific ESF design requirements and specifications.

The Mined Geologic Disposal System Generic Requirements (MGDS GR) document is applicable through the life of the MGDS, except for this Appendix E, which applies only for the period preceding license application. However, there are several permanent items in the ESF that will have requirements imposed beyond the license application. These permanent items will be incorporated into the repository; therefore, they have additional quality requirements consistent with relevant repository requirements. Furthermore, repository requirements for size and function are not applied to the ESF.

The permanent items listed below are the systems, structures, and components that shall be designed, procured, and constructed to be incorporated into the repository; thus, they will be connected to the Geologic Repository Operations Area (GROA) and must be designed to have a maintainable life and quality as specified for the repository. The requirements, criteria, and constraints relating to these permanent items are designated Repository Quality (RQ) in Section C of this Appendix E.

UNDERGROUND OPENING(S) - space created by mining or drilling, including those zones within the rock altered by that process;

Functions:

- provide space for in-situ operations and site characterization
- provide space to support operations and maintenance of in-situ site characterization
- provide access to operations and testing areas.

SHAFT LINER(S) - all components placed between the inside limits of the shaft and the accessible extent of the underground opening;

Functions:

- provide structural integrity to shaft opening
- provide a means for anchoring shaft fittings
- provide water control
- complement any operational seals.

OPERATIONAL SEAL(S) - any material placed in an underground opening and/or the peripheral rock for the purpose of controlling the flow of water and/or gas;

Functions:

- provide control for migration of water and/or gas between major aquifers and into shafts or underground openings
- complement any shaft liners.

GROUND SUPPORT - any means used to reinforce rock and/or control the movement of rock except for removable or replaceable hardware;

Functions:

- provide rock mass stability for shafts and underground openings
- provide protection from rock falls.

The requirements, criteria, and constraints relating to nonpermanent site characterization items are designated SC in Section C of this Appendix E.

Some requirements, criteria, and constraints are designated both RQ and SC. These requirements apply to both permanent items (RQ) and nonpermanent site characterization items (SC).

During the period up to repository license application, the current planning assumption is that no spent fuel or high-level waste will be used in the ESF.

B. ORGANIZATION

The generic ESF requirements specified in Section C of this Appendix E are organized by Work Breakdown Structure (WBS) in order to facilitate ease of use and compatibility with current reporting. The organization is fully consistent with the exploratory shaft section (generally referred to as Section 6) of "OGR Work Breakdown Structure and Dictionary -- Development and Evaluation Phase, OGR/B-4, November 1984, as supplemented by the report "Exploratory Shaft Facility Budget Guidance," April 1, 1986, for programmatic consistency at a lower level of detail. This Appendix E includes a Section 6.0, "General ESF Requirements," which applies to WBS categories 6.1 through 6.10. This Section 6.0 consolidates general requirements in order to avoid repetition and does not change the baselined WBS structure.

Each Appendix E requirement, criterion, or constraint is coded to indicate whether it applies to a permanent item (RQ), nonpermanent item (SC), or both (SC/RQ).

Section D provides a matrix that lists the Federal laws and regulations and DOE orders that are applicable to ESF design, construction, and operation. The regulatory requirements for the ESF include, but may not be restricted to, those cited.

C. GENERIC REQUIREMENTS FOR EXPLORATORY SHAFT FACILITY (ESF)
DESIGN, CONSTRUCTION, AND OPERATIONS

- 6.0 General ESF Requirements¹
- 6.1 Management and Integration²
- 6.2 Site Preparation
- 6.3 Surface Facilities
- 6.4 First Shaft
- 6.5 Second Shaft
- 6.6 Subsurface Excavations
- 6.7 Underground Service Systems
- 6.8 Operations²
- 6.9 Testing²
- 6.10 Decommissioning and Closure²

¹This category is not part of the WBS; it has been added for clarity and to consolidate general requirements in order to avoid repetition.

²Technical requirements for management and operations only. For all other WBS sections, the requirements are design and construction requirements.

6.0 GENERAL ESF REQUIREMENTS

DEFINITION:

The exploratory shaft facility (ESF) is the structures, systems, and components used for in-situ site characterization and performance confirmation of a candidate site for a repository.

FUNCTIONAL REQUIREMENTS:

- SC 1. Support in-situ site characterization for the Mined Geologic Disposal System and provide testing facilities for in-situ site characterization as required by DOE/OGR milestones and Site Characterization Plan.
- RQ 2. Provide an ESF that can be incorporated into the repository and can be used to support phase I repository construction.
- SC 3. Provide a suitable location for in-situ site characterization.
- SC 4. Provide equipment and facilities for ensuring a safe, healthful, and productive working environment.
- SC 5. Provide the facilities to alert onsite personnel of possibly dangerous situations.
- RQ 6. Provide design and construction methods that will demonstrate licensability and constructability for the candidate repository.

PERFORMANCE CRITERIA:

- SC 1. a. Underground openings shall be developed to meet the needs of in-situ site characterization including basic needs for the initially planned tests and an allowance for uncertainties in the test plans and underground conditions.
- SC b. All major systems for ventilation, utilities, emergency egress, rock handling, personnel support and others shall be analyzed to determine the need for the uncertainty allowance. If it can be demonstrated that critical parts of the allowance would require excessive cost, schedule, test disruption or other program impacts to design, procure and/or construct later (after the basic test plan needs are completed), consideration shall be given to designing, procuring and/or constructing these critical items as part of the initial facility.
- SC c. This uncertainty allowance shall be incorporated in the site-specific design requirements documents as a percentage over and above the requirements for the basic test area needs.
- SC d. The ESF shall be designed and constructed so that, to the extent practicable, breakdowns during construction and operations will not adversely affect schedule or budget.

6.0 General ESF Requirements

- RQ 2. ESF permanent structures, systems, and components (repository quality) that will be incorporated into the repository shall be designed and constructed with the same criteria, standards, and quality assurance levels as required for the repository to the extent known at the time of ESF design.
- SC 3. a. The ESF shall conform with the siting requirements of the Generic Requirements for a Mined Geologic Disposal System (OGR/B-2).
- SC b. The location of the ESF shall be within the candidate repository site and representative of the features and conditions expected at the candidate repository site.
- SC c. The thickness, lateral extent, physical and chemical properties, and composition of the host rock for the ESF shall be representative of the candidate repository site.
- SC d. Drill cores and other geologic data shall be used to confirm the location of and to design the ESF shafts and underground openings.
- SC e. The ESF shall conform to applicable Federal, State, and local codes and standards pertaining to natural hazards and foundation stability, such as the requirements specified in General Design Criteria Manual, DOE Order 6430.1.
- SC 4. a. Applicable provisions of the Federal Mine Safety and Health Act of 1977, as amended, shall apply to the design, construction, and operations of the ESF.
- SC b. Two shafts shall be incorporated into the ESF to ensure adequate alternative means of egress.
- SC 5. a. Alarm systems shall indicate when the various monitored conditions exceed predetermined specified limits. Redundant systems shall be installed as required by applicable regulations.
- SC b. Monitoring of conditions such as noise, noxious or flammable gas, and radon shall be done in accordance with applicable Federal, State, and local regulations.
- RQ 6. a. Shafts and other underground excavations shall be designed and constructed with reasonably available technology similar to or corresponding with the techniques planned for the candidate repository.

6.0 General ESF Requirements

- RQ b. The ESF structures, systems, and components that are incorporated into the repository shall meet the requirements of 10 CFR Part 60. Compliance with the requirements of 10 CFR Part 60 will be demonstrated at the time of repository license application.
- RQ c. For the ESF structures, systems, and components that shall be incorporated into the repository as engineered barriers and are important to waste isolation, the following criterion applies (compliance will be demonstrated at the time of repository license application):
- Assuming anticipated processes and events, the release rate of any radionuclide from the engineered barrier system, excluding shaft and borehole seals, following the containment period shall not exceed 1 part in 100,000 per year of the inventory of that radionuclide calculated to be present at 1,000 years following permanent closure or such other fraction of the inventory as may be approved or specified by the Commission, provided that this requirement does not apply to any radionuclide which is released at a rate less than 0.1 percent of the calculated total release rate limit. The calculated total release rate limit shall be taken to be 1 part in 100,000 per year of the inventory of radioactive waste, originally emplaced in the underground facility, that remains after 1,000 years of radioactive decay.
- RQ d. ESF openings, boreholes, and their seals shall be designed and constructed so that they do not become preferential pathways that may compromise the repository's ability to meet the performance objectives of 10 CFR Part 60. Compliance with this criterion will be demonstrated in the license application.

CONSTRAINTS:

- SC A. The ESF system shall comply with applicable Federal environmental regulations and with State and local environmental regulations consistent with the DOE's responsibilities under the Nuclear Waste Policy Act of 1982 (NWPA). Such compliance could include the following:
- (1) Point-source discharges of treated waste waters into surface-water systems shall comply with the provisions of the Clean Water Act, as amended, as implemented through the National Pollutant Discharge Elimination System (NPDES) permit process.

6.0 General ESF Requirements

- (2) Any placement of fill or dredged material into navigable waters shall be performed in accordance with the requirements of Section 404 of the Clean Water Act, which requires permits for such action. Federal regulations regarding this permit are contained in 33 CFR Part 323.
- (3) Any ESF activity that may affect a drinking-water source must meet the National Interim Primary Drinking Water Regulations and the National Secondary Drinking Water Regulations.
- (4) The management and disposal of solid and any hazardous wastes (excluding any radioactive wastes) shall be conducted in accordance with the requirements of the Resource Conservation and Recovery Act (RCRA), as amended, which could include RCRA permitting for the hazardous wastes.
- (5) The handling, use, and disposal of any toxic substances shall comply with the requirements of the Toxic Substances Control Act (TSCA), as amended. The Federal regulations implementing TSCA are coded in Title 40, Chapter I, Subchapter R.
- (6) Noise levels shall be controlled in accordance with the requirements of the Noise Control Act of 1972.
- (7) Any activity involving underground injections shall comply with the provisions of the Safe Drinking Water Act, as amended, which could require an Underground Injection Control (UIC) permit.
- (8) Any activity occurring within the coastal zone shall comply with the provisions of the Coastal Zone Management Act of 1972 and any applicable associated State implementing regulations. The disposal of materials (nonradioactive) into offshore waters will comply with appropriate regulations, such as the EPA Ocean Dumping Regulations and Criteria.
- SC B. Applicability of State and local regulations will be determined in consultation with State and local officials as stated in the final EAs, Mission Plan, and NWPA.
- RQ C. The orientation, geometry, layout, and depth of the ESF and the design of any engineered barriers that are part of the ESF shall not adversely impact the containment and isolation of radionuclides.
- SC/
RQ D. The ESF shall be designed so that the effects of credible disruptive events, such as flooding, fires, and explosions, shall be limited from spreading through the facility.
- RQ E. The design and construction of the permanent ESF structures, systems, and components shall not significantly increase the preferential pathways for ground-water or radioactive-waste migration to the accessible environment.

6.0 General ESF Requirements

- RQ F. The ESF engineered-barrier system shall be designed such that other systems, structures, and components of the ESF and the repository do not eventually become preferential ground-water flow paths and do not promote the release of radionuclides to the accessible environment.
- RQ G. The ESF structures, systems, and components important to safety shall be designed so that natural phenomena and environmental conditions expected at the ESF and candidate repository site will not interfere with necessary safety functions.
- RQ H. The ESF structures, systems, and components important to safety shall be designed to withstand dynamic effects, such as projectile impacts, that could result from equipment failure, and similar events and conditions that could lead to loss of their safety functions.
- RQ I. The ESF structures, systems, and components important to safety shall be designed and located to withstand the effects of credible fires and explosions as well as all other postulated design basis accidents.
- RQ J. The ESF structures, systems, and components important to safety shall be designed to ensure continued safe repository operation or prompt termination of operations and personnel evacuation, if necessary, under conditions resulting from the effects of natural phenomena and design-basis accidents.
- SC K. If the subsurface facility has the potential to be classified as a gassy mine, then all requirements of 30 CFR Part 57 in effect at the time of design shall be applicable.
- SC/
RQ L. To the extent practicable, the ESF shall be designed to incorporate the use of noncombustible and heat-resistant materials.
- SC M. The ESF shall be designed to include onsite facilities and services that ensure a safe and timely response to emergency conditions and that facilitate the use of available offsite services (such as fire, police, medical, and ambulance service) that may aid in recovery from emergencies.
- RQ N. The predicted thermal and thermomechanical response of the host rock and surrounding strata and the ground-water system shall be considered in the ESF design.
- SC O. Where there are conflicts between applicable Federal, State, and local safety regulations and codes, the requirements providing the greater protection shall govern (DOE Order 5480.4).
- SC P. To the extent practical and consistent with procurement regulations, consideration of surplus government equipment shall be given to fulfill the requirements for the support services and equipment.

6.0 General ESF Requirements

- SC/ RQ Q. The ESF site shall be located such that, on the basis of expected ground-water conditions, it will be unlikely that engineering measures beyond reasonably available technology will be required for ESF construction, operations, or closure.
- SC/ RQ R. To the extent practicable, ESF boreholes and shafts shall be located in areas where repository shaft pillars or boundary pillars are planned.
- SC S. Underground ESF construction shall not adversely affect in-situ site characterization.
- SC/ RQ T. ESF structures, systems, and components shall incorporate considerations for decommissioning and closure.
- SC U. The design life for all ESF systems, components, and structures shall be 5 years unless otherwise specified.
- SC V. All ESF activities shall be monitored frequently for the purpose of assessing the effect of those activities on the future suitability of the site for a repository.
- SC W. ESF activities shall not affect overall site integrity of the Mined Geological Disposal System as required by 10 CFR 60.112.

6.1 MANAGEMENT AND INTEGRATION

DEFINITION:

Overall DOE Project management of the ESF, such as planning, organizing, directing, controlling, and staffing.

FUNCTIONAL REQUIREMENTS:

- SC 1. Provide overall ESF management.
- SC 2. Provide the means to monitor ESF and validate construction and operations.
- SC/RQ 3. Support performance confirmation testing.
- SC 4. Provide a records system.
- SC 5. Provide a program for protecting the environment and worker health and safety.
- SC/RQ 6. Provide a quality assurance program.

PERFORMANCE CRITERIA:

- SC 1. a. Management shall plan, schedule, budget, control, and report ESF activities as required by applicable DOE orders and OGR requirements. This management responsibility includes support activities performed by the architect/engineer and the construction manager; the preparation of the integrated ESF design; and the acquisition of land and construction permits for the ESF.
- SC b. Management shall coordinate with other OCRWM program participants on ESF activities to ensure uniformity with all aspects of the Mined Geologic Disposal System (e.g., participation in the Geoscience Coordinating Group).
- SC c. Management shall prepare ESF site-specific design requirements documents and reports according to the Systems Engineering Management Plan (OGR/B-7).
- SC d. Management shall provide an effective organization to manage all facets of ESF design, construction, and operations in a safe, economical manner and according to schedule.
- SC e. Management shall conduct readiness reviews before each construction phase begins as defined by OGR milestones.

6.1 Management and Integration

- SC f. Project management reporting shall be conducted in accordance with the DOE's Project Management System and the OCRWM Program Management System Manual (DOE/RW-0043).
- SC 2. Physical, chemical, and biological conditions shall be monitored during ESF construction and operations to validate ESF design parameters and to provide correlation with baseline conditions.
- SC/RQ 3. Performance confirmation shall be initiated to meet the requirements of 10 CFR Part 60 Subpart F.
- SC 4. a. Records of design, construction, operations, and in-situ site characterization shall be maintained and shall include the following:
- SC (1) Surveys of the surface facilities and the underground facility excavations, shafts, and boreholes referenced to readily identifiable surface features or monuments.
- SC (2) A description of the geologic strata encountered.
- SC (3) Geologic maps and geologic cross sections.
- SC (4) Locations and amount of seepage.
- SC (5) Details of equipment, methods, progress, and sequence of work.
- SC (6) Construction problems.
- SC (7) Anomalous conditions encountered.
- SC (8) Instrument locations, readings, and analysis.
- SC (9) Location and description of structural support systems.
- SC (10) Location and description of dewatering systems.
- SC (11) Details, methods of emplacement, and location of seals and backfill used.
- SC b. Records necessary to demonstrate compliance with environmental protection requirements (e.g., those related to permitting and to personnel training and certification as well as medical and employment history) shall be maintained. Any other necessary records relevant to the safety of personnel and operations shall also be maintained.
- SC c. Records of changes in procedures shall be maintained. Records of tests and experiments not described in the in-situ site characterization test plans shall also be maintained.

6.1 Management and Integration

- SC d. The records-keeping system shall be organized in such a way that specific information needed from stored data can be readily recovered.
- SC 5. a. Health and safety, safety awareness, and safety training programs shall be implemented in accordance with DOE orders and other applicable Federal, State, and local regulations.
- b. Plans to monitor and, if needed, mitigate environmental and socioeconomic impacts shall be developed and implemented.
- SC/ RQ 6. A quality assurance program that is consistent with the requirements of OGR Quality Assurance Plan (OGR/B-3) shall be implemented.

CONSTRAINTS:

- RQ A. ESF designers shall coordinate with repository designers on underground location and layout and on permanent ESF structures, systems, and components.
- SC/ RQ B. The construction or operation of systems that require certification shall be performed only by trained and certified personnel.
- SC C. The accommodation of visitors shall not adversely affect ESF construction, testing, or operations without DOE Project Office approval.

6.2 SITE PREPARATION

DEFINITION:

Surface civil works such as roads, pads, drainage, fencing, and utilities.

FUNCTIONAL REQUIREMENTS:

- SC 1. Provide archaeological and control surveys and maps.
- SC 2. Provide for demolition and removal of existing roads, utilities, and structures that are unusable.
- SC/RQ 3. Provide general civil improvements, including clearing, grading, excavating, filling, parking, drainage systems, temporary roads, laydown areas, and rock-storage pads as required.
- SC 4. Construct new and relocate or refurbish existing roads as well as power, water-supply, communications, and sewage-treatment systems for the site. Include provision for road access to the site, as required.
- SC 5. Provide means for dust control.

PERFORMANCE CRITERIA:

- SC 1. The ESF site shall be surveyed and mapped with sufficient detail for archaeological and construction needs.
- SC 2. a. The area within the fenced boundaries shall be cleared of unusable roads, utilities, and structures that interfere with the ESF.
- SC b. Existing roads, utilities, and structures shall be incorporated into the ESF if this incorporation can be shown to be cost effective.
- SC 3. a. Roads, building pads, utility corridors, and rock-storage areas shall be cleared, graded, and stabilized. Top soil shall be stored in an environmentally acceptable manner.
- SC b. The site layout shall be able to accommodate future expansion.
- RQ c. Shaft and shaft-collar areas shall be located and/or graded to protect them from the probable maximum flood.
- SC d. Drainage ponds and rock-storage liners shall be designed and constructed for a 25-year life.
- SC 4. a. Necessary access roads shall meet the requirements of ESF construction and operations.

6.2 Site Preparation

- SC b. Necessary utility services, such as power, water, and communications systems, shall be constructed and made available to meet the requirements of ESF construction and operations.
- SC c. Site roads shall meet the requirements of site security, safety, and expected loads during ESF construction and operations.
- SC d. The water storage and distribution systems shall meet the needs of fire protection, construction, and operations.
- SC e. All storm-water runoff shall be controlled in an environmentally acceptable manner.
- SC f. A suitable system for treating, pumping, and disposing of credible water inflows into the ESF shall be provided.
- SC g. Sewage effluent discharges shall not adversely affect site characterization activities.
- SC h. The sewage system shall accommodate ESF construction, operations, and in-situ site characterization.
- SC i. Safety and security lighting shall be available.
- SC j. Utilities such as electric power, compressed air, and water systems shall be provided to underground construction, operations, and in-situ site characterization areas. When installed, these systems shall not restrict foot, vehicular, or shaft conveyance traffic; obstruct ventilation; or cause health and safety concerns.
- SC k. The rock-handling system shall be capable of transporting and storing all excavated rock in an environmentally acceptable manner. The storage area shall be capable of supporting the excavation allowance determined under General ESF Requirements Section PC 1.a.
- SC l. The capacity of surface rock storage shall include allowance for overbreak and swell of broken rock from shafts and underground development.
- SC m. Power distribution for the ESF, including the primary and secondary substations, transmission lines, and feeder cables, shall be adequately designed, with sufficient redundancy to meet load requirements at points of usage throughout the operations areas. Suitable switching and protective devices shall be provided in the electrical system to prevent damage to the equipment in case of power failure or faults. Sufficient metering shall be provided to establish the demand and consumption of power. Adequate surge protection and a well-engineered grounding system shall be provided in order to maximize personnel and equipment safety.

6.2 Site Preparation

- SC n. Lighting in operations areas shall support security requirements.
- SC/RQ o. Site preparation for shaft collars shall be designed and constructed for a maintainable 100-year design life.
- SC 5. Dust control shall be provided at potential dust-generation areas such as roads and earth-moving sites in order to minimize airborne particulates, as required by applicable Federal, State, and local codes.

CONSTRAINTS:

- SC A. When practical, a single water storage and distribution system shall be employed for fire, industrial, and personnel needs.
- SC B. A utility-provided power supply shall be available as soon as possible but no later than the start of shaft construction.
- SC C. Sewage systems shall use septic tanks or offsite disposal unless precluded by applicable State or local codes and/or economic analysis. These systems shall be reviewed with respect to impacts on testing.

6.3 SURFACE FACILITIES

DEFINITION:

Surface buildings, structures, and equipment for the support of ESF operations and in-situ site characterization.

FUNCTIONAL REQUIREMENTS:

1. Provide buildings and supporting equipment for the following functions:

- SC — Administration
 - SC — Operations and engineering staff
 - SC — Training
 - SC — Visitors
 - SC — Environmental health and safety
 - SC — Security
 - SC — Storage/warehouse
 - SC — Shop/maintenance
 - SC — Fire/emergency (and associated vehicles)
 - SC — Change room
 - SC — Laboratory (as required)
 - SC — Sleeping quarters (as required)
 - SC — Mine ventilation fans, filters, cooling, and enclosures
 - SC — Compressed air
 - SC — Computer/control system
 - SC — Drill pads and mud ponds (as required)
 - RQ — Shaft collars
 - SC — Surface mobile equipment (as required)
 - SC — Standby power
 - SC — Treatment of underground water
- SC 2. Provide air quality monitoring.
 - SC 3. Provide water quality monitoring (which includes the physical, chemical, and biological characteristics of ESF waste waters, the receiving water body, and any other water bodies that could be affected by ESF operations).
 - SC 4. Provide dust control and/or collection facilities.
 - SC 5. Provide for the detection of fires and explosions.
 - SC 6. Provide onsite transportation facilities for personnel, equipment, materials, and rock.

PERFORMANCE CRITERIA:

- SC 1. a. Surface facilities shall support the administration of records, including those of construction, operations, site characterization, security, permitting, personnel, personnel training and certification, visitors, compliance with regulations, safety, and other necessary records.

6.3 Surface Facilities

- SC b. Administrative facilities shall have space, supporting equipment, and furniture as necessary and appropriate to satisfy the needs of ESF operations and in-situ site characterization.
- SC c. Space and facilities shall support the training, certification, and requalification of operating and supervisory personnel.
- SC d. Security facilities shall protect the ESF in accordance with applicable DOE orders.
- SC e. Space and equipment shall support the functions of purchasing, storing, and dispensing equipment and materials, and shall be sized to accommodate the inventory needed for ESF operations and in-situ site characterization.
- SC f. Facilities shall support the maintenance of the roads, structures, equipment, grounds, buildings, and other facilities, if not available off the site.
- SC g. A change facility shall be established of sufficient size to provide all necessary personnel and underground visitors with a place to bathe, change, and dry clothes.
- SC h. Surface explosives and cap storage magazines, if required, shall meet all requirements of 30 CFR 57.6, 29 CFR 1910.109, applicable State and local regulations, and DOE Orders 5480.1a and 6430.1.
- SC i. During ESF construction, temporary visitor facilities shall be approved by the DOE. During ESF testing, facilities shall support a minimum capacity of 50 visitors on the surface and 10 visitors underground at any one time.
- SC j. Surface facilities shall combine functions when the combinations are cost effective.
- SC k. Necessary ventilation/exhaust and distribution facilities shall supply and exhaust adequate quantities of conditioned air to and from underground working areas such that operator safety, health, and productivity are maximized.
- SC l. Standby power shall support only those systems essential to evacuation, fire control, flood control, and critical in-situ site characterization testing.
- SC m. An uninterruptible power system shall be provided to service, as a minimum, the monitoring systems (e.g., fire, smoke, gas), communications systems, data collection systems, and those instruments and tests requiring continuous power.
- SC n. Shaft collars shall be designed and constructed for a maintainable 100-year design life.

6.3 Surface Facilities

- SC o. Facilities for treating water discharged from underground areas shall conform to applicable Federal, State, and local regulations.
- SC 2. a. The air quality monitoring system shall have the capability to sample, measure, and analyze physical and chemical conditions consistent with the requirements of applicable Federal, State, and local codes.
- SC b. The underground ventilation system shall be monitored for radon, methane, oxygen, carbon dioxide, temperature, humidity, air speed, and volume and as required by applicable Federal, State, and local regulations.
- SC 3. The water quality monitoring system shall have the capability to sample, measure, and analyze physical, chemical, and biological conditions consistent with the requirements of applicable Federal, State, and local codes.
- SC 4. Dust control/collection facilities at potential dust-generation areas such as rock-handling transfer points and processing areas on the surface shall control airborne particulates as required by applicable Federal, State, and local regulations.
- SC 5. Detection equipment for fires and explosions shall be in accordance with DOE Order 5480.1A, Chapter VII; DOE Order 6430.1, Chapter X.8; and any other applicable Federal, State, and local regulations.
- SC 6. Transportation facilities shall be of sufficient size to sustain ESF construction, operations, and testing.

CONSTRAINTS:

- SC A. The ESF system shall comply with applicable Federal environmental regulations and with State and local environmental regulations consistent with the DOE's responsibilities under the Nuclear Waste Policy Act of 1982 (NWPA). Such compliance shall include the following:
- SC (1) All stationary sources (point sources) of air emissions shall comply with the provisions of the Clean Air Act, as amended, which could include Prevention of Significant Deterioration (PSD) permitting, or offset policy review, or both. Federal regulations pertaining to compliance with the Clean Air Act include the National Primary and Secondary Ambient Air Quality Standards and Standards of Performance for New Stationary Sources.
- SC (2) All fugitive air emissions (nonpoint sources) shall be controlled in accordance with the provisions of the Clean Air Act, as amended, as well as all applicable State and local air quality regulations.

6.3 Surface Facilities

- SC B. To the extent practicable and economical, modular, relocatable, or portable structures shall be considered for surface facilities.
- SC C. To the extent practicable and consistent with procurement regulations, consideration of surplus government equipment shall be given to fulfill the requirements for the surface facilities and equipment.
- SC D. The minimal critical standby power requirements shall be determined by analysis.

6.4 FIRST SHAFT

DEFINITION:

The primary shaft (or decline) and emergency egress between the shaft collar and the candidate repository horizon (nominal 5 feet beyond the shaft liner). The first shaft includes the shaft excavation below the collar, measures for ground and water control, hoists, hoist house, head frames, shaft liners, shaft seals, and shaft outfitting (steel supports, guides, etc.).

FUNCTIONAL REQUIREMENTS:

- SC/ 1. Provide access to the candidate repository horizon and the
RQ underground portion of the ESF.
- RQ 2. Provide for testing in the shaft as required.
- SC 3. Provide means for emergency egress.
- SC 4. Provide facilities, utilities, and equipment for shaft construction and operations.
- SC 5. Provide for water drainage and/or control in the shaft.

PERFORMANCE CRITERIA:

- SC 1. a. The shaft shall be designed and constructed such that it meets the requirements of personnel, equipment, materials, utilities, excavated rock, and ventilation.
- RQ b. Permanent shaft structures, systems, and components shall be designed and constructed for a maintainable 100-year design life.
- RQ c. Techniques used for shaft excavation shall control overbreak of rock and minimize disturbance to the integrity of the adjoining rock mass.
- RQ d. The shaft shall be designed to provide stability and to minimize the potential for deleterious rock movement or fracturing that may create a pathway for radionuclide migration.
- RQ e. Rock support and other structural anchoring materials shall be compatible with waste isolation and shall neither interfere with radionuclide containment nor enhance radionuclide migration.
- SC f. Muck-handling systems shall be sized and designed for ESF operation and in-situ site characterization needs and shall minimize the spillage of rock during rock handling. This system shall provide capabilities for gathering and cleaning out rock spillage from the shaft bottom.

6.4 First Shaft

- RQ g. The location of openings for rock handling shall be selected to minimize effects on the integrity of any other openings.
- SC h. Appropriate gravity drainage and/or pumping systems shall be incorporated into the shaft for draining water away from testing and other working areas to suitable collection point(s) for further treatment and/or disposal.
- SC i. The shaft and its drainage systems shall control standing water and air/water contact surfaces where ventilation air will be flowing through in order to optimize humidity in air and to maintain the quality of the ventilation air being supplied.
- SC j. The size and shape of the shaft shall be adequate to supply and/or exhaust the required volumes of air for underground construction, operation, and in-situ site characterization.
- SC k. The size and depth of the shaft shall be sufficient for in-situ site characterization needs in terms of testing, personnel, materials, equipment, utilities, and schedule.
- SC l. The size and layout of the shaft shall be adequate for in-situ site characterization needs and capable of supporting the excavation allowances determined under General ESF Requirements Section 6.0 Performance Criteria 1.a. and 1.b.
- SC m. ESF hoisting systems shall be consistent with the requirements of operation and in-situ site characterization unless it is more economical to use construction hoists.
- RQ 2. Shaft design and construction shall provide for ESF design and construction testing, performance confirmation testing, and in-situ site characterization testing to the extent necessary.
- SC 3. Hoisting systems shall be designed and constructed for the evacuation of all underground personnel to safety within 1 hour.
- SC 4. a. Necessary shaft facilities and equipment required for handling excavated rock, materials, equipment, and supplies shall support construction, operations, and in-situ site characterization testing.
- SC b. Functional requirements of the shafts may be assigned to either or both shafts.
- SC 5. Water handling and control in the shaft shall be sized for credible water inflows.

CONSTRAINTS:

- SC/ A. Structures, systems, and components shall be provided for effective
RQ water and ground control.

6.4 First Shaft

- SC B. The shaft and its furnishings shall be designed to minimize air resistance to the extent practicable.
- RQ C. The use of blasting agents and explosives shall be controlled so that in-situ site characterization is not adversely affected.
- SC D. Personnel in the shaft shall not be exposed to air velocities greater than 2,000 feet per minute.
- SC E. Ventilation capacity, shaft design and air velocities in the shaft shall be optimized with respect to Project objectives.

6.5 SECOND SHAFT

DEFINITION:

Primary emergency egress from underground and secondary access between the shaft collar and the candidate repository horizon (nominal 5 feet beyond shaft liner). The second shaft (or decline) includes shaft excavation below the shaft collar, measures for ground and water control, emergency hoisting equipment, shaft liners, shaft seals, and shaft outfitting.

FUNCTIONAL REQUIREMENTS:

- SC/ 1. Provide primary emergency egress from underground.
RQ
- RQ 2. Provide for testing in the shaft, as required.
- SC 3. Support requirements for access, ventilation, and other service-related systems between the surface and the candidate repository horizon.
- SC 4. Provide for water drainage and/or control in the shaft.

PERFORMANCE CRITERIA:

- SC 1. a. The shaft shall be designed and constructed such that it meets emergency-egress and ventilation requirements.
- RQ b. Techniques used for shaft excavation shall control overbreak of rock and minimize disturbance to the integrity of the adjoining rock mass.
- RQ c. The shaft shall be designed to provide stability and to minimize the potential for deleterious rock movement or fracturing that may create a pathway for radionuclide migration.
- RQ d. Rock support and other structural anchoring materials shall be compatible with waste isolation and shall neither interfere with radionuclide containment nor enhance radionuclide migration.
- SC e. Appropriate gravity drainage and/or pumping systems shall be incorporated into the shaft for draining water away from testing and other working areas to suitable collection point(s) for further treatment and/or disposal.
- SC f. The shaft and its drainage systems shall control standing water and air/water contact surfaces where ventilation air will be flowing through in order to optimize humidity in air and to maintain the quality of the ventilation air being supplied.

6.5 Second Shaft

- SC g. The size, shape, and construction of the shaft shall be adequate to supply and/or exhaust the required volumes of air for underground construction, operations, and in-situ site characterization.
- RQ h. Permanent shaft structures, systems, and components shall be designed and constructed with a maintainable 100-year design life.
- SC i. Hoisting systems shall have a rated capacity sufficient for emergency egress.
- SC j. The shaft shall provide for evacuation and shall be capable of evacuating all underground personnel to safety within 1 hour.
- SC k. The size and the layout of the shaft shall be adequate for in-situ site characterization needs and capable of supporting the excavation allowances determined under General ESF Requirements Section 6.0 Performance Criteria 1.a. and 1.b.
- RQ 2. Shaft design and construction shall include allowances for construction testing, performance testing, and in-situ site characterization testing to the extent necessary.
- SC 3. a. Necessary shaft facilities and equipment required for handling excavated rock, materials, equipment, and supplies shall support construction, operations, and in-situ site characterization testing.
- SC b. Functional requirements of the shafts may be assigned to either or both shafts.
- SC 4. Water handling and control in the shaft shall be sized for credible water inflows.

CONSTRAINTS:

- SC/ RQ A. Structures, systems, and components shall be provided for effective water and ground control.
- RQ B. The use of blasting agents and explosives shall be controlled so that in-situ site characterization is not adversely affected.
- SC C. Personnel in the shaft shall not be exposed to air velocities greater than 2,000 feet per minute.
- SC D. The shaft and its furnishings shall be designed to minimize air resistance to the extent practicable.
- SC E. Ventilation capacity, shaft design and air velocities in the shaft shall be optimized with respect to Project objectives.

6.6 SUBSURFACE EXCAVATIONS

DEFINITION:

Underground openings 5 feet beyond the shaft liners. These openings include shaft stations, muck storage, drifts, underground shops, lunch room(s), warehouse(s), raise(s), and test alcove(s).

FUNCTIONAL REQUIREMENTS:

- SC/ 1. Provide underground openings for in-situ site characterization
RQ and support maintenance of in-situ site characterization.
- SC 2. Provide a system for removing excavated rock to the shaft.

PERFORMANCE CRITERIA:

- SC 1. a. Underground openings shall be designed and constructed to meet personnel, equipment, and ventilation requirements.
- RQ b. Permanent ESF structures, systems and components shall be designed and constructed for a 100-year maintainable design life.
- RQ c. Excavation techniques shall control overbreak of rock and minimize disturbance to the integrity of the adjoining rock mass.
- RQ d. Underground openings shall be designed to provide stability and to minimize the potential for deleterious rock movement or fracturing that may create a pathway for radionuclide migration.
- RQ e. Rock support and other structural anchoring materials shall be compatible with waste isolation and shall neither interfere with radionuclide containment nor enhance radionuclide migration.
- RQ f. Water intrusion, if any, into the underground openings shall be monitored and controlled by suitable measures such that the effects of expected water inflows (i.e., water, heat, gases) will not endanger worker safety and in-situ site characterization.
- SC g. Appropriate gravity drainage and/or pumping systems shall be incorporated in underground openings for draining water away from testing and other working areas to suitable collection point(s) for further treatment and/or disposal.
- SC h. Underground openings and drainage systems shall control standing water where ventilation air will be flowing through in order to optimize humidity in air and to maintain the quality of the ventilation air being supplied.
- SC i. The number and the size of openings shall satisfy in-situ site characterization needs in terms of testing, personnel, materials, equipment, utilities, and schedule.

6.6 Subsurface Excavations

- SC j. The size, shape, and construction of openings shall be adequate to supply and/or exhaust required volumes of air for underground operations and testing during normal and emergency conditions and shall minimize airborne dust during in-situ site characterization.
- SC k. The size and layout of openings shall be adequate for in-situ site characterization needs and capable of supporting the excavation allowances determined under General ESF Requirements Section 6.0 Performance Criteria 1.a. and 1.b.
- SC l. The openings required for rock handling and for support facilities (e.g., maintenance shops, electrical substations, pump stations, refuge chambers, lunch rooms, explosives magazines, and storage facilities for supplies and consumables) shall be located away from in-situ site characterization testing to minimize interruptions.
- SC m. The openings required for handling excavated rock shall be of sufficient size to allow equipment movement in such a way that interference with in-situ site characterization is minimized.
- SC n. During ESF construction, temporary visitor facilities shall be provided as approved by the DOE. During in-situ site characterization testing, facilities shall be provided for at least 10 visitors underground at any one time.
- RQ o. A refuge chamber(s) shall be provided with sufficient capacity and facilities to accommodate personnel underground.
- RQ p. Probe or pilot holes shall be drilled as appropriate in advance of drifting to detect and control sudden water and/or gas intrusions into openings.
- SC 2. The excavation facilities and equipment required for handling rock shall meet the needs of construction and testing activities and shall be capable of supporting the excavation allowances determined under General ESF Requirements Section 6.0 Performance Criteria 1.a. and 1.b.

CONSTRAINTS:

- SC/ RQ A. Structures, systems, and components shall be provided for effective water and ground control.
- SC B. Underground openings shall be designed to minimize air resistance to the extent practicable.
- SC C. Underground openings shall be designed to handle required volumes of air in order to cope with potential high temperatures from rock or waste-package simulation tests with heaters.
- RQ D. The use of blasting agents and explosives shall be controlled to preclude adverse effects on in-situ site characterization.

6.6 Subsurface Excavations

- SC E. Mechanical excavation methods shall be used if economically and technically feasible and justified.
- SC F. Underground openings shall be designed and constructed to minimize impacts on in-situ site characterization.
- RQ G. The design of underground openings and their supports shall consider pillar and opening geometries that limit excessive stress concentrations.
- SC H. Personnel in underground openings shall not be exposed to ventilation velocities that exceed 1,500 feet per minute. The ventilation volume shall not be less than 200 cubic feet per minute per person.
- SC I. The effective temperature in working areas shall be designed not to exceed 80 degrees wet-bulb globe temperature.

6.7 UNDERGROUND SERVICE SYSTEMS

DEFINITION:

Underground services for material and personnel transport, ventilation, mine dewatering, communications and instrumentation networks, utilities, and emergency provisions.

FUNCTIONAL REQUIREMENTS:

- SC 1. Provide utilities for underground ESF operations, in-situ site characterization, and monitoring.
- SC 2. Provide for underground water handling and treatment as required.
- SC 3. Provide a distribution system for ventilation air.
- SC 4. Provide dust-control equipment and/or facilities.
- SC 5. Provide facilities and equipment for the installation and maintenance of underground services.
- SC 6. Provide underground transport services for personnel, equipment, and materials.

PERFORMANCE CRITERIA:

- SC 1. a. The system shall have suitable utilities, including power, lights, water and compressed air, as required for construction, operations, and in-situ site characterization and shall be capable of supporting the allowances determined under General ESF Requirements Section 6.0 Performance Criteria 1.a. and 1.b.
- SC b. The utility services shall include minimal backup units for primary power lines, primary pumps, shaft conveyances, primary ventilation fans, and primary communications and testing equipment to allow testing continuity based upon Project analysis.
- SC c. Effective communications capability in and between the surface and the underground facilities shall be established and suitable safety alarm systems shall be provided where required. Closed-circuit television monitoring shall be provided for primary hoisting at critical locations.
- SC 2. a. Pumping systems with adequate capacity and control measures shall be designed and constructed for the control of underground water to ensure worker protection and preclude adverse effects on in-situ site characterization testing.

