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DEPARTMENT OF ENERGY

CONSTRUCTION QUALITY ASSURANCE PROGRAM

PLAN FOR THE WIPP PROJECT

(CARLSBAD, NM)

DISCLAIMER

CONSTRUCTION QUALITY ASSURANCE PROGRAM PLAN

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FOREWORD

The purpose of this plan is to describe the Quality Assurance (QA) Program to be established and implemented by the U.S. Department of Energy (DOE) Waste Isolation Pilot Plant (WIPP) Project Office (WPO) and by the Major Project Participants: the Architect-Engineer (Bechtel), the Construction Manager (U.S. Army Corps of Engineers), the Scientific Advisor (Sandia National Laboratory), and the Management and Operating Contractor (Westinghouse Electric Corporation). This plan addresses the construction, including site evaluation, design, and turnover phases of WIPP. Other work in progress during the same period is controlled by DOE documents applicable to that work effort.

The QA Programs of the Major Project Participants are to be structured to comply with this plan and the intent of ANSI-ASME NQA-1-1979 as applicable to those activities involved in the WIPP Site evaluation, design, and construction. The Architect-Engineer has been delegated the prime responsibility for quality in design on the WIPP Project and, therefore, must ensure that appropriate controls are applied to the actual design process and that appropriate technical and quality requirements are included in design output documents, such as drawings and technical specifications. The quality requirements contained in design output documents will vary depending upon the importance of the involved item or service to the safe and reliable operation of the WIPP Project and upon the complexity and/or uniqueness of the item or service. The Construction Manager has been delegated the prime responsibility for the preparation, award, and administration of the construction contracts for the WIPP Project. The Contract General and Special Provisions contain appropriate programmatic quality requirements to be followed by the involved Construction Contractors. In addition to representing the DOE/WPO in quality-related activities, as requested, the Management and Operating Contractor has been delegated the responsibility for the acceptance (turnover) of WIPP equipment and facilities from the Construction Manager and, therefore, must ensure that the turnover of equipment and facilities is performed in such a manner that the condition of the item is well understood with regard to safety, operability, content, and accountability.

The prime responsibility for ensuring the quality of construction rests with the DOE WIPP Project Office and is implemented through the combined efforts of the Construction Manager, the Construction Contractors, the Management and Operating Contractor, and the Architect-Engineer. Inspection and burden of proof of acceptability rests with the Construction Contractor as defined by the technical provisions of the contract and as otherwise specified by the DOE WIPP Project Office on an individual work-package basis. To the maximum extent possible, acceptance of work will be based upon first-hand witnessing by the Construction Manager and other representatives of the DOE organization. Overviews will be performed by DOE, or their delegated representative, of selected activities to ensure that work performance and inspection activities conform to contractual and technical requirements. Adequate documentation of inspection overview and test results shall be maintained.

1.0 ORGANIZATION

1.1 The overall responsibility for Quality Assurance during investigations, design, and construction of the WIPP Site rests with the Owner (DOE). The overall WPO Construction Program is implemented through the combined efforts of DOE and the Major Project Participants.

The organizational structure, functional responsibilities, levels of authority, and lines of communication for activities affecting quality are documented in the Major Project Participants' Quality Assurance Manuals and Procedures and in DOE WIPP Standard Operating Procedures.

1.2 The organizational structure, functional responsibilities, levels of authority, and lines of communication for activities affecting quality shall be documented by each major project participant in their own QA program. Additionally, the persons responsible for ensuring that a QA program is established and verifying that activities affecting quality have been correctly performed shall have sufficient authority, access to work areas, and organizational freedom to:

- o Identify quality problems
- o Initiate, recommend, or provide solutions to quality problems through designated channels
- o Verify implementation of solutions
- o Ensure that further processing, delivery, installation, or use is controlled until proper disposition of a nonconformance, deficiency, or unsatisfactory condition has occurred

These persons must also have direct access to responsible management at a level where appropriate action can be effected. Such persons shall report to a management level such that required and organizational freedom are provided, including sufficient independence from cost and schedule considerations.

2.0 QUALITY ASSURANCE PROGRAM

2.1 THE QA Program policies and requirements for the WIPP Project are established and documented by the Owner (DOE) and defined in this document and in contractual work tasks assigned to the Major Project Participants. The QA Program for the WIPP Project complies with the intent of the provisions of ANSI-ASME NQA-1-1979, as applicable to the site characterization, design, and construction of WIPP. A graded approach to the basic requirements of

NQA-1 that apply to the WIPP Project Participants are identified in Figure 1-1. The hierarchy of WIPP Project QA requirements documents is shown in Figure 1-2. The Design Classification System is shown in Figure 1-3. The minimum quality requirements for items listed under the Design Classification System are outlined in Figure 1-4.