6.7 Underground Service Systems

- SC b. Adequate piping shall be provided to carry water from underground pump station(s) to the surface.
- SC c. Monitoring and treatment facilities for underground water shall be available to control possible contamination and to prevent damage to pumping/piping systems from erosion or corrosion by waterborne particulates.
- SC 3. a. Underground ventilation shall dilute and/or remove particulate matter, blasting fumes, and other flammable and noxious gases from the working areas and divert polluted air to the exhaust opening(s) in conformance with applicable Federal, State, and local regulations.
- SC b. The underground ventilation system shall supply and exhaust adequate quantities of conditioned air in accordance with applicable Federal, State, and local regulations.
- SC c. The ventilation system shall minimize leakage and recirculation to the extent practicable.
- SC 4. Dust-control equipment and/or facilities at potential dust-generation areas (i.e., working faces, rock-handling transfer points, etc.) shall be capable of controlling airborne particulates.
- SC 5. The service facilities and equipment required for maintaining and installing underground services shall be provided to support ESF operation and in-situ site characterization and shall be capable of supporting the excavation allowances determined under General ESF Requirements Section 6.0 Performance Criteria 1.a. and 1.b.
- SC 6. a. The underground transport facilities shall be sufficiently sized to sustain construction, operations, and testing.
- SC b. The transport system(s) shall be designed with appropriate safety features as required by Project analysis and applicable Federal, State, and local regulations.

CONSTRAINTS:

- SC A. Utility systems (i.e., electric power, air, water, etc.), when installed, shall not restrict foot, vehicular, or shaft conveyance traffic; obstruct ventilation; or cause safety hazards.
- SC B. Personnel in underground openings shall not be exposed to air velocities that exceed 1,500 feet per minute. Ventilation volumes shall not be less than 200 cubic feet per minute per person.
- SC C. The effective temperature in working areas shall be designed not to exceed 80 degrees wet-bulb globe temperature.

6.8 OPERATIONS

DEFINITION:

The process of operating, maintaining, and inspecting the facility.

FUNCTIONAL REQUIREMENTS:

SC 1. Provide for ESF operations.

PERFORMANCE CRITERIA:

SC 1. a. Operators and maintenance personnel shall support in-situ site characterization.

SC b. Utilities, equipment, spare parts, and materials shall be adequate to sustain operations in support of in-situ site characterization.

SC c. Management and quality control procedures shall be implemented to ensure that in-situ site characterization is not adversely affected by ESF operations.

CONSTRAINTS:

SC A. Operations and maintenance shall be carried out in accordance with operating manuals, quality standards, and health and safety procedures.

SC B. Operations shall coordinate ongoing construction activities with testing so that in-situ site characterization is not adversely affected.

6.9 TESTING

DEFINITION:

Those activities associated with test equipment installation, test execution, test data recording, and test analysis for in-situ site characterization.

FUNCTIONAL REQUIREMENTS:

- SC 1. Provide the means for the implementation of in-situ site characterization testing plans.
- SC 2. Support performance confirmation testing.

PERFORMANCE CRITERIA:

- SC 1. a. In-situ site characterization shall meet applicable requirements of 10 CFR Part 60 and 10 CFR Part 960.
- SC b. In-situ site characterization shall meet the applicable requirements of the Site Characterization Plan.
- SC c. Testing plans must provide for feedback and modification as a result of initial and ongoing test and monitoring results.
- SC d. Reports shall contain adequate visual and diagrammatic information to make the conduct, setup, and objectives of all the tests clear to readers outside the Project.
- SC e. In-situ site characterization shall provide reliable information with specified accuracy and uncertainty as determined by the Project.
- SC f. Measurements, tests, and analyses shall be sufficient to determine the performance of the ESF and the effects of ESF construction on in-situ site characterization.
- SC g. An uninterruptible power supply system shall be available to ensure continuous operation of equipment and instrumentation related to critical testing as determined by the Project through analysis.
- SC h. Written procedures shall be developed for the procurement, construction, installation, maintenance, and operation of testing instruments and data collection facilities.
- SC i. Where potential gassy mine conditions exist, permissible equipment shall be provided, as required.

6.9 Testing

- SC 2. Performance confirmation testing shall be carried out to meet the requirements of 10 CFR Part 60 Subpart F.

CONSTRAINTS:

- RQ A. Tests shall be designed and located within the facility to ensure that thermal, mechanical, chemical and hydrological interactions will not endanger the structural stability of the ESF or adversely affect tests conducted in adjacent areas.
- SC B. Testing shall not affect overall site integrity of the Mined Geologic Disposal System as required by 10 CFR 60.112.
- SC C. Testing equipment requirements, including design life, shall be based on the performance goals of the tests.
- SC D. Tests shall be classified according to primary information needs (i.e., site characterization, ESF site characterization, ESF design confirmation, repository design, or performance confirmation) and defined with respect to duration, scale, and space requirements. This classification and definition shall be the basis for equipment design; underground layout; and ventilation, personnel, and utility requirements.
- SC E. The ESF shafts shall be connected prior to initiation of full-scale in-situ testing.

6.10 DECOMMISSIONING AND CLOSURE

DEFINITION:

Decommissioning and closure of the ESF.

FUNCTIONAL REQUIREMENTS:

SC/ 1. Provide for decommissioning and closure of the ESF.
RQ

PERFORMANCE CRITERIA:

SC 1. a. The ESF shall be designed, constructed, and operated to meet decommissioning and closure requirements of applicable Federal, State, and local codes.

SC b. Decommissioning and closure shall be in accordance with the Site Characterization Plan.

SC/ c. Decommissioning and closure shall be planned for two scenarios:
RQ (1) the site is chosen for repository development, and
(2) the site is not chosen for repository development.

CONSTRAINTS:

RQ A. The ESF and repository designs shall be integrated to ensure that decommissioning and closure requirements are consistent.

D. ESF REGULATORY MATRIX

This matrix lists the Federal laws and regulations and EOE orders considered to be relevant to ESF design, construction, and operation as expressed in ESF requirements. Specific applicability will be determined by the projects. Other laws, regulations, and orders may also apply.

Laws, Regulations, and Orders	Work Breakdown Structure Category										
	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	6.10
10CFR60 Subpart D											X
10CFR20		X									
10CFR50 App B		X									
10CFR60	X	X									X
10CFR60 Subpart F	X	X									X
10CFR60.112	X										X
10CFR60.113(a)	X										
10CFR60.131(b)(1)	X										
10CFR60.131(b)(2)	X										
10CFR60.131(b)(3)(ii)	X										
10CFR60.131(b)(3)	X										
10CFR60.131(b)(8)	X										X
10CFR60.131(b)(9)	X										
10CFR60.133(b)									X		
10CFR60.133(d)	X										
10CFR60.133(e)(2)					X	X	X				
10CFR60.133(f)	X										
10CFR60.133(i)	X										
10CFR60.134(a)	X										
10CFR60.134(b)	X										
10CFR60.72(b)		X		X							X
10CFR73				X							
10CFR960											X
10CFR960.5-1(a)(3)		X									
10CFR960.5-2-10(a)		X									
10CFR960.5-2-10(d)		X									
15USC2601	X										
16USC1451	X										
29CFR1910.109				X							
29CFR1910.95		X									
29CFR1926.21		X									
29CFR1926.52		X									
29CFR1926.800(c)	X										
30CFR CH I Sub D		X									
30CFR CH I Sub E		X									
30CFR CH I Sub N		X									
30CFR.CHAPTER I	X										

D. ESF Regulatory Matrix (continued)

Laws, Regulations, and Orders	Work Breakdown Structure Category										
	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	6.10
30CFR29.9								X			
30CFR31.9(a)	X										
30CFR31.9(a)(4)		X									
30CFR31.9(b)		X									
30CFR31.9(e)		X									
30CFR32.9								X			
30CFR32.9(a)(4)		X									
30CFR32.9(b)		X									
30CFR32.9(e)		X									
30CFR36.45(b)	X										
30CFR48		X								X	
30CFR49		X								X	
30CFR57	X							X			
30CFR57-4-43					X						
30CFR57 Subpart J	X		X	X				X			
30CFR57 Subpart K	X		X	X				X			
30CFR57 Subpart L	X										
30CFR57 Subpart M			X	X				X			
30CFR57 Subpart N		X									
30CFR57 Subpart O			X	X				X			
30CFR57 Subpart P	X										
30CFR57.18		X									
30CFR57 Subpart R	X										
30CFR57						X			X		
30CFR57.19120 to .19135		X									
30CFR57.19001 to .19018						X					
30CFR57.19035 to .19041						X					
30CFR57 Subpart S	X										
30CFR57 Subpart T	X					X		X			
30CFR57.21100									X		
30CFR57.21020 to .21023				X							
30CFR57.21039									X		
30CFR57.21040									X		
30CFR57.21065									X		
30CFR57.21080									X		
30CFR57.21099									X		
30CFR57.3020 to .3058					X			X			
30CFR57 Subpart C			X					X			

D. ESF Regulatory Matrix (continued)

Laws, Regulations, and Orders	Work Breakdown Structure Category										
	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	6.10
30CFR57.4401,.4430,.4431		X									
30CFR57.4530		X									
30CFR57.4531		X									
30CFR57 Subpart D	X	X									
30CFR57.5001		X									
30CFR57.8518 to .8519				X							
30CFR57.5002		X									
30CFR57.8525		X									
30CFR57.8531		X									
30CFR57.5040		X									
30CFR57.5005		X							X		
30CFR57.5050		X									
30CFR57 Subpart E	X			X	X			X			
30CFR57 Subpart H	X		X	X				X			
30CFR58.30000to.40000	X										
33CFR323	X										
33USC1251	X			X							
40CFR Chapter I	X										
40CFR122				X							
40CFR125				X							
40CFR141	X			X							
40CFR143	X			X							
40CFR1505	X										
40CFR1505.2(c)		X								X	
40CFR191		X									
40CFR204		X									
40CFR220-229	X										
40CFR50				X							
40CFR60				X							
42USC300F	X			X							
42USC3251	X			X							
42USC7401				X							
DOE 1323.1		X									
DOE 1324.2		X							X		

D. ESF Regulatory Matrix (continued)

Laws, Regulations, and Orders	Work Breakdown Structure Category										
	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	6.10
DOE 1325.1A		X									
DOE 1330.1A CH I		X									
DOE 1350.1		X									
DOE 1540.1	X	X									
DOE 1800.1		X							X		
DOE 2100.4		X									
DOE 2200.1		X									
DOE 2250.1A		X									
DOE 3220.1		X									
DOE 3220.2		X									
DOE 3230.2A		X									
DOE 3304.1		X									
DOE 3400.1		X									
DOE 3410 SERIES		X									
DOE 3710.1		X									
DOE 3750.1		X									
DOE 3771.1		X									
DOE 3790.1		X									
DOE 4200.3		X									
DOE 4200.4		X									
DOE 4220.3A		X									
DOE 4320.1A		X									
DOE 4330.4		X									
DOE 5031.1		X									
DOE 5100.1		X									
DOE 5300.1A					X						
DOE 5420.1		X									
DOE 5440.1B		X			X						
DOE 5480.1 CH I	X										
DOE 5480.1 CH XI	X										
DOE 5480.1 CH XIII	X										
DOE 5480.1A		X	X	X							
DOE 5480.1A CH I									X		
DOE 5480.1A CH I.11	X										
DOE 5480.1A CH VII					X				X		
DOE 5480.4		X									
DOE 5481.1A		X									
DOE 5482.1A		X									

D. ESF Regulatory Matrix (continued)

Laws, Regulations, and Orders	Work Breakdown Structure Category										
	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	6.10
DOE 5483.1A		X									
DOE 5484.1		X									
DOE 5484.2		X									
DOE 5500.1 CH I		X									
DOE 5500.1 CH II		X									
DOE 5500.3		X									
DOE 5500.4		X									
DOE 5630.10		X							X		
DOE 5630.2		X							X		
DOE 5630.7		X							X		
DOE 5630.9		X							X		
DOE 5631.1				X							
DOE 5631.2				X							
DOE 5631.3				X							
DOE 5633.1				X							
DOE 5635.1				X							
DOE 5650.2				X							
DOE 5700.2B		X									
DOE 5700.4A		X									
DOE 5700.5		X									
DOE 5700.6A		X									
DOE 5700.7A		X									
DOE 5900.1		X									
DOE 5900.2		X									
DOE 6410.1		X									
DOE 6430.1		X									
DOE 6430 CH I.3.M		X									
DOE 6430 CH XIX		X									
DOE 6430.1			X	X							
DOE 6430.1 CH I	X										
DOE 6430.1 CH I.3	X										
DOE 6430.1 CH I.3.C				X							
DOE 6430.1 CH V	X										
DOE 6430.1 CH VI	X										
DOE 6430.1 CH VII	X										
DOE 6430.1 CH X.8				X				X			
DOE 6430.1 CH XI	X										
DOE 6430.1 CH XIII	X										
DOE 6430.1 CH XIV				X							
DOE 6430.1 CH XVI.3		X									
DOE 6430.1 CH XXI.8	X										
NQA-1		X									
NWPA	X										

D. ESF Regulatory Matrix

Laws, Regulations, and Orders	Work Breakdown Structure Category										
	6.0	6.1	6.2	6.3	6.4	6.5	6.6	6.7	6.8	6.9	6.10
P.L. 92-140		X									
P.L. 92-574	X										
P.L. 95-396											X

Exploratory Shaft Facility Subsystem Design Requirements Document
(NVO-309)

**Nevada Nuclear Waste
Storage Investigations Project
Exploratory Shaft Facility (ESF)
Subsystem Design Requirements Document (SDRD)**

Prepared by Nevada Nuclear Waste Storage Investigations (NNWSI) Project participants as part of the Civilian Radioactive Waste Management Program. The NNWSI Project is managed by the Waste Management Project Office of the U.S. Department of Energy, Nevada Operations Office. NNWSI Project work is sponsored by the Office of Geologic Repositories of the DOE Office of Civilian Radioactive Waste Management.

Prepared by

U.S. Department of Energy
Nevada Operations Office
Waste Management Project Office

Compiled by

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

Prepared for

U.S. Department of Energy
Nevada Operations Office

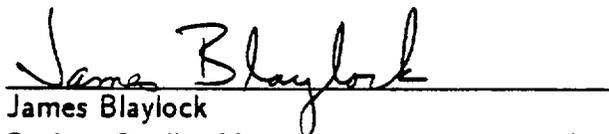
SUBMITTALS AND APPROVALS

This Exploratory Shaft Facility (ESF Subsystem Design Requirements Document (SDRD) for the Nevada Nuclear Waste Storage Investigations (NNWSI) Project is submitted by:



Lester P. Skousen, Chief
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Waste Management Project Office

DEC 18 1987



James Blaylock
Project Quality Manager
Waste Management Project Office

APPROVED BY:



Carl P. Gertz, Director
Waste Management Project Office

The work that is approved under this document constitutes the development of Engineering Requirements for the Preliminary Design (Title I) for the Exploratory Shaft Facility at the Yucca Mountain Site in Nevada.

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT

REVISION/CHANGE RECORD

Page 2 of 2
9/26/88

DOCUMENT NUMBER: NVO-309
Exploratory Shaft Facility Subsystem Design Requirements
DOCUMENT TITLE: Documents (ESF - SDRD) Volume 1 and 2

DATE/ REVISION NUMBER	C/SCR NUMBER	REVISION/CHANGE DESCRIPTION	PAGES AFFECTED
Rev. 5	88/025	<p><u>Replace</u> Appendix C "Test Hole Requirements" Title Page, with Appendix C of the "ESF Drilling Requirements"</p> <p><u>Replace</u> Appendix C "Test Hole Requirements" Table, December 1, 1986 with Appendix C "ESF Drilling Requirements, April 28, 1988.</p> <p><u>Replace</u> Index Tab C "Test Hole Requirements" with Index Tab C "ESF Drilling Requirements"</p> <p><u>Replace</u> "Revision Change Control Record, with Rev. 5 the "Revision Change Record"</p>	<p>N/A</p> <p>N/A</p> <p>N/A</p> <p>1-2</p>

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT

REVISION/CHANGE RECORD

Page 1 of 2

9/26/88

DOCUMENT NUMBER: NVO-309

DOCUMENT TITLE: Exploratory Shaft Facility Subsystem Design Requirements Document (ESF - SDRD), Volume 1 and 2

DATE/ REVISION NUMBER	C/SCR NUMBER	REVISION/CHANGE DESCRIPTION	PAGES AFFECTED
Rev. 1	88/014	<p><u>Delete</u> the July 18, 1986 Draft ESF - SDRD</p> <p><u>Insert</u> ESF SDRD, NVO-309 Revision 1. dated, December 18, 1987</p>	N/A
Rev. 2	88/017	<p><u>Add</u> Supplementary Requirements for the ESF design into the SDRD entitled "Repository Design Requirements Shaft Collars and Linings Preclosure Period" at the back of Appendix D</p> <p><u>Replace</u> Appendix A, Sketch 5, SNL Drawing R007048A (1 sheet) with the new issue of SNL Drawing R07048A consisting of (15 sheets)</p>	1-4 1-15
Rev. 3	88/021	<p><u>Replace</u> Appendix A, ESF sketches title page</p> <p><u>Replace</u> Appendix B, Test Integrated Data Systems (IDS) Requirements Title page</p>	N/A N/A
Rev. 4	88/022	<p><u>Replace</u> Sketches 3, 4, and 5 of Appendix A with SNL Drawing R07048A</p>	1-15
Rev. 5	88/025	<p><u>Replace</u> Appendix C, "Test Hole Requirement" table, with Appendix C of the SDRD: "ESF Drilling Requirements"</p> <p><u>Replace</u> Volume 1, Table of Contents, 1.2.6 Appendices (last page)</p> <p><u>Replace</u> Volume 2, Table of Contents</p>	1-12 1-5 N/A N/A

NNA-81007.0015

EXPLORATORY SHAFT FACILITY

SUBSYSTEM DESIGN REQUIREMENTS DOCUMENT

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- Appendix F Work order system / Work Breakdown Structure

Design Basis Document
Holmes & Narver, Inc.

December 18, 1987

HOLMES & NARVER, INC.

Exploratory Shaft Facility

Title I

Design Basis Document

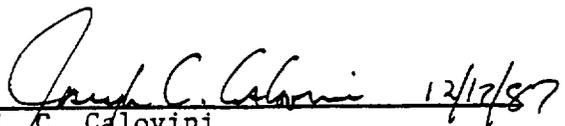
Nuclear Waste Storage Investigations Project

DECEMBER 1987

December 18, 1987

SUBMITTALS AND APPROVALS

This Exploratory Shaft Facility (ESF) Subsystem Design Basis Document (DBD)
for the NNWSI Project is submitted by:


J. C. Calovini 12/17/87
Holmes & Narver, Inc

Approved by:

Waste Management Project Office

**EXPLORATORY SHAFT FACILITY
DESIGN BASIS DOCUMENT**

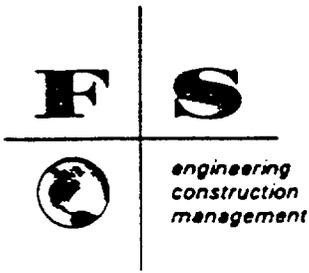
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Basis for Design
Fenix and Scisson, Inc.

NNA '88 0525 . 0039



NNWSI EXPLORATORY SHAFT FACILITY

BASIS FOR DESIGN

ISSUE 1

APRIL 11, 1988

APPROVED: *Sureyard* DATE: 4-13-88
Project Design Manager

APPROVED: *T. L. Zullo* DATE: 4-19-88
Project Manager

APPROVED: *Dennis H. Erby* DATE: 5-4-88
WMPO

FENIX & SCISSON, INC.
Tulsa, Oklahoma

SAIC/T & MSS

MAY 25 1988

C O F RECEIVED

ESF BASIS FOR DESIGN

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5.

The Nevada Nuclear Waste Storage Investigations
Reference Information Base

**The
Nevada Nuclear Waste Storage Investigations Project
Reference Information Base**

Version 03.001 -- December 1987

NNWSI PROJECT REFERENCE INFORMATION BASE VERSION 03.001

The Nevada Nuclear Waste Storage Investigations (NNWSI) Project Reference Information Base (RIB) has been established to maintain and control the flow of interpreted technical reference information for use by Project design and performance assessment activities and to provide a basis for an eventual license application to construct and operate a nuclear waste repository at Yucca Mountain, Nevada.

The original draft version 01.001 of the RIB was issued as an example of a proposed structure and format for the RIB in April 1986 for review comment by Project participants. In May 1987, draft version 02.001 was released as Sandia National Laboratories Letter Report SLTR87-6001. The information in the second draft, which incorporated review comments received on the original draft information, was updated and modified. The content was considerably expanded by incorporating a select fraction of the information compiled in the course of producing the NNWSI Site Characterization Plan Conceptual Design Report (SCP-CDR). In August 1987, a replacement page set was released for updating the RIB content from draft version 02.001 to draft version 02.002. This replacement page set provided an example of the mechanism proposed for regularly updating the content of the evolving information base.

Version 03.001 is the current base version of the RIB and was released for Project use in December 1987. The content of this version includes only those items from version 02.002, which were identified as required for use in Title I Exploratory Shaft Facility (ESF) design.

Although approved for use in ESF activities, several precautions regarding the use of version 03.001 are strongly advised. A significant source of information for RIB version 03.001 is the SCP-CDR. In many cases, the origin documentation for SCP-CDR information has not been identified or verified. Original data, which were not generated by an NNWSI activity and reflect design by rule, do not have a quality level designation specified. At the time version 03.001 was issued, all of the information therein was the subject of an ongoing intensive re-evaluation to certify the information as appropriate for use in ESF design. This re-evaluation is intended to identify the origin of raw technical data from which the RIB information is distilled and address relevant quality assurance requirements. As a result of this re-evaluation, it is expected that values in version 03.001 may change. As the re-evaluation proceeds, replacement page sets (identified as versions 03.002, 03.003, etc.) will be submitted through Project approval procedures for incorporation of these modifications in the RIB.

The Table of Contents which follows this introduction illustrates the general organization of this version of the RIB. Subject headings for which reference information is included are underlined. An appendix, which follows the reference information pages, provides a topic index to assist in locating more specific information.

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APPENDICES

Appendix 1 - Topic Index

Exploratory Shaft Facility Technical Element
and
Interface Control Procedure
NNWSI AP-5.6Q



ADMINISTRATIVE PROCEDURE

N-AD-001
2/87

Title AP-5.6Q EXPLORATORY SHAFT FACILITY TECHNICAL ELEMENT AND INTERFACE CONTROL PROCEDURE

1.0 PURPOSE AND SCOPE

The purpose of this procedure is to define the methods to be used in establishing and implementing control of the Exploratory Shaft Facility (ESF) technical element and interfaces for the Nevada Nuclear Waste Storage Investigations (NNWSI) Project ESF. This includes changes to the ESF technical element; and the identification, definition, control, and approval of all functional and physical interfaces for the ESF design.

2.0 APPLICABILITY

This procedure applies to all participants during the design for the NNWSI Project ESF. The provisions of this procedure apply to changes to the ESF technical element; and identification, definition, control, and approval of all functional and physical interfaces for the ESF.

3.0 DEFINITIONS

3.1 COMPONENT INTERFACE DOCUMENT (CID)

A document (drawing and/or sketch) used to specify how mating items relate to each other at their common boundary and the characteristics of each at that boundary. CIDs may be in the form of data sheets, catalog information, and/or specifications; or in the form of design drawings that identify the interface requirements.

3.2 CRITERIA

New information required for the start of a design phase or for a continuation of a design phase which improves standard or state-of-the-art practices required for the design or totally new concepts or directives that were not envisioned at the start of design. New criteria can be developed either outside or within the ESF.

3.3 ENGINEERING CHANGES

Technical changes dictated by new criteria or design evolution.

3.4 ENGINEERING CHANGE REQUEST (ECR)

A document (Exhibit 1) that describes in detail the engineering change required and the reason for the change. The document should also give the cost and schedule impacts expected if the change is not accomplished. This ECR should be accompanied by the information necessary to clarify, define, and document the requirements for the change.

APPROVALS

Date Issued	Revision	Project Manager	Page	No.
7/5/88	0	<i>Mitchell K. ...</i>	1 of 11	AP-5.6Q
	Supersedes	QA Manager		
	SOP-03-05	<i>James Blaylock</i> 6/21/88		

NNA.880823.0025



ADMINISTRATIVE PROCEDURE

N-AD-001
2/87

Title AP-5.6Q EXPLORATORY SHAFT FACILITY TECHNICAL ELEMENT
AND INTERFACE CONTROL PROCEDURE

3.5 ESF TECHNICAL ELEMENT

A configuration identification document or a set of such documents concerning ESF formally designated and approved for baselining at a specific time. (The time need not be the same for each document in the set.) Interface control documentation is included in the ESF technical element.

3.6 INTERFACE CONTROL DOCUMENTATION (ICD)

A controlled document (or set of documents) that identifies and records the results of interface activities and that can include identifying interfaces, participants, and methods of interface resolution. Examples of ICDs are ECRs, System Interface Documents (SID), and CIDs.

3.7 INTERFACE CONTROL WORKING GROUP (ICWG)

A group of individuals that represents the U.S. Department of Energy (DOE) Waste Management Project Office (WMPO) and other Project participants such as Science Applications International Corporation (SAIC), Fenix & Scisson, Inc. (F&S), Holmes & Narver, Inc. (H&N), Reynolds Electrical & Engineering Company (REECo), Los Alamos National Laboratory (LANL), the United States Geological Survey (USGS), Lawrence Livermore National Laboratory (LLNL), and Sandia National Laboratories (SNL). The ICWG is a working group which provides the official communication link between the ESF participants and other Project participants for interface activities. It identifies functional and physical technical interfaces between the ESF surface and underground designs and also between the ESF and the Repository, Waste Package, Site Investigations, Environmental, Socioeconomic, and Regulatory-Licensing elements.

3.8 NNWSI PROJECT BASELINE CHANGES

Documents which convey a complete description and justification of any proposed changes to the NNWSI Project Baseline.

3.9 SYSTEM INTERFACE DOCUMENT (SID)

A diagrammatic representation used to specify how systems relate at their common boundary and their characteristics at that boundary.

3.10 ADDITIONAL DEFINITIONS

See NNWSI/88-9 (formerly NVO-196-17), Appendix A for additional definitions.

APPROVALS

Date Issued	Revision	Supersedes	Page	No.
7/5/88	0	SOP-03-05	2 of 11	AP-5.6Q

**ADMINISTRATIVE PROCEDURE**N-AD-001
2/87Title AP-5.6Q EXPLORATORY SHAFT FACILITY TECHNICAL ELEMENT
AND INTERFACE CONTROL PROCEDURE**4.0 RESPONSIBILITIES****4.1 WASTE MANAGEMENT PROJECT OFFICE (WMPO)****4.1.1 NNWSI Project Manager**

The NNWSI Project Manager shall appoint the ESF ICWG Chairman. Delegation of authority from the NNWSI Project Manager to the ICWG Chairman shall be documented and distributed to all appropriate organizations.

4.1.2 ICWG Chairman

The ICWG Chairman shall be a representative of the WMPO. The Chairman shall be responsible for determining the nature and extent of design interfaces between participating organizations, and ensuring that the contents of all ICDs are adequate to delineate, document, and control ESF functional and physical interfaces. The ICWG Chairman shall approve changes to the ESF technical element that are generated within the ICWG. The ICWG Chairman shall also originate requests for changes to the NNWSI Project Baseline in accordance with NNWSI Project procedures.

4.2 INTERFACE CONTROL WORKING GROUP (ICWG)

The ICWG identifies and defines functional and physical technical interfaces for the ESF design. The ICWG shall: (1) identify interfaces; (2) identify design documentation, schedules and schedule changes which have an impact on ESF interfaces; (3) review status of actions having a direct bearing on ESF interface activities; (4) review and recommend solutions for ESF interface problems; (5) ensure that functional and physical ESF interfaces are properly addressed; and (6) develop a charter and applicable operating procedures for the operation and function of the group.

4.3 PARTICIPANTS

Participants shall provide an individual representative to the ICWG who is authorized to review ESF technical element and interface documents submitted to the ICWG for review and concurrence. The participants shall also initiate (through their authorized representative) required ICDs with associated information for distribution, analysis, and verification to the ICWG. In addition, the participants can request changes to the ESF technical element.

4.3.1 Participants Technical Project Officer (TPO)

The TPO from the participants shall appoint the primary and alternate representatives for the ICWG. Each ICWG participant representative shall have the recommendation and approval of his/her Technical Project Officer to represent the interest of his/her organization with stated full approval

APPROVALS

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authority for all activities and responsibilities within the scope of the ICWG.

5.0 PROCEDURE

This procedure discusses (1) the management of changes to the ESF technical element and (2) the management of technical interface requirements among the ESF participants.

5.1 BASELINE

There are two areas of concern to the ESF: the NNWSI Project Baseline and the ESF technical element. Some, but not necessarily all, documents admitted to the ESF technical element will be added to the NNWSI Project Baseline. Documents internal to the ESF design may be a part of the ESF technical element, but not admitted to the NNWSI Project Baseline.

5.1.1 NNWSI Project Baseline

The NNWSI Project Baseline includes, but is not limited to, the following: ESF Design Requirements, ESF Project Schedule, ESF Project Budget, and the Reference Information Base. Any changes to these documents affect participating organizations and therefore require changes in accordance with NNWSI Project administrative procedures.

5.1.2 ESF Technical Element

The ESF technical element includes documents introduced by approved ECRs. These documents can include studies, design criteria, and design documents. Admission of documents to the ESF technical element shall be approved by the ICWG Chairman through ECRs. Changes to the ESF technical element will be incorporated into the NNWSI Project Baseline as required.

5.1.2.1 ESF Technical Element Change Process

The process for changing the ESF technical element is shown in Exhibit 2. The process involves the identification of proposed changes to the ESF technical element; the documentation of proposed changes to the ESF technical element; formal review of proposed changes to the ESF technical element; the approval of proposed changes to the ESF technical element; incorporation of approved, proposed baseline changes into the ESF; and the notification of participant organizations.

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5.1.2.2 Identification of Proposed Changes

Proposed changes can be identified by the participants or the WMPO from new criteria, NNWSI Project Baseline changes, or design evolution through ongoing studies, reviews, and discussions of the project and ESF information.

5.1.2.3 Documentation of Proposed Changes

The participating organization (or the ICWG Chairman) identifying the proposed change(s) shall initiate an ECR. The ECR, along with the supporting information, shall be forwarded to the ICWG Chairman. The ECR shall contain sufficient data for evaluation of the proposed change. The WMPO or any participant can request changes. ECRs submitted for ICWG approval shall be reviewed and signed by the TPO or ICWG and a Quality Assurance (QA) representative of the participant requesting the changes. The WMPO representative will assign ECR numbers after submittal to ICWG.

5.1.2.4 Formal Review of Proposed Changes

Upon receipt of the ECR, the ICWG Chairman shall request a formal participant review. This review shall focus on the technical merits of the proposed change. This review will be conducted and documented by the representatives. The reviewer(s) make their comments within the time limit set by the ICWG Chairman. Comments received after the due date are not to be considered. The comments are distributed to the originator of the document covered by the proposed ECR. The originator of the document resolves the comments with the reviewers. If the reviewer does not respond within the time frame set by the ICWG Chairman, the comment resolution is accepted. In the event of a conflict between the reviewer and originator of the document, the ICWG Chairman decides and documents the resolution. Failure to respond to a request for comments or for comment verification in the time frame specified will mean complete acceptance of the document by that participant. Acceptance of the document can be obtained by correspondence or a signature on the document. The originator of the document transmits the ECR and supporting documentation to the ICWG Chairman. The originator shall retain the documented results of the review process.

5.1.2.5 Approval of Proposed Changes

Upon completion of the review process, with the knowledge of the affected NNWSI Project participants through their ICWG representative, the ICWG Chairman will approve/disapprove the proposed changes to the ESF technical element. The ESF technical element is changed by the approval of the ECR by the ICWG Chairman. The change is verified by the controlled distribution of the ECR and the supporting information by the T&MSS to the affected participants.

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AND INTERFACE CONTROL PROCEDURE5.1.2.6 Notification of Participant Organizations

The participant organizations shall be notified of the outcome of the review process by the ICWG Chairman. If the proposed change is rejected, a copy of the ECR shall be returned to the initiating organization. If the proposed change is approved, the ECR and any subsequent version of the information shall be distributed to the affected participants.

5.1.3 ESF ICWG Design Interface Control

An implementing procedure shall be developed to cover the design interface control. The method used to develop these interfaces is shown in Exhibit 3. This procedure shall discuss the details of how review comments/disputes are documented and resolved.

5.1.3.1 Interface Method

The identity of an interface is determined by the participants (can be through the ICWG). The identification is accomplished by SIDs which graphically portray each ESF system. These portrayals start with the systems which are documented by the design requirements. The SIDs are submitted to the ICWG Chairman for review and approval. Upon approval, the SIDs are transmitted by H&N to the T&MSS Contractor for controlled distribution to the affected participants for inclusion into the ESF design. After identification, the responsible architect/engineer (either H&N or F&S, depending on the system) defines the precise functional and physical characteristics of the interface. These characteristics are transmitted to H&N. The CIDs are developed by H&N. H&N shall obtain the necessary interface control data through coordination with the other participants. This can take place within the ICWG. The CIDs are submitted to the ICWG Chairman for review and approval. Upon approval, the CIDs are transmitted by H&N to the T&MSS for controlled distribution to the affected participants for inclusion into the ESF design. Control is in effect once an interface design documentation is formally approved by the ICWG Chairman via an ECR. This is intended to prevent design changes to ESF interface documentation without prior approval of the ICWG Chairman. All design interface control documentation submitted to the ICWG for incorporation into the ESF technical element shall be by ECRs as discussed herein. The ICWG Chairman shall direct the changes to any other appropriate interfacing documentation. All changes directed to the ESF technical element shall be submitted and implemented via an ECR. An index list of CIDs under ICWG control will be published periodically.

5.2 INTERFACE CONTROL WORKING TROUP (ICWG)

5.2.1 ICWG Organization

The ICWG shall be chaired by a WMPO delegate appointed by the NNWSI Project Manager and shall consist of at least one member from each of the

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major participating organizations engaged in the ESF development. Additional members may be requested from other NNWSI Project participants at the discretion of the ICWG Chairman. The ICWG secretary shall be selected by the ICWG Chairman. A roster of membership and alternate membership will be initiated and maintained by the ICWG Chairman.

5.2.2 ICWG Duties

The ESF ICWG is a working group whose duties shall consist of all activities necessary to assist the ICWG Chairman in controlling the functional and physical ESF interfaces. The ICWG participant representatives shall help identify and define the ESF interfaces and shall recommend solutions to interface problems, document interface agreements, and coordinate interface inputs on changes as requested by the ICWG Chairman.

6.0 REFERENCES

NNWSI/88-9 (formerly NVO-196-17) NNWSI Project Quality Assurance Plan

NNWSI AP-1.70 NNWSI Project Information Management System Record
Collection and Retrieval

7.0 APPLICABLE FORMS

Exhibit 1. Engineering Change Request Form

8.0 RECORDS

The following documents shall be QA Records and shall be maintained in accordance with NNWSI Project AP-1.70, NNWSI Project Information Management System Record Collection and Retrieval:

- CIDs.
- Comments and resolutions of comments of formal reviews.
- ECRs with supporting documents.
- Roster of membership in ICWG.
- SIDs.

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ESF TECHNICAL ELEMENT CHANGE PROCESS

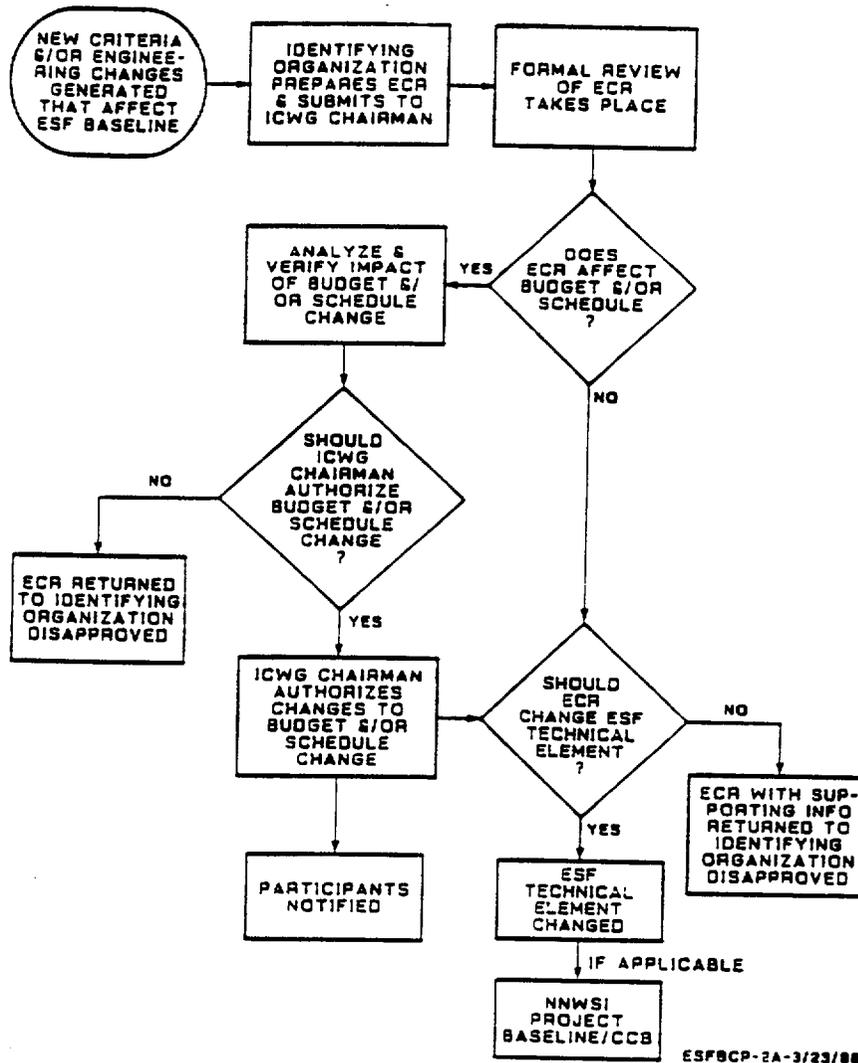


Exhibit 2. Process for Changing the ESF Baseline.

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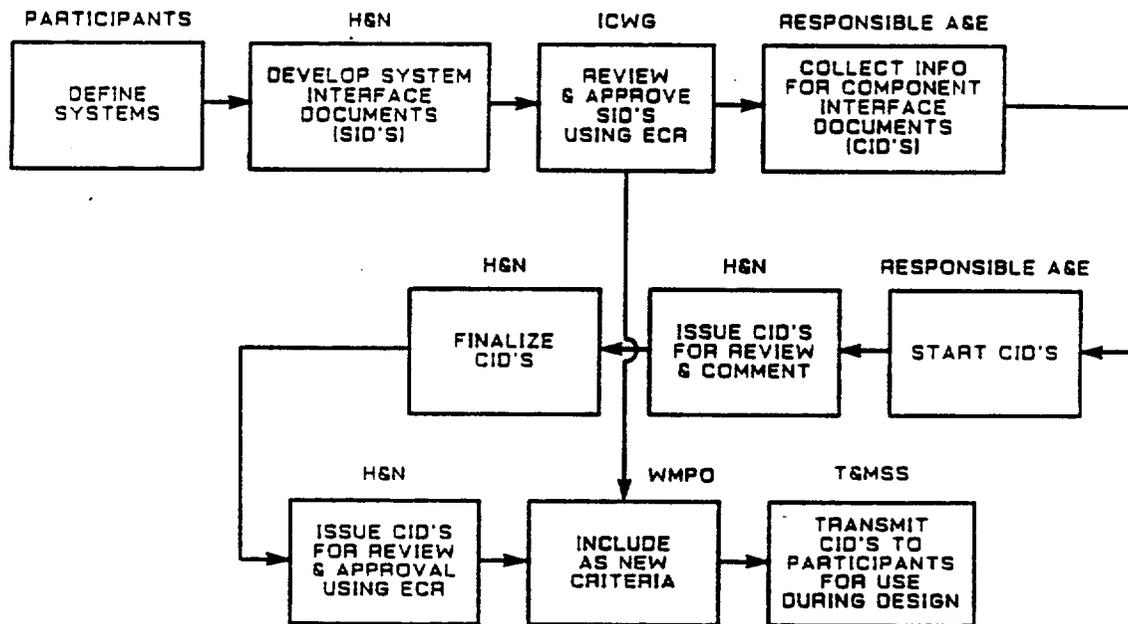


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**ESF DESIGN INTERFACE DOCUMENTATION METHOD
(INTERFACE CONTROL DRAWINGS)**



ESFOIDM/3-25-88

NNWSI Project

AUG 23 1988

Exhibit 3.

CRF Received

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Yucca Mountain Project
Exploratory Shaft Facility
Title I 100 Percent Technical Assessment
Review Record Memorandum
(YMP/88-19A)

U.S. DEPARTMENT OF ENERGY

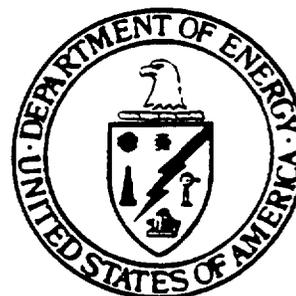
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YUCCA MOUNTAIN PROJECT

YUCCA MOUNTAIN PROJECT EXPLORATORY SHAFT FACILITY TITLE I 100 PERCENT TECHNICAL ASSESSMENT REVIEW REVIEW RECORD MEMORANDUM

VOLUME 1



AUGUST 1988

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

NEVADA NUCLEAR WASTE STORAGE INVESTIGATIONS PROJECT

TITLE I - TECHNICAL ASSESSMENT REVIEW

FOR THE EXPLORATORY SHAFT FACILITY

AT 100 PERCENT DESIGN COMPLETION

REVIEW RECORD MEMORANDUM

Review Meeting: August 8, 1988

Report Issued: October 10, 1988

Technical Assessment Review Committee Approval

Date

G. K. Beall (Chairman)	<u>G.K. Beall 10/7/88</u>
J. G. Reiser (Secretary)	<u>Joseph G. Reiser 10-5-88</u>
P. J. Karnoski (Quality Assurance)	<u>P.J. Karnoski 10/7/88</u>
M. C. Brake (Civil/Structural/Architectural)	<u>MAURICE BRAKE BY Joe Little</u>
E. M. Cikanek (Geotechnical/Testing)	<u>Edward M. Cikanek 10/7/88</u>
R. Tome' (Mechanical)	<u>R. Tome' for E. Tome' 10/7/88</u>
I. R. Cottle (T&MSS Lead Reviewer)	<u>Joe R. Cottle 10/7/88</u>
J. H. McConville (Electrical)	<u>James H. McConville</u>
T. H. Pysto (Environmental)	<u>Thomas H. Pysto</u>
S. C. Smith (Repository/Operations)	<u>Steven Smith 10/7/88</u>
A. L. Langstaff (Mining/Shaft/Ventilation)	<u>A.L. Langstaff 10/7/88</u>
S. W. Phillips (Safety)	<u>S.W. Phillips 10/7/88</u>
J. M. Davenport (Regulatory Compliance)	<u>J.M. Davenport 10/7/88</u>

PREFACE

The focus of this review is to provide a Technical Assessment of the ESF Title I Design at 100 percent completion and to document the review comments and resolutions. The review purpose was to determine whether the design meets the criteria provided to the Architect-Engineers (A/Es) in the Project approved Title I Scope and Planning Documents, for a preliminary design.

To support the assessments required, the Yucca Mountain Project Office invited seventeen (17) reviewing and four (4) observing organizations to participate in the review process, of which fifteen (15) reviewing organizations participated. The reviewing organizations provided a total of fifty-one (51) reviewers representing the technical/scientific disciplines required for the technical review of the A/Es design drawing, specifications, etc.

The review process started on August 8, 1988 and was completed on September 9, 1988. The process developed eleven hundred and seventy-two (1172) comments, of which only five (5) remain in dispute by the reviewers. It is the responsibility of the reviewer to present his/her concerns in writing to the next higher level of project authority for a decision.

As part of the 100 Percent Title I ESF Technical Assessment Review (TAR) the design submitted by the Architect/Engineers (A/Es) was subjected to a review for compliance with 10 CFR 60. A proposed checklist of the regulations in 10 CFR 60 that apply to the design of the ESF, considering eventual incorporation into the repository system, was developed by the Nuclear Regulatory Compliance Division (NRC) of the T&MSS contractor (SAIC). The list was developed using 10 CFR 60, input from other T&MSS staff members, and notes from recent NRC interactions. Prior to conducting the review, the NRC presented this list to the organizations assigned the responsibility of conducting the compliance review. Assignments of responsibility were made by the NRC and the Project participants based on the scopes of Project work of the participants. During two workshops a final checklist to be used by the organizations was finalized. The review itself consisted of the responsible organization assessing the compliance of the design with the assigned 10 CFR 60 regulation(s) and supplying a short justification of that assessment on forms provided by the NRC. The reviewing organizations determined that the ESF design complied with 15 of the 20 applicable 10 CFR 60 regulations. Please note that an additional evaluation (of 10 CFR 60 - General Comment) was completed during the review. In all cases where the reviewers determined the design was not in compliance with the regulations, a comment was submitted to the proper Architect/Engineer (A/E). Listed below are the regulations to which the reviewers felt the ESF - design was not in compliance and the number of the comment made by the reviewer to the A/E addressing this non-compliance:

10 CFR 60 - General Comment	Comment No. S.MI.RES.004
10 CFR 60.75 - NRC Office Space	Comment No. T.AR.JMD.003
10 CFR 60.113(a)(1) -Postclosure Performance by Engineered Barrier System	Comment No. L.MI.DGW.018
10 CFR 60.133(b) - Flexibility of Design of Underground Facilities	Comment No. S.GE.TEB.001
10 CFR 60 -Subpart F -Performance Confirmation Program	Comment No. S.MI.RES.004

All comments submitted to the A/Es as a result of this exercise were dispositioned satisfactorily to both the reviewer and the A/E, indicating that the reviewer believed the design either complied with the regulation or would comply with the regulation once the agreed-upon action had been completed. For more details, see Section 7.0, Volume 2, "10 CFR 60 Compliance Review of this memorandum.

The Exploratory Shaft Facility Title I-100 Percent Design completion Technical Assessment Review was conducted in accordance with Quality Management Procedure QMP-02-08 and the approved plan, which among other requirements calls for the Technical Assessment Review Secretary to provide "Meeting Minutes" of the review activities, and "Review Record Memorandum". No attempt was made to produce a daily verbatim transcription of the interchange between the fifty-one Reviewers and their counterparts on the Architect-Engineers design teams. This decision is based upon the fact that the resulting culmination of the dialogue between the parties is represented in the final documentation of the Reviewer's Comments Sheets and the Architect-Engineers Comments Resolution Sheets as accepted by the parties, and this three Volume Review Record Memorandum constitutes relevant meeting minutes. Both sets of "records" referred to above have been included in Section 6.0 Volume 2 and Section 3.0 Volume 1 respectively of this memorandum. Where a workshop was conducted and meeting minutes were considered to be either useful or necessary, they have been provided, (i.e. "Concerns Related to 10 CFR 60" Section 7.0 Volume 2 of this memorandum).

Additionally, Reviewers were asked to verify that his/her organization's comments from the ESF Title I-50 Percent Design Review had been incorporated. The reviewer's responses are contained in either the reviewer's restatement of the comment in this review or in a separate stand alone statement, included in this document.

Lastly, from a review checklist, the Technical Assessment Review Committee Discipline Coordinators (TARC) prepared responses in accordance with their area of technical expertise. Section 1, Volume 1.0 Findings & Recommendations were developed from the Discipline Coordinates Responses. This Review Record Memorandum is a comprehensive document, which provides an in depth report of the Technical Assessment Review activities. Briefly, this memorandum includes the following key activities and/or documents:

- o The DOE approved Plan used to implement the QMP-02-08 review process.
- o Presentations to Reviewers provided to highlight the review process and the reviewers' responsibilities.
- o Identification of the reviewing organizations, their respective scopes, and qualified reviewers.
- o Comment and resolution acceptance documentation.
- o TARC Team Findings and Recommendations as appropriate, based on a checklist evaluation by TAR Team Members.
- o Comment Resolution Concurrence and Items in dispute process.
- o Other items as identified in the Table of Contents of this memorandum.

Joseph G. Reiser, Secretary
Technical Assessment Review Team

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1.0 Findings and Recommendations of the TARC of the Exploratory Shaft
Facility Title I 100 Percent Design Completion

FINDINGS AND RECOMMENDATIONS
OF THE TECHNICAL ASSESSMENT REVIEW COMMITTEE
OF ESF TITLE I 100 PERCENT DESIGN COMPLETION

SECTION 1.0

Based on the performance of the Exploratory Shaft Facility (ESF) Title I - 100 Percent Technical Assessment Review, with emphasis on a Management and Technical Assessment, the Technical Assessment Review Committee has developed the following findings and recommendations with respect to the A/E's design effort submitted jointly by Holmes & Narver, Inc. (H&N) and Fenix & Scisson, Inc. (F&S).

FINDINGS AND RECOMMENDATIONS

o SAFETY ANALYSIS

Numerous changes have been made in the design to address comments related to safety that were developed in the 50 Percent design review. Notably, both the surface and underground layouts were modified to improve safety, tapered guides were added to the headframes, a truck-mounted emergency hoist was added, the hoist house was divided with a barrier wall to isolate the hoists from each other, fire protection capability underground was augmented, a dust collection system was added to the underground ventilation system, and noise control measures were specified for ventilation equipment.

Several commentors identified safety concerns during the 100 Percent Title I Technical Assessment Review. Approximately 240 comments were related to safety. The issues raised have been considered by the A/Es and agreements were reached to make appropriate design changes. This process provides some confirmation that certain aspects of the design are adequate with respect to occupational safety requirements, particularly those aspects which are governed by published standards and codes. The Technical Assessment Review does not provide a systematic review of all potential hazards associated with the design and operation of the ESF, nor has the A/E completed such a review or analysis.

Currently, at the completion of ESF Title I work, the basis to conclude that the design wholly satisfies the Subsystem Design Requirements Document (SDRD) requirement for the provision of a safe workplace is incomplete. According to DOE Order 6430.1A, a Preliminary Safety Analysis must be initiated in the Conceptual Design Phase and further developed during Title I and Title II. The Project Office has directed the A/Es to perform and document a systematic review of all potential design and operations related hazards during the ESF Title II design. The resolution of F&S General Comment 3 shows that a Safety Analysis Plan is being prepared and will be available prior to the end of Title I, and the Safety Analysis will be

scheduled to be completed in Title II. Therefore, it is concluded that the design, when properly matured during the ESF Title II work, will satisfy the SDRD requirement to provide a safe workplace.

In some cases, it may be appropriate to exceed the minimum requirements imposed by codes and standards. A safety analysis would identify these cases.

o CONFORMANCE TO NEVADA TEST SITE (NTS) STANDARDS

Several comments focused on the identification and interpretation of applicable standards. A related concern is the process by which the A/E reviews the design against safety requirements to determine that the design complies with all applicable requirements. One comment suggested a checklist approach and a second comment suggested documenting interpretations of regulatory requirement.

o QUALITY ASSURANCE (QA)

Two areas of concern, both related to Quality Assurance Level were presented identifying the QA level of items/activities shown on a drawing or in a specification, and a definition of the QA Level I activity, "Fluid control." It is suggested that the Project make a study of the fluid control requirements and define the limits, if any of the QA Level I parts of the water carrying systems and incorporate into the SDRD for Title II Design.

o QUALITY

While improvement was apparent in the quality of the drawings prepared by the A/Es, over the 50 Percent Design Review, 3 comments were made which are typical of the inadequacy of checking of the drawings and specifications by both A/Es. Typical among the discrepancies were errors of spelling, incorrect or confusing symbols, incomplete or incorrect cross-references between drawings, and inconsistency of details on different drawings or views.

o ENVIRONMENTAL REQUIREMENTS

In general, the 100 Percent Review established that the majority of the environmental requirements were being addressed. The approximately 50 comments were considered by the A/Es and agreements were reached which resolved the concerns of the reviewers, including agreements to incorporate necessary design changes to meet permitting requirements.

o COMPLIANCE TO 10 CFR 60 REQUIREMENTS

No issues that could impact future licensing considerations were identified during the review. The reviewing organizations determined that the ESF designs either complied with the 10 CFR 60, regulation or would comply with the regulation once the agreed upon action had been completed, see Section 7.0, Volume 2, "10 CFR 60 Compliance Review" of this memorandum for expanded detail including workshops.

o EXPECTED ENGINEERING CHANGE REQUESTS (ECRs)

- Comment No. 19 - F&S Mining

FS-GA-0160

An ECR will need to be submitted by Los Alamos to modify drift geometry for the separation between the vertical waste package drifts and the horizontal and vertical drifts to allow drilling and instrumentation operations.

- Comment No. 61 F&S Mining

FS-GA-0166 PLAN

Meets current requirements of SDRD, but will need modification to reflect ECR in process for changes in drift sizing, spacing, computer and IDS alcoves.

- Comment No. 170 H&N Civil

JS-025-ESF-C46 H&N

An unincorporated comment from ESF Title I, 50 Percent Design Review was to incorporate designs criteria to minimize harm to floodplains (DOE General Design Criteria, 6430.1A 0185.3.2.5) (Executive Order 11988, Floodplain Management). This ECR will be prepared and submitted by H&N.

- Comment No. 6 F&S General

GENERAL F&S

The General Arrangement Drawing FS-GA-0160 has drifts not found in the Appendix A of the SDRD as well as major changes to arrangements such as shaft station excavations. F&S agrees ECRs will be submitted to reflect consensus' reached at 50 Percent Review and in subsequent meetings with SNL and other Project participants.

o COMMENTS IN DISPUTE

The following comments have not been resolved to the satisfaction of the reviewers and are shown below:

- H&N and F&S General GE-053 by D. STUCKER, Reference: Q.GE.DS.002
- H&N Civil CI-154 by P. PHILLIPS, Reference: N.CI.PEP.028

Concerning placement of QA Level and QALA references on drawings, the following are in dispute:

- H&N General GE-006 by M. FOX, Reference: R.GE.MAF.010
- H&N General GE-007 by M. FOX, Reference: R.GE.MAF.015
- F&S General GE-010 by M. FOX, Reference: R.GE.MAF.011

The process for conclusion of a disputed comment resolution requires the reviewer to present his concerns in writing to the next higher level of project authority for a decision.

o COMMENT RESOLUTION CONCURRENCE

The review team lead representatives concurred with all of the resolutions developed for all of the comments submitted by his/her organization during the design comment and resolution activities, except for the comments shown above in "Comments in Dispute."

o NOTE

The approved resolution for F&S Civil Comment 66 is incorrect. Replace the word "Mining" with "Civil" in the resolution statement.

2.0 Technical Assessment Review Checklist

Reiser
9/22/88

EXPLORATORY SHAFT FACILITY (ESF) TITLE I 100 PERCENT TECHNICAL ASSESSMENT REVIEW
CHECKLIST

<u>DISCIPLINE</u> <u>COORDINATOR</u>	<u>QUESTIONS</u>
Each	1. Does the design comply with the Subsystem Design Requirement Document (SDRD), its references, and the Reference Information Base document (RIB)?
Ed Cikanek	2. Does the design accommodate testing, considering the current level of detail (100 Percent)?
Each	3. Is the design feasible (constructable and operable), considering the current level of detail (100 Percent)?
Joe Reiser	4. Have the A/Es provided the deliverables, for the 100 Percent Technical Assessment Review, as identified in the WMPO approved Planning and Scoping documents?
Each	5. Are necessary design interfaces properly identified, considering the current level of detail (100 Percent)?
Stan Phillips	6. Is the design adequate with respect to occupational safety requirements, considering the current level of detail (100 Percent)?
Pete Karnoski	7. Have any Quality Assurance (QA) concerns been identified by the design review?
Tom Pysto	8. Does the design reflect ESF environmental requirements, considering the current level of detail (100 Percent)?
M. Davenport	9. Has the Technical Assessment Review identified any issues which could impact future licensing considerations?
Each	10. Have the drawings and/or specifications received adequate checking?
Each	11. Have any comments been unresolved or resolutions in dispute?

NOTE: Responses check list questions should be answered in the context of the reviewers comments received, and provide evidence, see attached examples.

Please provide responses to Joe Reiser by Wednesday, September 28, 1988, COB.

cc: K. Beall
I. Cottle

CHECK LIST QUESTION ANSWER

EXAMPLES

6. Is the design adequate with respect to occupational safety requirements, considering the current level of detail (50 percent)?

There is a reasonable basis to conclude that the design process will adequately address occupational safety requirements. Safety features are being incorporated into the design to the extent feasible within the constraints imposed by baselined requirements. Safety concerns have been raised by 8 reviewing organizations, representing both regulatory and operational perspectives. The issues raised have been considered by the A/Es, and agreements were reached to make appropriate design changes.

Approximately 200 comments were related to safety aspects of the design. A list of these comments is provided in Section 6. The majority of these related to compliance with applicable standards, and were resolved either because the A/Es agreed to incorporate the reviewer's suggestion, or because the A/Es defended their interpretation of the requirement to the reviewer's satisfaction.

A smaller number of comments relate to the SDRD requirement to provide a safe workplace (SDRD, Section 1.2.6.0, Performance Criteria 7, Constraints 4 and 6; Section 1.2.6.1, Performance Criteria 1, etc.) The underground A/E agreed to perform a safety analysis as part of the Title I deliverable (General comment GF-017). Issues that need to be included in the context of this safety analysis include:

- o Adequate separation of the hoists, hoist control rooms, and/or hoist utility systems so that a catastrophic failure of one hoist does not disable both (Shaft comments F-009, F-074, F-078, F-079, and F-085)
- o Adequate protection of scientific personnel using the shaft sinking stage as a work platform for test activities (Shaft comments F-095, F-100, F-132, F-144, F-145, F-146)
- o Ability of the ventilation design concept to provide an adequate supply of air during all phases of construction and operation, and to function under emergency conditions that may be associated with credible mishaps (Mining comments I-113, I-114, I-115)
- o Adequate margin of safety in structures associated with the shaft conveyances, including provision for emergency stop conditions and overtravel protection (General comments GF-016; Shaft comment F-164)
- o The degree of risk imposed by the proposed shaft station layout which intersects drifts at a 45 degree angle (General comment G-013; Shaft comments F-008, F-172).

In addition to the issues to be addressed in the A/E safety analysis, some fire protection requirements will be determined by the A/E after discussions with the local fire protection authority. These discussions will include; 1) the transfer of diesel fuel from surface to underground locations (Mining comment I-026; Shaft comments F-067, F-072), and 2) fire protection systems for underground transformers and related electrical equipment (Mining comments I-082, I-083, I-084, I-085).

7. Have any Quality Assurance (QA) concerns been identified by the design review?

After reviewing the drawings provided by both Fenix & Scisson (F&S) and Holmes & Narver (H&N), and the specifications provided by F&S, the following Quality Assurance Level Assignment Sheets (QALAS) related concerns were identified:

- o QALAS need to be specified or referenced in some form, as appropriate, on all design documents
- o The relationship between the QALAS and the appropriate drawings and specifications must be identified. (As a minimum, drawings need to reference QALAS source information relative to the content of the drawing. F&S General comment GF-053.)

Additionally, the appropriate quantitative and/or qualitative acceptance criteria for sampling, testing, and inspection must be shown or referenced on applicable documents.

Vendor QA programs, when required, must be approved by the A/Es QA organization.

No H&N specifications were available for review during the 50 Percent Design Review. H&N must provide all of their Title I specifications at the final 100 Percent Design Review.

The A/Es provided satisfactory resolutions for all QA concerns raised as comments during the completion of the 50 Percent Design Review.

8. Does the design reflect ESF environmental requirements, considering the current level of detail (50 percent)?

In general, the 50 Percent Review established that the majority of the environmental requirements were being addressed. The exceptions that needed clarification included:

- o Storage and disposal of chemical and hazardous wastes (Civil comments C-037, C-039, C-060, C-016, C-017; Architectural comment A-013)
- o Fuel handling and storage (Civil Comments C-060; Mining Comments I-011, I-026, I-060)

SECTION 2.0

EXPLORATORY SHAFT FACILITY (ESF) TITLE I-100 PERCENT TECHNICAL ASSESSMENT REVIEW CHECKLIST

1. Does the design comply with the Subsystem Design Requirement (SDRD), its references, and the Reference Information Base document (RIB)?

o Civil, Architectural, and Architectural/Structural

Yes, the current level of design in the H&N Civil, Architectural, and Architectural/Structural areas comply with the SDRD requirements and needs with the following exceptions:

There were two comments on the SDRD requirement for a chemical storage area (H&N Architectural 8 [T.AR.SWP.002] and H&N Architectural 15 [T.AR.THP.036]) that was not identified in the Title I submittal.

There was one comment on the DOE Order DOE 6430.1A requirement for 8" water mains where 6" are now shown in the design (H&N Civil 26 [N.CI.PEP.026]).

There was one unincorporated comment from the 50 percent review on the conflict between the waste water design and the SDRD criteria for offsite disposal of the waste water (H&N Civil 120 [T.CI.THP.002]).

o Mining/Shaft/Ventilation and Civil

Minor discrepancies exist which the A/E has agreed to fix, e.g. number of boreholes for tests; F&S Mining Comment #7 Upper Demonstration Breakout Room (UDBR) dimensions; F&S Mining Comment #8 and heater hole length; F&S Mining Comment #63.

o Geotechnical/Testing

From a testing support standpoint, the design complies with the SDRD. Several comments identified errors in the test details shown, but these were caused by recent changes that had not been incorporated into the SDRD, and thus could not be used by F&S (MI-19, MI-22, MI-61) or else were simply minor drafting errors (MI-51, MI-63, MI-64).

No comments identified use of data that disagree with that in the RIB.

o Mechanical

No mechanical-related issues were identified that would indicate that the ESF Title I design does not comply with the SDRD, its references, or the RIB.

- o Electrical

The electrical power system feed from the Nevada Test Site (NTS) source, the substation, the primary and secondary distribution system and the standby generator system design fairly and adequately meets the Subsystem Design Requirement Document and its references, and the reference information base document.

The communication systems should comply with the requirements in these reference documents now that two Engineering Change Requests submitted by Holmes and Narver - Facility Design & Support Contractor (surface/NTS) (H&N) to clarify the shaft and hoist communication requirements have been approved.

- o Environmental Design

In general, the 100% Review established that the majority of the environmental requirements were being addressed. Approximately 50 comments were related to the environmental aspects of the design. The comments were considered by the A/E's and agreements were reached which resolved the concerns of the reviewers. See Question No. 8 below for specific concerns.

- o Repository/Operations

The current 100% level of design does comply with the SDRD and RIB requirements and needs as interpreted by the A/E's. However, some concern was expressed about the correctness and/or completeness of the supporting SDRD reference documents identified in some cases, especially those dealing with life and fire safety and also electrical installations. All concerns expressed were resolved satisfactorily.

- o Safety

See Question 6 below.

- o Regulatory Compliance

Within the limits of this review, it is concluded that the design does comply with the appropriate design requirements documents.

2. Does the design accommodate testing considering the current level of detail (100 Percent)?

- o After considering all Exploratory Shaft Facility (ESF) Title I Design related factors, the 100 Percent Title I Design does indeed accommodate testing. Approximately 4 percent of the comments transmitted during the 100 Percent Design Review were testing related. The comments developed were in the following general areas:

- Shaft conveyance and access to test locations before and after shaft outfitting (SH-23, SH-31, SH-36).
- Terminology and test details (greatest number off comments).
- Flexibility to accommodate testing changes (MI-21, SH-24).
- ECR's needed to change certain test details (MI-19, MI-61).
- Excavation dimensions must change to
 - promote success in smoothwall blasting (MI-55)
 - allow instrument installation (MI-61)
- IDS alcoves must be shown (SH-1, SH-2, MI-61).
- Excavated geometry possibly interferes with nearby testing (MI-50, SH-97).

As indicated by the above, the vast majority of testing related comments indicated no conditions adverse to support of testing. The few adverse conditions indicated were not serious and will be corrected during Title II design. Resolution for most of the other comments involve clarification and consistency of details and information, which will also be accomplished during Title II.

3. Is the design feasible (constructable and operable), considering the current level of detail, (100 Percent)?

o Civil, Architectural, and Architectural/Structural

No major problems were identified to indicate that the surface design would not be constructable or operable. Concerns as to the effect of certain design aspects would have on the ease of operation of the ESF surface facilities were identified in the following areas:

There were several comments on the operability of the IDS design. Two were concerned with the sunken floor in the computer area (H&N Architectural 34 and 36 [A.AR.TJM.015 and J.AR.RDE.003]) and the drainage in that area. Another comment identified non baselined criteria about the need of the building 3 months before data collection begins for set up and check out (H&N Civil 15 A.CI.TJM.007).

There was a comment on the dust hazard of the muck storage and its impact on the underground ventilation for the ESF (H&N Civil 7 B.CI.BC.010).

There were two comments on the location of the batch plant, aggregate stockpile, septic disposal system, and the mine waste water system and the interference with an area currently being constructed for drilling storage (H&N Civil 31 and 32 [R.CI.DLK.001 and R.CI.DLK.002]).

o Mining/Shaft/Ventilation and Civil

Some minor design modifications will be needed in Title II design phase to facilitate construction and operations as exemplified by F&S Mining Comments #56 and 57 concerning drift enlargement, and F&S Shaft Comment #31 and 36 (accessing test locations), and Shaft Comment #126 (sump pump location).

o Mechanical

No major mechanical-related problems were identified that would indicate that the ESF design would not be constructable or operable. However, some design-related concerns were identified in the following areas:

- The fire protection system relative to control of the water supply (F&S comment PI-013), surface and underground sprinkler systems (H&N comments FP-008, FP-084, and FP-089), the underground fueling area (H&N comments FP-004 and FP-006), smoke detection (H&N comments FP-030 and FP-035), and the surface data building (H&N comments FP-068, FP-070, FP-076, and FP-077).
- Hoist resistor banks sizing (H&N comment ME-053) and cooling (H&N comment ME-054).
- Conditioned air for the surface data building (H&N comments ME-060, ME-061, and ME 062).
- The A/E's have agreed to evaluate and resolve these issues during the ESF Title II design.

o Electrical

The electrical power design is feasible to construct and with the possible exception of the standby generators, it is operable. More detailed information (Title II) regarding the standby generator loading is needed before the operational success of the standby generator can be insured.

The communication system design utilizes directly available subsystems and is easily installed. The subsystems should meet the operational needs, even if they change as the details of the operations become apparent.

o Regulatory Compliance

Although some concerns exist over the regulatory compliance of the Exploratory Shaft Facility, no issues have been identified at this point that could impact future licensing. As the design matures during Title II, special attention will be paid to these concerns to ensure the design complies with applicable 10 CFR 60 regulations and has no negative impacts on eventual repository licensing.

o Repository/Operations

No major problems were identified during the ESF Technical Assessment Review to indicate that the ESF Design would not be constructable or operable. Concern was expressed over the availability of space for contractor development and operational support space in the underground. All concerns expressed were resolved satisfactorily.

4. Have the Architect-Engineers (A/Es) provided the deliverables, for the 100 Percent Technical Assessment Review, as identified in the WMPO approved planning and scoping documents?

- o Yes, required deliverables for the ESF Title I-100 Percent Technical Assessment Review include the following number of drawings and specifications from the A/Es:

<u>Drawings</u>			<u>Specifications</u>		
No. Required	No. Received		No. Required	No. Received	
H&N	128	130	123	124	
F&S	103	84	78	76	

The significant difference of F&S drawings and specifications "Required" and those "Received" resulted from the comments accepted during the ESF Title I 50 Percent Design Review. As the design developed it became apparent that:

- Both shafts could use the same sinking deck and concrete forms,
- Shaft bottom changes resulting from new loadout, no bucket elevator, and new shaft bottom clean-out,
- And the Calico Hills Breakout level development was eliminated.

These changes resulted in the deletion of some 33 drawings and 2 specifications from the original list. Additionally, 14 new drawings were added for a total of 84 drawings and 76 specifications Received. See Question 10 below for concerns relating to the drawing quality standards and practices.

5. Are necessary design interfaces properly identified, considering the current level of detail (100 Percent)?

o Civil, Architectural, and Architectural/Structural

The basic interfaces are being identified in accordance with AP-5.6Q. One minor instance of an interfacing problem between the A/Es is apparent in the current design as shown in H&N Civil comment 16 (F.CI.JAJ.027). A larger problem is apparent; however, in the interfaces between the Project Office and the Nevada Test Site Office (NTSO). This is shown through the H&N Civil comments 31 and 32 (R.CI.DLK.001 and R.CI.DLK.002).

o Mining/Shaft/Ventilation and Civil

Some discrepancies exist with respect to items shown on F&S drawing vs. H&N drawings; examples F&S Civil Comment 1 concerning Buildings 10 and 11 and Civil Comments #24 and 25 concerning barrier wall between ES-1 and ES-2 hoists. The A/E has agreed to conform to H&N drawings.

o Mechanical

Are necessary design interfaces properly identified, considering the current level of detail (100 percent)?

The basic mechanical design interfaces have been identified in the Title I 100 percent design. However, a number of interface-related discrepancies were identified on the A/E drawings (F&S comment PI-014 and H&N comments ME-005 and ME-034). The A/Es have agreed to correct these discrepancies during ESF Title II design.

o Electrical

Those interfaces necessary to complete the Title I electrical power system design are evident.

The communications system interfaces are obvious and have been adequately addressed for the Title I design.

o Regulatory Compliance

All interfaces checked during the Review were properly identified.

o Repository/Operations

The basic design interfaces have been identified in the Interface Control Plan (ICP) portion of SOP 03-05 and through the ICWG; the A/Es are aware of this. Only minor instances of a lack of interfacing between A/Es are apparent in the current design. These instances occur in the surface area of the design where main pad layouts overlap between AE's. All inconsistencies identified were resolved satisfactorily.

6. Is the design adequate with respect to Occupational Safety Requirements, considering the current level of detail (100 Percent)?

Numerous changes have been made in the design to address comments related to safety that were developed in the 50 Percent design review. Notably, both the surface and underground layouts were modified to improve safety, tapered guides were added to the headframes, a truck-mounted emergency hoist was added, the hoist house was divided with a barrier wall to isolate the hoists from each other, fire protection capability underground was augmented, a dust collection system was added to the underground ventilation system, and noise control measures were specified for ventilation equipment.

Several commentors identified safety concerns during the 100 Percent Title I Technical Assessment Review. Approximately 240 comments were related to safety. The issues raised have been considered by the A/Es and agreements were reached to make appropriate design changes. This process provides some confirmation that certain aspects of the design are adequate with respect to occupational safety requirements, particularly those aspects which are governed by published standards and codes. The Technical Assessment Review does not provide a systematic review of all potential hazards associated with the design and operation of the ESF, nor has the A/E completed such a review or analysis.

Currently, at the completion of ESF Title I work, the basis to conclude that the design wholly satisfies the Subsystem Design Requirements Document (SDRD) requirement for the provision of a safe workplace is incomplete. According to DOE Order 6430.1A, a Preliminary Safety Analysis must be initiated in the Conceptual Design Phase and further developed during Title I and Title II. The Project Office has directed the A/Es to perform and document a systematic review of all potential design and operations related hazards during the ESF Title II design. The resolution of F&S General Comment 3 shows that a Safety Analysis Plan is being prepared and will be available prior to the end of Title I, and the Safety Analysis will be scheduled to be completed in Title II. Therefore, it is concluded that the design, when properly matured during the ESF Title II work, will satisfy the SDRD requirement to provide a safe workplace.

In some cases, it may be appropriate to exceed the minimum requirements imposed by codes and standards. A safety analysis would identify these cases.

Some of the issues that need to be included in the safety analysis were listed in the 50 Percent Design Review Report. These issues are:

- o Adequate separation of hoists, hoist control rooms, and hoist utility systems,
- o Adequate protection of scientific personnel using the shaft sinking stage as a work platform for test activities,

- o Ability of the ventilation system to provide an adequate supply of air during all phases of construction and operation, and to function under emergency conditions,
- o Adequate margin of safety in structures associated with shaft conveyances,
- o The degree of risk imposed by the proposed shaft station layout which intersects drifts at a 45 degree angle,
- o The minimization of fire risk associated with the transfer of diesel fuel from the surface to underground vehicles.

Some of these concerns drew additional comments during the 100% review, as indicated below:

- o Safe access to the test locations in the shaft (F&S General Comment 15; F&S Shaft comments 1, 2, 11, 31, 36, 83, 84, and 87).
- o Underground fuel storage (F&S Mining Comment 30 and H&N Mechanical Comment 4).
- o Adequate ventilation (F&S Ventilation Comments 2, 3, 4, 5, and 10).

Other safety concerns that were raised in the 100% review include:

- o The need for an on-site ambulance and fire truck (General Comment 60).
- o Design criteria for ground support and pillar width (F&S General Comment 16, F&S Mining comments 23 and 128).
- o Safety and reliability of the life safety and operations control system (F&S Piping and Instrumentation Comments 1, 3, 6, 10, and 11 and H&N Mechanical Comments 15, 16, and 17).

Several comments focused on the identification and interpretation of applicable standards (General Comments 28, 29, 33, 35, 56; H&N Architectural Comments 1 and 33, Architectural/Structural Comments 13, 14, 18, 30, 36, 42 and 59; F&S Mining Comments 48, 70, 105, and 146). The resolution of F&S Mining Comment 48 assumed DOE acceptance of the regulatory interpretation stated therein. DOE acceptance needs to be documented separately.

A related concern is the process by which the A/E reviews the design against safety requirements to determine that the design complies with all applicable requirements. One comment suggested a checklist approach (General comment 24) which the A/E agreed to consider, and a second comment suggested documenting interpretations of which regulatory requirements are applicable to this design (General comment 23), to which the A/E agreed.

7. Have the Quality Assurance (QA) concerns been identified by the Design Review?

Two areas of concern, both related to Quality Assurance Level were presented in our closing comments: identifying the QA level of items/activities shown on a drawing or in a specification, and a definition of the QA Level I activity, "Fluid Control."

The first concern is addressed in comment T.GE.PJK.003 for F&S drawings: "The QALAS stamp is acceptable for Title I drawings only. Its use will be impractical for procurement and construction because it will put the responsibility of QALAS interpretation on others than the technical authors of the design; therefore, subsequent issues of F&S drawings should identify the applicable QALAS for each drawing in the drawing notes."

A comment on the H&N drawings was: "Place QA level along with QALA reference on each drawing. (R.GE.MAF.010).

The intent of both comments was to identify with some detail, the QA level of items which would have to be procured and constructed, not leaving that decision to a procurement or construction individual. The method for doing this was postponed for the Title II design phase by the AEs, leaving the decision on how it was to be accomplished until the next TAR.

When the methods are determined, they should be similar so that the procurement and construction operations can be performed with a minimum of errors.

The second concern was stated in Comment No. A.ME.TJM.005. "The quality level of valves, meters and fittings that could affect fluid control should be Quality Level I. See QALA 1.2.6-0001. It appears that failure of this component could cause uncontrolled spillage of water in the ESF."

The comment recognizes the QA Level of the fluid control activity, but the question given to the Project Office was about the components and construction of the many systems which would be containing water on the site. It was suggested that the Project Office request Los Alamos to make a study of the fluid control requirements and define the limits, if any of the QA Level I parts of the water carrying systems.

8. Does the design reflect ESF Environmental Requirements considering the current level of detail (100 Percent)?

In general, the 100% Review established that the majority of the environmental requirements were being addressed. Approximately 50 comments were related to the environmental aspects of the design. The comments were considered by the A/Es and agreements were reached which resolved the concerns of the reviewers.

The areas of concern included:

- o Environmental permitting requirements affecting ESF facilities.
- o Dust control, compliance, and reclamation (G-25, C-224, C-227, C-228, C-230, C-234, C-235).
- o Dust control procedures for the ESF Activities (C-176, C-219, S-136, S-143, S-148).
- o Activities related to reclamation (C-173, C-182, C-183, C-186, C-192, C-200, C-218).
- o Fuel Handling and Chemical Storage (A-7, A-15, C-36, C-82, C-83, C-84, M-6, ME-141, M-147, and E-37).
- o Design of Muck Storage Area (C-97, C-98, C-110, C-111, and C-173).

There are several areas where permitting requirements may require additional work. These include:

- o Underground Storage Tank Requirements (C-83, C-84, and E-37).
- o Air quality Requirements (E-38, C-147, and G-25).
- o Mine Wastewater Quality (C-119).

Six comments from the 50% Title I Review were restated for the 100% review. One resolution (regarding the Mine Wastewater System (C-170) requires an ECR to change the SDRD. This ECR will be prepared and submitted by H&N.

The A/As have agreed to incorporate the necessary design changes to meet permitting requirements. Discussion with the appropriate agencies will be held to determine permitting applicability and requirements.

9. Has the Technical Assessment Review identified any issues which could impact future Licensing considerations?

No issues that could impact future licensing considerations were identified during the Exploratory Shaft Facility (ESF) 100% Title I Technical Assessment Review (TAR).

Included in the ESF 100% Title I TAR was an exercise by Project participants to check the ESF design for compliance with the applicable 10 CFR 60 regulations. During two workshops, the list of applicable 10 CFR 60 regulations, review procedures, required documentation, and review responsibilities were finalized. The review consisted of the assigned Project participants conducting an evaluation of the ESF design for compliance with assigned regulations from the checklist of applicable 10 CFR 60 regulations and documenting

the results on the supplied form according to the review procedure. For more details (including the checklist, the appropriate form and the review procedure), see the minutes of the two workshops Enclosures A and B of the Regulatory Compliance Review Exercise Documentation Package included in this Review Record Memorandum, Section 7.0, Volume 2, "10 CFR 60 Compliance Review".

The reviewing organizations determined that the ESF design complied with 15 of the 20 applicable 10 CFR 60 regulations. Note that an additional evaluation (of 10 CFR 60 - General Comment) was completed during the review. In all cases where the reviewers determined the design was not in compliance with the regulations, a comment was submitted to the proper Architect/Engineer (A/E). Listed below are the regulations to which the reviewers felt the ESF design was not in compliance and the number of the comment made by the reviewer to the A/E addressing this non-compliance:

10 CFR 60 - General Comment	Comment No. S.MI.RES.004
10 CFR 60.75 - NRC Office Space	Comment No. T.AR.JMD.003
10 CFR 60.113(a)(1) -Postclosure System	Performance by Engineered Barrier Comment No. L.MI.DGW.018
10 CFR 60.133(b) -Flexibility of Design of Underground Facilities	Comment No. S.GE.TEB.001
10 CFR60 -Subpart F -Performance Confirmation Program	Comment No. S.MI.RES.004

All comments submitted to the A/Es as a result of this exercise were dispositioned satisfactorily to both the reviewer and the A/E, indicating that the reviewer believed the design either complied with the regulation or would comply with the regulation once the agreed-upon action had been completed.

In two of the cases (10 CFR 60.113(a) and 10 CFR 60.133(b), the A/E agreed with the reviewer and committed to the action proposed by the reviewer to bring the design into compliance. Concerning the NRC office space, the A/E stated that office space that complied with the regulations would be located in the A&E Building. The A/E disagreed with the reviewer's conclusion of non-conformance of the design with 10 CFR 60 -Subpart F regulations and with the 10 CFR 60 -General Comment (which concerned testing flexibility). A resolution between the reviewer and the A/E was reached during the comment disposition phase of the TAR.

There was one case (10 CFR 60.72) in which the reviewer could draw no conclusion of compliance. The reviewer felt that compliance with this regulation could not be determined until later in the design. The reviewer did state that: "There is nothing in the current design that appears to preclude the proper collection of the required records."

Please note that all review forms completed during this exercise are included as Enclosure C of the Regulatory Compliance Review Exercise Documentation Package, included in this Review Record Memorandum, Section 7.0, Volume 2, "10 CFR 60 Compliance Review".

Additionally, there were several areas to which reviewers outside of the above exercise addressed comments. These were design flexibility, testing, and seals. All of these comments were also dispositioned to the satisfaction of the reviewer by the A/E.

Some of the NRC concerns were addressed as part of the TAR. Many of the ones not addressed cover Project positions (e.g. shaft locations, shaft spacing, testing in ES-2) that are dictated to the A/Es through baselined design requirements documents such as the SDRD and the RIB. These documents were not subject to review during the 100% Title I TAR. These concerns will be addressed by other means and any resulting changes in Project positions will be handed down to the A/Es in the form of changes to these documents. The incorporation of these changes into the ESF design will then be within the scope of subsequent reviews.