2.2 The Major Project Participants shall develop and implement plans and procedures for their delegated work scopes. The DOE/WPO has developed and implemented Standard Operating Procedures (SOP) to define the quality assurance guidelines to be followed by WPO and Major Project Participants at the WIPP Site.

2.3 Quality controls exercised by the Major Project Participants for shop and field testing, inspection, and procurement of materials shall be based on the assigned design classification of the specific items. The WIPP Design Classification System is described in Chapter 3 of the WIPP Safety Analysis Report (SAR). The corresponding quality control requirements to be considered for each assigned design classification (based on the item's uniqueness, complexity, and importance to public safety) are set forth in Figure 1-4. The resulting quality control requirements are addressed in the technical specifications by the responsible design agency. Such requirements are set forth to ensure that each item will perform its safety functions with the appropriate degree of reliability under the adverse conditions of design basis accidents and natural phenomena.

2.4 The application of quality requirements to WIPP Construction Contractors and suppliers will be accomplished by the inclusion of appropriate quality and documentation requirements in contractual provisions and in technical specifications.

2.5 The WIPP Project QA Program shall be implemented as defined in the SAR, DOE-SOPs, Major Project Participants' QA Manuals/Plans and other instructions and procedures. Management of the Major Project Participants shall ensure that their QA program provides for the planning and accomplishment of activities affecting quality under suitably controlled conditions. Such controlled conditions include the use of appropriate equipment, suitable environmental conditions for accomplishing the activity, and assurance that prerequisites for the given activity have been satisfied. Also, each Major Project Participant, as applicable, shall provide for any special controls, processes, tests, equipment, tools, and skills necessary to attain the required quality, and for necessary verification of quality, such as by inspection or test.

3.0 DESIGN CONTROL

3.1 The DOE has delegated prime responsibility for the design of WIPP components, systems, and structures to the Architect-Engineer. The Architect-Engineer shall establish and implement design control procedures which comply with the intent of ANSI-ASME NQA-1-1979.

3.1.1 The DOE/WPO has also delegated design responsibilities to the Scientific Advisor and the Management and Operating Contractor (MOC). These organizations shall establish and implement design control procedures to comply with the intent of ANSI-ASME NQA-1-1979.

3.2 The DOE has retained review and approval responsibility for all phases of design on the Project, including design changes, by the review and approval of design documents and associated documentation, and by periodic audits of the design control practices of the Architect-Engineer. The DOE/WPO utilizes the services of the MOC, the Scientific Advisor, and the Construction Manager to assist in the review of documents prepared by the Architect-Engineer.

3.3 Design changes initiated by the Architect-Engineer, the Scientific Advisor, or the MOC are processed in accordance with applicable WIPP Project Change Control Procedures. Post award construction change requests are processed in accordance with DOE-issued SOPs.

3.4 Design adequacy shall be verified by persons other than those who designed the item. Design changes, including field changes, shall be governed by control measures commensurate with those applied to the original design. This includes the review and approval of design changes by the organization that initiated the design, except where it has been determined that the Architect-Engineer is no longer responsible, then the DOE or its designee is responsible.

4.0 PROCUREMENT DOCUMENT CONTROL

4.1 The DOE has delegated prime responsibility for the award and administration of construction contracts and the procurement of some long-lead equipment to the Construction Manager. In some instances, procurement responsibility has been extended to the Architect-Engineer and the MOC. In addition, the DOE has delegated the award and administration of certain site validation, design verifications, and experimental test subcontracts and purchase orders to the Scientific Advisor and the MOC. The preparation and processing of procurement documents will be performed in accordance with the Construction Contractors and Major Project Participants' internal procedures unless otherwise

defined within their contracts. These procedures will ensure that procurement documents contain appropriate technical and quality requirements. To the extent necessary, procurement documents will require contractors and suppliers to have quality programs which are adequate to provide the required quality of the applicable items or services. Changes to primary procurement documents shall be subject to approval by the DOE/WPO.

4.2 Technical requirements shall be specified in the procurement documents. Where necessary, these requirements shall be specified by reference to specific drawings, specifications, codes, standards, regulations, procedures, or instructions, including revisions thereto that describe the items or services to be furnished. The procurement documents shall provide for identification of test, inspection, and acceptance requirements of the Purchaser for monitoring and evaluating the Supplier's performance.