Although some concerns exist over the regulatory compliance of the Exploratory Shaft Facility, no issues have been identified at this point that could impact future licensing. As the design matures during Title II, special attention will be paid to these concerns to ensure the design complies with applicable 10 CFR 60 regulations and has no negative impacts on eventual repository licensing.

10. **Have the drawings and/or specifications received adequate checking?**

o Civil, Architectural, and Architectural/Structural

A review of the H&N Civil, Architectural, and Architectural/Structural drawings and specifications revealed 17 checking errors.

o Mining/Shaft/Ventilation and Civil

Minor discrepancies which could be prevented with more careful checking exist within the drawings. Examples are F&S Mining Comment 41, Section B-B not consistent with Section A-A; Mining Comment 54, symbols inconsistent; Mining Comment 59, Section E-E inconsistent with other views, Mining Comment 84, duplication of paragraphs in specification. F&S agreed to correct the discrepancies.

o Geotechnical/Testing

A review of the drawings and specifications still revealed a number of checking errors. The following types of errors were noted:

- Spelling
- Incorrect or confusing symbols
- Incomplete or incorrect cross-references between drawings
- Inconsistency of details on different drawings or views

Both A/Es stated that detailed checking was not performed prior to the review due to lack of time and manpower. They intended to perform their own detailed checking concurrently with the technical assessment review. All inconsistencies and drafting errors would be corrected prior to the final Title I submittal.

It would be much better if the A/Es did their detailed checking and made corrections prior to submittal for the Technical Assessment Review.

There was improvement in a related area, that of legibility of lettering and symbols when reduced to half size. Such comments were made at the 50 percent Title I review. At this review, no such comments were made relative to F&S drawings. H&N drawings were, in general, improved, but lettering was still not as legible or clear as it could be on some drawings. H&N agreed to further correct this problem during Title II.

- o Mechanical

The F&S drawings have been signed off for checking approval. The H&N drawings have not been signed off for checking approval. However, both the F&S and H&N drawings contain numerous drafting errors and discrepancies. Examples of these problems are addressed by H&N comments ME-005, ME-027, ME-057, and AR-020 and F&S comments PI-002, PI-020, SH-101, SH-111, CI-001, CI-040, CI-046, and CI-048.

The A/Es have agreed to correct these errors/discrepancies.

- o Electrical

The electrical drawings have no major errors. The electrical specifications which were available in outline form, or very abbreviated form for Title I design, were sufficient.

- o Repository/Operations

A review of the drawings and specifications revealed only minor problems with checking and of those identified, the majority were located in the specifications.

- o Quality Assurance

Comments were made on the inadequacy of checking of drawings by both A/Es. For the F&S drawings Comment No. F.GE.JAJ.007 says in part, "Drawings do not indicate a QA review and acceptance by F&S." For the H&N drawings, Comment F.GE.JAJ.031 states, "There is no evidence on the drawings that a H&N QA review of these drawings has been completed." Comment T.GE.PJK.001 ends with "No drawings have been checked."

11. Have any comments been unresolved or resolutions in dispute?

- o Civil, Architectural, and Architectural/Structural

No H&N Civil, Architectural, or Architectural/Structural comment remain unresolved or resolutions in dispute.

- o Mining/Shaft/Ventilation and Civil

There were no unresolved comments or disputed resolutions in the categories reviewed for F&S Mining, Shaft, Civil and Ventilation.

- o Mechanical

No mechanical-related comments are unresolved or comment resolutions in dispute.

- o Electrical

All electrical comments have been resolved.

- o Repository/Operations

None of the comments submitted at the 100 percent ESF Technical Assessment Review were left unresolved. Final review resolution of all comments is delegated by project procedure to the AE's and so no comments lacked resolution. Three of the comment resolutions as accepted by the AE's are in dispute. The disputed comment resolutions are as follows:

- o General comment GE-010 by M. Fox, Reference: R.GE.MAF.011
- o General comment GE-053 by D. Stucker, Reference: Q.GE.DS.002
- o Civil comment CI-154 by P. Phillips, Reference: N.CI.PEP.028

The process for conclusion of a disputed comment resolution requires the reviewer to present his concerns in writing to the next higher level of project authority for a decision.

- o Regulatory Compliance

All comments submitted to the A/Es addressing licensing concerns or compliance with 10 CFR 60 regulations were resolved during the comment resolution phase of the TAR.

3.0 Comments Disposition and Resolution (including items in dispute
process)

COMMENT RESOLUTION ORDER

GENERAL-GENERAL	H&N AND F&S
GENERAL	H&N
GENERAL	F&S
CIVIL	H&N
ARCHITECTURAL	H&N
ARCHITECTURAL/STRUCTURAL	H&N
MECHANICAL/FIRE PROTECTION	H&N
ELECTRICAL/COMMUNICATIONS	H&N
CIVIL	F&S
SHAFT	F&S
VENTILATION	F&S
PIPING & INSTRUMENTATION	F&S
ELECTRICAL	F&S
MINING ————— MECHANICAL	F&S F&S

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES.

ORGANIZATION NAME: DOE / HQ

LEAD REPRESENTATIVE: Dean Tucker

DATE: 9/8/88

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES.

ORGANIZATION NAME: YMPD

LEAD REPRESENTATIVE: Robert J. Water

DATE: September 8, 1988

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES.

ORGANIZATION NAME: WESTON

LEAD REPRESENTATIVE: James E. Monty

DATE: 9/2/88

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES.

ORGANIZATION NAME: T E M S S

LEAD REPRESENTATIVE: John R Little

DATE: 9 SEPT 88

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES.

ORGANIZATION NAME:

SAIC/RA

LEAD REPRESENTATIVE:

John Gardini

DATE:

9/9/88

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES.

ORGANIZATION NAME: NSHA

LEAD REPRESENTATIVE: Rodric M. Ireland

DATE: 9/9/88

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES.

ORGANIZATION NAME: U.S. Bureau of Mines

LEAD REPRESENTATIVE: Bruce Cantrell

DATE: 9-9-88

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

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ORGANIZATION NAME: U. S. Geological Survey

LEAD REPRESENTATIVE: Robert W. Craig

DATE: Sept. 9, 1988

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES.

ORGANIZATION NAME:

SANDIA NATIONAL LABORATORIES

LEAD REPRESENTATIVE:

Robert E. Stinebaugh

DATE:

9/8/88

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES.

ORGANIZATION NAME: Lawrence Livermore National Lab.

LEAD REPRESENTATIVE: Dale G. Willis

DATE: 9/8/88

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES.

ORGANIZATION NAME: Los ALAMOS

LEAD REPRESENTATIVE: Thomas J. Mason

DATE: September 9, 1988

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES.

ORGANIZATION NAME: DOE/NTSO

LEAD REPRESENTATIVE: Andrew R. Veloso

DATE: 9/9/88

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES, EXCEPT FOR THE FOLLOWING COMMENTS:

H&N GENERAL GE-006 R.GE. MAF.010
H&N GENERAL GE-007 R.GE. MAF.015
F&S GENERAL GE-010 R.GE. MAF.011

CONCERNING PLACEMENT OF QA LEVEL AND QALC REFERENCES ON DRAWINGS IS IN THE DISPUTE PROCESS.

IT IS THE REVIEWER'S RESPONSIBILITY TO CONTINUE THE DISPUTE PROCESS WITH THEIR MANAGEMENT AND THE YUCCA MOUNTAIN PROJECT OFFICE.

ORGANIZATION NAME: REEC

LEAD REPRESENTATIVE: DANIEL L. KOSS

DATE: SEPT 09, 1988



ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES, EXCEPT FOR THE FOLLOWING COMMENTS: *NONE*

IT IS THE REVIEWER'S RESPONSIBILITY TO CONTINUE THE DISPUTE PROCESS WITH THEIR MANAGEMENT AND THE YUCCA MOUNTAIN PROJECT OFFICE.

ORGANIZATION NAME: *U.S. ARMY CORPS OF ENGINEERS*
LEAD REPRESENTATIVE: *Clark Jensen*
DATE: *16 SEP 1988*

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES, EXCEPT FOR THE FOLLOWING COMMENTS:

H & N Civil 154, N-CI-PEP-087, concerning looping the fire main, is in the dispute process.

IT IS THE REVIEWER'S RESPONSIBILITY TO CONTINUE THE DISPUTE PROCESS WITH THEIR MANAGEMENT AND THE YUCCA MOUNTAIN PROJECT OFFICE.

ORGANIZATION NAME: DOE-NV Safety & Health Division

LEAD REPRESENTATIVE: Robert E. Phillips

DATE: September 9, 1988

ESF TITLE I 100% TECHNICAL ASSESSMENT REVIEW

COMMENT RESOLUTION CONCURRENCE

THE REVIEW TEAM LEAD REPRESENTATIVE CONCURS WITH ALL THE RESOLUTIONS DEVELOPED FOR ALL OF THE COMMENTS SUBMITTED BY HIS ORGANIZATION DURING THE DESIGN COMMENT AND RESOLUTION ACTIVITIES, EXCEPT FOR THE FOLLOWING COMMENTS:

IT IS THE REVIEWER'S RESPONSIBILITY TO CONTINUE THE DISPUTE PROCESS WITH THEIR MANAGEMENT AND THE YUCCA MOUNTAIN PROJECT OFFICE.

ORGANIZATION NAME: DOE/NV ISTD

LEAD REPRESENTATIVE: D D Bryan

DATE: 9/23/88

COMMENT RESOLUTION SHEET

Document Originator <u>H&N AND F&S</u> Date <u>8/8/88</u> Document Title <u>ESF 100% Technical Review</u> <u>Title I</u> <u>General</u> Coordinator _____	TECHNICAL ASSESSMENT REVIEW Acceptance Signatures Chairperson <u>[Signature]</u> Date <u>9/15/88</u> QA <u>[Signature]</u> Date <u>9/15/88</u> A/E <u>[Signature]</u> Date <u>9/15/88</u> WMPO <u>[Signature]</u> Date <u>9/16/88</u>
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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
NOTES:			
1. See Page 2 for start of comments.			
2. All of Dean Stucker's comments submitted as General* comments 1 through 9 have been renumbered General 52 through 60 respectively. Comment statement, agreed to resolution, and reviewer unique comment identification remains unchanged, as shown in example below:			
<u>EXAMPLE: WAS CONDITION</u>			
1.	GENERAL	I have reviewed all of our organizations ESF Title I-50% Design Review comments and they have been incorporated to my satisfaction; except for those which have been restated herein. Q.GE.DS.001* <u>IS CONDITION</u>	No comment. (F&S) No H&N resolution required. (H&N)
52.	GENERAL	I have reviewed all of our organizations ESF Title I-50% Design Review comments and they have been incorporated to my satisfaction; except for those which have been restated herein. Q.GE.DS.001*	No comment. (F&S) No H&N resolution required. (H&N)

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 Name of Reviewer General

COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
1		<p>GENERAL As lead reviewer for Los Alamos, I have reviewed all of our organizations' ESF Title I 50% Design Review comments and they have been incorporated to my satisfaction (consistent with the resolution agreed to) except as shown below or as appears in a new comment.</p> <p>Exception: A.I.P.A.014 (Inconsistent wording on test detail drawings). A.GE.TJM.017</p>	<p>No H&N resolution required. (H&N) Agree. Will change "Excavation Effects Test" to "Intact Fracture Test" in two places, A-7, A-5 on FS-GA-0163. (F&S)</p>
2		<p>GENERAL I have reviewed all of the ESF Title I 50 Percent Design Review comments and they have been incorporated to my satisfaction, except for:</p> <p>E. G. AV.001 E.GE.ARV.005</p>	<p>No H&N resolution required. (H&N) Agree. Valve symbols not complying with ISA standards will be corrected. (F&S)</p>
3		<p>GENERAL The approved resolutions to the T&MSS comments submitted at the 50 Percent ESF Title I Design Review have been satisfactorily incorporated into the ESF Title I Design at 100 Percent or the comments have been restated herein.</p>	<p>No H&N resolution required. (H&N) No comment. (F&S)</p>

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
		T.GE.SWP.001	
4		<p>GENERAL All comments from Title I 50 Percent Review were resolved except for 6 comments which were restated.</p>	<p>No H&N resolution required. (H&N) No comment. (F&S)</p>
		T.GE.THP.039	
5		<p>GENERAL Except as noted herein, the rest of my comments from the 50% review have been incorporated to my satisfaction.</p>	<p>No H&N resolution required. (H&N) No comment. (F&S)</p>
		T.GE.ALL.004	
6		<p>GENERAL I have reviewed all of the REECO ESF Title I 50 Percent Design Review comments and they have been incorporated to my satisfaction, except for:</p> <p>R.F.WG.001 R.F.WG.004 R.F.WG.005 R.I.WG.022 R.I.WG.027 R.I.WG.028 R.I.WG.039 R.I.WG.040 R.C.DK.005 R.C.DK.037 R.A.DK.048 R.A.DK.039 R.F.DK.056</p> <p>These comments have been repeated or restated herein.</p>	<p>No H&N resolution required. (H&N) No comment. (F&S)</p>
		R.GE.DLK.033	

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
7		<p>GENERAL I have reviewed all of our organizations ESF Title I 50% Design Review Comments and they have been incorporated to my satisfaction, except for as shown below:</p> <p>None.</p> <p align="right">C.GE.EOJ.033</p>	<p>No H&N resolution required. (H&N) No comment. (F&S)</p>
8		<p>GENERAL Note: My ESF 50 Percent Title I Design Review Comments have been incorporated or have been restated herein.</p> <p align="right">T.GE.IRC.020</p>	<p>No H&N resolution required. (H&N) No comment. (F&S)</p>
9		<p>GENERAL All accepted comments from the 50 Percent Title I Design Review have been accommodated except for G.I.BG.006, G.F.BG.009, G.I.BG.013, G.I.BG.014, and G.I.BG.015.</p> <p align="right">G.GE.RWC.001</p>	<p>No H&N resolution required. (H&N) Agree. These comments are addressed elsewhere. (F&S)</p>
10		<p>GENERAL The approved resolutions to the T&MSS comments submitted at the 50 Percent Title I Design Review have been satisfactorily incorporated into the</p>	<p>No H&N resolution required. (H&N) H&N Drawing. (F&S)</p>

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
		<p>ESF Title I Design at 100 Percent Completion with the following exceptions: T.F.SS.006, T.F.SS.C15, T.F.SS.032, which are repeated below. T.GE.SCS.001</p>	
11		<p>GENERAL With the exception of the following, all review comments made at the ESF Title I 50 Percent Design Review have been incorporated in a satisfactory manner: G.F.TL.006, G.F.TL.008, G.F.TL.015, and G.F.TL.016. G.GE.TLL.001</p>	<p>No H&N resolution required. (H&N) Agree. Comments will be incorporated. (F&S)</p>
12		<p>GENERAL I accept all resolution of 50% Review comments, unless otherwise noted. L.GE.DGW.019</p>	<p>No H&N resolution required. (H&N) No comment. (F&S)</p>
13		<p>GENERAL All 50 Percent Review comment resolutions have been incorporated. T.GE.JHM.004</p>	<p>No H&N resolution required. (H&N) No comment. (F&S)</p>
14		<p>GENERAL The 100% Title I Design has adequately incorporated the resolution to my comments on the 50% Title I Design.</p>	<p>No H&N resolution required. (H&N) No comment. (F&S)</p>

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
		T.GE.JMD.001	
15		<p>GENERAL The approved resolutions to the T&MSS/SAIC comments submitted at the 50 percent ESF Title I Design Review have been satisfactorily incorporated into the ESF Title I Design at 100 percent completion.</p>	<p>No H&N resolution required. (H&N) No comment. (F&S)</p>
		T.GE.RLT.001	
16		<p>GENERAL GENERAL From 50 Percent Review the following comments have been fully addressed except as repeated herein:</p>	<p>No H&N resolution required. (H&N) No comment. (F&S)</p>
		R.GE.WHG.001	
17		<p>GENERAL With the exception of the above comments, all resolutions from the 50% review were adequately incorporated into the design.</p>	<p>No H&N resolution required. (H&N) No comment. (F&S)</p>
		T.GE.EMC.006	
18		<p>GENERAL The following H&N drawings do not conform (not compatible) to the NTS drawing note requirements described in</p>	<p>Will be incorporated in Title II. (H&N) H&N comment. (F&S)</p>

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
		<p>the DOE directive, issued by the DOE/NTSO Director to all NTS contractors, NTSO:ON-233 dated 7/13/88 (attached), which states, in part, "Requirements shall be defined by citing individual sections, paragraphs or sentences of the selected code, standard..."</p>	
		<p>JS-025-ESF-A1.A - Note #3 - AISC, AWS</p>	
		<p>JS-025-ESF-A1.A - Note #7 - U.S.C.</p>	
		<p>JS-025-ESF-E1.A - Note #4 - NEC, ANSI</p>	
		<p>JS-025-ESF-FP5.B Note #5 - NFPA</p>	
		<p>JS-025-ESF-FP6.B Note #5 - NFPA</p>	
		<p>JS-025-ESF-FP7.B Note #5 - NFPA</p>	
		<p>JS-025-ESF-FP8.B Note #5 - NFPA</p>	
		<p>JS-025-ESF-FP9.B Note #5 - NFPA</p>	
		<p>JS-025-ESF-FP10.B Note #5 - NFPA</p>	
		<p>JS-025-ESF-FP11.B Note #5 - NFPA</p>	

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
JS-025-ESF-FP12.B		Note #5 - NFPA	
JS-025-ESF-FP13.B		Note #5 - NFPA	
JS-025-6000-A1.B		Note #9 - ACI	
JS-025-6000-A1.B		Note #10 - ASTM	
JS-025-6000-A1.B		Note #11 - ASTM	
JS-025-6000-E2.B		Note #3 - NEC	
JS-025-6001-A1.B		Note #9 - ACI	
JS-025-6001-A1.B		Note #11 - ASTM	
JS-025-6001-A2.A		Note #1 - AWS, UBC	
JS-025-6001-A2.A		Note #7 - UBC	
JS-025-6001-E1.B		Note #3 - NEC	
JS-025-6002-A1.A		Note #1 - AISC, UBC	
JS-025-6002-E3.B		Note #3 - NEC	
JS-025-6004-A1.B		Note #4 - UBC	
JS-025-6004-E1.B		Note #2 - NEC, ANSI	

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
		JS-025-6006-A1.B Note #2 - AWS, UBC	
		JS-025-6006-E1.B Note #2 - NEC	
		JS-025-6007-A1.B Note #2 - AWS	
		JS-025-6007-A1.B Note #3 - UBC	
		JS-025-6007-E1.B Note #3 - NEC	
		JS-025-6008-A1.A Note #2 - AISC, UBC	
		JS-025-6008-E1.B Note #2 - NEC	
		JS-025-058-1-E1.B Note #2 - NEC	
		JS-025-058-2-E1.B Note #3 - NEC	
		E.GE.ARV.002	
19		<p>GENERAL On the H&N drawings, it would be easy to find a drawing if the drawings were consecutively numbered as with the F&S drawings.</p> <p style="text-align: center;">M.GE.JW.001</p>	<p>The drawings will be reordered and numbered for 30% Title II. (H&N)</p> <p>H&N comment. (F&S)</p>
20		<p>GENERAL Include a description of requirements for the control of processes (such as</p>	<p>Will be a part of the Title II specifications. (H&N)</p>

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
21	GENERAL	<p>installation) for QA Level I items under the heading "Quality Assurance". F.GE.JAJ.028</p> <p>Although the present version of the RIB may be adequate for a Title I design, it has not been adequately reviewed to assure the NRC that we are using the best available data to design the ESF to meet the requirements in the 10 CFR 60. Sandia has been conducting reviews of data for inclusion into an updated version of the RIB that may have the pedigree to satisfy NRC concerns. Submission of that version is scheduled for September. DOE/WMPO and SAIC must ensure that procedures for reviewing the RIB and baselining it as a project document are in place. Without significant management pressure, this may not occur. Delay in a project baselined version of the RIB will have a profound effect on a Title II schedule. S.GE.TEB.002</p>	<p>Title II Specifications will include the appropriate description for all QA levels. (F&S)</p> <p>Agree, no H&N resolution required. (H&N)</p> <p>No comment. (F&S)</p>

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
22	GENERAL	<p>In future Technical Assessment Reviews of the ESF, the review for compliance to 10 CFR 60 requirements should be fully integrated into the review. This will require that participants be assigned by DOE/WMPO the responsibility for determining (a primary function, not a review function) whether the ESF design meets each of the applicable regulations. The responsible organizations should then provide their findings as part of the presentations and documents to be reviewed during the design review. Other project participants who are not responsible for evaluating whether a particular regulation is met by the design should be assigned to review this work.</p> <p align="right">S.GE.TEB.003</p>	<p>Agree, no H&N resolution required. (H&N)</p> <p>No comment. (F&S)</p>
23	GENERAL	<p>The SDRD Appendix E currently identifies OSHA, MSHA, State of California, and State of Nevada mining regulations as applicable to the design and construction of the ESF underground facility. It is unclear as to who is</p>	<p>H&N will assess a mechanism to document that applicable codes are being used. (H&N)</p> <p>This may require a memorandum of understanding between DOE (Project Office) and the regulatory agencies. (F&S)</p>

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS
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responsible for the interpretation and implementation of these regulations. Without this knowledge it is difficult for the A/E to make a judgment on the applicability of certain sections of the regulations (e.g., ladderways in shafts). The enforcing agencies need to be identified and should interface with the A/E to provide guidance on the applicability of the regulations.
K.GE.DW.015

24 **GENERAL**
 The A/Es should prepare a checklist system to periodically review design requirements in DOE Orders, mining codes and other requirements documents. This checklist must be revisited on a regular basis to see that new impacts are picked up as they occur.
K.GE.JEM.001

H&N will assess a mechanism to document that applicable codes are being used. (H&N)
 Agree. This is also a part of the basis for design (BFD). (F&S)

25 **GENERAL**
 ES-1 and ES-2 shafts will require a operating permit for air pollution. Show dust control methods for headframes and shafts.
T.GE.THP.030

No H&N resolution required. (H&N)
 Dust control is accomplished at the source (present design). Shaft air effluent will not exceed applicable standards. (F&S)

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
26		<p>GENERAL The Life Safety/Fire Protection subcommittee met several times since the prior drawing review. This subcommittee generated a total of 30 recommendations that are documented in H&N transmittals dated July 1, 1988, and July 5, 1988. There is a minority report on Item #4 (SHD to L.P. Skousen 7/11/88) that must be resolved by Dennis Irby. These recommendations are not detailed in the H&N or F&S Title I drawings, but need to be in Title II. N.GE.PEP.059</p>	<p>Agree, will be considered in Title II. (H&N) Agree. These recommendations were appropriately excluded from Title I. Project Office approval is required before incorporating recommendations as design inputs; these recommendations will be considered and incorporated after Project Office approval. (F&S)</p>
27		<p>GENERAL It is recommended that all previous fire protection recommendations, which were made by the ESF-Life Safety/Fire Protection Subcommittee and not included in these drawings, be incorporated in the Title II drawings. These recommendations are listed in H&N Conference Report CR: 88-033, dated June 20, 1988 (draft), and H&N Conference Report CR: 88-038, dated July 1, 1988. R.GE.JLB.014</p>	<p>Agree, will be considered in Title II. (H&N) Agree. These recommendations were appropriately excluded from Title I; Project Office approval is required before incorporating recommendations as design inputs; these recommendations will be considered and incorporated after Project Office approval. (F&S)</p>

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
28		GENERAL DOE Orders 6430.1A and 5480.1B will apply. N.GE.PEP.110	Agree. (H&N) No comment. (F&S)
29		GENERAL The National Electrical Code will apply. N.GE.PEP.111	Agree. (H&N) No comment. (F&S)
30		GENERAL All equipment should be UL or FM listed with label, for the purpose used. N.GE.PEP.112	Agree, where applicable. (H&N) Agree. UL or FM labeled equipment will be used where appropriate. (F&S)
31		GENERAL Mueller hydrants are the NTS Standard and are usually government furnished. Wet-barrel hydrants cannot be used because they will freeze. N.GE.PEP.115	Agree, but brand names may not be listed. (H&N) No comment. (F&S)
32		GENERAL The use of brand names identifies the quality of the product. If you specify a Cadillac Brougham, you should not accept a Ford. N.GE.PEP.116	Brand names, when used, will be stated "or equal" with determination by the A/E. (H&N) Government regulations do not permit specification by brand name. Salient features will be incorporated in the specifications to define the quality. (F&S)

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
33		<p>GENERAL Transformer installations must also meet FM Loss Data Sheet 5-4 (Required by 6430.1A Page 1-29 and Page 16-8, Paragraph 1630-2.3.5). N.GE.PEP.117</p>	<p>Agree. (H&N) H&N comment pertains to oil filled transformers. (F&S)</p>
34		<p>GENERAL Access ladders are required in both shafts. N.GE.PEP.118</p>	<p>No H&N resolution required. (H&N) Not required by SDRD. An alternative egress is afforded by the escape hoist. (F&S)</p>
35		<p>GENERAL Ref. 30 CFR 75.300-2 (c) (i) Main surface fans should have a separate power circuit independent of any other mine circuit. M.GE.JW.005</p>	<p>Disagree, This is a coal mine standard and is not applicable to the ESF. (H&N) Disagree. 30 CFR 75 pertains to gassy coal mines. 30 CFR 75 is not applicable to this Project. SDRD requires compliance with 30 CFR 57. (F&S)</p>
36		<p>GENERAL Ref. 30 CFR 57.5050 Make the fan manufacturers guarantee that underground fans meet the noise requirements (i.e. less than 90 dBA). M.GE.JW.006</p>	<p>No H&N resolution required. (H&N) Agree. (F&S)</p>

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37		<p>GENERAL Ref. 30 CFR 57.5003</p> <p>Make the drill manufacturers guarantee that all dry drilling will meet the dust requirements.</p> <p align="right">M.GE.JW.007</p>	<p>No H&N resolution required. (H&N)</p> <p>Disagree. Manufacturer cannot guarantee conditions beyond his control, only that his equipment will perform tasks for which it was designed to do. Dust control is an operating responsibility. (F&S)</p>
38		<p>GENERAL</p> <p>All F&S specifications do not conform (not compatible) in format and technical content as required by NTS "Guide to Specification Writing", as described and directed in the DOE letter issued by DOE/NTSO Director to all NTS contractors, NTSO: ON-230, dated 5/17/88 (attached).</p> <p align="right">E.GE.ARV.003</p>	<p>No H&N resolution required. (H&N)</p> <p>Agree that specification is not compatible. However, final determination of the applicability of NTSO directives is to be made by F&S contracting officer and DOE/NV contracting officer, since NTSO is currently involved in the procurement process for NNWSI. (F&S)</p>
39		<p>GENERAL ALL</p> <p>All H&N specifications do not conform (not compatible) in format and technical content as required by NTS "Guide to Specification Writing", as described and directed in the DOE letter issued by DOE/NTSO Director to all NTS contractors, NTSO: ON-230, dated 5/17/88 (attached).</p> <p align="right">E.GE.ARV.001</p>	<p>Will be incorporated in Title II. (H&N)</p> <p>No comment. (F&S)</p>

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40		<p>GENERAL SPECIFICATIONS These Specifications should be updated to reflect numerous changes which were made in DOE 6430.1A, "General Design Criteria" (Draft). R.GE.JLB.037</p>	<p>Will provide in Title II. (H&N) Agree. (F&S)</p>
41		<p>GENERAL F&S TECHNICAL SPEC. General - All references to "Contract Drawings" should be changed to "Project Drawings" to avoid confusion and multiple changes when the specification applies to work which will be done by both contractor (REEC0) and the subcontractor. R.GE.LGC.003</p>	<p>No H&N resolution required. (H&N) Drawings are part of the contract package and they are referred to as construction drawings. (F&S)</p>
42		<p>GENERAL H&N DIVISION 15.A A review of the basic outline specifications covering Div. 15, mechanical, has revealed the omission of information covering quality control/inspection in the following documents: SECTION 15140.A, 15190.A, 15242.A, 15260.A, 15440.A, 15450.A, 15480.A, 15781.A, 15782.A, 15785.A, 15870.A, 15875.A, 15880.A, 15885.A, 15890.A,</p>	<p>Will provide in Title II. (H&N) H&N comment. (F&S)</p>

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		15990.A, 05120.A. A section covering quality control/inspection should be added. This comment also applies to the following specs: Section 05210.A, 05300.A, 07200.A, 07465.A, 08800.A, 11180.A, 13121.A, 02211.A, 02222.A, 02500.A, 02556.A, 02614.A, 02720.A <p align="right">F.GE.JAJ.023</p>	
43	GENERAL	DIVISION 15 SPECIFICATIONS a. General: Verify that the CSI spec. nos. as used in this contract are the official nos. normally used by CSI, and change as necessary. b. Section 15145: Use the term Electric Space Heater I.L.O. Electric Boiler. c. Sections 15781 and 15782 may be combined due to many commonalities. d. Recommend Sections 15410 and 15440 be combined since subject to same trade.	A. Agree, will verify during Title II. B. Section 15145 will be deleted. Section 15440 will address electric unit heaters. C. Either format should be acceptable. D. Either format should be acceptable. E. Either format should be acceptable. (H&N) H&N comment. (F&S)

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		<p>e. Recommend Sections 15890 and 15910 be combined since subject to same trade. C.GE.EOJ.032</p>	
44	GENERAL	<p>CALCULATIONS COOLING LOAD Consider the cooling load due to lights be reduced from 3 watts/sf to approximately 1.5-2.0 watts/sf which is a more realistic value for present day efficiency light fixtures. C.GE.EOJ.027</p>	<p>These are preliminary calculations. Calculations to date are not reviewable or commentable documents. (H&N) H&N comment. (F&S)</p>
45	GENERAL	<p>CALCULATIONS M-000 a. Re-evaluate your hot water demand based on a water heater efficiency of 0.8. b. State the recovery rate for the heaters. c. Be aware that undersizing a hot water system could cause extreme inconvenience. C.GE.EOJ.029</p>	<p>See comment #44 or C.GE.EOJ.027. (H&N) H&N comment. (F&S)</p>

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46		<p>GENERAL CALCULATIONS M-0001 Verify and state criteria source for the ventilation rate. 1/2 AC/HR appears inadequate. C.GE.EOJ.031</p>	<p>See comment #44 or C.GE.EOJ.027. (H&N) H&N comment. (F&S)</p>
47		<p>GENERAL CALCULATIONS M-0003 For the welding exhaust system, provide calcs. for the capture velocity, and verify that it satisfies the Department of Industrial Hygiene's requirements. C.GE.EOJ.030</p>	<p>See comment #44 or C.GE.EOJ.027. (H&N) H&N comment. (F&S)</p>
48		<p>GENERAL CALCULATIONS PLUMBING In all buildings that have flush valve type water closets the domestic cold water requirement shall be 10 FU I.L.O. 35 (20 FU some locations). Reference: UPC, 1988 edition, (Appendix A, Table A-2, Page 137). C.GE.EOJ.028</p>	<p>See comment #44 or C.GE.EOJ.027. (H&N) H&N comment. (F&S)</p>
49		<p>GENERAL FP CALCULATIONS Draw the system curve for all buildings with a water sprinkler system and show that your demand point (gpm vs resid. pressure) is on or below this curve. C.GE.EOJ.025</p>	<p>See comment #44 or C.GE.EOJ.027. (H&N) H&N comment. (F&S)</p>

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50	GENERAL	<p>FP CALCULATIONS In all buildings where a fire sprinkler system is to be installed, the designer shall state the basis for layout of the system (i.e., based on pipe schedule, hydraulically calculated system, etc.). If a hydraulically calculated system option is permitted, calcs for such system shall be provided. C.GE.EOJ.026</p>	<p>See comment #44 or C.GE.EOJ.027. (H&N) H&N comment. (F&S)</p>
51	GENERAL	<p>As presently planned, the ESF will not necessarily meet 10 CFR 60.133 (b), flexibility of design. This regulation requires that, "The underground facility shall be designed with sufficient flexibility to allow adjustments where necessary to accommodate specific site conditions identified through in situ monitoring, testing, or excavation". The information from existing coreholes is insufficient to locate, with confidence, the long exploratory drifts in the ESF. Present plans include these drifts as future repository drifts. Sandia's IGIS system has been used to project the stratigraphy along the</p>	<p>No H&N resolution required. (H&N) Agree. When new data is made available the design will be appropriately reviewed and/or revised. (F&S)</p>

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		<p>direction of these drifts, but recent sensitivity studies (presentation by R.E. Stinebaugh and M. Fowler to the ESF-ICWG on May 3, 1988) have demonstrated that a reinterpretation of existing coreholes would significantly change the projection of stratigraphy in some areas. Additional coreholes near the northeastern part of the repository are required to assure that the stratigraphy along the direction of the long drifts is projected with confidence. Only then can the long drifts be located with assurance that they meet "specific site conditions".</p> <p>Until new corehole data is available, drawings that show underground elevations and slopes (e.g. FS-GA-0195 to 0199) should contain a note that elevations and slopes are preliminary pending new corehole data. More importantly, the schedule for the integrated drilling plan must include timely completion of appropriate coreholes.</p> <p align="right">S.GE.TEB.001</p>	

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92. GENERAL		<p>I have reviewed all of our organizations ESF Title I-50% Design Review comments and they have been incorporated to my satisfaction; except for those which have been restated herein. Q.GE.DS.001*</p>	<p>No comment. (F&S) No H&N resolution required. (H&N)</p>
53. GENERAL		<p>Comment #1 from the 50% Design Review, "The seismic design factors referenced from the SDRD assume that the permanent items specified in the GR Appendix E (specifically, the liner) are not important to safety or a Category IV as identified in UCRL-15910. The analysis and rationale that the A/E conducted to determine this is not available; therefore, the GR Appendix E, 6.0, pc 2, 3-e, 6-b, and constraint H, and J do not appear to be incorporated in the design. Q.G.DS.001", has not been addressed in the 100% Design as agreed. Q.GE.DS.002*</p>	<p>Disagree. A Title I study has been prepared (FS-ST-0053) and is available to address these concerns. This is a preliminary report and will be expanded during Title II. No fatal flaws to the design can be recognized from seismic impacts due to the results of this study. (F&S) No H&N resolution required. (H&N)</p>

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54. GENERAL		<p>Comment 6 of the 50% Design Review: "The design appears to assume that for emergency hoisting, the portable hoist at the NTS will be available. This may not be the case if it is already in use. The design must incorporate an emergency system that is 100% available, therefore, suggest utilizing the 400 hp hoist already purchased and reconditioned as the emergency hoist. Q.G.DS.005", appears to not have been complied with as agreed.</p> <p>..... Q.GE.DS.003 *</p>	<p>Disagree, a new truck mounted emergency hoist with torpedo cage will be purchased which is solely dedicated to serve ES-1 and ES-2 during sinking and operational phase. Additionally, during the sinking phase the bucket and the galloway provide alternate means of emergency egress. (F&S)</p> <p>No H&N resolution required. (H&N)</p>
55. GENERAL		<p>Comment 9 of the 50% Design Review restated, "Appendix E, 6.10, Constraint A requires that the ESF and repository design be integrated to ensure decommissioning and close requirements are consistent. Repository design currently shows location for seals, yet the ESF design does not. It, therefore, appears that this requirement has not been complied with. I suggest identifying the postclosure seal location now, and assuring that there are accommodations for allowing future installation (example, there is a 50' distance from ES-2 to the repository drift. Is this enough space</p>	<p>Disagree, nothing has been done in the ESF design that precludes closure and sealing. SNL is doing detailed sealing and closure studies at this time and F&S is tracking this work to assure that our design presents no problems. Locating the seals prior to completion of the sealing and decommissions studies is considered premature. A Title I study by F&S on decommissions and closure (FS-ST-0055) is available. F&S will attempt to identify potential closure seal areas in coordination with the latest available design information on seal structures (approved or assumed) by 90% Title II. (F&S)</p> <p>No H&N resolution required. (H&N)</p>

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56.	GENERAL	<p>to construct the postclosure seal realizing 20' to 25' feet of this distance is shaft station area). Q.G.DS.008" Q.GE.DS.004*</p> <p>The design of ES-2 does not identify a ladderway. The State of Nevada Chapter 512 of Nevada Revised Statutes, effective July 1, 1985, Part 1, Title 46, 11-b requires: "all main shafts or raises equipped with hoisting machinery must have one compartment set aside for a ladderway."</p> <p>Appendix E of the GRD identifies that the Function of ES-1 and ES-2 are the same except that ES-2 additionally is to provide for the primary emergency egress. With this in mind, it would appear that both ES-1 and ES-2 are main shafts equipped with hoisting capabilities.</p> <p>In addition, Appendix E, 6.0 Constraint B states: "Applicability of State and local regulation will be determined in consultation with State and local officials as stated in the final EA's Mission Plan NWPA." It appears that State officials have not been contacted to determine if they agree with the</p>	<p>The SDRD states that ES-1 will have a ladderway and is designated as a main shaft for that purpose. The ESF A/E has just completed the preliminary design in compliance with the SDRD.</p> <p>Based on the SDRD, the shafts are different in their applications for the ESF.</p> <p>The A/E has not consulted with the state and local agencies as this is not a work scope item and is considered a client responsibility.</p> <p>Redundant escape/egress options are included in the present design and are considered to be in excess of the requirements. (F&S)</p> <p>No H&N resolution required. (H&N)</p>

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		<p>current interpretation.</p> <p>California Administrative Code, Title 8, Chapter 4, Subchapters 17 and 20, is required by DOE Order 5480.4 and the SDRD as applicable design requirements. Section 7044, manways and ladder installations, j & l on page 650.10 state: "(j) In all shafts which are in the process of sinking or enlarging, a fixed ladder, stair, or ramp shall be provided to within such distance from the bottom of the shaft as will secure it from the danger of blasting."</p> <p>"(l) Every shaft shall be provided with a continuous means of egress from the bottom of such shaft to the nearest active mine level. Such means of egress may be by stairs or fixed ladders or ramps, or by a combination of the above."</p> <p>Additionally, Section 8496, (1), page 684.40, states "there shall be two sole means of access in shafts at all times. This may include the ladder and hoist." (Current concepts show the use of a portable hoist. It appears that this hoist may not be available at all times.).</p>	<p>During the sinking phase, the stage is provided with an access ladder for each level. Access from the sinking stage to the bottom of shaft is accomplished using the sinking bucket or lowering the stage close to the shaft bottom. Chain ladder will be attached underneath the stage.</p> <p>Fixed access ladders with landings spaced at 20 ft. intervals are provided from bottom of shaft to the Main Test Level for ES-1 and ES-2.</p> <p>The truck mount emergency hoist will be used as the second egress to the shaft in case of emergency. It complies with SDRD.</p> <p>During construction the bucket and galloway provide alternate means of emergency egress. (F&S)</p>

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57. GENERAL		<p>It appears the design is, therefore, out of compliance with existing baseline requirements for ladderways in ES-2. Additionally, the stated function of the ES-2 shafts in the GRD include "provide for testing in the shaft", it would appear that a ladderway similar to the one in ES-1 would better support testing and mapping in ES-2. I, therefore, suggest that the design be adjusted to accommodate a ladderway in the Title I drawings. Q.GE.DS.005*</p> <p>The current general arrangement drawings show a refuge chamber 51' long by 21' wide. This appears to be small to accommodate the 135 personnel currently expected underground. I suggest enlarging to accommodate personnel and appropriate provisions, requirements and include space for expansion of additional personnel if needed, because of flexibility provisions. Q.GE.DS.006*</p> <p>The current general arrangement drawings as baselined by the interface control drawing R07048A</p>	<p>At the present time no testing in the ES-2 shaft is anticipated at 100% Title I and the design complies with the requirements stated in the SDRD. (F&S)</p> <p>Title II design will consider most recent population studies for refuge chamber sizing. Analysis will include developed criteria for sizing. (F&S)</p> <p>No H&N resolution required. (H&N)</p> <p>Design for the considerations mentioned are adequate at this time. As more detail, better parameters and criteria become available it will be appropriately reflected in the design. (F&S)</p>
58. GENERAL			

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		<p>do not appear to take into account space for operational considerations. Examples of this are lunch rooms, restrooms, supervision office space, equipment parking, adequate space for shop and underground warehouse storage. Considering there will be approximately 135 personnel per shift, and approximately 10 separate vehicles underground, I suggest that the A/E reconfigure the general arrangement to accommodate these considerations with adequate flexibility.</p> <p>..... Q.GE.DS.007 *</p>	<p>ECRs will be submitted to cover these considerations by 30% of Title II. (F&S)</p> <p>No H&N resolutions required. (H&N)</p>
59.	GENERAL	<p>The general arrangement drawing depicts three drifts intersecting the future repository drift. It appears that if the general arrangement of the central core area should be rearranged to have only one drift intersecting the repository drift, future postclosure seal concerns would be minimized. I, therefore, suggest that this be reviewed with current conceptual seal requirements and the ESF central core area be modified to accommodate only one drift connecting to future repository drifts.</p> <p>..... Q.GE. DS.008*</p>	<p>Disagree. There are no current requirements to minimize drifts to future repository drifts. SNL has reviewed the ESF design and has no comments in this area. (F&S)</p> <p>No H&N resolution required. (H&N)</p>

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60.	GENERAL	<p>The GRD Appendix E, Section 6.0 Constraint M, requires:</p> <p>The ESF shall be designed to include onsite facilities and services that ensure a safe and timely response to emergency conditions and that facilitate the use of available offsite services (such as fire, police, medical, and ambulance service) that may aid in recovery from emergencies.</p> <p>It would appear that an onsite ambulance and fire vehicle, with facilities for storage, are required because of the distance to Mercury and response time if an emergency should develop.</p> <p>..... Q.GE.DS.009*</p>	<p>H&N comment. (F&S)</p> <p>The GRD requirements for on-site emergency facilities and services will be re-evaluated and addressed in the Design Basis Document and for Title II submittal. (H&N)</p>

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Date 8/8/88

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Coordinator _____

TECHNICAL ASSESSMENT REVIEW

Acceptance Signatures

Chairperson [Signature] Date 9/15/88

QA [Signature] Date 9/15/88

AE [Signature] ^{for} R.L. Bullock Date 9-16-88

WMPO [Signature] Date 9/16/88

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RESOLUTION

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1		<p>GENERAL F&S The following comments were agreed upon at the 50 Percent Title I Review but changes have not been made for the 100 Percent Title I Review:</p> <p>G.G.MW.016 G.I.MW.019 G.GE.MSW.001</p>	<p>Agree. Will make corrections.</p>
2		<p>GENERAL F&S J.G. RW.004/GF-026, J.G. RW.003/GF-032, J.G. RW.001/GF-036, J.I. RW.011/I-050, J.I. RW.012/I-051, J.I. RW.013/I-061, J.F. RW.006/F-114, J.F. RW.008/F-126, J.F. RW.010/F-136, J.S. RW.014/S-070, J.S. RW-015/S-076.</p> <p>These comments are all resolved and have been incorporated in the 100 Percent Design/Specification documents. J.GE.RSW.003</p>	<p>No comment.</p>
3		<p>GENERAL F&S The agreed resolution to a comment on the 50 Percent Title I design was that the A/E would perform a safety analysis and provide a list of hazards considered during the design process, design alternatives considered, and the</p>	<p>A safety analysis plan is being prepared and will be available prior to completion of Title I. The safety specialist will be "on board" and the safety analyses are scheduled to be completed in Title II. The A/E will provide a list of hazards considered, design alternatives considered, and design features</p>

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		<p>principal design, construction and operating features selected for preventing accidents or reducing risks to acceptable levels. A list of hazards has been prepared. Documentation of the safety analysis performed to date still needs to be completed and included as a Title I deliverable. (This comment was identified as T.G. SP.001 and listed as comment number GF-017 in the 50 Percent Design Review Report).</p> <p align="right">T.GE.SWP.013</p>	<p>selected for preventing accidents by 30 Percent Title II.</p>
4		<p>GENERAL F&S The agreed resolution to a comment on the 50 Percent Title I design was that the A/E should provide information to support development of the fire protection design analysis defined in DOE Order 5480.7. Additional support in this area for preparation of the Title I Design Summary will be needed. (The relevant comment was identified as T.G. SP.002 and listed as comment No. GF-018 in the 50 Percent Design Review Report).</p> <p align="right">T.GE.SWP.014</p>	<p>Agree. Additional information supporting the fire protection system will be developed.</p>

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5		<p>GENERAL F&S Results of muck spillage and shaft sump design survey of operating facilities noted but supporting data not furnished in calculations packages or elsewhere. Provide decision backup information. T.GE.SCS.070</p>	<p>The results of a survey are presented in a letter report dated July/August 1988, which can be made available on request.</p>
6		<p>GENERAL F&S There is evidence that F&S is not conforming to their and WMPO's quality assurance plan. An example of this is the general arrangement drawing FS-GA-0160, which has drifts not found in the Appendix A of the SDRD as well as major changes to arrangements such as shaft station excavations. Since SNL is performing the analysis to demonstrate conformance to 10 CFR 60, it is essential that F&S maintain conformance to the configuration or inform the other parties that a change in the arrangements is necessary and the analysis could be modified if necessary. J.GE.LJO.053</p>	<p>Agree. ECRs will be submitted to reflect consensus' reached at 50 Percent Review and in subsequent meetings with SNL and other Project participants.</p>

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		F.GE.JAJ.008	
10		GENERAL F&S TYPICAL DRAWING Place QA level and QALA reference on each drawing. R.GE.MAF.011	F&S will confer with DOE/Project Office to determine the project method for the QA level identification in Title II.
11		GENERAL F&S SPECIFICATIONS QA SECTION General Comment - Quality Assurance Section Identify applicable criteria related to assigned QA level and/or reference approved QALA. R.GE.MAF.014	Will reference the QALAS which will identify the appropriate criteria.
12		GENERAL F&S TYPICAL General Comment QA sections to specs. should list specific QA criteria applicable. R.GE.MAF.016	Will reference the QALAS which will identify the appropriate criteria.
13		GENERAL F&S A consolidated review of all underground requirements should be done ASAP to determine the appropriateness of the present operations plan and	Agree. The BFD and Design Scope and Planning Document will be revised as required and submitted for DOE approval prior to start of Title II.

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		<p>facilities. Many concepts have been revised during Title I and an updated understanding of the overall needs of the ESF should be developed before continuing with Title II. This update should include a comprehensive analysis of possible alternatives.</p> <p align="right">K.GE.JEM.013</p>	
14		<p>GENERAL F&S The design needs to incorporate some allowances for seals. Requirements from 10 CFR 60 should be analyzed and appropriate design criteria developed consistent with the SCP.</p> <p align="right">K.GE.JEM.007</p>	<p>This comment was answered at the 50 Percent Review (General comment #9), and a study FS-ST-0055 has since been written. Nothing in the ESF Design precludes or prevents seals from being placed after ESF or repository development. The design is consistent with the SDRD. As additional requirements for postclosure seals are generated by SNL and incorporated into the SDRD, the design will be revised accordingly.</p>
15		<p>GENERAL F&S The use of the work deck to access the test locations in the shaft during sinking should be reviewed with respect to safety and efficiency of operations. The stage winches are difficult to synchronize and are slow. Some twisting of the deck must be expected. This system should be</p>	<p>F&S will review the use of the work decks as access to the testing stations in the shaft.</p>

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16	GENERAL F&S	<p>compared with the alternative of outfitting the shaft as its being sunk. K.GE.JEM.005</p> <p>Design criteria for rock support and shaft lining is needed. These criteria should address the range of rock characteristics which are needed to initiate the Title II design.</p> <p>These criteria are needed to analyze drift and pillar configurations which must preclude the design of utilities and general ESF layout. These designs must also be reviewed for compatibility with repository requirements and therefore should be done ASAP. K.GE.JEM.008</p>	<p>Analyses, based on the available data, have been completed for Title I design. F&S will recommend the following to the Project Office for their review and approval of the additional scope of work entailed.</p> <ol style="list-style-type: none"> Integration among SNL, F&S, and others is needed to prepare comprehensive design of ground support and excavations. Probing in advance of drifting where adverse ground conditions may exist could be required to satisfy Programatic and safety requirements. Drifts will initially be driven at minimum size. Enlargement will be done after ground is assessed in small drifts. All designs and draft supporting analysis should be available for review by 30% Title II Design Review. Design impacts need to be reviewed and assessed with respect to possible risk/accident events or probabilities. Plan needs to be generated before 30% with allowance for ongoing development.

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17		<p>GENERAL F&S The drawing package does not include any drawing showing the preliminary rock support arrangement for the upper breakout level. R.GE.DLK.027</p>	Agree. Title II detail.
18		<p>GENERAL F&S The drawing package does not include any drawing showing the stratigraphic column of the upper breakout level mining horizon for drift construction. R.GE.DLK.025</p>	Agree. Title II detail.
19		<p>GENERAL F&S The drawing package does not include any drawing showing the stratigraphic column of the main test level mining horizon for drift construction. R.GE.DLK.017</p>	Agree. Title II detail.
20		<p>GENERAL F&S The drawing package does not include any drawing showing the preliminary rock support arrangement for the main test level. R.GE.DLK.026</p>	Agree. Title II detail.

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21	GENERAL F&S	The drawing package does not include any drawing showing the G-4 geomechanical boring log information for ES-1/ES-2 shaft construction. R.GE.DLK.015	Agree. This is a part of the Title II package.
22	GENERAL F&S	The drawing package does not include any drawing showing the ES-1/ES-2 shaft preliminary rock support arrangement. R.GE.DLK.016	Agree. Title II detail.
23	GENERAL F&S	Calculation FS-GA-0073, Excavation Scheduling/Mining Cycles. Indicates the plan for the infiltration test is to have the lower 6 foot drift driven last. Examine the probable stability of the test block overhead. A different development scheme may be required. T.GE.SCS.071	Agree. Intended as a Title II calculation.
24	FS-GA-0001	GRID C,D-6,7 Label area where the infiltration test will be conducted. G.GE.MSW.007	Agree.

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25	GENERAL F&S	DRAWINGS It would be more appropriate to make the entire title of each drawing, as listed on FS-GA-0002, boldface. As it is now, there are such nondescript boldface titles as "Plan" and "Sheet 1". T.GE.EMC.015	Disagree. Drawing format was changed to closely follow the H&N title block format per comments from the 50 Percent Review. Refer to General comment #25-9.
26	FS-GA-0003	GRID B-1 Add symbol and explanation to cover the volcanic term "ash flow" since it is used under stratigraphic units to describe the Topopah Spring Member. G.G.MW.016 G.GE.MSW.002	Agree.
27	FS-GA-0003	GRID B-3 Under Geotechnical Instrumentation change the spelling of Piezimeter to Piezometer. G.GE.MSW.004	Agree.
28	FS-GA-0003	SYMBOLS a. "400" should be removed from "Strike and Dip" diagram. b. Piezometer (spelling correction). T.GE.DMR.017	Agree.

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29	FS-GA-0003	D2 Change "Rock Wall" to "Rock" to allow more general use of the symbol. (See 50%, General Comment 35). T.GE.EMC.002	Agree.
30	FS-GA-0003	8D Delete "National Park" from the list of boundaries. T.GE.EMC.011	Agree.
31	FS-GA-0003	Reserve Geology and Stratigraphic units symbols for when design package contains this type of information. T.GE.SCS.036	Disagree. This information is included for future reference to avoid omissions and errors.
32	FS-GA-0004	B The symbols for both F&S and H&N need to be consistent; i.e., H&N symbol for the lightning arrestor is not the same as the F&S symbol, the potential transformer symbols are different. The mechanical symbols for pressure reducing valve and water arrestor are also different. A.GE.SDF.003	Agree. The inconsistency will be resolved.

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- 33 FS-GA-0004 4C
The water meter symbol is repeated as a
motor symbol on drawing FS-GA-0203.
Use another symbol for an electric
motor.
T.GE.SCS.037
Agree. Drawing FS-GA-0004 will be corrected
during Title II.
- 34 FS-GA-0005
T&MSS organizations other than SAIC are
missing from the acronyms list.
T.GE.SCS.038
Agree. Will correct.
- 35 FS-GA-0005
Under abbreviations, CHDR should be
omitted.
T.GE.SCS.039
Agree. Will correct.
- 36 FS-GA-0006 B4
Identify Bulk Permeability Test area.
G.GE.RWC.008
Agree. F&S will remove any inconsistencies.
- 37 FS-GA-0006 5C
Suggest adding reference to drift to
Ghost Dance Fault (G.I.BG.006).
G.GE.RWC.002
Agree.
- 38 FS-GA-0006 GENERAL
Two outer waste package vertical drifts
are shown horizontal rather than
Agree. Will make corrections.

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		<p>inclined as shown in SDRD Appendix A (see L.I.DW-003-50% Review comment). L.GE.DGW.006</p> <p>39 GENERAL F&S SPECIFICATION Tech. specs. should place requirements only on the constructor. Specs. should avoid placing specific inspection requirements on the contracting officer. The C.O. has the right to inspect all work at his discretion. It is intended that the quality control plans will define all the Title III inspections needed to verify the constructors performance to the tech. requirements. T.GE.IRC.013</p> <p>40 GENERAL F&S There were a number of recommendations generated by the Fire Protection/Life Safety subcommittee that are not incorporated in this set of specifications, particularly the underground fueling of equipment. N.GE.PEP.103</p>	<p>Agree.</p> <p>Will incorporate when direction is recieved.</p>

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41		GENERAL F&S The ANSI standard cited will not apply to pressure testing any fire protection piping. Use NFPA standards. N.GE.PEP.119	Agree. The applicable standard providing the greater degree of protection will apply.
42		GENERAL F&S SPECIFICATION Measurement and payment sections should be deleted. If REECO subcontracts the work, payment clauses would be added in the special conditions. T.GE.IRC.014	Agree. Measurement and payment are normally summarized under division 1.
43		GENERAL F&S Due to lack of time, these specifications were not reviewed. N.GE.PEP.102	No comment.

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Document Originator H&N
 Date 8/8/88
 Document Title ESF 100% Technical Review
 Title I
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TECHNICAL ASSESSMENT REVIEW

Acceptance Signatures
 Chairperson [Signature] Date 9/15/88
 QA [Signature] Date 9/15/88
 A/E [Signature] Date 9/15/88
 WMPO [Signature] Date 9/16/88

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1		<p>GENERAL H&N This comment (J.C. RW.005/C-001) from the 50 Percent Design Review has been acceptably resolved, and incorporated in the 100 Percent Design Review drawings. J.GE.RSW.002</p>	<p>No H&N resolution required.</p>
2		<p>GENERAL H&N The agreed resolution to a comment on the 50 Percent Title I design was that the A/E should provide information to support development of the fire protection design analysis defined in DOE Order 5480.7. Additional support in this area for preparation of the Title I Design Summary will be needed. (The relevant comment was identified as T.G.SP.020 and listed as comment No. GH-002 in the 50 Percent Design Review Report) T.GE.SWP.003</p>	<p>Agree.</p>
3		<p>GENERAL H&N At the 50 Percent Design Review, comment J.C. RW.002, Civil comment No. 149 addressed the relocation of the IDS Building to the Northwest of the Main Pad, as per the conceptual plan. The original comment directed the A/E to</p>	<p>H&N will supply the requested analysis.</p>

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perform the Analysis and assess the impacts of re-locating the IDS Building. The comment was accepted as agreeable and the A/E agreed to submit the necessary ECR to affect the change. Subsequent to this, an ECR was judged not necessary to affect a change; however, the original premise of the comment has been violated, in that another IDS Building location has been chosen that is different than the originally agreed upon conceptual plan. Therefore, my original comment is unresolved from the 50 Percent Review.

In addition, if the new proposed location is the A/E recommended location, then as a DOE reviewer, I would direct the A/E to show that the new proposed location be justified, and that an analysis be performed to show that the IDS can be located as shown without affecting the schedule, and meeting the intended purpose of the IDS, to be ready to collect data at the start of the ES-1 shaft collar.

This comment was not resolved satisfactorily. See comment No. J.C.

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		RW.002/C-149 from the 50% Review for clarification. <p align="right">J.GE.RSW.001</p>	
4		GENERAL H&N All H&N drawings - references to Quality Level Assignments can be satisfied by a note or stamp saying "Quality levels of the items or activities on this drawing shall be found in the ESF Quality Assurance Level Assignment Sheets (QALAS). No drawings have been checked. <p align="right">T.GE.PJK.001</p>	Agree.
5		GENERAL H&N There is no evidence on the drawings that a H&N QA review of these drawings has been completed. Per the H&N QAPP QA must review design output is required. Such a review must be complete prior to these drawings appearing in the Title I design report. <p align="right">F.GE.JAJ.031</p>	Agree.
6		GENERAL H&N Place QA level along with QALA reference on each drawing.	H&N will confer with DOE/Project Office to determine the project methods for identifying the QA Level in Title II.

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		R.GE.MAF.010	
7		GENERAL H&N Identify QA Level and criteria with applicable QALAS. If no QA level is required, so state.	Same as comment GE 6.
		R.GE.MAF.015	
8		GENERAL H&N DRAWINGS It would be more appropriate to make the entire title of each drawing, as listed on JS-025-ESF-T2, boldface. As it is now, there are such nondescript boldface titles as "Plans" and "Sections".	The H&N Drafting Manual dictates that the last line be bold face.
		T.GE.EMC.016	
9		GENERAL H&N Lettering is much improved over 50% submittal, but much of the lettering in the first half of the drawing package is still not legible when printed at half size. Use a larger, and perhaps different style, font. (See 50%, General Comment 4).	Agree.
		T.GE.EMC.001	

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		<p>must be provided as part of this project and the telephone company will provide the equipment. N.GE.DDB.002</p>	
14		<p>JS-025-ESF-T2 .A This drawing does not list the two folded insert drawings in our package, JS-025-ESF-C45C and JS-025-ESF-46A (JS-025-ESF-C46A). N.GE.PEP.022</p>	<p>Agree.</p>
15		<p>JS-025-ESF-T3 There is no need for a separate symbol for on-off sprinklers as all sprinklers in a zone will be the same. The symbol shown will not show if it is only a pendant or a pendant on a drop nipple. N.GE.PEP.078</p>	<p>In some facilities, two separate zones will be provided. Distinction for pendant or pendant on a drop nipple will be provided in Title II.</p>
16		<p>JS-025-ESF-T3 The Preaction Valve Symbol is incorrect. A Preaction Valve is identical to a deluge valve. The only difference is that closed sprinklers are used instead of open sprinklers. N.GE.PEP.079</p>	<p>Agree, will revise callout.</p>

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20		<p>JS-025-ESF-T3 Not all extinguishers will necessarily be in cabinets. N.GE.PEP.083</p>	<p>Agree, the intent is to provide a protected location against dirt, dust, and light physical abuse. H&N will agree to look at extinguisher locations and identify those which require protective cabinets.</p>
21		<p>JS-025-ESF-T3 Other symbols, such as Fire Hydrant, should be added. N.GE.PEP.084</p>	<p>Symbols shown reflect those used on "M" and "FP" drawings. Fire hydrants are shown on the "C" drawings.</p>
22		<p>JS-025-ESF-T3 .A Two symbols should not be shown for horns/speakers. NFPA 172 identifies a speaker as a horn. N.GE.PEP.023</p>	<p>Agree, there will not be two different symbols.</p>
23		<p>JS-025-ESF-T4 .A The symbol for the push button station is the same as used for a manual station on drawing JS-025-ESF-T3.A. N.GE.PEP.024</p>	<p>Agree, will review and change if necessary in Title II. Please note that disciplines are clearly marked for each symbol set.</p>
24		<p>JS-025-ESF-T4 A The symbols for both F&S and H&N need to be consistent; i.e., H&N symbol for the lightning arrestor is not the same as the F&S symbol, the potential transformer symbols are different. The</p>	<p>To the extent that is practical, symbols will be coordinated.</p>

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		mechanical symbols for pressure reducing valve and water arrestor are also different. <p align="right">A.GE.SDF.002</p>	
25	JS-025-ESF-T5 .A	Add symbols for supervised valves (OS&Y and PIV). <p align="right">N.GE.PEP.025</p>	Agree.
26	JS-025-ESF-T5 .A	Since thrust blocks require specific orientations they can be turned 90 degrees from that shown here. If turned, they will look like "bench marks". Change the bench mark symbol. (As an example, see drawing JS-025-ESF-C11.BZone 7/8-B/C). <p align="right">N.GE.PEP.085</p>	The symbols will be marked with TB or BM, for thrust block or bench mark.
27	GENERAL H&N SPECIFICATIONS	Recommend that a submittal summary be included with each technical specification. Typically these summaries would include: o Title o Reference section	A submittal requirements summary will be incorporated into the specifications.

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		<ul style="list-style-type: none"> o Action requirements <ul style="list-style-type: none"> - approval - information - quality control record - etc. o Required timing <p>Note: Please see the F&S form. T.GE.IRC.016</p>	
28	GENERAL H&N	<p>DIVISION 1 SPECIFICATIONS</p> <p>The outline Division 1 specifications presented here are generally redundant to the ongoing management plan process. These Division 1 type requirements will be developed and approved by the WMPO and implemented by a series of administrative procedures. ESF participating organizations will, in turn, develop internal procedures. For construction, REECO may choose to pass down certain requirements to</p>	<p>Will verify the Division 1 implementation requirements in Title II.</p>

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		subcontractors, however, these requirements would normally be defined in the special conditions, not in the technical specifications. Recommend that these concepts be clarified before work continued on Division 1 specifications. <p align="right">T.GE.IRC.018</p>	
29		SECTION 01005 2.02A Delete. GFE will be installed by the contractor (REECO) or its subcontractors. <p align="right">R.GE.LGC.027</p>	Disagree, this refers to items noted "Not in contract."
30		SECTION 01005 .A No comment. <p align="right">T.GE.PJK.056</p>	Agree
31		SECTION 01050 .A Add C - "The Quality Assurance Level of the engineering activity will depend upon the QA Level of the item/activity being surveyed, evaluated or reviewed as established in the applicable ESF-QALAS". <p align="right">T.GE.PJK.057</p>	Agree.

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42		<p>GENERAL H&N SPECIFICATION Provide a specification for the two above ground water tanks, if one specification can cover both a 10,000 gallon tank and a 150,000 gallon tank. If one specification cannot cover both tanks then provide a specification per tank. C.GE.DLP.106</p>	Agree.
43		<p>GENERAL H&N SPECIFICATION Provide a specification for an underground POL tank. Indicate in the specification for an underground POL tank. Indicate in the specification that the tank will be double wall with continuous leak detection/monitoring. Also add that any metallic tank or piping will have cathodic protection. C.GE.DLP.107</p>	A specification will be developed for a buried tank.
44		<p>GENERAL H&N SECTION DIV. 16 ELECTRICAL: Insufficient detail on which to comment. R.GE.LGC.038</p>	Agree.
45		<p>GENERAL H&N ELECTRICAL As these are only outlines, there is little to comment on.</p>	Agree

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		N.GE.PEP.109	

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Date 8/8/88

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Title I

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TECHNICAL ASSESSMENT REVIEW

Acceptance Signatures

Chairperson L. Beall

Date 9/15/88

QA [Signature]

Date 9/15/88

A/E [Signature]

Date 9/15/88

WMPO [Signature]

Date 9/16/88

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1		JS-025-ESF-C1 A - C10 Change the outline coverage of sheet C26 to stop short of the four-way intersection. C.CI.DLP.001	Agree.
2		JS-025-ESF-C1 A, 6B Security gate location is not consistent with location shown on JS-025-ESF-C16. T.CI.SCS.005	Agree.
3		JS-025-ESF-C2 "Vicinity and Location Maps" would be a better title for this drawing. It would be better to locate this drawing as the first or second one in the set as is the identical drawing for F&S. T.CI.EMC.007	A. Drawing is "Vicinity and Location Maps". B. Title II.
4		JS-025-ESF-C2 B Include the location and phone number of the nearest emergency medical facility. This information should be provided to allow a rapid response to a construction accident. C.CI.DLP.002	The drawings are not the place for this.

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5		<p>JS-025-ESF-C3 B A companion map should be included in the drawing package that shows all surface testing (i.e., as built and proposed drill holes, trenches, etc.). R.CI.DLK.004</p>	<p>Will include in the Title II Design Analysis to be completed by 30% Title II.</p>
6		<p>JS-025-ESF-C3 B GRID E-9 The SDRD specifies auxiliary pads are required. Yet in the overall site drawings, no mention is made of the auxiliary pads. It is not clear where the organizational trailers will have utilities provided. A.CI.SDF.004</p>	<p>Auxiliary pads are called out by their names and are provided with utility stub outs.</p>
7		<p>JS-025-ESF-C3 The muck storage pile is located close enough to the main pad to represent a significant source of hazardous dust for both surface work areas and the fresh air supply for the ESF. Stringent dust control procedures for the muck storage areas should be specified as part of the ESF plan. This could take the form of an enclosure for the muck storage pile or the routine stabilization of the pile by chemical means.</p>	<p>Routine stabilization of the muck storage pile will be an operational concern. H&N will provide a specification during Title II for dust palative that will include the muck storage pile.</p>

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		B.CI.BC.010	
8		<p>JS-025-ESF-C3 B The borrow area indicated on map has not been sampled and tested for suitability for use as compacted fill material. If the borrow area is found unsuitable for use as compacted fill, it will impact the proposed site configuration (i.e., use of the borrow area as a flood diversion channel).</p> <p align="right">R.CI.DLK.003</p>	Agree.
9		<p>JS-025-ESF-C3 B6 H&N The numbering of ES-1 and ES-2 are interchanged. Recommend changing the numbering to ES-1, ES-2, as per H&N Drawing JS-025-ESF-C4.B.</p> <p align="right">J.CI.RSW.004</p>	Agree.
10		<p>JS-025-ESF-C3 E10 Reverse the naming of ES-1 and ES-2.</p> <p align="right">T.CI.EMC.008</p>	Agree.
11		<p>JS-025-ESF-C3 F10 The "Exploratory Storage Road" should be the "Explosives Storage Road".</p> <p align="right">T.CI.EMC.009</p>	Agree.

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12	JS-025-ESF-C3 B G-3	QALAS 6.2.1-0001 also applies. T.CI.PJK.004	Agree.
13	JS-025-ESF-C4 B	Comment R.C.DK.005 from the 50 Percent Title I Design Review has not been fully addressed (shop facility space adjacent to the shop building). The comment is repeated below: The shop building location relative to the main pad general facility arrangements will not meet REECo operational and functional space requirements as required by Performance Criteria 1 of Section 1.2.6.3 of the SDRD. The shop facility will require space adjacent to the shop building: 1. An outside access area and equipment parking area extending 30 ft. out from a multi-use area concrete apron, fenced. 2. An outside multi-use area concrete apron extending 20 ft. out from the	An ECR to change the shop requirements in the SDRD has been submitted by REECo. Upon resolution of this ECR by the ICWG, our Title II design package will be changed to reflect the resolution. The referenced ECR was withdrawn by REECo at the ICWG. The ECR will be resubmitted.

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		<p>shop building, located directly in front of the Mechanical, lube and mechanical/electrical bays inside the shop.</p> <p>3. An outside steam cleaning concrete pad extending out 20 ft. to the side of the multi-use area.</p> <p>4. An outside storage area extending out 20 ft. adjacent to the side of the shop building.</p> <p>5. A side access route to the outside access area extending 20 ft. adjacent to the outside storage area and steam clean pad area, fenced and with a gate.</p> <p>The shop facility sector, including the building and all adjacent areas, will require 0.3 acres as a minimum. Make the required changes as described above.</p> <p>This comment impacts on JS-025-ESF-C30, JS-025-ESF-C33, and JS-025-ESF-E5. R.CI.DLK.018</p>	

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14		<p>JS-025-ESF-C4 B No provision for LLNL Machine Shop Trailer (See L.C.DW.008-50% Review). L.CI.DGW.003</p>	<p>No requirements identified in the SDRD. If required, an ECR needs to be issued to revise the SDRD.</p>
15		<p>JS-025-ESF-C4 The schedule for development of the site with respect to the start of ES-1 is not presented. There will be a requirement that the beneficial occupancy of the IDS surface building will be required about 3 months before data collection (the first data is during collar construction) can be accomplished. A.CI.TJM.007</p>	<p>Agree, no H&N action to Title I design. (see H&N general comment #3 or J.GE.RSW.001.)</p>
16		<p>JS-025-ESF-C4 .B This drawing should be made a part of the ESF baseline per AP5.6Q as a System Interface Drawing (SID) because it describes interfaces between F&S and H&N with respect to the hoisting operation. See FS-GA-0011 Revision B. Also note that Item No. 11 is identified as the warehouse on the F&S drawing. And is "unassigned" on the H&N drawing. F.CI.JAJ.027</p>	<p>A. As an agent of the ICWG, H&N is responsible for developing SIDs. This is accomplished per H&N's Procedure #029. H&N/NNWSI Procedure #029 requires the use of design interface identification sheets as a basis for SID development and the interfaces shown on the referenced drawing. Until approval of SIDs, scheduled for 30% of Title II, the identification sheets are the means for controlling interfaces. B. The building designation will be reconciled in Title I final submittal.</p>

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		located behind the main pad. C.CI.DLP.009	
26		JS-025-ESF-C11 .B Pipe sizes are difficult to read but it appears that water mains are shown as 6". DOE Order 6430.1A will require 8" water mains where serving hydrants or sprinkler systems. N.CI.PEP.026	Agree.
27		JS-025-ESF-C11 B Locate the center point of the new 10,000 gallon water tank with a set of coordinates. C.CI.DLP.010	Title II.
28		JS-025-ESF-C11 B Change the symbols for the thrust block to reflect that they are new thrust blocks and not existing ones. C.CI.DLP.011	Agree.
29		JS-025-ESF-C11 B Use a symbol for new asphaltic concrete to indicate the limits of the AC work. C.CI.DLP.013	No pavement has been specified. A general note will be added on Drawing C-3 specifying initial surface treatment. Details will be provided in Title II.

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30	JS-025-ESF-C11 B. ZONE G7	On the north side of the Booster Pump Station there is a squared off area; please indicate what this area is. If it is a PCC slab, use the symbol from the civil legend.	The north "squared off" area will be deleted and the east "squared off" area will be identified as a stoop.
		C.CI.DLP.012	
31	JS-025-ESF-C14 B	DOE/NTSO probably will not authorize REECo to remove and relocate existing trailers and equipment at the Area 25 subdock. The subdock site is currently undergoing expansion by REECo to support NNWSI Project drilling activities.	Location of the batch plant, aggregate stock pile and septic and mine waste water disposal systems in relationship to the existing REECo subdock will be reevaluated and relocated by 30% of Title II.
		R.CI.DLK.001	
32	JS-025-ESF-C14 B	The area identified for occupancy by the batch plant and aggregate stockpile should be located specifically on the drawing. The current expansion of the subdock site may have occupied some of the designated space.	Location of the batch plant, aggregate stock pile and septic, and mine wastewater disposal systems in relationship to the existing REECo subdock, will be reevaluated and relocated by 30% of Title II.
		R.CI.DLK.002	
33	JS-025-ESF-C14 B	Comment R.C.DK.037 from the 50 Percent Title I Design Review has not been	Location of the batch plant, aggregate stock pile and septic, and mine wastewater disposal systems in relationship to the

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
		<p>fully addressed as agreed (stub water line to the batch plant area). Refer to Comment 2 100 Percent Title I for possible space conflicts.</p> <p>The comment is repeated below:</p> <p>A stub water line from the full stand water line is required to service the batch plant. Add details as necessary. R.CI.DLK.019</p>	<p>existing REECO subdock, will be reevaluated and relocated by 30% of Title II.</p>
34		<p>JS-025-ESF-C16 B At the Booster Pump House, change the 8 foot dimension to 12 foot from the edge of the AC. This change will put this sheet in agreement with sheet JS-025-ESF-C11.B. C.CI.DLP.014</p>	<p>Agree.</p>
35		<p>JS-025-ESF-C16 B, 8C No guard shack is sited at the security gate. Explain this omission or provide guard shack. T.CI.SCS.006</p>	<p>The requirement of guard shack has not been identified.</p>
36		<p>JS-025-ESF-C17 B, A-9 Indicate type and use of tanks shown in drawings.</p>	<p>Location of the batch plant, aggregate stock pile and septic, and mine wastewater disposal systems in relationship to the</p>

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		T.CI.THP.020	existing REECo subdock, will be reevaluated and relocated by 30% of Title II.
37		JS-025-ESF-C17 B, C-7 The 55 mph speed limit on the unpaved H Road would not minimize airborne particulates as required in SDRD 1.2.6.0 Constraint #11. align="right"> T.CI.THP.032	The speed limit will depend on the road surface.
38		JS-025-ESF-C18 B Indicate the size of the two culverts that cross the access road near Zone C8. align="right"> C.CI.DLP.015	Agree.
39		JS-025-ESF-C18 B Provide a note to indicate that all curve and survey data for the access road can be found on Sheet C40.B. align="right"> C.CI.DLP.016	Agree.
40		JS-025-ESF-C18 B At upstream end of the two culverts that cross "H" road provide a PCC apron in front of the headwall. This will help to transition the flow into the culverts and reduce erosion on the upstream end.	Will provide CMP end sections and rip-rap in Title II.

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		C.CI.DLP.017	
41		JS-025-ESF-C18 B Provide curve and survey data for the new channel work north of H road. C.CI.DLP.018	Will provide in Title II.
42		JS-025-ESF-C18 B At the downstream end of the four culverts, use a "L" shaped end wall to end them altogether. Also provide rip-rap protection to prevent erosion. C.CI.DLP.019	We will use CMP end sections and rip-rap in Title II.
43		JS-025-ESF-C18 B At sta. 388+00 at a note that states that the existing pavement will be sawcut full depth. C.CI.DLP.020	We will address in specifications in Title II.
44		JS-025-ESF-C18 B Re-examine the need for the vertical curve from stas. 387+00 to 389+00. There seems to be no work to be done between stas. 387+00 and 388+00, therefore no need for the vertical curve. C.CI.DLP.021	Agree.

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45		<p>JS-025-ESF-C19 B 3-36" diameter culverts handle the combined north and south Coyote Wash water. On drawing JS-025-ESF-C20.B, 3-36" diameter culverts are required to handle the north Coyote Wash water only. Explain this inconsistency. R.CI.DLK.006</p>	<p>The two locations are designed for different magnitude of floodwaters.</p>
46		<p>JS-025-ESF-C19 B On the profile indicate the access road at sta. 401+70. C.CI.DLP.022</p>	<p>Will provide in Title II.</p>
47		<p>JS-025-ESF-C19 B On the profile at sta. 405+87.31 indicate that this is a BVC point. C.CI.DLP.023</p>	<p>Will provide in Title II.</p>
48		<p>JS-025-ESF-C19 B On the profile at sta. 417+62.06 label this as a BVC point and list the finish grade elevation. C.CI.DLP.030</p>	<p>Will provide in Title II.</p>
49		<p>JS-025-ESF-C19 B Please show the culverts that cross the north access road near H road sta. 408+00.</p>	<p>Agree.</p>

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		C.CI.DLP.024	
50		JS-025-ESF-C19 B The elevation line between H road stations 404+00 to 406+00 do not agree with what is shown on sheet C37.B; please resolve.	Agree.
		C.CI.DLP.025	
51		JS-025-ESF-C19 B Indicate the bearing of the centerline of the new ditch.	Will provide in Title II.
		C.CI.DLP.026	
52		JS-025-ESF-C19 B Near H road sta. 406+00, indicate the radii of the pavement edge.	No pavement has been specified. A general note will be added on Drawing C-3, specifying initial surface treatment. Details will be provided in Title II.
		C.CI.DLP.027	
53		JS-025-ESF-C19 B Provide concrete aprons on the headwall and end wall of the four culverts that cross H road.	We will provide CMP end sections and rip-rap in Title II.
		C.CI.DLP.029	
54		JS-025-ESF-C19 B At H road station indicate that the curve and survey data for the pad entrance road can be found on sheet	Agree.

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		<p>the culverts that cross the G4 Road. Ensure that the work indicated on the two sheets agree, or remove the indicated work from one sheet and reference the other. C.CI.DLP.040</p>	
60		<p>JS-025-ESF-C24 B Upstream of the culverts that cross G4 Road indicate the bearing of the centerline of the channel improvement. C.CI.DLP.039</p>	<p>Will provide in Title II.</p>
61		<p>JS-025-ESF-C24 B At the downstream end of the culverts that cross G4 Road provide a note informing people that sheet C20.B shows some channel improvement in this area. C.CI.DLP.038</p>	<p>The note exists on C24 but the match line will be extended to include the channel work.</p>
62		<p>JS-025-ESF-C24 B Provide PCC aprons on the headwall and endwall of the three culverts that cross G4 road. Also provide a rip-rap design for the protection of the endwall area. C.CI.DLP.037</p>	<p>The culverts will be provided with CMP end sections and riprap in Title II.</p>

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63		JS-025-ESF-C24 B On the profile at sta. 0+00 a BVC point is indicated. Please show the VPI and EVC associated with the BVC. C.CI.DLP.036	Will provide in Title II.
64		JS-025-ESF-C24 B On the profile indicate the EVC and BVC points of the 200' vertical curve which has a v.p.i. at sta. 1+15. C.CI.DLP.035	Will provide in Title II.
65		JS-025-ESF-C24 B On the profile at sta. 4+34.15 indicate that this is a BVC point, and show the finish grade elevation. C.CI.DLP.034	Will provide in Title II.
66		JS-025-ESF-C24 B Provide matchline note for drawing C20. T.CI.SCS.007	Agree.
67		JS-025-ESF-C24 .B QALAS 6.2.1-0001 applies. T.CI.PJK.006	Agree.
68		JS-025-ESF-C26 B On the profile label all BVC and EVC points and their associated finish	Will provide in Title II.

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		C.CI.DLP.045	
73		<p>JS-025-ESF-C27 B Show the three culverts that cross the road to the explosive storage area at sta. 14+60 with single headwalls and endwalls. Also show or reference the channel work upstream or downstream of these culverts.</p>	<p>A) Agree. B) The culverts will be provided with CMP end sections and riprap. C) Channel work will be shown.</p>
		C.CI.DLP.047	
74		<p>JS-025-ESF-C27 B Indicate the radii of pavement edges where roads intersect.</p>	<p>No pavement has been specified. A general note will be added on Drawing C-3, specifying initial surface treatment. Details will be provided in Title II.</p>
		C.CI.DLP.046	
75		<p>JS-025-ESF-C28 B The rip-rap design is incomplete. Please provide the following information:</p> <ol style="list-style-type: none"> 1. A rock gradation, not just upper and lower rock sizes. 2. Layer thickness of the rip-rap (approximately 1.5 x largest rock size). 3. Minimum specific weight of the 	<p>Will provide in Title II specifications.</p>

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		<p>rock.</p> <p>4. Exact dimensions of the rip-rap placement.</p> <p>5. Indicate if a bedding layer is needed.</p> <p align="right">C.CI.DLP.049</p>	
76		<p>JS-025-ESF-C28 B On the profile label all BVC and EVC points, and indicate their associated finish grades.</p> <p align="right">C.CI.DLP.048</p>	Will provide in Title II.
77		<p>JS-025-ESF-C31 .B The second "Reference Drawing" is not readable.</p> <p align="right">N.CI.PEP.027</p>	Agree.
78		<p>JS-025-ESF-C31 .B The separation between application of QALAS should be shown because 1.2.6-0001 is Level I and 6.2.2-0001 is Level III.</p> <p align="right">T.CI.PJK.007</p>	Disagree, this is the reason for referencing the QALAS. The QALAS are the best and official place to define the quality level.

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79		JS-025-ESF-C36 B, 2E Schematics indicate compressed airline is 12 inches and not 8 inches as noted here. <p align="right">T.CI.SCS.008</p>	Agree.
80		JS-025-ESF-C36 B Provide Title I preliminary engineering drawings for the generator building identified on drawing JS-025-ESF-C36.B. Provide drawing details similar to what was provided for the change house, warehouse, hoist house, etc. <p align="right">R.CI.DLK.023</p>	Will provide by 30% of Title II.
81		JS-025-ESF-C36 B The ditch area on the west side of the north access road does not agree with what is shown on sheet C26.B. Please coordinate these two sheets. <p align="right">C.CI.DLP.050</p>	Agree.
82		JS-025-ESF-C37 B Indicate that the "buried fuel tank" is new. <p align="right">C.CI.DLP.052</p>	Agree.