4.3 Procurement documents shall indicate to the Supplier when a documented QA Program is required and/or shall invoke portions or all of the requirements of this plan. The content of any required program shall depend upon the type and use of the item or service being procured. Where appropriate, the procurement documents shall require the Supplier to incorporate appropriate QA Program requirements in subtier procurement documents.

4.4 Procurement document changes shall be subject to the same degree of control as provided in the preparation of the original documents.

4.5 The DOE has reserved the right to review and approve procurement documents prepared by the Major Project Participants as stated in the DOE prime contracts. The DOE also reserves the right to review and approve the Project Participants' procurement document control procedures and to periodically audit the implementation of these procedures.

5.0 INSTRUCTIONS, PROCEDURES, AND DRAWINGS

5.1 Components, systems, structures, and associated services that are important to the safe and reliable operation of the WIPP are designed, fabricated, erected, inspected, and tested in accordance with approved specifications and drawings. In addition, site investigation activities are also performed in accordance with approved instructions, procedures, specifications, and drawings. Documents are prepared in formats suitable to their application. Where appropriate, the written documents shall contain quantitative and qualitative acceptance criteria to form the basis for verifying that quality-related activities are satisfactorily accomplished.

5.2 The DOE has reserved review and approval rights for all construction design drawings and technical specifications. The DOE also reviews and approves, on a selective basis, other important documents including drawings, instructions, or procedures prepared by Major Participants, Construction Contractors, or Suppliers. The documents are submitted for review and/or approval when designs of components, systems, and structures are to be further refined by Construction Contractors. Shop drawing submittals, when specified in contract documents, will be submitted by the Contractor for the Construction Manager's review and approval prior to use.

5.3 The DOE, or a designated representative acting in behalf of the DOE, will periodically audit and monitor the work practices of all Project Participants to verify the availability and effective implementation of instructions, procedures, specifications, and drawings. These auditing and monitoring activities will also include both scheduled and unscheduled DOE overviews that are specific in nature and supplement the formal audit program described in Section 18.0. Details relative to performing overviews are outlined in WPO-DOE SOPs and interagency agreements.

6.0 DOCUMENT CONTROL

6.1 The DOE and the Major Project Participants shall establish and implement appropriate measures to control the preparation, review, approval, and issuance of documents, such as standard operating procedures, drawings, procedures, specifications, and instructions, including changes thereto, which prescribe activities affecting quality. Document controls shall provide for the following:

- o Identification of documents to be controlled
- o Identification of personnel, positions, or organizations responsible for preparing, reviewing, approving, and issuing documents
- o Review of documents for adequacy, completeness, and correctness prior to approval and issuance

6.2 Changes to documents prepared by cognizant Major Project Participants are subject to review and approval by DOE. Documents such as field changes, noncompliance reports, test reports, etc., which are produced by the Construction Contractor, will be controlled by being submitted to the Construction Manager for review and approval. These documents will be retained in the MOC Master Record Center. Contractor submittals may include backup calculations, design drawings analysis, operations and maintenance manuals, etc., and will be specifically required in their contract. Accordingly, internal document control procedures

will not be required from Construction Contractors. The MOC is responsible for developing, implementing, and maintaining detailed procedures that establish and control the Master Record Center.

6.3 The DOE reserves the right to review and approve documents and associated document control procedures prepared by the Major Project Participants. In addition, the DOE, or a designated representative will monitor and audit the execution of the Document Control Systems on the WIPP Project to ensure that contractors are working to the latest revisions and that such systems are implemented adequately and effectively.

7.0 CONTROL OF PURCHASED ITEMS AND SERVICES

7.1 Measures shall be established and implemented on the WIPP Project by the DOE and the Major Project Participants to ensure that purchased items and services, whether purchased directly or through Contractors, conform to the procurement documents. These measures shall be included in contract provisions, as appropriate, for the following:

- o Source inspections
- o Receiving inspections
- o Monitoring of site construction activities
- o Acceptance testing
- o Objective evidence submitted by contractors and suppliers to demonstrate compliance with contract requirements

7.2 The procurement activities at WIPP shall be planned and documented to ensure a systematic approach to the procurement process. Planning shall provide, as applicable for the item or service being procured, for the integration of:

- o Procurement document preparation, review and change control
- o Selection of procurement sources
- o Bid evaluation and award
- o Purchaser control of Supplier performance
- o Verification (surveillance, inspection or audit) activities by Purchaser, (including notification for hold and witness points)

- o Control of nonconformances
- o Corrective action
- o Acceptance of item or service
- o QA records

7.3 Where applicable, the selection of Suppliers shall be based on evaluation of their capability to provide items or services in accordance with the requirements of the procurement documents prior to award of contract. In this regard, those Major Project Participants responsible for procurement activities shall ensure that measures for Supplier evaluation and selection are established in a timely manner and include one or more of the following considerations outlined in 7.3.1 through 7.3.3.