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83		<p>JS-025-ESF-C37 B Please indicate that the buried fuel tank will be of a double wall construction with continuous leak detection. Also add that if a ferrous tank is used, cathodic protection will be provided.</p> <p align="right">C.CI.DLP.105</p>	<p>Will provide in Title II specifications.</p>
84		<p>JS-025-ESF-C37 B There is a buried fuel tank indicated to serve the substation, but no specifications are given for the tank. Notification to the state of Nevada is required for this tank, and that requirement must be included in the submittals for the tank specifications.</p> <p align="right">R.CI.GLH.003</p>	<p>A portion of specifications will be provided by 30% of Title II.</p>
85		<p>JS-025-ESF-C37 B, 11C 12 inch air line, not 8 inches.</p> <p align="right">T.CI.SCS.009</p>	<p>Agree.</p>
86		<p>JS-025-ESF-C37 B-ZONE A/B-8/9 Move the pedestrian stairway about 50 to 60 feet to the south. In addition, include a 3 foot wide asphalt walkway along the south side of the main pad</p>	<p>The precise location will be provided by 30% of Title II.</p>

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		<p>from the top of the pedestrian stairway to the vicinity of the changehouse. This will eliminate foot traffic through the REECO shop and shaft sinking subcontractors work areas. R.CI.RRR.001</p>	
87		<p>JS-025-ESF-C37 B Furnish pedestrian stairways to other parking levels as shown at drawing location 9C. Suggest stairways at general locations 8D, 7C, 6C, and 6E. T.CI.SCS.010</p>	Agree.
88		<p>JS-025-ESF-C37 B Provide a pedestrian stairway between the two largest lower parking areas. C.CI.DLP.055</p>	Agree.
89		<p>JS-025-ESF-C37 B Provide pedestrian access from the lower parking areas south of H road to the main pad. C.CI.DLP.056</p>	Agree.
90		<p>JS-025-ESF-C37 B The elevation lines shown on this sheet for H road east of the lower parking areas do not agree with what is shown on</p>	Agree.

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		sheet C19.B. Please rectify the differences between these two sheets. C.CI.DLP.059	
91		JS-025-ESF-C37 B Label the five lower parking pads A-E or 1-5 for easier identification. C.CI.DLP.051	Disagree.
92		JS-025-ESF-C37 B The H road match line to sheet C20.B does not show up on sheet C20.b. Please rectify. C.CI.DLP.057	Agree.
93		JS-025-ESF-C37 B Where the three culverts cross the north access road show a single headwall and endwall with a ACC apron. C.CI.DLP.060	The culverts will be provided with CMP end sections and rip-rap.
94		JS-025-ESF-C37 B Indicate the radii of all pavement edges at road intersection areas. C.CI.DLP.053	No pavement has been specified. A general note will be added on Drawing C-3, specifying initial surface treatment. Details will be provided in Title II.
95		JS-025-ESF-C37 B In Zone F9 provide a complete rip-rap design as per previous comment.	Will provide in Title II.

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		C.CI.DLP.054	
96		JS-025-ESF-C37 B Indicate the sizes of the MWW and SS lines that leave the main pad. Also show these lines with the correct symbol for new utility lines.	Agree.
		C.CI.DLP.058	
97		JS-025-ESF-C38 .B Liner should be of sufficient size to collect all fluids in muck storage pile area. Show muck storage liner boundaries.	Agree, more details will be provided by 30% of Title II.
		T.CI.THP.021	
98		JS-025-ESF-C38 B The borrow pit muck storage pad designation is unclear. Prior use of the muck storage pad area as a borrow pit is not indicated on JS-025-ESF-C3.B. If so, area has not been sampled and tested to determine if borrow material is adequate for compacted fill.	Agree, more details will be provided by 30% of Title II pending access to the borrow pit area.
		R.CI.DLK.007	
99		JS-025-ESF-C38 B Provide centerline stationing, bearings, and curve data for both the "muck	Will provide in Title II.

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		storage access road" and channel work. Please note that this is the only sheet that shows the "muck storage access road." <p align="right">C.CI.DLP.061</p>	
100		JS-025-ESF-C38 B Use a symbol for new asphaltic concrete pavement to show the limits of the new paving. <p align="right">C.CI.DLP.062</p>	No pavement has been specified. A general note will be added on Drawing C-3, specifying initial surface treatment. Details will be provided in Title II.
101		JS-025-ESF-C39 13 Show the connection of the 8 inch drain pipe from the detention pond to the MWW pipe from the main pad on a larger scale sheet. <p align="right">C.CI.DLP.064</p>	Will provide in Title II.
102		JS-025-ESF-C39 B Indicate the degree of bend in the 8 inch drain pipe from the detention pond where it makes a non 90 degree bend. <p align="right">C.CI.DLP.063</p>	Will provide in Title II.
103		JS-025-ESF-C39 B, 11C The detention pond drain pipe is cut short. <p align="right">T.CI.SCS.011</p>	Agree.

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		C.CI.DLP.068	
109		JS-025-ESF-C39 B C.6 Show slopes for topsoil storage area. T.CI.THP.022	Will provide by 60% of Title II.
110		JS-025-ESF-C39 B, D 8-10 Resolve differences in size of the inflow and outflow pipes. T.CI.THP.028	Agree.
111		JS-025-ESF-C39 D, 8-10 The collection pond below the muck storage pile should be a retention pond, not a detention pond. The pond should be sized to be able to contain all the runoff from the muck pile, in the event of a 100- year flood (as well as containing any leachage from the muck pile). T.CI.THP.027	A) Disagree because the pond will discharge, outflow will be valved and controlled based on effluent quality. B) Agree.
112		JS-025-ESF-C40 B ZONE B-8 Move the warehouse building to the northeast far enough to allow access of a forklift through a large door on the southwest side of the warehouse. Refer to comment No. R.AR.RRR.005. R.CI.RRR.017	Will provide by 30% of Title II.

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113		JS-025-ESF-C40 B Provide a centerline bearing for the new drainage channel. C.CI.DLP.070	Will provide in Title II.
114		JS-025-ESF-C40 B Where the four culverts join on the north side of H road reference sheet C18.B for the downstream channel work. C.CI.DLP.071	It is referenced.
115		JS-025-ESF-C40 B, 7E, 6F, AND 4G Shift ramps between benches southward along bank away from drainage channel to; 1) avoid erosion of ramps in the event of a flash flood, and 2) run ramp along face of bank to reduce use of bench area by ramp. Add pedestrian stairways between benches. T.CI.SCS.012	Will consider in Title II.
116		JS-025-ESF-C40 B ZONE D-2&3 Redesign the access road from the "H" road to the southeast equipment storage pad by eliminating the "S" curve and making the access road straight. R.CI.RRR.018	Will provide preliminary by 30% of Title II.

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117	JS-025-ESF-C41	<p>An unincorporated comment from ESF Title I 50 Percent Review:</p> <p>The water from site runoff and mine waste water looks like it will affect the sewage leachate system.</p> <p>Show why the mine wastewater will not affect the sewage leachate system. T.CI.THP.003</p>	Facilities are currently being relocated.
118	JS-025-ESF-C41	<p>An unincorporated comment from ESF Title I 50 Percent.</p> <p>"State the design capacity of the system in gallons/day/person. (SDRD Page 2.3-1, performance criteria #2)" T.CI.THP.004</p>	This was provided in the calculations (#C-0018, PP-6) as agreed to at 50% Title I.
119	JS-025-ESF-C41 .B	<p>An unincorporated comment from Title I 50%:</p> <p>If the mine wastewater system is designed to discharge water, then a NPDES permit may be required. This permit may have very stringent</p>	<p>This was provided in the calculations (#C-0019, PP-6 & 7) as agreed to at 50% Title I. At this time, we can only make assumptions as to the quality of the mine wastewater. These assumptions are that only suspended solids and oil will affect water quality of the effluent.</p>

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		<p>requirements. The design for water treatment may require "Best Available Technology" treatment before being released. (SDRD pp. 0-4, constraints 1.a.). Provide data on quantity and quality of water for mine wastewater system as stated in Title I Design Basis Document.</p> <p align="right">T.CI.THP.005</p>	
120	JS-025-ESF-C41 .B CIVIL	<p>An unincorporated comment from ESF Title I 50 Percent. "According to SDRD, page 2.5-1, performance criteria #2, the wastewater is supposed to be collected and pumped for offsite disposal where as, this drawing shows the water being discharged." Resolve conflict between SDRD and proposed wastewater design.</p> <p align="right">T.CI.THP.002</p>	<p>At 50% Title I we proposed to submit an ECR to resolve the apparent conflict in SDRD 1.2.6.2.5, performance criteria #2 and constraint #1. To date this has not been accomplished but will be in the immediate future. The "discharge" is an "environmentally acceptable manner" as outlined in constraint #1.</p>
121	JS-025-ESF-C41 B	<p>There are problems with the waste lines as shown on this sheet and sheets C43.B and C44.B. These problems include the line locations, sizes, and if the line is gravity or a force main. Subsequent comments will address specific problems, however, the entire waste line system</p>	<p>A. Line locations are approximate for Title I. I. Locations will be finalized by 30% Title II. B. Sizes will be corrected. C. Forced and gravity main design is described on Page 7, Calculation #C-0019.</p>

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		should be coordinated. <p align="right">C.CI.DLP.072</p>	
122		JS-025-ESF-C41 Provide a distribution box at the head of the leach field pipes to prevent one pipeline from becoming overloaded. <p align="right">C.CI.DLP.087</p>	Will provide in Title II.
123		JS-025-ESF-C41 B Provide invert elevations of the leach field pipes and the 8 inch header pipe. <p align="right">C.CI.DLP.086</p>	Will provide in Title II.
124		JS-025-ESF-C41 B A 8 inch -SS- is shown on this sheet while a 3 inch -SS- force line is shown on C43.B and C44.B. <p align="right">C.CI.DLP.073</p>	The forced line becomes a gravity flow system as described in the calculations. Details will be provided in Title II.
125		JS-025-ESF-C41 B Where the -SS- makes a 90 degree bend, provide a manhole. <p align="right">C.CI.DLP.074</p>	Will be provided in Title II.
126		JS-025-ESF-C41 B If the -SS- is a force line provide a check valve just before the septic	The line is gravity flow at this point.

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		tank. <p align="right">C.CI.DLP.075</p>	
127		JS-025-ESF-C41 B Change the label on the 6" waste water line to MWW so that it is consistent with Sheet C44.B. Also indicate if it is a force main or gravity line. <p align="right">C.CI.DLP.077</p>	Agree.
128		JS-025-ESF-C41 B Show where the waste oil is to be stored until it can properly be removed from the site. <p align="right">C.CI.DLP.078</p>	The oil will be removed properly when the oil water separator is full.
129		JS-025-ESF-C41 B Show the pipeline size of the pipe that leaves the oil/water separator. Also show the inverts of that pipeline. <p align="right">C.CI.DLP.079</p>	Will be provided in Title II.
130		JS-025-ESF-C41 B Provide the inverts of the pipelines at the inlet and outlet of the septic tank. <p align="right">C.CI.DLP.080</p>	Will be provided in Title II.

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131		JS-025-ESF-C41 B Locate the corners of the fence around the lagoon via a set of coordinates. This will help ensure the proper alignment and orientation of the lagoon system. C.CI.DLP.081	Will be provided in Title II.
132		JS-025-ESF-C41 B Show the lagoon top of berm elevations and the bottom elevation. C.CI.DLP.082	Will be provided in Title II.
133		JS-025-ESF-C41 B Show the invert elevations of the lagoon's 8 inch outlet pipe. C.CI.DLP.083	Will be provided in Title II.
134		JS-025-ESF-C41 B Consider moving the concrete splash block back toward the lagoon near the 3890' elevation to reduce the erosion effect of the ditch flow on the splash block foudation. C.CI.DLP.084	Will consider in Title II.
135		JS-025-ESF-C41 B Provide a complete rip-rap design at the splash block area. This design should	Will provide in Title II.

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		contain the required information in prior comment. <p align="right">C.CI.DLP.085</p>	
136		JS-025-ESF-C41 B Show the radii of all rounded pavement areas. <p align="right">C.CI.DLP.076</p>	No pavement has been specified. A general note will be added on Drawing C-3, specifying initial surface treatment. Details will be provided in Title II.
137		JS-025-ESF-C42 B At the water tank pad show the location of the 12 inch water line that serves the tank. <p align="right">C.CI.DLP.088</p>	Will provide in Title II.
138		JS-025-ESF-C42 B At the water tank pad show a complete rip-rap design. <p align="right">C.CI.DLP.089</p>	Will provide in Title II.
139		JS-025-ESF-C42 B The G-4 pad has no identified use except for access to and preservation of the G-4 drill hole collar. Dirtwork and flood control work should be justified by a determination of G-4 pad for operational use. <p align="right">R.CI.DLK.005</p>	The justification has been provided in the SDRD.

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140		JS-025-ESF-C42 B At the G4 pad show where the 12 inch water line crosses the pad as indicated by sheet C43.B. <p align="right">C.CI.DLP.090</p>	Will provide in Title II.
141		JS-025-ESF-C42 B At the G4 pad provide a complete rip-rap design. Be very careful in how the toe area of the rip-rap is designed to avoid erosion of the toe area. <p align="right">C.CI.DLP.091</p>	Will provide in Title II.
142		JS-025-ESF-C43 AND C44 Suggest placing water supply, waste water, and sewage systems on separate utility plan drawings for clarity (similar to 50 percent drawings). Also, add water supply line to muck storage area. Increase scale of utility plan drawings for clarity. <p align="right">T.CI.RLT.003</p>	Will provide in Title II.
143		JS-025-ESF-C43 B Sheet C44.B does not agree with this sheet as to the location of the 3"-SS- in respect to the 6"WW. Please resolve. <p align="right">C.CI.DLP.092</p>	Agree.

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144		JS-025-ESF-C43 B Sheet C41.B does not agree with this sheet as to the size of the sanitary sewer line. Please resolve. C.CI.DLP.093	Agree.
145		JS-025-ESF-C43 B Change the 8" WW label to 8" MWW to be consistent with other drawings. C.CI.DLP.094	Agree.
146		JS-025-ESF-C43 B The intersection of the 8" drain line from the detention pond to the 8" MWW from the main pad should be shown on a larger scale map to more effectively locate the connection point. C.CI.DLP.095	Will provide in Title II.
147		JS-025-ESF-C43 B The angle at which the MWW and -SS- leaves manhole number 3 is different between sheets C43.B and C44.B. Please resolve. C.CI.DLP.096	Agree.
148		JS-025-ESF-C43 E9 There is no water line going to the communications shelter for fire	H&N will reinvestigate the necessity for a water line to that building.

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153		JS-025-ESF-C44 .B Indicate the interface between potable and non-potable water systems and show means of preventing backflow or back siphonage of non-potable water to comply with 30 CFR 57.20002. T.CI.SWP.004	Will provide in Title II.
154		JS-025-ESF-C44 .B The waterline appears to be 12" but DOE Order 6430.1A will require a looped system rather than the dead end system shown here. N.CI.PEP.028	Per DOE Order 6430.1A the looped system is required if feasible. It is not feasible in this situation.
155		JS-025-ESF-C44 .B On the south side there are 6 buildings in a row. Building #1, on the left, appears to have no sprinkler system. Sprinklers should be required. Buildings 2,3,4, and 5 appear to have two sprinkler systems where one system would be adequate. N.CI.PEP.086	Building #1 is the Surface Data Building and is sprinkled. The trailers have separate systems to enable them to be relocated if needed during various stages of the project.
156		JS-025-ESF-C44 B Show black box for tracer injection system for water system. T.CI.THP.023	Agree. Will be shown by 30% Title II.

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157		JS-025-ESF-C44 B In Zone C3 provide thrust blocks at the pipeline bends. Also indicate the degree of pipeline bend. C.CI.DLP.097	Will provide in Title II.
158		JS-025-ESF-C44 B Make the nomenclature of the dual grinder pump and lift station agree with sheets C43.B and C44.B. C.CI.DLP.098	Agree.
159		JS-025-ESF-C44 B Indicate the bearings of the MWW and -SS- lines where they leave manhole number 3. C.CI.DLP.099	Will provide in Title II.
160		JS-025-ESF-C44 B Change the -WW- to -MWW- to be consistent. C.CI.DLP.100	Agree.
161		JS-025-ESF-C44 B Show the size of the water lines that directly feed the fire hydrants. C.CI.DLP.101	Agree.

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167	JS-025-ESF-C44	General Notes: Add: QALA No. 1.2.6-0001 R.CI.MAF.008	Agree.
168	JS-025-ESF-C45 B	Omit this drawing in favor of most current version of JS-025-ESF-46A. T.CI.SCS.013	C45B will be replaced with C45C and C46A.
169	JS-025-ESF-C45 C, D8, D9	Change ESF #1 and ESF #2 to read ES-1 and ES-2. G.CI.RWC.007	Agree.
170	JS-025-ESF-C46 H&N	An unincorporated comment from ESF Title I, 50 Percent Design Review was: Show overlay of 100-year floodplain for all facilities (including mine wastewater, sewage system). The design of any facility built in the 100-year floodplain must incorporate designs criteria to minimize harm to floodplains (DOE General Design Criteria, 6430.1A 0285.3.2.5) (Executive Order 11988, Floodplain Management). Show design	The facilities are being relocated and designed per DOE 6430.1A. This will be evident in the Title II design analysis.

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		criteria used to protect facilities in 100-year floodplain. T.CI.THP.001	
171	JS-025-ESF-C46	This is one of two folded drawings added to our package. I believe this should be shown as a Civil drawing, JS-025-ESF-C46A. N.CI.PEP.021	Agree.
172	SECTION 02110 .A AND 02211.A	Although the specification is consistent with Constraint 11 of SDRD 1.2.6.1, the specification should be more specific as to what is required. The original requirement was to stockpile the top 6 inches of the material from all cleared areas to preserve natural seeds for future reclamation. A.CI.TJM.006	Agree. H&N will expand on this on next submittal of Title II.
173	SECTION 02110 PAGE 3, 3.05A	Show location and design criteria (slopes, size, etc.) of waste material disposal area. T.CI.THP.007	These are or will be shown on drawings, not specifications.

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		T.CI.PJK.064	
178		SECTION 02202 1.04.A "Submit shop drawings." Shop drawings are not normally submitted for rock removal. "Submit blast patterns" might be more appropriate as discussed in paragraph 1.04.B.	Agree. H&N will delete the phrase, "submit shop drawings."
		T.CI.MCB.003	
179		SECTION 02202 1.06 P.2 Add section "Comply with Department of Transportation requirements for transporting hazardous materials."	Agree.
		T.CI.THP.038	
180		SECTION 02211 .A 1.05 Paragraph 1.05 - Quality Assurance Level shall be in accordance with ESF-QALAS No. 6.2.1-0001.	Agree.
		T.CI.PJK.065	
181		SECTION 02211 PAGE 3, PART 3 Section 1.01C implies there may be some fill placement involved in this work. If so, add a numbered section under Part 3 to cover the fill placement.	Disagree, items of fill will be covered in Section 02223. In related work, H&N will direct reader to the proper section.
		T.CI.EMC.041	

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182		SECTION 02211 2.01 Definitions of topsoil and subsoil need to be revised to incorporate reclamation requirements (i.e. vegetative materials should be left in topsoil). <p align="right">T.CI.THP.034</p>	Agree, H&N will add definition of top soil in next submittal of Title II.
183		SECTION 02211 PAGE 3, 3.01A A reclamation plan is being prepared by T&MSS reclamation specialists. Input from these reclamation specialists should be incorporated into topsoil requirements. <p align="right">T.CI.THP.008</p>	Agree, H&N will contact T&MSS for their recommendations.
184		SECTION 02211 3.01 E Replace "utility operating company" with "local responsible agency." <p align="right">T.CI.MCB.002</p>	Agree.
185		SECTION 02211 3.02 PAGE 3 Renumber 3.02 sub-soil excavation as 3.03 and change 3.03 tolerances to 3.04. Delete C from Subsoil excavation as no large roots exist in ESF area. <p align="right">G.CI.MSW.014</p>	Agree.

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190		SECTION 02222 3.01.D Replace "utility company" with "local responsible agency." <p align="right">T.CI.MCB.004</p>	Agree.
191		SECTION 02222 3.02.B Put in a reference to Table P-1 Approximate Angle of Repose contained in 29 CFR 1926.652 page 204 (revised as of 7-1-87). <p align="right">T.CI.MCB.005</p>	Agree. H&N will change to read, ".... to slopes shown on plans...."
192		SECTION 02222 PAGE 4 302.F Indicate area designated on site for stockpiling excavated material. <p align="right">T.CI.THP.012</p>	This is or will be shown on drawings, not specifications.
193		SECTION 02222 PAGE 4, H4 For greater clarity, state the slope as 2h:1v instead of two-to-one. <p align="right">T.CI.EMC.040</p>	Agree.
194		SECTION 02222 .A No comment. <p align="right">T.CI.PJK.066</p>	No resolution required.
195		SECTION 02223 PAGE 1 Since this appears to be the only section that covers fill in the	Agree.

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		specification, a more appropriate title would be "Fill" or "Fill and Backfill". T.CI.EMC.044	
196	SECTION 02223 PAGE 2, 1.02	Add Section 01410-Testing Laboratory Services to list of related work. This is mentioned in 3.05A. T.CI.EMC.045	Agree.
197	SECTION 02223 .A 1.05	Paragraph 1.05 Quality Assurance Level shall be in accordance with ESF-QALAS No. 6.2.1-0001. T.CI.PJK.067	Agree.
198	SECTION 02223 3.01	Paragraph 3.01: Add an initial requirement to "Verify that all inspections and tests, of equipment to be buried, have been performed and accepted". Unless someone reviews and accepts the work, we could just be burying mistakes or requiring that it be dug up for final inspection. This comment also applies to H&N Spec 02225. N.CI.PEP.003	Agree, will be incorporated in next submittal of Title II.

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199	SECTION 02223	3.01.D Clarify to disallow standing water but still allow moisture in the soil. T.CI.MCB.006	Agree, this will be clarified in next submittal of Title II.
200	SECTION 02223	PAGE 4 3.03J Show location and size of site for surplus back fill material. T.CI.THP.013	This will be reflected on the drawings.
201	SECTION 02223	3.05.A The option of using in place nuclear density testing should be maintained. T.CI.MCB.007	Agree.
202	SECTION 02223	PAGE 5, 3.06 A4 Increase the depth of high compaction zone under concrete slabs. Suggest 4 feet instead of 12 inches. T.CI.EMC.046	Will be considered for incorporation in Title II. If not incorporated, the reviewer will be informed why.
203	SECTION 02225	PAGE 2, 1.02 To the list of related work add: Section 01050 - Field Engineering, Section 01410 - Testing Laboratory Services, Section 02202 - Rock Removal. These are mentioned in 3.02A, 2.03A and	Agree.

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		3.03D respectively. T.CI.EMC.047	
204		SECTION 02225 .A 1.05 Paragraph 1.05 Quality Assurance Level shall be in accordance with ESF-QALAS No. 6.2.1-0001. T.CI.PJK.068	Agree, in next submittal of Title II.
205		SECTION 02225 3.01.C Clarify to disallow standing water, but still allow moisture in the soil. T.CI.MCB.010	Agree, this will be clarified in next submittal of Title II.
206		SECTION 02225 3.05 A Paragraph 3.05 A: Should be revised. The only support allowed for water mains serving fire protection, is earth, along the entire length of pipe. Wood blocks or other supports, holding the pipe above grade, are not allowed as, when back filled. These impose point loads on the pipe. N.CI.PEP.004	Agree.
207		SECTION 02225 3.07.A The option of using in place nuclear density testing should be maintained. T.CI.MCB.008	Agree.

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223		SECTION 02730 3.05A Paragraph 3.05A: This is not practicable. The bottom of a trench is essentially flat. N.CI.FEP.006	Agree.
224		SECTION 02730 3.13 .D P.9 Approval for operating the system will also be required from the Nevada Dept. of Health (N.R.S. Chapter 445). T.CI.THP.037	Agree. Permitting is currently being accomplished by SAIC.
225		SECTION 02730 3.13.B.4 Since fluids are being controlled on this project, define the provisions for monitoring this allowable leakage. T.CI.MCB.012	H&N will reevaluate the testing requirements and resubmit in next submittal of Title II.
226		SECTION 02731 .A 1.05 Paragraph 1.05 Quality Assurance Level of Systems shall be in accordance with ESF-QALAS 6.2.2-0001. T.CI.PJK.077	Agree, add in next submittal of Title II.
227		SECTION 02731 A, 1.01 PAGE 2, 3.05 PAGE 5 The wastewater lagoons are referred to as sewage lagoons in the specification, but this is incorrect.	Agree.

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		<p>This lagoon will receive only industrial wastewater, and not any sewage. A sewage lagoon system would require an operating permit from the state of Nevada. R.CI.OLH.004</p>	
228		<p>SECTION 02731 A, 1.04, PAGE 2 An operating permit from the state of Nevada will be required for the septic tank/leachfield system. The information necessary to obtain this permit should be added to the submittals. R.CI.OLH.001</p>	<p>There are no submittals required. The permitting is being accomplished by SAIC.</p>
229		<p>SECTION 02731 A, PART 3 No mention is made of the manner in which sewage pumped from underground toilets will be disposed of. I recommend that the material be pumped into a portable tank underground, which can then be brought to the surface. This tank should then be somehow connected or pumped into the septic tank system for disposal. Some sort of receiving port or connection should be built into the system for quick, easy disposal. R.CI.OLH.005</p>	<p>F&S providing methods for underground waste removal. H&N will modify sanitary appurtances to accommodate F&S design.</p>

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Date 8/8/88
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TECHNICAL ASSESSMENT REVIEW

Acceptance Signatures

Chairperson [Signature] Date 9/15/88
QA [Signature] Date 9/15/88
A/E [Signature] Date 9/15/88
WMPO [Signature] Date 9/16/88

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		<p>shop will be the primary access for large equipment. The north side of the shop should be left open for ease of access and to provide as large a work area as possible. This comment also applies to Drawings JS-025-6000-M4.B/M5.B/M6.B/M7.B/FP1.B/FP2.B/E2.B/W1.B/.</p> <p align="right">R.AR.RRR.003</p>	
5		<p>JS-025-6000-A1 B, M4.B-M7.B, FP1.B-FP2.B,E2.B, W1.B Comment R.A.DK.039 from the 50 Percent Title I Design Review has not been fully addressed. (Shop interior general arrangement) Specifically, the required amount of shop space has not been provided for.</p> <p align="right">R.AR.DLK.021</p>	<p>An ECR to change the shop requirements in the SDRD has been submitted by REECO. Upon resolution of this ECR by the ICWG, our Title II design package will be changed to reflect the resolution. The referenced ECR was withdrawn by REECO at the ICWG. The ECR will be resubmitted.</p>
6		<p>JS-025-6000-A1 .B AND OTHERS The electric doors shown here and elsewhere must have a safety-stop strip on the bottom to stop the door if it hits anything.</p> <p align="right">N.AR.PEP.041</p>	<p>Agree, this is covered in the specifications.</p>

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7		JS-025-6000-A1 B Show location for storage for chemical and hazardous materials. T.AR.THP.024	Agree, will be shown at 30% Title II.
8		JS-025-6000-A1 .B SDRD criteria 1.2.6.3.7 Performance Criteria No. 4 requires a chemical storage area. The designated storage area is enclosed by woven wire partitions which would not meet OSHA regulation 29 CFR1910.106(d) requirements for liquid-tight construction, self-closing fire doors, and sufficient ventilation to provide 6 air changes per hour. The A/E should determine the quantity of flammable materials that may be required to be stored and allocate space for an inside storage room, if needed. T.AR.SWP.002	The woven wire partition is for secure storage not chemical storage. H&N and REECO have not completed criteria development to identify the types and quantities of chemicals to be stored. This will dictate the location, size, and construction for the storage area and will be included in 30% Title II.
9		JS-025-6001-A1 .B GRID F-10 Same as comment TAR SWP 002. T.AR.SWP.026	See response to H&N Architectural comment No. 8.
10		JS-025-6001-A1 B The 6001 building shown is not the same as shown on JS-025-6001-A2.A, etc.	Drawing 6001-A1 is the warehouse building submitted in the 50% Title I review. It is included here only to show compliance with 50%

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		the updated ones. <p align="right">K.AR.DW.004</p>	
14		JS-025-6001-A2 A The warehouse shown on H&N Drawing JS-025-6001-A2.A will satisfy REECO's currently identified warehousing requirements. Use this warehouse concept for Title II design. <p align="right">R.AR.RRR.016</p>	Agree
15		JS-025-6001-A2 .A Indicate location of chemical storage area (SDRD 1.2.6.3.7 Performance Criteria #4). <p align="right">T.AR.THP.036</p>	H&N and REECO have not completed criteria development to identify the types and quantities of chemicals to be stored. This will dictate the location, size, and construction for the storage area and will be included in 30% Title II.
16		JS-025-6001-A2 A Clearly define OS&D storage. <p align="right">T.AR.SCS.025</p>	This is storage for items received that are "Over, Short, or Damaged". This will be defined on the Title II drawings.
17		JS-025-6001-A2 A General Note #4 should also state that the electrically operated roll-up doors will have a safety stop device as required by the NTS Construction Specifications, paragraph 9.4.2.2. <p align="right">R.AR.JLB.006</p>	Safety stop is covered by specifications. Section 08330.A para. 2.03.C.5.

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18	JS-025-6001-A2 A Reverse the north arrow so that the loading dock side of the warehouse is facing in a northerly direction. This drawing will then be in agreement with the warehouse orientation as shown on H&N Drawing JS-025-ESF-C40.B Add a second large door on the side of the warehouse opposite from the loading dock in order to accommodate access of a forklift. This change will eliminate the need for the ramp at the loading dock. This change was proposed by H&N and REECO agrees with it. R.AR.RRR.005	North arrow direction will be revised to agree with the civil drawing. Agree, the doors will be added and the ramp deleted in Title II.	
19	JS-025-6001-A2 A A gate or door must be installed in the chain link fence located on the east side of the building so emergency exiting away from the building will be possible in accordance with Section 5-7.1 of NFPA 101 (Life Safety Code). R.AR.JLB.005	Agree, when the entire complex is shown at 30% Title II gates will be shown.	
20	JS-025-6001-A2 AND A3 Clarify different warehouse configuration identified on these	See response to H&N Architectural comment No. 10.	

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		<p>drawings in comparison to warehouse identified on drawings JS-025-6001-A1, M1, M2, FP1, FP2, E1 and W1 (Drawing JS-025-ESF-C4 identifies former warehouse as "unassigned bldg."). T.AR.RLT.004</p>	
21		<p>JS-025-6001-A3 A The dimensions of the warehouse building 6001 are shown to be 100 feet by 50 feet. Other reference drawings for this building show dimensions of 40 feet by 30 feet. Delete the drawings which are no longer applicable and replace with the updated ones. K.AR.DW.005</p>	<p>See response to H&N Architectural comment No. 10.</p>
22		<p>JS-025-6001-A3 A WAREHOUSE BUILDING 6001 SECTIONS AND ELEVATIONS</p> <p>The loading dock on the south elevation view measures to be four feet to ground level. It is required by 1910.23 (c) (1) that open-sided floors/platforms that are 4 feet or more above the adjacent floor or ground level shall be guarded by standard railing. It is recommended tht a</p>	<p>Agree, will add in the next submittal of Title II.</p>

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		removable railing system be developed and installed at this location to comply with the existing standard. R.AR.FAS.012	
23	JS-025-6001-A3 .A	Double wide storage racks over 12' high are shown. NFPA 231 will apply. If the building is as depicted, the fire protection drawings will require revision. N.AR.PEP.046	Height of storage racks will be identified and if over 12' high, fire protection drawings will follow NFPA 231 requirements.
24	JS-025-6002-A1 A	Separate the two hoist areas by a one-hour fire wall and separate the resistor banks from the hoists with a one-hour fire wall as recommended by the ESF Life Safety/Fire Protection Subcommittee. Any penetrations of these fire walls would have to be protected by fire doors, fire windows, fire dampers, etc. R.AR.JLB.007	The 12" CMU wall separating the hoists is a 1 hour rated fire wall. There is not to be a wall separating the hoists from the resistor banks. The subcommittee report will be reviewed and the resistor bank problem will be reconsidered.
25	JS-025-6002-A1 .A	The criteria for the wall around hoist #1 is that it was to be a fire wall, floor to roof with UL/FM labeled fire	The 12" CMU wall will be detailed in Title II to be a 1 hour rated fire wall separation. The fire door or any penetration will be one hour or better rated.

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		doors and fire rated penetration seals. This is not shown on the drawing. N.AR.PEP.047	
26		JS-025-6002-A1 A Provide sumps in electrical trenches to remove water. R.AR.LJF.014	Agree, a sump pit will be added in the next submittal of Title II.
27		JS-025-6002-A1 A General Notes, Note 2: Rewrite note to read, "... metal buildings. Furnish all structural calculations... to assemble all components. All drawings..." C.AR.EOJ.008	All building requirements will be handled via the specifications in Title II. Okay as is.
28		JS-025-6002-A1 A, A2.A The above drawings should agree with FS-GA-0016 and FS-GA-0034 that show temporary building enclosures for the stage hoists for ES-1 and ES-2 sinking. R.AR.DLK.012	Exact criteria for the stage hoists enclosures will be defined and shown at 30% Title II.
29		JS-025-6002-A1 .A General Note 10 specifies, "Quality Level will be noted when ESF Quality	Agree

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		Assurance Level assignment sheets are issued". Unless actual quality levels are going to be referenced on H&N drawings, the note should read, "ESF Quality Assurance Level assignment sheets will be referenced when issued". This deficiency also applies to JS-025-6004-A1B and to JS-025-6007-A1B. F.AR.JAJ.024	
30	JS-025-6002-A2 A	Reference 30 CFR Sections 57.14036 and 57.11001 Drawings do not depict a removable roof of hoist house. Two overhead rail mounted cranes should be utilized to facilitate the removal of large parts and components of the hoists and electrical gear. M.AR.PT.004	Disagree, if a portion of the roof should require removal it can be easily done with pre-engineered metal building panels, to provide access for suitable lifting equipment with proper communication systems.
31	JS-025-6006-A1 B	Title: Surface Data Building 6006 Floor Plan & General Notes Indicate in General Notes that the records vault door will be fire rated greater than or equal to the two-hour	All door requirements will be handled via a door schedule at 30% Title II.

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		fire rated walls. <p align="right">T.AR.JMD.002</p>	
32		JS-025-6006-A1 B General Note #4 should also state that fire doors will be installed in the Computer Room and Records Vault fire separations. <p align="right">R.AR.JLB.008</p>	All door requirements will be handled via a door schedule at 30% Title II.
33		JS-025-6006-A1 .B The computer room fire wall is shown with glass windows. It will be necessary to identify that the entire wall and all its components can be assembled to meet DOE/EP-0108 floor to roof. Requirements including details as to how the wall will fit around roof supports. <p align="right">N.AR.PEP.049</p>	At 60% Title II all wall/door/window details will insure the integrity of a 1 hour rated wall assembly.
34		JS-025-6006-A2 A "raised floor" was specified for the computer areas in the Surface Data Building. A "sunken floor" is not acceptable due to possibilities of water pooling of rain runoff or water leaks inside the building. <p align="right">A.AR.TJM.015</p>	H&N will reinvestigate the IDS building design and provide adequate analysis if the sunken floor is needed.

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35		<p>JS-025-6006-A1 B General Notes, Note 2: Re-edit note to read as follows, "... pre-engineered Metal Buildings. Furnish all structural calculations ... to assemble all components. All drawings shall indicate..."</p> <p align="right">C.AR.EOJ.009</p>	<p>All building requirements will be handled via the specifications in Title II. Okay as is.</p>
36		<p>JS-025-6006-A2 A The sunken floor in the computer area should be justified. As is, the area under the computers will act as a drain for any water in the building. This is especially important because there are wet sprinklers used in the fire protection system.</p> <p align="right">J.AR.RDE.003</p>	<p>H&N will reinvestigate the IDS building design and provide adequate analysis if the sunken floor is needed.</p>
37		<p>JS-025-6007-A1 .B The IDS subsurface Data Building may require a second exit from the IDS Console Room and Workstation Room to meet fire codes.</p> <p align="right">A.AR.TJM.008</p>	<p>Only one exit required per code but will add a door in the glass partition wall for ease of use.</p>
38		<p>JS-025-6007-A1 .B Correct General Note 3. The computer floor must meet DOE/EP-0108. Wood</p>	<p>Note 3 only calls for vinyl floor covering. Computer floor panels are covered in the specifications and call for all metal</p>

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		<p>core metal encased panels are not acceptable. N.AR.PEP.052</p>	<p>panels. Okay as is.</p>
39		<p>JS-025-6008-A1 A CHANGE HOUSE BUILDING 6008 FLOOR PLAN & GENERAL NOTES</p> <p>Presently shown in the lamp room is an eye wash station that is there because of the battery charging station also located in this room. To comply with OSHA 1926.441 standard, a shower must be installed within 25 feet of a battery charging station. R.AR.FAS.003</p>	<p>Agree, the face and eye wash station will be upgraded to a shower with a face and eye wash station.</p>
40		<p>JS-025-6008-A1 A Comment R.A.DK.048 from the 50 Percent Title I Design Review has not been fully addressed. (Service building combined facilities) Specifically, no provision has been made in the change house building for the following:</p> <ul style="list-style-type: none"> o female craft labor lockers o scientific user lockers - male and female 	<p>Agree, H&N will review design to include occupancy by male and female craft laborers, visitors and PIs if required.</p>

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		<p>o shower and toilet facilities for craft and scientific females</p> <p>In addition to the above, make allowance for future expansion of the changehouse.</p> <p align="right">R.AR.DLK.020</p>	
41		<p>JS-025-6008-A1 A Show what change house arrangements are being considered for female workers. If no arrangements are being considered in this building, add a drawing of the proposed facility.</p> <p align="right">K.AR.DW.002</p>	<p>See response to comment 40. Agree, H&N will review design to include occupancy by male and female craft laborers, visitors and PI if required.</p>
42		<p>JS-025-6008-A1 A Show what change house arrangements are being considered for female visitors. If a separate facility is being considered, add a drawing of proposed facility.</p> <p align="right">K.AR.DW.003</p>	<p>See response to comment 40. Agree, H&N will review design to include occupancy by male & female craft laborers, visitors and PI if required.</p>
43		<p>JS-025-6008-A1 A Provide area for womens facility to accomodate expected woman visitors and experimentors.</p>	<p>See response to comment 40. Agree, H&N will review design to include occupancy by male and female craft laborers, visitors and PI if required.</p>

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		T.AR.SCS.033	
44		<p>JS-025-6008-A1 A It is recommended that a wall be constructed to separate the Life Safety and Fire Control Room from the Walker area. This would help control dust exposure to sensitive electrical equipment in the Life Safety and Fire Control Room.</p> <p align="right">R.AR.JLB.011</p>	<p>It is our understanding that the walker needs to be immediately accessible to the Life Safety alarms. Additional evaluation/discussion with the Life Safety Subcommittee will determine if separation is advisable and if needed it will be added at 30% Title II.</p>
45		<p>JS-025-6008-A1 .A If the Life Safety and Fire Control is the main focal point of all critical systems at this location, it should be separated from other areas by a minimum 1 hour fire enclosure.</p> <p align="right">N.AR.PEP.054</p>	<p>Agree.</p>
46		<p>JS-025-6008-A1 A Due to the critical nature of the Life Safety and Fire Control Room, it is recommended that it be protected from external fire exposure by a one-hour fire rated wall. Any penetrations of this fire wall will require protection by fire doors, fire windows, fire dampers, etc.</p>	<p>Agree.</p>

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50	JS-025-058-2-A1 .A H-3	<p>the office area that meets the requirements does not offer the visual and acoustical privacy required. Suggest adding a note to this drawing explaining that in Trailer 7 the wall separating the two offices in the southern end of the trailer will be removed, only one door will be installed, and this area will serve as office space for NRC.</p> <p style="text-align: right;">T.AR.JMD.003</p> <p>QALAS 6.3.1-0001 should be referenced.</p> <p style="text-align: right;">T.AR.PJK.012</p>	<p>QALAS references are on Drawing JS-025-ESF-A1.A under General Note 12.</p>

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Date <u>8/8/88</u>	
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1		SECTION 03001 .1, 05120.A,05210.A,13121.A Paragraph 1.05 Quality Assurance Level shall be in accordance with the applicable ESF-QALAS. <p align="right">T.AS.PJK.081</p>	Agree.
2		SECTION 03001 1.04.A Shop drawings are not normally required for reinforcing steel. Rebar details or certifications may be required. <p align="right">T.AS.MCB.013</p>	Will clarify in Title II.
3		SECTION 03001 3.04.B Concrete is normally "placed" not "poured." <p align="right">T.AS.MCB.014</p>	Will change "poured" to "placed" which matches verbage on the rest of specifications.
4		SECTION 03001 PLAIN AND REINFORCED CONCRETE Suggest that an approved source and standard mix for surface concrete be identified. It is unlikely that on-site concrete will be available for surface work. <p align="right">T.AS.IRC.017</p>	Agree.

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9	SECTION 05120 .A	<p style="text-align: right;">R.AS.LGC.042</p> <p>A section covering Quality Control/Inspection should be added. This comment also applies to the following specs:</p> <p>Section 05210.A, 05300.A, 07200.A, 07465.A, 08800.A, 11180.A, 13121.A, 02211.A, 02222.A, 02500.A, 02556.A, 02614.A, 02720.A</p> <p style="text-align: right;">F.AS.JAJ.029</p>	<p>Title II. Agree.</p>
10	SECTION 05300	<p>1.05 "QUALITY ASSURANCE" - Subparagraph A addresses design and fabrication requirements rather than QA methods of verifying that fabrication, installation, etc. meet the requirements.</p> <p style="text-align: right;">R.AS.LGC.030</p>	<p>Agree, will revise for the next submittal in Title II.</p>
11	SECTION 05400 3.01 INSPECTION	<p>Change title to "EXAMINATION OF EXISTING CONDITIONS" to be consistent with other specifications.</p> <p style="text-align: right;">R.AS.LGC.031</p>	<p>Agree, will revise for the next submittal in Title II.</p>

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12		SECTION 07175 3.01,3.02,3.03, P.4 Subparagraph A of 3.01 is duplicated in 3.03A but the latter is more specific. Delete 3.01A. 3.03 B and C should be moved to 3.02. Method of testing for moisture content should be specified. R.AS.LGC.032	Agree, will revise the paragraphs prior to next submittal in Title II and add method for testing.
13		SECTION 07200 Paragraph 1.03: Should be revised to cite DOE Orders 6430.1A and 5480.1B. The Factory Mutual Approval Guide should also be cited. This applies to many other specifications sections too. N.AS.PEP.009	Will add FM guide. DOE orders are not standards for material testing and should not be referenced in construction specifications. Will conform to DOE Order 6430.1A and 5480.1B in the next submittal for Title II.
14		SECTION 07200 A, PART 1.03(A) Factory Mutual (FM) should also be listed under "References". Both the FM Approval Guide and FM Data Sheet 1-57 are applicable references for the use of foamed plastic insulation. R.AS.JLB.017	Agree, will add in the next submittal for Title II.
15		SECTION 07200 1.05 The requirement of UL/FM label showing proper characteristics is a part of QA.	Agree, will add in Title II for labeled products prior to the next submittal.

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		N.AS.PEP.061	
16	SECTION 07200 PAGE 3, 1.05	In subparagraph A, minimum years of experience should be indicated. Subparagraphs B through C are more appropriate for Part 3 "EXECUTION" than for "QUALITY ASSURANCE". R.AS.LGC.033	Agree, will add requirement for 3 years experience in next submittal for Title II.
17	SECTION 07200 2.02	All these materials used inside a building, must meet DOE Orders 6430.1A and 5480. Generally, this will mean UL/FM labeled with flame spread not over 25. Paper faced insulation would, generally, be excluded and rigid foam would have additional requirements. N.AS.PEP.062	UBC Standard No. 42-1 will be referenced for testing insulation meeting <25 flame spread and <450 smoke developed (per UBC). Rigid foam will only be used as exterior perimeter insulation for concrete slabs.
18	SECTION 07200 A, PARTS 2.02(C)&(I)	It should be specified that the use of foamed plastics must be in accordance with FM Data Sheet 1-57 "Rigid Foamed Polyurethane". This is a mandatory requirement per DOE Order 6430.1A. R.AS.JLB.018	Agree, will also add <75 flame spread and <450 smoke developed per UBC Standard #42-1.

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23		SECTION 07900 A, PART 1.03 The Underwriter's Laboratories (U.L.) Building Materials Directory and Factory Mutual FM Approval Guide should also be listed under "References." R.AS.JLB.020	Agree, will add in the next submittal for Title II to reference testing required for fire rated caulks.
24		SECTION 07900 A, PART 2.01(I) It should also be specified that the fire stop sealant used must be U.L. listed or FM approved and provide fire resistive rating equal to or greater than the fire resistive separation which was penetrated. R.AS.JLB.021	Agree, will add in the next submittal for Title II to require the fire rated caulks be tested and labeled by nationally accredited laboratory.
25		SECTION 08100 A, PART 1.03 The Factory Mutual (FM) Approval Guide should also be listed under "References". R.AS.JLB.022	Agree, will add in the next submittal for Title II.
26		SECTION 08100 Paragraph 1.03: Add the Factory Material FM Approval Guide. N.AS.PEP.010	Agree, will add the Factory Mutual Approval Guide in the next submittal for Title II.

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27		SECTION 08100 1.03 Add the UL equipment lists. N.AS.PEP.064	Agree, will add in the next submittal for Title II.
28		SECTION 08100 1.03 Add Warnock Hersey Fire Laboratory Listing. N.AS.PEP.065	Agree, will add in the next submittal for Title II.
29		SECTION 08100 1.05B4 Oversized doors must be certified by a nationally recognized testing laboratory as being built in the same manner as a labeled fire door. N.AS.PEP.066	Agree, will delete paragraph 1.05B4.
30		SECTION 08100 A, PART 1.06(A) NFPA 80 is the applicable code for fire-rated frames and doors and should be specified. R.AS.JLB.023	Agree.
31		SECTION 08100 2.01 08330.A, 08500.A, 08700.A, 08800.A, 09111.A, 09260.A, 09310.A, 09511.A, 09650.A, 09686.A, 09900.A, 10160.A, 10605.A, 10800.A, 13121.A, Acceptable Manufacturers. Same comment as for 07465.A.	Agree, will add product name to corresponding manufacturer in the next submittal for Title II as stated in the specification approval is per DOE/COR.

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		R.AS.LGC.036	
32		SECTION 08100 A, PART 2.01(A)&(B) It should be clarified that these are not acceptable manufacturers of fire doors and frames because their products are not U.L. listed or FM approved. R.AS.JLB.024	H&N will insure that cited manufacturers make fire rated door assemblies approved by a nationally accredited testing laboratory in the next submittal of Title II.
33		SECTION 08330 Paragraph 2.02D: This is inadequate to describe a safety-stop device on the bottom of a door to halt movement when it hits an object. N.AS.PEP.011	Disagree safety stop is covered under paragraph 2.03.C.5.
34		SECTION 08100 2.03A It is doubtful that any fire door will ever have a polyurethane core. N.AS.PEP.067	Agree, will rewrite in Title II to clarify requirements for fire rated doors versus regular doors.
35		SECTION 08330 2.03C5 Paragraph 2.03C5 is acceptable. N.AS.PEP.068	Agree.
36		SECTION 08500 A There should be a "Regulatory Requirements" section added which states that fire window frames must be	Agree, will add the requirements for assemblies to be rated by a nationally accredited laboratory and be installed per NFPA 80 in the next submittal for Title II.

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		U.L. listed or FM approved and installed in accordance with NFPA 80. R.AS.JLB.027	
37		SECTION 08500 A, PART 1.03 The Underwriter's Laboratories (UL) Building Materials Directory and Factory Mutual (FM) Approval Guide should also be listed under "References" because fire window frames must be U.L. listed or FM approved. R.AS.JLB.025	Agree, will add in the next submittal for Title II to reference testing requirements.
38		SECTION 08500 This specification is not adequate to describe windows in any fire rated wall or assembly. N.AS.PEP.012	Agree, in Title II will separate fire rated window requirements for clarity.
39		SECTION 08500 A, PARTS 2.01(A)&(B) It should be clarified that these are not acceptable manufacturers of fire windows because they are not U.L. listed or FM approved. R.AS.JLB.026	H&N will insure that cited manufacturers make fire rated window assemblies approved by a nationally accredited testing laboratory in the next submittal of Title II.
40		SECTION 08500 2.03 If aluminum frames are required, do not bother specifying fire-rated glass.	Agree, aluminum frames not allowed per UBC. Will revise in Title II.

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
		<p>This must be revised. N.AS.PEP.069</p>	
41		<p>SECTION 08700 A, PART 1.03 The Factory Mutual (FM) Approval Guide should also be listed under "References". R.AS.JLB.028</p>	<p>Agree, will add in the next submittal for Title II.</p>
42		<p>SECTION 08700 A, PART 2.06(A) It should be specified that exit devices and accessories must also conform to NFPA 101 (Life Safety Code). R.AS.JLB.029</p>	<p>Agree, will add in the next submittal for Title II.</p>
43		<p>SECTION 08700 All fire doors must have UL or FM listed and labeled fire door hardware. Listing must be in accordance with fire door requirements. N.AS.PEP.013</p>	<p>Will clarify in the next submittal of Title II for fire rated hardware to be tested and labeled by nationally recognized laboratory.</p>
44		<p>SECTION 08800 A Glass and glazing for fire doors and fire windows should be addressed in these specifications. R.AS.JLB.030</p>	<p>Agree, will clarify in the next submittal for Title II.</p>

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45		SECTION 09111 This spec. is not adequate to describe fire wall design or installation. N.AS.PEP.014	Agree. Fire wall designs will be detailed on the drawings in the next submittal for Title II.
46		SECTION 09260 A, PART 1.03(A) ASTM E-84, "Standard Test Method for Surface Burning Characteristics of Building Materials", should also be listed. R.AS.JLB.032	Agree, will be added in the next submittal for Title II.
47		SECTION 09260 A, PART 1.03 Factory Mutual should also be listed under "References". R.AS.JLB.031	Agree, will be added in the next submittal for Title II.
48		SECTION 09260 1.03 Paragraph 1.03: Add FM Approval Guide. N.AS.PEP.070	Agree, will be added in the next submittal for Title II.
49		SECTION 09260 1.03G Add UL Equipment Lists. N.AS.PEP.071	Agree, will be added in the next submittal for Title II.
50		SECTION 09260 1.06 Paragraph 1.06: They must also conform to DOE Order 6430.1A. N.AS.PEP.072	Agree, will conform to DOE Order 6430.1A in the next submittal for Title II.

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51		SECTION 09260 Paragraph 1.03: Add DOE orders 6430.1A and 5480.1B. <p align="right">N.AS.PEP.015</p>	Disagree, DOE orders are not standards for material testing and should not be referenced in construction specifications. Will conform to DOE Order 6430.1A in the next submittal for Title II.
52		SECTION 09260 A, PART 2.02(E)(2) It should also be specified that the fire retardant wallboard must be U.L. listed or FM approved with a flame spread rating of 25 or less and a smoke developed rating of 50 or less per ASTM E-84. <p align="right">R.AS.JLB.033</p>	H&N will specify for Type "X" fire rated gyp board to be approved by a nationally accredited testing lab and will list UL fire assembly test numbers for the next submittal in Title II.
53		SECTION 09260 2.02 The material must be UL/FM labeled and firewalls must be assembled in accordance with listed design. <p align="right">N.AS.PEP.073</p>	Agree, UL assembly designs will be detailed on the drawings in the next submittal for Title II. Material testing and labeling will be clarified.
54		SECTION 09511 Paragraph 1.03: Add FM Approval Guide. <p align="right">N.AS.PEP.016</p>	Agree, will add in Title II.
55		SECTION 09511 1.06 There are additional restrictions on ceiling tile, if we wish to exclude requiring sprinklers above the ceiling.	Agree.

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		N.AS.PEP.074	
56		SECTION 09650 Paragraph 1.06: I doubt that you will find much floor covering that has been tested to this criteria. This is not a DOE requirement.	Agree, will delete in Title II.
		N.AS.PEP.017	
57		SECTION 09686 A, PART 1.03 The DOE/NV carpet requirements should be listed under "References" since it is the governing document on fire protection requirements for carpet.	Disagree to referencing DOE documents or DOE standards on the specifications and drawings.
		R.AS.JLB.034	
58		SECTION 09686 Paragraph 1.03E: There is no UL listed carpet that will meet the criteria. We will accept any nationally recognized testing laboratory.	Agree, will revise in Title II.
		N.AS.PEP.018	
59		SECTION 09686 1.04D This is incorrect. See DOE/NV Manager's letter of June 12, 1984.	The DOE/NV carpet requirement is for NVO and has not been specified for this project. If DOE/Project Office imposes this on H&N, it will be conformed with.
		N.AS.PEP.075	

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Date 8/8/88

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Coordinator _____

TECHNICAL ASSESSMENT REVIEW

Acceptance Signatures

Chairperson [Signature] Date 9/15/88
QA [Signature] Date 9/15/88
A/E [Signature] Date 9/15/88
WMPO [Signature] Date 9/16/88

COMMENT NO. PAGE REVIEWER'S COMMENTS

RESOLUTION

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
1		<p>JS-025-ESF-FP1 B ABC portable fire extinguishers are shown at all DAS locations. It should be specified that these extinguishers be Halon 1211. The use of ABC dry chemical extinguishers on sensitive electronic equipment would result in costly clean up and probable damage to the equipment. This same comment also applies to drawings JS-025-ESF-FP2.B and JS-025-ESF-FP3.B.</p> <p align="right">R.ME.JLB.001</p>	<p>Agree, Halon 1211 was intended.</p>
2		<p>JS-025-ESF-FP1 .B ABC dry chemical extinguishers are not suitable for the locations shown. These appear to be small alcoves that will house instrumentation and data acquisition equipment, much like a computer room. An ABC dry chemical extinguisher should be prohibited in those locations. (See DOE/EP-0108 and NFPA 75.) Similar comments apply to JS-025-ESF-FP2.B and others. Dry chemical may be needed for MSHA compliance while mining, but cannot be used when occupied for scientific IDAS and similar purposes as it will destroy the electronic equipment.</p>	<p>Agree, Halon 1211 was intended.</p>

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		N.ME.PEP.031	
3		JS-025-ESF-FP1 B THRU FP4.B General Note 4: QALA No. 6.7.1-0014 not approved and released; Replace with TBD. align="right"> R.ME.MAF.005	Agree.
4		JS-025-ESF-FP3 B There is a fueling area indicated on the MTL; but it is not indicated if there will be a storage tank at this level or if refueling will be directly from a surface tank. This information should be included somewhere for comment. align="right"> R.ME.OLH.002	Agree, the design of the fueling area and fueling systems will be provided by F&S. Fire protection system design will be based on the F&S configuration. F&S has requested a new configuration for the fueling area as shown on Page 3 of F&S Engineering Change Request #FS-ECR-009 on 07/15/88. H&N will coordinate the design of the fire protection system to whichever configuration F&S uses in Title II design.
5		JS-025-ESF-FP3 12.B ZONE E-10 The location of the fueling station area is not consistent with the current F&S, Inc. Title I Design; i.e.: Drawing FS-GA-0160. align="right"> R.ME.RRR.019	Agree, see comment #4.

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6		JS-025-ESF-FP3 .B The fueling area should be located and designed for containment of all fuel spills (containment should include fuel from tanks and all lines). T.ME.THP.035	Agree, see comment #4.
7		JS-025-ESF-FP3 B, C8 Identify Bulk Permeability Test area. G.ME.RWC.013	Disagree, this area has not been defined. Existing MTL Plan is based on Sandia Drawing No. R07048A/2 Revision 1 of 02/88.
8		JS-025-ESF-FP3 .B Main Test Level Use of automatic sprinklers in main u/g test level. Where does this requirement come from. Has A/E considered potential impact on experiments and instrumentation systems if system is accidentally or purposely triggered. Suggest alternates be considered that are localized so that impact, if triggered, is minimized. S.ME.RES.001	The requirement for automatic sprinklers used in selected areas comes from DOE Order 5480.7 General Design criteria for automatic sprinkler system is given in DOE Order 6430.1A. The use of automatic sprinklers and it's impact on experiments and instrumentation systems has been discussed by the ESF Life Safety/Fire Protection Subcommittee. This subcommittee has published recommendations to DOE/YMPO for incorporation into the ESF design. For additional information please see H&N Conference Reports NNWSI:CR:88-037 (07/88) and NNWSI:CR:88-038 (07/88). H&N will reinvestigate water flow requirements with SNL and provide a preliminary design analysis by 30% Title II.

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9		<p>JS-025-ESF-FP3 B Provision of extinguishers is excessive. Omit those units not located at site of possible conflagration (i.e., if not at DAS site of specific equipment/service site then remove unit. Extinguishers on mobile equipment will supplement stationary extinguisher units. T.ME.SCS.014</p>	<p>Disagree, as per DOE Order 6430.1A, extinguishers must be provided as per NFPA 10.</p>
10		<p>JS-025-ESF-FP3 B The halon system needs to be called out in the MTL IDS building. J.ME.RDE.004</p>	<p>Disagree, keyed Note 5 reads "For fire protection inside IDS Building see sheet JS-025-6007-FP1. Protection shown is for alcove."</p>
11		<p>JS-025-ESF-FP4 B Reduce number of extinguishers in the extension drifts to only those at specific equipment and service sites. Mobile equipment will carry sufficient extinguisher units. T.ME.SCS.015</p>	<p>Disagree, as per DOE Order 6430.1A, extinguishers must be provided as per NFPA 10.</p>
12		<p>JS-025-ESF-FP4 B The black triangle symbols shown on the drawing every 150 feet do not correspond with the symbol denoting an ABC portable fire extinguisher, which</p>	<p>Agree, the reduction process made the symbols solid instead of a triangle with a square. The full size drawings show the symbol correctly.</p>

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		<p>is shown in keyed note #1. The symbol is also not shown on the Fire Protection Symbols and Abbreviations Drawing (JS-025-ESF-T3.A). R.ME.JLB.016</p>	
13		<p>JS-025-ESF-FP4 B The key note No. 1 indicates the devices shown are fire extinguishers. Change the symbols to that shown on Drawing JS-025-ESF-T3.A to represent fire extinguishers. T.ME.JHM.003</p>	See comment #12.
14		<p>JS-025-ESF-FP4 .B An "arrow" symbol is not shown on Drawing T3.A. N.ME.PEP.032</p>	See comment #12.
15		<p>JS-025-ESF-FP5 .B Based on discussions in the Life Safety round table meeting 8/9/88, the requirements shown here do not satisfy the users or the standards. An ad hoc committee of users and experts should meet to discuss the overall problem. This may result in a change of criteria and a change in the SDRD documents.</p>	Disagree, however, will refer the problem to the Yucca Mountain Project Office for clarification. H&N does satisfy the needs.

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		N.ME.PEP.033	
16		<p>JS-025-ESF-FP5 B Some of the monitoring and control systems appear unnecessary for cost effective equipment operation. There is the likelihood that the monitoring and control systems themselves could shut down operating equipment and systems just for maintenance of the monitoring and control devices. Provide the safety and reliability analysis that justifies all of the detailed monitoring and control devices for power, ventilation, hoists, and compressors.</p> <p align="right">R.ME.DLK.008</p>	<p>The types of items to be monitored and controlled are determined by F&S.</p>
17		<p>JS-025-ESF-FP5 B - 11G It is noted that several parameters are being monitored by the life safety and operations control. The workshop discussion indicated that the selection of monitored parameters are not necessarily supported by analysis. Because many of these systems are QA Level II it is recommended that the life safety and operations control be fully integrated with operational emergency</p>	<p>Agree.</p>

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		subsequent drawings. <p align="right">N.ME.PEP.034</p>	
21		JS-025-ESF-FP8 .B GRID D-7 Label area where the infiltration test will be conducted. <p align="right">G.ME.MSW.005</p>	Agree.
22		JS-025-ESF-FP8 B, C8, D7 Identify Bulk Permeability Test and Infiltration Test areas. <p align="right">G.ME.RWC.014</p>	Agree for the Infiltration Test area. Disagree for the Bulk Permeability Test area due to lack of existing criteria for this test. See Sandia Drawing No. R07048A/2, Revision 1 of 02/88.
23		JS-025-ESF-FP8 B Waste package vertical tests will be conducted at ends of drifts. These are the most likely places for fires to occur. It would seem appropriate for a manual alarm station to be placed at ends of drifts in addition to stations in main drift near DAS alcoves. This spacing is consistent with that shown on JS-025-ESF-FP9.b. The location of a manual alarm station at the end of the drift is especially critical for the inclined downward central drift where smoke would rise and make it difficult for personnel (already under stress) to	Agree, will place alarm stations near the ends of the Waste Package Vertical Test drifts.

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		<p>quickly move up the 12% grade for more than 200 ft. to pull the alarm and then return to fight fire. Subsequent ECRs (not approved) place DAS alcove mid location in drifts so the alarms shown in those locations are appropriate. L.ME.DGW.015</p>	
24		<p>JS-025-ESF-FP8 B Alarming is shown in areas (e.g., extension drifts) which are primarily travelways with little personnel occupancy, therefore the distance interval between alarms can be increased in these areas. T.ME.SCS.017</p>	<p>Disagree, according to NFPA 101 Life Safety Code, manual alarm station boxes "shall be provided so that travel distance to the nearest box will not be in excess of 200 ft." 7-6.2.4. In addition Chapter 3-5.2 of Standard 72F requires that loudspeakers be placed so that their operations will be clearly heard.</p>
25		<p>JS-025-ESF-FP8 .B Either the manual station symbol is shown incorrectly or else we have a new unidentified symbol of a solid square rotated 90 degrees inside a square. If it is a manual station, it appears that some devices in close proximity of others should be deleted. N.ME.PEP.035</p>	<p>The drawing reduction process has changed the appearance of the manual station symbols. Criteria used for locating manual alarm stations was: 1. Located at the exits of each drift. NFPA 101 7-6.2.3. 2. Located not more than 200 ft. travel distance. NFPA 101 7-6.2.4.</p>

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26	JS-025-ESF-FP8 .B	<p>As speakers are not necessarily directional, it appears that we have more speakers than necessary in some areas while in other areas speakers may be too far apart to be heard distinctly.</p> <p style="text-align: right;">N.ME.PEP.090</p>	<p>3. Located at each Data Acquisition Station. (H&N)</p> <p>4. Located near each area that may present an operational hazard. (H&N)</p> <p>Based on this criteria H&N will review the placement of manual stations and delete any that are excess, in Title II. Disagree, according to NFPA 101 Life Safety Code, manual alarm station boxes "shall be provided so that travel distance to the nearest box will not be in excess of 200 ft." 7-6.2.4. In addition Chapter 3-5.2 of Standard 72F requires that loudspeakers be placed so that their operations will be clearly heard.</p> <p>Disagree, the speaker represented (manufactured by Atlas, Model AP-15TU) has a directivity index of 8dB which means that it is 8dB more directive on axis than a nondirective speaker. It has a high sensitivity rating (121dB at 4' at 15 watts) which allows for a greater distance between speakers. The intent of the design is to comply with NFPA-72F requirements for alarm messages to be clearly heard.</p>

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27		<p>JS-025-ESF-FP9 B There appears to be an inconsistency between this drawing and the previous drawing JS-025-ESF-FP8.B. This drawing states that typical spacing for fire alarm stations is 400' but the previous drawing shows the spacing as 200'. R.ME.JLB.002</p>	<p>Agree, inconsistency is due to the criteria used to select locations of alarm stations. See resolution #25.</p>
28		<p>JS-025-ESF-FP9 .B Speakers 100' apart will preclude distinctly hearing voice messages. N.ME.PEP.036</p>	<p>Disagree, see resolution #26.</p>
29		<p>JS-025-ESF-FP9 B Remove speaker and visual indicators between alarm stations and locate only at alarm stations. The scheme shown is over-kill and subject to unacceptable failure rates based on the sheer number of units. T.ME.SCS.018</p>	<p>Disagree, speakers must be placed to meet NFPA 72F requirements for evacuation signals to be clearly heard. Visual indicators are placed with speakers to draw visual attention to the alarm notification in temporary noisy locations.</p>
30		<p>JS-025-ESF-FP11 .B AND OTHERS Smoke detection may be of some value in areas used only by scientists but cannot be used during mining or construction. If the usage will change from scientific to other</p>	<p>Agree, smoke detection will be used in areas after mining and construction operations have been completed. Multiple zoning with zone shutoff will be used. The SDRD (1.2.6:7.8) requires electronic fire detection in the underground areas.</p>

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		<p>purposes, a zone shut off and multiple zoning are recommended to minimize false alarms.</p> <p>As these areas are supposed to be free of combustibles or sprinklered, the cost-effectiveness of the added smoke detectors is questionable. N.ME.PEP.037</p>	
31		<p>JS-025-ESF-FP12 .B GRID C,D-6,7 Label area where the infiltration test will be conducted. G.ME.MSW.006</p>	Agree.
32		<p>JS-025-ESF-FP12 B, C8, D7 Identify Bulk Permeability Test and Infiltration Test areas. G.ME.RWC.015</p>	Agree for the Infiltration Test area. Disagree for the Bulk Permeability Test, see comment #22.
33		<p>JS-025-ESF-FP12 .B AREA 8E Data Acquisition alcove adjacent to Sequential Drift #2 might have to be relocated due to blast damage. Recommend H&N coordinate with LANL and F&S. J.ME.RSW.007</p>	H&N will use the latest approved version of the Main Test Level for the Title II design. Blast damage to the Data Acquisition alcove will be determined by others.

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		<p>detectors need only be placed at specific equipment/service areas and in the principal return air ducts. Also the method/system to be used for detection needs to be identified. T.ME.SCS.019</p>	<p>detection device used will be identified in Title II.</p>
37		<p>JS-025-6000-M4 .B The ventilation air flow pattern in this building flows across the welding and storage areas toward other occupied spaces including the office. Ability to control chemical exposures in accordance with 30 CFR 57.5001 can be improved by moving the supply air diffuser to the building centerline. Revise drawings as appropriate. T.ME.SWP.006</p>	<p>Local welding exhaust hood and portable cone should minimize this problem. The centerline of this building is reserved for an I-beam hoist.</p>
38		<p>JS-025-6000-M4 .B Compliance with 30 CFR 57.4530 requires sufficient exits for prompt escape in case of fire. Consider adding second means of egress from office (not counting electric rolling doors). T.ME.SWP.007</p>	<p>Disagree, not required by code due to low occupancy.</p>

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39		JS-025-6000-M5 .B Provide an emergency eyewash in the shop building to comply with 29 CFR 1910.151 (c). <p align="right">T.ME.SWP.008</p>	No corrosive materials have been identified to warrant an emergency eyewash.
40		JS-025-6000-M6 B SHOP BUILDING 6000 COMPRESSED AIR SYSTEM PLAN OSHA-1910.169 (b) (3) (i) and CFR 30 Sec. 57.13011 requires that every air receiver be equipped with one or more safety relief valves. The total relieving capacity of each valve shall prevent pressure in the receiver from exceeding the maximum allowed working pressures by 10%. <p align="right">R.ME.FAS.002</p>	Agree, standard feature that will be identified in the compressed air system specifications.
41		JS-025-6000-M6 B Compressed Air System Plan: Consider providing separate fresh air intake for compressor. <p align="right">C.ME.EOJ.001</p>	Volume of compressed air (18 CFM) does not warrant a separate air intake.
42		JS-025-6000-M6 B Drop leg detail 2: Identify shut-off valve.	Agree, will add call out.

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		C.ME.EOJ.002	
43		JS-025-6000-M7 .B GRID G-10 Designate storage area as "non-combustible" storage, because it is adjacent to welding area. T.ME.SWP.010	This would be an operational function which is not shown on the design. This area will not be designated as a chemical storage area as defined in the SDRD.
44		JS-025-6000-FP1 .B AND OTHERS The roof slope should be shown to determine sprinkler coverage and deflector alignment. N.ME.PEP.042	Agree, will provide.
45		JS-025-6000-FP1 .B Sprinklers will be required under the stair. N.ME.PEP.091	Agree, will provide.
46		JS-025-6000-FP2 .B AND OTHERS The drawing does not depict single and multiple cable as shown on drawing JS-025-ESF-T4.A. N.ME.PEP.043	H&N will clarify in Title II.
47		JS-025-6000-FP2 .B AND OTHERS General Note 5 should cite drawing T4.A, in addition to T3.A N.ME.PEP.092	H&N will clarify in Title II.

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48		JS-025-6000-FP2 .B AND OTHERS The fire alarm sound above ground should be the same as underground. Do not mix bells with speaker-horns. N.ME.PEP.093	Agree.
49		JS-025-6000-FP2 B Fire Alarm Plan: Change "Water Flow Switch" to "Water Flow Indicator" and specify paddle wheel or pressure type, or include both options. Applicable to all FP drawings. C.ME.EOJ.003	Agree, will change callout. Specifications will clarify the paddle wheel type.
50		JS-025-6001-M2 .B Provide an emergency eyewash in the warehouse building to comply with 29 CFR 1910.151 (c). T.ME.SWP.011	No corrosive materials have been identified to warrant an emergency eyewash.
51		JS-025-6001-M2 B Plumbing Plan: Add VTR from Floor Sink. C.ME.EOJ.004	Agree, will add "VTR".
52		JS-025-6001-FP2 B Fire Alarm System Schematic: Replace "Water Flow Switch by Sprinkler Contractor" with "Water Flow Indicator." C.ME.EOJ.005	Agree, see comment 49.

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53		<p>JS-025-6002-M4 The "FS-CA-0033 Hoist Resistor Bank Calculations" adequately determine the resistor heat generated at high torque, low slip conditions. These are conditions commensurate with or exceeding the ES-1 and ES-2 production duty cycles requirements for the hoists. The torque-speed requirements for handling materials have not been addressed. As is noted in the calculations, those hoisting requirements could severely impact the resistor sizing, cooling and hoist control methods. A list of probable material hoisting needs should be developed in order that the hoist consultant can adequately determine if the present design will be impacted. T.ME.JHM.002</p>	<p>Coordination with F&S will be accomplished prior to finalization of Title II design.</p>
54		<p>JS-025-6002-M4 Reverse the air flow for the ventilation fans for the resistor banks. The heat should be drawn from above the banks and exhausted from the building rather than force it away from the banks into the surrounding building areas. T.ME.JHM.005</p>	<p>Agree, will revise in Title II.</p>

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55		JS-025-6002-M4 B Domestic Water Isometric: Show height AFF for PRV. (Applicable to all buildings with PRV.) <p align="right">C.ME.EOJ.007</p>	Agree, will add dimension.
56		JS-025-6002-M4 B Maintain a minimum 5 foot separation between the sanitary sewer lines and the buildings to avoid interference with the footings. <p align="right">C.ME.EOJ.006</p>	Agree, will add dimension.
57		JS-025-6002-M4 B, FP1.B, E3.B, W1.B The above drawings should agree with FS- GA-0016 and FS-GA-0034 that show temporary building enclosures for the stage hoists for ES-1 and ES-2 sinking. <p align="right">R.ME.DLK.013</p>	Agree, exact criteria for temporary enclosures will be defined and incorporated at 30% of Title II.
58		JS-025-6002-FP1 .B In an emergency, the hoist operator should have a number of things to do. The strobe lights and the alarm signals will be a distraction. Recommend that each operator be given an "acknowledge" button which will only stop the local alarms in his facility.	Agree.

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		N.ME.PEP.094	
59		JS-025-6002-FP1 .B The fire alarm strobe lights are behind the operator and the cabinet. Recommend they be relocated for visibility. N.ME.PEP.048	Agree, will incorporate in Title II when cab design is finalized.
60		JS-025-6006-M1 .B Ventilation design does not appear to heat 2 offices at Grid C-9 and computer room; it does not ventilate workstation room. Modify design, as appropriate, to improve indoor air quality. T.ME.SWP.012	Agree, H&N will reevaluate the heating requirement at the next Title II submittal.
61		JS-025-6006-M1 Provide conditioned air to the workstation room and the two offices using air conditioning or heat pump systems as required. T.ME.RLT.005	Agree, H&N will reevaluate the heating requirement at the next Title II submittal.
62		JS-025-6006-M1 B, 9F, 10F Furnish ventilation to workstation or indicate means of temperature control if this room is part of computer room	Agree, H&N will reevaluate the heating requirement at the next Title II submittal.

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
		system. <p align="right">T.ME.SCS.029</p>	
63		JS-025-6006-M1 B HVAC Plan: Redesignate "Dry Cooler Remote Heat Exchanger" as "Air Cooled Condenser Unit." <p align="right">C.ME.EOJ.011</p>	An air cooled condenser applies to a split-system DX outdoor unit. This cooler is a glycol coil heat exchanger connected to a water cooled condenser that is located within the indoor unit.
64		JS-025-6006-M1 B HVAC Plan: Indicate glycol piping to be located in raised floor space. <p align="right">C.ME.EOJ.010</p>	Agree, will add callout to clarify.
65		JS-025-6006-M2 B Domestic Water Isometrics: Provide check valve in CW-drop to process cooling units. <p align="right">C.ME.EOJ.012</p>	Agree.
66		JS-025-6006-M2 B Plumbing Plan: Suggest converting san. sewer system to a combination waste-vent system and eliminate VTRs. <p align="right">C.ME.EOJ.013</p>	Length of run exceeds recommended distance for combination waste-vent lines. VTR's preferred.
67		JS-025-6006-M2 B SURFACE DATA BUILDING PLUMBING PLAN	

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		Presently shown in the UPS Room is an eye wash station that is there because a battery charging station is located in this area. To comply with OSHA-1926.441 standard, a shower must be installed within 25 feet of a battery charging area. R.ME.FAS.001	Agree, will upgrade face/eyewash to shower and eyewash station.
68		JS-025-6006-FP1 .B If possible, there should be a separate fire zone for the computer room to kill power and call for assistance. N.ME.PEP.050	Agree.
69		JS-025-6006-FP1 .B Dry-charged sprinkler system was requested for computer areas in both the Surface and Subsurface Data Buildings. H & N drawings show Ordinary Hazard, Group 2, Wet-Pipe sprinkler system. A.ME.TJM.014	Comment understood, system will be reevaluated before resubmittal of Title II.
70		JS-025-6006-FP1 3 The halon system needs to be included in this fire protection plan. J.ME.RDE.005	Subject is addressed on General Note 4.

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
71		<p>JS-025-6006-FP1 .B There has been no documented substantiation and justification for the added cost of a Halon System. It is not required by code. If installed, in addition to meeting NFPA 12A, it must also meet DOE/NV standards for both design and equipment. (This applies to all Halon Systems). N.ME.PEP.095</p>	<p>SDRD 1.2.6.8.1 specifies a Halon System.</p>
72		<p>JS-025-6006-FP1 B Fire Protection Plan: Provide siamese FD connection ILO single connection. C.ME.EOJ.014</p>	<p>Only a single fire department connection is required at the NTS for facilities of less than 5,000 sq. ft. (acceptable to the authority having jurisdiction).</p>
73		<p>JS-025-6006-FP2 .B A graphic annunciator panel is recommended for the computer smoke detectors. N.ME.PEP.051</p>	<p>Agree, will provide in Title II.</p>
74		<p>JS-025-6006-FP2 .B The vault must meet DOE/EP-0108. N.ME.PEP.096</p>	<p>Agree.</p>
75		<p>JS-025-6006-FP2 B Furnish detectors in UPS room and records vault.</p>	<p>Smoke detectors are not required in UPS rooms. A detector will be provided in the vault.</p>

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80		JS-025-6007-M1 B General Notes: Add to Note 4 that space under raised floor in computer, IDS, and work-station rooms is used as a SA plenum. <p align="right">C.ME.EOJ.016</p>	Agree, will provide airflow arrow.
81		JS-025-6008-M1 B HVAC Plan: a. Clarify RA and EA duct runs at west wall. b. Provide EA outlet in shower area. c. Show space for eye wash in Lamp Room. <p align="right">C.ME.EOJ.018</p>	Agree, will provide section in Title II. Not required due to 6'6" partition walls. Agree, will provide background change.
82		JS-025-6008-M1 E9 Have the calculations on hydrogen off gassing been completed and do they require external ventilation of the lamp room? <p align="right">N.ME.DDB.005</p>	No calculations have been performed since hydrogen out gassing is a function of the brand and type of battery. Ventilation is provided for 4 air changes per hour which should be adequate for almost all battery types.

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83		<p>JS-025-6008-M2 B a. Recommend running piping above clg. ILO in partition for shower area.</p> <p>b. Recommend floor mounted water closets ILO wall mounted as shown in toilet area.</p> <p>c. Show T&P relief valve for electric water heaters.</p> <p>d. Indicate piping above clg. along east wall.</p> <p align="right">C.ME.EOJ.019</p>	<p>There is no ceiling.</p> <p>Agree, both are acceptable. Floor mounted water closets will be specified.</p> <p>Agree, will provide in Title II isometric.</p> <p>See response above 83.a.</p>
84		<p>JS-025-6008-FP1 .B Most areas of this building will be damp locations and require corrosion resistant sprinklers.</p> <p align="right">N.ME.PEP.055</p>	<p>Agree, will provide in Title II.</p>
85		<p>JS-025-6008-FP1 B Sprinklers in shower area is excessive, remove if allowable under current regulations.</p> <p align="right">T.ME.SCS.034</p>	<p>Required per NFPA 13.</p>

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
		N.ME.PEP.100	
91		JS-025-058-1FP1 .B ALL TRAILERS In regards to all raised floor areas, see NFPA 13, Paragraph 4-4.3. N.ME.PEP.101	Agree, space will meet the conditions allowing for the omission of sprinklers.
92		JS-025-058-2-M1 B Partial Floor Plan - Plumbing: Show san. sewer pipe as a solid line (as per the plumbing legend). Applicable to all other drawings where shown as dashed line. C.ME.EOJ.024	Agree, will standardize.
93		SECTION 15140 .A 1.05 15140.A, 15190.A, 15242.A, 15260.A, 15300.A, 15365.A, 15410.A, 15440.A, 15450.A, 15480.A, 15781.A, 15782.A, 15785.A, 15811.A, 15860.A, 15865.A, 15870.A, 15875.A, 15880.A, 15885.A, 15890.A, 15910.A, 15936.A, 15990.A Insert "The Quality Assurance Level of this item/activity is found in ESF- QALAS". T.ME.PJK.053	Where ESF QALAs apply, those QALAs will be referenced.

COMMENT RESOLUTION SHEET

Document Originator H&N
Date 8/8/88
Document Title ESF 100% Technical Review
Title I
Electrical
Coordinator _____

TECHNICAL ASSESSMENT REVIEW

Acceptance Signatures
Chairperson [Signature] Date 9/15/88
QA [Signature] Date 9/15/88
AE [Signature] Date 9/15/88
WMPO [Signature] Date 9/16/88

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RESOLUTION

See Page 2 for start of comments.

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
1		JS-025-6000-E2 .B AND OTHERS As emergency area lighting is shown, there is no requirement for exit lights. These should be deleted. N.EL.PEP.044	Agree.
2		JS-025-6000-E2 B The electric roll-up doors are required to have a safety stop device per NTS Construction Specifications, paragraph 9.4.2.2. R.EL.JLB.003	Agree, will be included in the next submittal for Title II design.
3		JS-025-6000-E2 B C11 Clarify the requirement for two 480/277 volt power panels (PP7 & PP8) instead of using one. R.EL.LJF.010	PP-8 is the main panel which feeds panel PP-7 and PP-6.
4		JS-025-6000-E2 B E8 Include a motor starter for the 5 hp motor on the air compressor. R.EL.LJF.013	Agree, will be included in the next submittal for Title II design.
5		JS-025-6000-W1 B Show telephone backboard so that it does not interfere with power panels and transformer on the same wall space as shown on Drawing JS-025-6000-E2.B-C10.	Telephone backboard will be relocated to the north wall outside of the restroom, in the shop area. JS-025-6000-W1.B, E-9.