7.3.1 The Supplier's history of providing an identical or similar product that performs satisfactorily in actual use shall be evaluated. The Supplier's history shall reflect current capability.

7.3.2 The Supplier's technical and quality capability as determined by a direct evaluation of his facilities and personnel and the implementation of the Supplier's QA program or plan will be considered.

7.3.3 The Supplier's current quality records supported by documented qualitative and quantitative information which can be objectively evaluated will also be considered.

7.4 When source verification is used, it shall be performed at intervals consistent with the importance and complexity of the item or service, and it shall be implemented to monitor, witness, or observe activities at predetermined points. Upon Purchaser acceptance of source verification, documented evidence of acceptance shall be furnished to the receiving destination of the item, to the Purchaser, and to the Supplier.

7.5 When receiving inspection is used, purchased items shall be inspected as necessary to verify conformance to specified requirements, taking into account source verification and audit activities and the demonstrated quality performance of the Supplier. When applicable, receiving inspection shall be performed in accordance with established procedures and inspection instructions, to verify by objective evidence such features as:

- o Proper configuration
- o Identification

- o Dimensional, physical, and other characteristics
- o Freedom from shipping damage
- o Cleanliness

Receiving inspection shall be coordinated with the review of Supplier documentation when procurement documents require such documentation to be furnished prior to receiving inspection.

7.6 When post-installation testing is used, post-installation test requirements and acceptance documentation shall be mutually established by the Purchaser and Supplier.

7.7 Supplier-generated documents shall be controlled, handled, and approved in accordance with established methods. Means shall be implemented to ensure that the submittal of these documents is accomplished in accordance with the procurement document requirements. These measures shall provide for the acquisition, processing, and recorded evaluation of technical, inspection, and test data against acceptance criteria.

7.8 Special consideration, such as mandatory inspection, will be required by the DOE and the Major Project Participants for the control of those procurement activities that involve any items or services that have been so designated by the Architect-Engineer in design documents.

7.9 The DOE, or a designated representative, will review the procurement control procedures of the Major Project Participant's procurement control practices to verify that they are maintaining adequate control during procurement and receipt of services, materials, and equipment.

8.0 IDENTIFICATION AND CONTROL OF ITEMS

8.1 Where appropriate, measures will be established by the DOE and the Major Project Participants to provide for identification and control of materials, parts, and components. The objective of these measures is to ensure that only correct and acceptable items are used and installed in the WIPP. Design drawings, technical specifications, procurement documents, and Special Field Instructions (SFI), issued by the Architect-Engineer will provide the requirements for the identification and control of items important to the safe operation of WIPP.

8.2 The DOE and the Major Project Participants shall establish measures which provide for the following:

- o Physical identification to the maximum extent possible
- o Physical separation, procedural control, or some other appropriate means to provide control where physical identification is either impractical or insufficient
- o Identification on the item or on records traceable to the item
- o Markings, when used, to be clear, unambiguous and indelible, and applied in such a manner as to not affect the function of the item
- o Transfer of markings to each part when items are subdivided

8.3 The DOE, primarily in conjunction with the Construction Manager and optionally with other Project Participants as delegated, will audit and monitor the material identification and control procedures and practices of the Construction Contractors and suppliers to verify that such procedures and practices are adequate and are effectively implemented. These auditing and monitoring activities include both scheduled and unscheduled DOE overviews that are specific in nature and supplement the formal audit program described in Section 18.0. Details relative to performing overviews are outlined in WPO-DOE SOPs and interagency agreements.

9.0 CONTROL OF PROCESSES

9.1 The DOE has delegated implementing responsibilities for the control of processes to the Architect-Engineer, the Construction Manager, and the Construction Contractors. The DOE reviews and approves the process controls placed in the technical specifications by the Architect-Engineer, and in the Construction Contracts by the Construction Manager. The DOE, or a designated representative, also monitors the implementation of the specified controls at Supplier's plants and at the site, as applicable.