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		R.EL.LJF.009	
6		JS-025-6000-W1 B Too few phone outlets in building, add several in shop bay area. T.EL.SCS.023	Additional phone outlets will be added.
7		JS-025-6000-W1 B The last sentence of keyed note #1 should be corrected to read "UL/FM Koppers NCX nonleaching plywood". This same correction should be made to keyed note #1 on drawings JS-025-6001-W1.B, JS-025-6002-W1.B, JS-025-6006-W1.B, JS-025-6008-W1.B, JS-025-058-1-W1.B and JS-025-058-2-W1.B. R.EL.JLB.004	Agree.
8		JS-025-6001-W1 B Too few phone outlets in building, add several in storage bay area. T.EL.SCS.026	Additional phone outlets will be added during Title II.
9		JS-025-6001-W1 B Add phone outlets in bay and service areas. T.EL.SCS.027	Agree.

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10		JS-025-6004-E1 B Phone outlets not shown on this or other drawing. Correct this omission. T.EL.SCS.028	During Title I the requirement for telephone service had not been identified. Requirements will be further investigated during Title II.
11		JS-025-6006-E1 B The term "Processing Unit" should read "Indoor Process Cooling Unit" to match DWG JS-025-6006-M1.b. A.EL.TJM.012	Agree.
12		JS-025-6006-E1 B F7 Relocate 112 1/2 KVA transformer "TR-IDS-1" outside as it will take up at least 2 feet of the 4 feet hallway. R.EL.LJF.015	Agree.
13		JS-025-6006-W1 B There is a need for telephones and PA capabilities in the computer room and IDS Console Room of the IDS alcove Subsurface Data Building and IDS Surface Data Building. A.EL.TJM.013	Exact location of telephone outlets for the Surface Data Building 6006 and Subsurface Building 6007 will be determined during Title II. General note 5 refers to PA speakers for each building/ trailer.
14		JS-025-6006-W1 B Furnish additional phone outlets in computer room, UPS room, and communications room.	See comment 13.

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
		T.EL.SCS.031	
15		JS-025-6006-W1 B,D,E7 The EAPBX and Mine plant experimenters intercom and a UPS should be shown in the Communications Room. align="right"> N.EL.DDB.004	EAPBX and mine plant experimenters intercom will not be located in the communications shelter.
16		JS-025-6007-E1 .B Light fixtures must meet DOE/EP-0108. align="right"> N.EL.PEP.053	Agree.
17		JS-025-6007-W1 B Furnish additional phone outlets in computer room, and IDS console room. align="right"> T.EL.SCS.032	Additional phone outlets will be added during Title II design.
18		JS-025-6007-W1 GRID G-6 TO G-11 A cross-section elevation view should be provided. align="right"> A.EL.SDF.001	Cross-section elevation views are not normally provided when depicting telephone outlet locations.
19		JS-025-6008-E1 B Lighting and Power Plan: Show space for EW in lamp room. align="right"> C.EL.EOJ.021	Agree.

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20		JS-025-6008-W1 B, 8E Furnish phone outlet in supervisors and visitors locker room. T.EL.SCS.035	Additional phone outlets will be added during Title II.
21		JS-025-ESF-E2 A Add: Notes For general notes, see Dwg. JS-025-ESF-E1. R.EL.MAF.009	Agree.
22		JS-025-ESF-E2 A H-3 Applicable QALAS should be listed. T.EL.PJK.008	Agree.
23		JS-025-ESF-E3 A H-3 Applicable QALAS should be listed. T.EL.PJK.009	Agree.
24		JS-025-ESF-E4 B D-3 Applicable QALAS should be listed. T.EL.PJK.010	Agree.
25		JS-025-ESF-E5 E6.B,E7.B,E8.A,E9.A Applicable QALAS should be listed. T.EL.PJK.011	Agree.

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26		<p>JS-025-ESF-E2 AND E4.A Cross-references of power feeds from MPP-1 to MPP-2, 3, and 4 (Essential Power, Bays 5, 8, and 9) are incorrect. Should indicate ATS-1, 2, and 3 instead of MPP-2, 3, and 4. A.EL.TJM.009</p>	<p>Agree.</p>
27		<p>JS-025-ESF-E3 .A AND OTHERS In all cases, power for the Fire Alarm Control Panel is to be taken off the 110 volt circuit, in a separate fused panel, ahead of the main disconnects. N.EL.PEP.030</p>	<p>Agree, details will be shown in the next submittal for Title II.</p>
28		<p>JS-025-ESF-E3 A The number of transformers could be reduced by incorporating a central secondary substitution area to service the shops, trailers, and other surface facilities. A central area could be more easily incorporated into the design when standoff requirements and all protection systems required by 6430.1A, in particular 1640-2.3 which requires that the minimum number of transformers necessary, etc. J.EL.LJO.020</p>	<p>Consideration will be taken into account during Title II design.</p>

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29		<p>JS-025-ESF-E4 There appears to be the potential to run both the 1500 HP and the 900 HP on generator power together. This would add to the size requirement for the generators and is probably not necessary. J.EL.LJO.046</p>	<p>Agree, will provide a design analysis in Title II.</p>
30		<p>JS-025-ESF-E4 There appears to be the potential to feed the 1500 HP hoist package from the generators and normal power at the same time. This could damage the hoist package. Show protection switches. J.EL.LJO.047</p>	<p>Agree.</p>
31		<p>JS-025-ESF-E4 It seems that the first aid facility should be on essential power. Also any pumps etc for fire protection should be on essential power. J.EL.LJO.048</p>	<p>Agree.</p>
32		<p>JS-025-ESF-E4 B Power for hoist PNL "H" 100A and HA "100 should not be from same distribution as power for hoist package. Remove</p>	<p>Agree.</p>

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		<p>present connection between ES-1 and hoisthouse and add facility for hoisthouse separately. J.EL.LJO.019</p>	
33		<p>JS-025-ESF-E5 Consideration should be given to minimizing the necessary crossovers of IDS data cables with the 4160 line. Possible relocation of 4160 line to G-4 and routing data cable to back side of ES-1 and ES-2 should be considered. A.EL.TJM.016</p>	<p>Routing of IDS and power cables will be coordinated in Title II design.</p>
34		<p>JS-025-ESF-E5 B Show the routing and/or the location with respect to each other of the buried main pad utilities (electrical duct bank, water, sanitary sewer, compressed air, mine waste water, communications) showing vertical and horizontal spacing requirements. R.EL.LJF.005</p>	<p>Agree, details will be provided in the next submittal for Title II design.</p>
35		<p>JS-025-ESF-E5 B Power and lighting plan or some other drawing should show proposed ground net. J.EL.LJO.021</p>	<p>Grounding will be shown in Title II design.</p>

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36		JS-025-ESF-E5 B No provision for LLNL Machine Shop Trailer (See 50% Review Comment L.E.DW.010). L.EL.DGW.001	No criteria for the facility has been officially received.
37		JS-025-ESF-E6 Installation of a buried fuel tank (include all buried fuel lines) requires notifying the state (Subtitle I 9002) and providing detection, monitoring, and testing as outlined in Subtitle I.9003 and 9005. T.EL.THP.029	Agree.
38		JS-025-ESF-E6 .B D-7 Standby generators will require a registration certificate and operating permit. Emission controls should be designed to meet those requirements (NAC 445.430-445.945). T.EL.THP.040	Agree.
39		JS-025-ESF-E6 B Clarify showing the tie between the 16 MVA transformer and MPP-1 as an underground 4" conduit where on JS-025-ESF-E2.A, the tie is bus bar from a transformer transition section.	Agree, will be clarified in the next submittal for Title II.

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		R.EL.LJF.008	
40	JS-025-ESF-E6	B Notes: Add Notes: For general notes, see Dwg. JS-025-ESF-E1	Agree.
		R.EL.MAF.002	
41	JS-025-ESF-E7	A Add: Notes For general notes, see Dwg. J8-025-ESF-E1.	Agree.
		R.EL.MAF.001	
42	JS-025-ESF-E8	A Add: Notes For general notes, see Dwg. JS-025-ESF-E1.	Agree.
		R.EL.MAF.003	
43	JS-025-ESF-E9	A Add: Notes For general notes, see Dwg. JS-025-ESF-E1.	Agree.
		R.EL.MAF.004	
44	JS-025-ESF-E6	B D7 Provide a layout of the generator building showing the location of the 8	Agree, this will be provided in the next submittal for Title II design.

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		generators and their associated equipment. Include the location of the metal clad switch gear, MPP-1, MPP-2, MPP-3, and MPP-4. R.EL.LJF.016	
45		JS-025-ESF-E7 A Modify shaft section on ES-1 to show bottom of shaft approximately 50 feet below floor of MTL. (Shaft will not penetrate Calico Hills unit at this time.) K.EL.DW.001	Agree.
46		JS-025-ESF-E7 C7 Add a note stating that "there are currently no plans to excavate to the CHOR. The drawing shows how the UPS would be installed if it is later decided to so excavate". T.EL.EMC.010	The Calico Hills Drill Room will be deleted.
47		JS-025-ESF-E7 H&N This drawing references the Calico Hills Drill Room. It is the project position to delete references to the CHDR on drawings, yet to maintain this option. Recommend you interface with F&S to obtain the new reference shaft	The Calico Hills Drill Room will be deleted.

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		bottom elevations. <p align="right">J.EL.RSW.005</p>	
48		JS-025-ESF-W10 B Move the EPABX and the mine plant intercom system to a more centrally located facility on the main pad. This will reduce the mean distance of the distribution lines to the individual stations. <p align="right">T.EL.JHM.001</p>	Agree.
49		JS-025-ESF-W10 B,E,D8,9 The EPABX and Mine Plant Intercom System should not be located in the communications shelter. This is due to the fact that there is adequate space available in the communications room in the Surface Data Building. Another reason is that all cable from every telephone and intercom station would have to be routed to the communications shelter and back. Instead, it would be a much shorter run to the Data Building. <p align="right">N.EL.DDB.001</p>	EAPBX and mine plant experimenters intercom will not be located in the communication shelter.
50		JS-025-ESF-W12 A dedicated communications system for each shaft independent of any other	Agree, Title II design will depict the use of separate mine phone systems for shaft sinking as requested.

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		<p>communications system is required. This system is to provide communications between the hoist operator, collar, and shaft stations during the construction/shaft sinking phase(s). Following completion of shaft sinking and for ongoing mining of the drift(s), the multipath intercom type system proposed in this Technical Assessment Review is acceptable. E.EL.WAB.001</p>	
51		<p>JS-025-ESF-W12 .B Normal telephone service is apparently available and could be used for reporting emergencies, especially if selective numbering is used. The alarm reporting phones shown on Drawing JS-025-ESF-T3.A should be deleted to reduce cost and complexity. N.EL.PEP.040</p>	<p>Agree, during Title II, H&N will determine if the normal dialing phone system meets the emergency needs that are served by the referenced alarm reporting phone. If the normal dialing phone service can be configured to meet emergency needs, the alarm reporting phone system will be deleted. If not, H&N will justify the use of alarm reporting phone system.</p>
52		<p>JS-025-ESF-W14 .B GRID C-7 Relocate intercom 50 to other end of shaft. G.EL.MSW.009</p>	<p>Relocation will be reflected in Title II, after coordination with USGS.</p>

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53		<p>JS-025-ESF-W15 .B (And other H&N MTL drawings) are not the same geometry from the F&S drawing FS-GA-0161 (and others). This is obvious with respect to the fuel station and the sump alcove. The suggestion is that the same geometry be used in both packages.</p> <p align="right">A.EL.TJM.001</p>	<p>Agree, Title II drawings will reflect the same geometry.</p>
54		<p>JS-025-ESF-W15 B, D7 Identify Infiltration Test area.</p> <p align="right">G.EL.RWC.016</p>	<p>Agree, and also, H&N will remove the room designation from the Bulk Permeability Test Area.</p>
55		<p>JS-025-ESF-W3 .B AND OTHERS As one of the primary reasons for the main tunnels and shafts (not cross drifts) is to carry environmental air, it is recommended that NFPA 70, Paragraph 300-22 (c) should apply to all wire and cable that are located in the main tunnels or shafts.</p> <p align="right">N.EL.PEP.038</p>	<p>Agree.</p>
56		<p>JS-025-ESF-W3 B Drawings, such as electrical details for the IDS cable plant, created in both H&N and F&S packages should be coordinated so that they agree.</p>	<p>Agree.</p>

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		A.EL.TJM.011	
57	JS-025-ESF-W3 B	<p>Change cable tray to open top, open work type tray to facilitate cable identification, maintenance and emergency repair and control. A completely closed tray will hide more problems than it will protect against. For example:</p> <ol style="list-style-type: none"> 1. In the confined drift space, maintenance will be prolonged and difficult (i.e., location of concealed problems, removal of bolted covers, work space, etc.). 2. Ducting of line fire along enclosure access and cover length. 3. Inspection problems due to enclosure opening requirements. 4. Difficulty in adding or removing cable from tray. 5. Tendancy of closed tray to collect water. <p align="right">T.EL.SCS.020</p>	<p>Disagree, covered cable trays are a practical design requirement (IDS, Part 3, para 4.2.2) and NFPA 70, 300-22 (c) as expensive Plenum cables would be required if cable trays are not used. With respect to the facilitation of cable identifications, maintenance and repair:</p> <ul style="list-style-type: none"> * The trays are wide and shallow so cables can be easily found. * The system for identification of cables will be developed in Title II. * The trays will be installed to allow clearance for re-entry. H&N will recommend fused terminal blocks for all multipair cables to reduce need for servicing. <p>In addition, the potential problems related to the use of completely closed cable trays has been considered as follows and will be more fully investigated in Title II.</p> <ol style="list-style-type: none"> 1. Cables in these cables trays should not require servicing after initial installation.

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58	JS-025-ESF-W4	<p>An unincorporated comment from ESF Title I 50%:</p> <p>"The drawing does not show any facility for potable water treatment." T.EL.THP.006</p>	<p>2. Selected fire retardant materials for cable insulation will be self extinguishing.</p> <p>3. Electrical and performance testing can be performed without entering the cable trays. Visual inspection should not be necessary.</p> <p>4. Properly located DAS's and Zone boxes, along with adequate spares, should preclude the need for cable count changes. This will be considered in Title II.</p> <p>5. Natural and engineered tray drainage will be considered in Title II. Also performance of the cable plant should not be effected by moisture in the cable trays.</p> <p>Potable water is provided from Well J-13. H&N will reference the chlorinator on the appropriate drawing.</p>
59	JS-025-ESF-W5 .B AND OTHERS	<p>Many of the Telemetry block diagrams depict more than would normally be</p>	<p>Drawings submitted contain basic information necessary for a fundamental understanding of telemetry system intent and operation. This</p>

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		required to meet DOE standards and usage. These should be referred to an ad-hoc subcommittee as suggested in comments on drawing JS-025-ESF-FP5.B. N.EL.PEP.039	is standard information contained within H&N telemetry controlled systems packages.
60		JS-025-ESF-W5 B Include control provision to override demand for water from the 150,000 gallon tank whenever the 10,000 gallon tank is low, then restores demand when the 10,000 gallon tank is replenished. R.EL.LJF.007	Agree, complete system operation and sequence of events are to be included in the next submittal for Title II effort.
61		JS-025-ESF-W6 B, AND W17.B Remove and relocate the communication terminal board from the hoist house. R.EL.DLK.011	Title II drawings will reflect the communications terminal removed from hoist house. The CCTV interface box will be moved to ES-2 hoist cab. A small terminal will be required for distribution of the Mine Plant and administrative telephones to their respective hoist cabs.
62		JS-025-ESF-W7 B, W8.B Consideration should be given to providing a camera at the ES-2 headframe skip discharge location. R.EL.DLK.010	Agree, a camera will be added to the Title II engineering package.

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63		JS-025-ESF-W8 B The cable reel unit shown in detail 1 and 2 needs to be identified as to use and purpose. <p align="right">T.EL.SCS.021</p>	H&N will comply.
64		JS-025-ESF-W9 B, 9C Foundation for tower appears inadequate to resist overturn from wind loading. Provide needed foundation. <p align="right">T.EL.SCS.022</p>	Exact dimensions for the tower foundation will be provided during Title II.
65	1.05	SECTION 16010 16111, 16112, 16114, 16120, 16123, 16130, 16141, 16190, 16195, 16250, 16310, 16320, 16351, 16360, 16401, 16402, 16420, 16480 Should include "The Quality Assurance Level of this item/activity is found in ESF-QALAS". <p align="right">T.EL.PJK.054</p>	Agree, where QALAS applies.
66	1.05	SECTION 16440 16450, 16460, 16461, 16465, 16470, 16500, 16530, 16601, 16610, 16611, 16612, 16614, 16721, 16726, 16740, 16741, 16750, 16770, 16782, 16903	Agree, where QALAS applies.

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		Should include "The Quality Assurance Level of this item/activity is found in ESF-QALAS _____". <p align="right">T.EL.PJK.055</p>	
67		SECTION 16721 DOE/NV Standard Specifications, 1980, should be used as a guide for all technical areas. <p align="right">N.EL.PEP.113</p>	Agree.
68		SECTION 16721 3.05 Paragraph 3.05 and perhaps all fire protection specifications should be reviewed by the Fire Protection/Life Safety Subcommittee. Zones will particularly need their review. <p align="right">N.EL.PEP.114</p>	Disagree.
69		SECTION 16903 .A Information pertaining to quality control/inspection should be included in this specification for the waterline waterless telemetry system. <p align="right">F.EL.JAJ.026</p>	Agree, will be done in Title II.

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Date 8/8/88
Document Title ESF 100% Technical Review
Title I
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Coordinator _____

TECHNICAL ASSESSMENT REVIEW

Acceptance Signatures

Chairperson L. Beall Date 9/15/88
QA [Signature] Date 9/15/88
AE [Signature] B.L. Bullock Date 9-16-88
WMPO [Signature] Date 9/16/88

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RESOLUTION

See Page 2 for start of comments.

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
1		FS-GA-0011 Building No. 11 is identified as a warehouse. H&N drawing JS-025-ESF-C4 identifies this building as "unassigned". Correct discrepancies. T.CI.RLT.006	Agree. Will update Dwg. to conform with H&N Dwg. JS-025-ESF-C4.B.
2		FS-GA-0011 Building #10 is the REECo shop and Building #11 is unassigned. Change the drawing to so state. R.CI.WHG.002	Agree. Will update Dwg. to conform with H&N Dwg. JS-025-ESF-C4.B.
3		FS-GA-0011 No provision for LLNL Machine Shop Trailer (See L.F.DW.002-50% Review). L.CI.DGW.002	Will coordinate with H&N.
4		FS-GA-0011 Concerning guard rails between main fans and haul road. Consider substantial barrier to protect the fans from being hit by a haul truck. M.CI.JW.002	Agree. Will consider substantial barrier by 60% Title II.
5	5B	FS-GA-0011 Haul road designation conflicts with actual use of road (T.F.SS.006). T.CI.SCS.002	Haul road will be changed to H Road per H&N Dwg. JS-025-ESF-C20.B.

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
6	FS-GA-0011	5B Remove "Haul Road" label on road. T.CI.SCS.040	Agree. See Civil Comment #5.
7	FS-GA-0011	5C, 4C Furnish traffic control lights for haul trucks to either side of cross over point. T.CI.SCS.043	Agree. Will incorporate in Title II.
8	FS-GA-0011	7C Passenger vehicle traffic pattern overlaps haul truck turn around area and conflicts with the traffic pattern shown on H&N drawing JS-025-ESF-C4.B. T.CI.SCS.042	Agree. Will update to conform with H&N Dwg. JS-025-ESF-C4.B.
9	FS-GA-0011	D4 In the note describing where the road goes, replace "IDS" with "muck storage". T.CI.EMC.013	Agree.
10	FS-GA-0011	8C Identify the purpose of burm/ramp shown. T.CI.SCS.041	BERM/RAMP will be deleted per H&N Dwg. JS-025-ESF-C4.B.

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11	FS-GA-0011	D-C Side loading the 35 ton trucks may cause one or more of the following conditions: <ul style="list-style-type: none"> o de-rated payload o increased spillage o bed modification o unbalanced loads Suggest that an end loading option be provided by the design. T.CI.IRC.004	The Loading System is designed for both ways; either side loading or end loading whichever is convenient to the operator.
12	FS-GA-0012	Since there is no need for the dump wall at ES-1 during the operation period, remove the wall but provide a design which allows simple reinstallation. This will open up collar area for access, ventilation, etc. in the event that a decision will be made later to sink to the Calico Hills level or a need arises to hoist rock for some other reason. J.CI.LJO.007	Agree. Will incorporate details in Title II.

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
13	FS-GA-0012	C-C Reference 30 CFR 57.18002 (a) & 57.19104 The 5-ton rated job cranes located at the shaft collars can be accidentally swung into the open shaft compartment when not in use. A lock or latch should be installed to secure the crane-boom at the farthest retracted position. M.CI.PT.003	Agree. Will add note on the Drawing. "Jib crane shall be provided with a locking device. Crane shall remain in locked position at all times if not in use."
14	FS-GA-0012	0013, 0014, 0030, 0031, 0033 Provide a lock for the existing 5 ton jib crane to prevent the jib from swinging when not in use. R.CI.FAS.013	Agree. Will add note on the Drawing. "Jib crane shall be provided with a locking device. Crane shall remain in locked position at all times if not in use."
15	FS-GA-0013	Meteorological information will be needed for certain tests planned in the shaft. Indicate location for meteorological equipment on the headframe. T.CI.THP.025	Agree. Will incorporate in Title II.

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16	FS-GA-0013	Provide a lock for the existing 5 ton jib crane to prevent the jib from swinging when not in use. R.CI.FAS.014	Agree. See comment Response Civil #14.
17	FS-GA-0013	Reference 30 CFR 57.19120 & 57.19129 Drawing depicts 900 hp hoist drum gravity brake weight travels in a well "hole" below the floor level. This design restricts inspection, housekeeping, and maintenance. M.CI.PT.009	Agree. Will investigate at 60% Title II other alternatives to allow inspection & maintenance of gravity brake weights.
18	FS-GA-0013	In response to several comments on the 50 percent Title I design, the Action/Response to shaft Item #18 Page 3 of 36 states "a dedicated emergency hoisting system will be considered in the Title I design." This is not evident from the referenced drawings. K.CI.DW.007	Agree. No emergency hoisting was considered for ES-1 during operational phase because access ladders are provided according to CA law to the full depth of the shaft. Emergency hoisting is provided during sinking phase (see Dwg. FS-GA-0015). For Title II design this additional option will be incorporated. F&S will provide documentation that one emergency hoist is adequate for both shafts.
19	FS-GA-0013	A-A Reference 30 CFR 57.11001, 57.19007, 57.19083, 57.19129, 57.19130	Disagree. Tapered Guides is an added safety feature to decelerate the conveyance before crashing into the crash beams in the event

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		<p>Tapered guides in the headframe should be removed. They are a high maintenance item, working off of cross head to maintain guides provided limited safety. Safety controllers "Lillies" installed with overtravel and deceleration cams, properly installed and adjusted to the hoist function will negate the need for tapered guides.</p> <p align="right">M.CI.PT.002</p>	<p>of overtravel due to malfunction of the hoist controls. CFR 30 57.19036 states that headframes shall be high enough to provide clearance for overtravel and safe stopping of the conveyance. Tapered guides were discussed at the 50% Title I Review and were re-evaluated for 100% design and incorporated into the design. Platforms accessible from stairs will be designed in Title II for safe access for inspection and maintenance.</p>
20	FS-GA-0014	<p>Provide a lock for the existing 5 ton jib crane to prevent the jib from swinging when not in use.</p> <p align="right">R.CI.FAS.016</p>	<p>Agree. See comment response to Civil #14.</p>
21	FS-GA-0014	<p align="center">SECTION C-C</p> <p>The note for the 5 ton jib crane (for sinking bucket handling) should say "relocated", as the jib crane is not in Section C-C.</p> <p align="right">R.CI.RRR.006</p>	<p>Disagree. Jib crane will be shown phantom outline to indicate it is located above the section. It will be marked "Relocated" on the operational phase Dwg. (See Dwg. FS-GA-0012).</p>
22	FS-GA-0014	<p>Illustrate and label the crosshead/bonnet in all pertinent</p>	<p>Agree. Will incorporate in Title II Design.</p>

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		<p>sections to ensure adequate clearance . space exists for the required functions. The crosshead should be the largest item moving in the headframe area.</p> <p align="right">J.CI.LJO.036</p>	
23		<p>FS-GA-0014 Section C-C, area D-6 of the drawing shows a cross member at collar access area which would block access to the shaft. Remove this member and check headframe design to determine if adequate clearances exist.</p> <p align="right">J.CI.LJO.009</p>	<p>Agree. Cross member will be deleted.</p>
24		<p>FS-GA-0015 To satisfy the shaft comment #85 on the 50% Title I design that the barrier wall between ES-1 and ES-2 be fireproof the man doors shown to provide access between the hoists should also be fireproof.</p> <p align="right">K.CI.DW.008</p>	<p>Agree. Will update to conform with H&N Dwg. JS-025-6002-A1.A.</p>
25		<p>FS-GA-0015 The barrier wall between ES-1 and ES-2 hoists is shown as a concrete block wall. The H&N drawing JS-025-6002-A1A</p>	<p>Agree. Will update to conform with H&N Dwg. JS-025-6002-A1.A.</p>

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		<p>is shown as a 12 inch reinforced CMU wall. These drawings should be made compatible.</p> <p style="text-align: right;">K.CI.DW.009</p>	
26	FS-GA-0015	<p>Collar arrangement does not show arrangements necessary to fix concepts. An additional drawing should be provided at the collar area to demonstrate how the vent system works with the doors closed, how the equipment access necessary for shaft construction is provided and other features necessary to understand the operation of the collar area especially where safety analyses are involved.</p> <p style="text-align: right;">J.CI.LJO.006</p>	<p>Disagree. See Dwgs. FS-GA-0027, & 0028 which are additional drawings in the collar area. Notes and intake airflows arrows will be added on the drawings to demonstrate the ventilation system.</p>
27	FS-GA-0015	<p>Show fence and gate necessary to protect collar and allow access and operation around the collar.</p> <p style="text-align: right;">J.CI.LJO.034</p>	<p>Disagree. Fence & gate are not required because collar platform and doors will provide the barrier. Removable handrail and toeplate installed at the North/South side of the collar door opening provides an additional barrier if doors are open</p>
28	FS-GA-0015	<p>The crosshead shown does not have a bonnet and therefore provides no</p>	<p>Agree. Will add cross head bonnet and dimensions.</p>

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29	FS-GA-0015 0031, 0033	<p>overhead protection for personnel in the bucket. Add proper overhead protection. Also show dimensions of the crosshead necessary to hold the bucket stable during hoisting.</p> <p style="text-align: right;">J.CI.LJO.035</p> <p>Consideration should be given to replacing the present suggested emergency rescue truck with a permanently mounted hoist at each shaft. The advantage to a permanently mounted hoist would be lower maintenance and higher reliability compared to the vehicle type hoist. The emergency vehicle would require time for transportation to the location along with spotting and set-up time. In addition, maintenance schedules would have to be developed for both the boom/hoist portion of the unit as well as the vehicle portion. If this unit would be down for major repairs, a similar unit would have to be available. Permanently mounted hoists will be on location at all times and could easily be replaced with a similar unit. The cost of a back up</p>	<p>Disagree. Permanent emergency hoist system would not be possible on ES-1 or ES-2 during sinking phase because of space limitation for an emergency hoist sheave in the headframe. (See sect. E-E FS-GA-0014) and hoist foundation on the surface. (FS-GA-0011). Similar space limitations exist during the operational phase. In our estimate the application of truck mounted emergency hoist is more flexible and economical.</p>

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		<p>hoist unit would be considerably less than the vehicle unit. R.CI.FAS.006</p>	
30	FS-GA-0015 AND 0031 AND 0032 Reference 30 CFR 57.19111	<p>During shaft sinking, fixed ladders or an escape hoist shall be provided.</p> <p>Emergency torpedo truck must comply with personnel hoisting standards. Fixed emergency hoist is recommended. M.CI.PT.006</p>	<p>Agree. The truck mounted hoist will be provided for ES-1 and ES-2 for sinking phase and will be designed to comply with federal safety provisions and personnel emergency hoisting standards. The procurement specification will be written by 60% Title II.</p>
31	FS-GA-0015 4B Indicate clearances and/or special construction allowances for removal of shaft sinking drill jumbo. T.CI.SCS.044		<p>Disagree. Adequate clear access space is provided in headframe framing (13' x 28') for equipment handling during construction phase. Jib crane will be used for installation. No special provisions are required for drill jumbo. Information on the dimensions of the drill jumbo will be added in Title II.</p>
32	FS-GA-0015 B5 The position of the collar door air cylinders causes the following concerns:		<p>Agree. Alternative arrangements for collar door with air cylinder under the collar platform will be developed and evaluated with operator (REECo) before Title II design will be started.</p>

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		<p>o Extended rams in the closed door position will be subjected to abrasion and bending loads during materials handling, leading to reliability problems.</p> <p>o The pivoting of the cylinder during operation will require extensive guards and shields to ensure safety, thereby restricting the usable work space.</p> <p>Suggest that the cylinders be lowered and incorporated into the collar deck framing.</p> <p align="right">T.CI.IRC.003</p>	
33	FS-GA-0015 B5	<p>Air door attachment to headframe appears to be unnecessarily complicated. The size of the headframe is larger (14') than the collar doors also the surface obstruction should be reduced to limit items of personnel safety exposure to tripping and hampering access, etc.</p> <p align="right">J.CI.LJO.005</p>	<p>Agree. To simplify we suggest locating the cylinders under the collar doors. Refer to comment #32.</p>

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34	FS-GA-0016 Reference 30 CFR 57.19000	Recommend that double-drum stage hoist be replaced by two single drum hoists to satisfy rope stretch, tension and balance of the Galloway staging. M.CI.PT.008	Agree. Will revise & update to two single drum hoists during Title II.
35	FS-GA-0016	The double drum galloway hoist will not be acceptable. This should be two separate winches properly designed to support the galloway needs. J.CI.LJO.018	Agree. See comment response Civil #34.
36	FS-GA-0016	5-C Show two stage winches as opposed to a single double drum hoist. R.CI.WHG.003	Agree. See comment response Civil #34.
37	FS-GA-0016	The winches are too spread out and will interfere with operations around the shaft. Relocate all possible winches to a suitable location near the hoist house. Reduce form winches to two only if the third winch is the congestion problem.	Disagree. The winches are spread out for the following reasons: (a) To accommodate a possible bldg. enclosures for each winch. (b) To avoid rope interference with the headframe backleg bracings.

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		J.CI.LJO.045	
38	FS-GA-0016	0025, 0033, & 0171 Drawing does not have QALAS stamp. T.CI.PJK.002	(c) To avoid congestion and foundations overlapping. Agree. QALAS stamp will be added.
39	FS-GA-0025	Since the surface fans are so close to the shaft collar, the designers should consider putting additional noise control on the fans to back up the silencers shown. The additional backup could be done with an additional wall or enclosure made of sound attenuating material. Note: The title box on this drawing shows ES-2 rather than ES-1. K.CI.JEM.002	Agree. Will investigate and incorporate in Title II Design.
40	FS-GA-0025	Title identifies picturization as ES-2 plans and section. Should be ES-1 plans and section. T.CI.RLT.008	Agree. Will revise.

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		<p>vent ducts in primary access ways remove valuable space that can be used to provide increased areas for conveyances. Removal of the vent duct (ventilation would then be a flow through system) would allow a substantially larger conveyance and significantly improved operating conditions which would benefit the ESF for the life of the facility.</p> <p style="text-align: right;">E.CI.SAT.001</p>	<p>as presented, also refer to Ventilation Comment #2.</p>
51		<p>FS-GA-0026 There does not appear to be a requirement for the ring beams in the water ring structure. Since they would hamper pump installation, clean out, etc., the beams should be removed. Liner plates without ring beams should have adequate structural strength for probable ground stress. Required shape can be maintained by extending liner plate lip into concrete of above pour.</p> <p style="text-align: right;">J.CI.LJO.051</p>	<p>Agree, but the elimination of ring beams must be supported by stress analyses which will be performed in Title II.</p>
52		<p>FS-GA-0026 REV B A pump should be installed in the water ring with a flow meter to measure any output of water flowing from the water</p>	<p>Disagree. If required, the water ring will be provided with drain pipe and gravity flow down to the MTL Mine Waste Water Pump Station (see FS-GA-0235). The minimal amount of</p>

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		ring. A method of handling and metering the water that collects in the water rings should be provided. A.CI.SDF.007	water, which is expected from the collar level, does not justify the installation of pump and flowmeter.
53	FS-GA-0026	Show or otherwise indicate that the collar structure is a reinforced concrete structure. J.CI.LJO.052	Agree. The requirement and extent of reinforcing will be determined in Title II Design.
54	FS-GA-0026 6C	Utility tunnel wire enclosure now shown in this view. T.CI.SCS.047	Agree. Will revise.
55	FS-GA-0026 REV B GRID C-7	The 12' dia arrow extends to the rough edge of the concrete. It should extend to the inside of the concrete liner. A.CI.SDF.008	Agree. Will revise.
56	FS-GA-0027	A safety ladder is shown in ES-2 on Drawing FS-GA-0025 and others. A similar safety ladder is needed in ES-1 in the event there is trouble with that hoist and passengers must either	Disagree. Not required by SDRD.

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		climb up or down in order to get out. N.CI.PEP.057	
57	FS-GA-0027	The "Plan-Headframe Foundation" does not show any headframe foundation information. Add necessary information to fix headframe foundation concepts. Add section to ensure no interference problem etc. exists. J.CI.LJO.050	Disagree. This is a Title I design general arrangement drawing. The plan headframe foundation is the collar structure and headframe foundation. Additional details will be added in Title II Design after Title II planning is completed. For sections refer to FS-GA-0028.
58	FS-GA-0027 6B	Hoist rope relief opening in shaft collar doors should be shown and identified. T.CI.SCS.048	Agree. Will show.
59	FS-GA-0028 7C, 6C	Remove collar door air cylinders and replace with below deck hydraulics with slow release should system fail and door shut without the capability to control their rate of decent or hold them at one position. T.CI.SCS.049	Agree. See response to comment Civil #32.

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
60		FS-GA-0030 Provide a lock for the existing 5 ton jib crane to prevent the jib from swinging when not in use. R.CI.FAS.015	Agree. See response to comment civil #14.
61		FS-GA-0030 6C Wire enclosure extends over hinged platform, obstructing the movement of the hinged platform. T.CI.SCS.050	Agree. Will revise wire enclosure to clear hinged platform in Title-II.
62		FS-GA-0031 Meteorological information will be needed for tests conducted in the shaft. Indicate location of meteorological equipment on headframe. T.CI.THP.031	Agree. Will incorporated in Title II.
63		FS-GA-0031 Provide a lock for the existing 5 ton jib crane to prevent the jib from swinging when not in use. R.CI.FAS.017	Agree. See response to Civil #14.
64		FS-GA-0031 In response to several comments, on the 50 percent Title I design the Action/Response to shaft Item #18 Page 3	Disagree. Truck mounted emergency hoist system with torpedo cage for sinking and operational phase is shown on Dwgs. FS-GA-0031, 0033, 0040, 0042 and 0058.

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
		<p>of 36 states "a dedicated emergency hoisting system will be considered in the Title I design." This is not evident from the referenced drawings. K.CI.DW.006</p>	
65	FS-GA-0031	<p>It is recommended that all aboveground diesel or gasoline powered vehicles/equipment which are routinely in close proximity to the shaft openings (dump trucks, forklifts, end loaders, etc.) be required to have an automatic extinguishing system built into the engine compartment. An uncontrolled fire involving these items could be catastrophic because it may not only damage the headframe and cables, which could severely affect the whole project, but smoke would probably enter the shaft through the ventilation system and threaten the lives of personnel underground. R.CI.JLB.012</p>	<p>Agree. Will be addressed in the next submittal of this procurement specification in Title-II.</p>
66	FS-GA-0031 0013	<p>HEAD FRAME - OPERATION PLAN, Elevation & Section</p>	<p>Refer to Mining Comment #19.</p>

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
67	FS-GA-0031 Reference 30 CFR 57, 57.9034, 57.11001, 57.19103	<p>A-A</p> <p>It is recommended that the tapered guides at the top of the headframe be removed. The tapered guides may experience cracking around the bolts from vibration of the headframe while in the skid dumping operation. These cracks may cause the guides to fail when needed. Also, if a conveyance would hang up on the tapered guides, it would be very difficult and hazardous to remove the tapered guides.</p> <p>It is recommended that in place of the tapered guides, a procedure for good hoist and lilly control maintenance be installed. This would eliminate the need for tapered guides. This is a counter to a 50% Title I comment.</p> <p align="right">R.CI.FAS.008</p> <p>A free floating rock deflection door at the end of the muck discharge chute will direct rock material into the truck box, and will limit rock spillage,</p>	<p>Agree. Will incorporate this design feature at 60% Title II Design.</p>

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
		fly rock, tripping and slipping hazards. M.CI.PT.001	
68	FS-GA-0031	B3, B4 No facility is shown for dust control using sprays during surface muck dumping operations. This will be necessary regardless of other dust control measures taken. It will affect the collar design and require a change in water supply to the headframe. B.CI.BC.006	Agree. Water spray system for dust control at the muck dump area will be shown on detail design drawings in Title-II.
69	FS-GA-0033	Provide a lock for the existing 5 ton jib crane to prevent the jib from swinging when not in use. R.CI.FAS.018	Agree. See comment response Civil #14.
70	FS-GA-0034	Replace dual drum stage hoist with two (2) stage winches. R.CI.WHG.005	Agree. Will revise and update to two single drum hoists.
71	FS-GA-0034	ES-2 SURFACE, SINKING HOIST LOCATION PLAN	Agree. Will incorporate.

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
		<p>Show a path of entry for emergency torpedo truck while ES-2 is in sinking mode. It seems that headframe backlegs, form hoist and stage hoist enclosure would make entry very difficult in a situation that may require timely actions.</p> <p align="right">R.CI.FAS.019</p>	
72	FS-GA-0034	<p>Show how the emergency torpedo truck can be maneuvered into position at the shaft collar during the sinking phase with the form hoists in position.</p> <p align="right">R.CI.RRR.007</p>	Agree. Will incorporate.
73	FS-GA-0040 7-C	<p>Show screens and cleanout to protect vent fans from trash.</p> <p align="right">R.CI.WHG.006</p>	Agree. Will incorporate.
74	FS-GA-0040 7B	<p>Wire enclosure obstructs movement of hinged platform.</p> <p align="right">T.CI.SCS.051</p>	Agree. Will revise wire enclosure to clear hinged platform at Title-II.
75	FS-GA-0040 C-C Ref. 30 CFR 57.12082		Agree. Will investigate in Title-II. F&S will separate the water and power lines.

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		Suggest separating the water and power lines in the shaft as was done on ES-1 shaft. M.CI.JW.003	
76		FS-GA-0041 Show screens and cleanouts to protect vent fans from trash. R.CI.WHG.007	Agree. Will incorporate.
77		FS-GA-0041 SECTION A-A The necessity for a water ring in this location is not apparent. In this climate it may be more efficient to allow minor inflows to evaporate on the shaft walls. T.CI.IRC.006	Disagree. The water ring is a safety feature and a part of the isolation joint between the shaft lining and the headframe foundation. The water ring will also intercept the water dripping from the surface during a downpour.
78		FS-GA-0043 .B GRID C-7 Modify cage for temporary access ladder to comply with requirement in 30 CFR 57.11026 that cage start not more than seven feet above bottom of ladder. T.CI.SWP.023	Agree. Will modify ladder cage.
79		FS-GA-0045 Regarding the 900 hp hoist, show the two new drum flanges as indicated on Drawing FS-GA-0013.	Agree. Will incorporate.

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COMMENT NO.	PAGE	REVIEWER'S COMMENTS	RESOLUTION
		R.CI.RRR.008	