9.2 Provisions for the control of processes (e.g., welding, nondestructive examination, installation, construction, and testing phases) shall be incorporated into the applicable technical specifications by the Architect-Engineer. The process control provisions included in the technical specifications will vary depending on the importance and complexity of the involved process, component, system, or structure. Processes shall be controlled by instructions, procedures, drawings, specifications, checklists, travelers, or other appropriate means. These means shall ensure that process parameters are controlled and that specified environmental conditions are maintained. It is the

responsibility of the Supplier or Contractor performing the special process to adhere to the approved procedures and processes.

9.3 Qualification of personnel, procedures, and equipment shall comply with specified requirements.

10.0 INSPECTION

10.1 The DOE has delegated implementing responsibilities for inspection of WIPP materials, parts, components, systems, facilities, structures, services, and construction activities to the Architect-Engineer, Construction Contractors, and the Construction Manager. In addition, the Scientific Advisor and MOC may perform inspections on items and services, as delegated by the DOE. The responsibilities of the Architect-Engineer, Construction Contractor, and the Construction Manager are outlined in 10.1.1, 10.1.2, and 10.1.3. Inspection activities are performed by persons independent of the work being inspected. Inspection personnel shall not report directly to the immediate supervisors who are responsible for performing the work being inspected.

10.1.1 The Architect-Engineer is responsible for identifying in the technical specifications those manufacturing fabrication, installation, and construction operations that require shop and/or field inspection, and where appropriate, require documented procedures and records. The Architect-Engineer is responsible for identifying points in the manufacturing or construction process, which at the option of DOE, will be handled as Hold and/or Witness Points. The Architect-Engineer is responsible for the preparation of SFIs to identify those construction items or functions which require "special" quality control attention.

The Architect-Engineer is also responsible for performing onsite installation inspection and review of test activities, as directed by the DOE, to ensure construction complies with applicable drawings and specifications.

10.1.2 Construction Contractors are responsible for planning, performing, and documenting inspections, as specified in the Contract documents, to ensure and substantiate that the quality of all construction work is in compliance with applicable drawings and specifications whether performed onsite or offsite. The details of the Construction Contractor's Inspection System will be defined in the Contractor's Quality Control plan or program, which the Contract Special Provisions will require to be prepared and submitted to the Construction Manager for review and approval.

10.1.3 The Construction Manager will approve construction Contractor quality control plans as required by the Contract documents.

The Construction Manager is responsible for planning, performing, and documenting surveillance of the Contractor's inspection activities with special attention given to those items and function identified in SFIs as "special." In addition, the Construction Manager will be responsible for proper disposition of those inspections and tests that have been identified as Contracting Officer Hold and Witness Points in the technical specifications. The Construction Manager will perform additional confirmatory inspections and tests as deemed necessary.

10.2 The Construction Manager's consent to waive specified Hold Points shall be recorded prior to continuation of work beyond the designated Hold Point.

10.3 Final inspections shall include a Construction Manager's records review of the results and resolution of nonconformances identified by prior inspections. The final inspections shall be planned to arrive at a conclusion regarding conformance of the item to specified requirements.

10.4 Completed items shall be inspected for completeness, markings, calibration, adjustments, protection from damage, or other characteristics as required to verify the quality and conformances of the item to specified requirements. Applicable quality records shall be examined for adequacy and completeness.

10.5 Modifications, repairs, or replacements of items performed subsequent to final inspection shall require reinspection or retest, as appropriate, to verify acceptability.

10.6 The DOE has reserved the right to review and approve all Architect-Engineer prepared technical documents included in Construction Contract Packages (CCPs), the final procurement package assembled by the Construction Manager, and the SFIs used in managing site construction. The DOE, or a designated representative acting in behalf of the DOE will overview the inspection activities to ensure that adequate and appropriate inspection is being performed by the responsible organizations on all phases of the WIPP Project. The overviews will be performed as described in WPO-DOE SOPs and interagency agreements.

11.0 TEST CONTROL

11.1 The DOE has delegated implementing responsibilities for test control to the Major Project Participants. Test programs will be established to ensure that components, systems, and structures perform satisfactorily in service, and that the testing is identified and documented in written test procedures that incorporate or reference the requirements and acceptance limits

contained in applicable design documents. Responsibilities of Major Project Participants are documented in 11.1.1 through 11.1.4.

11.1.1 The Architect-Engineer is responsible for identifying in technical specifications the shop and field testing requirements for components, systems and structures, and the document submittal and approval requirements. The Architect-Engineer is responsible for identifying points in the manufacturing and construction process which are to be handled as Contracting Officer Hold and Witness Points. The Architect-Engineer is responsible for preparing test recommendations, as required, for acceptance testing of systems (by the Contracting Officer).

The Architect-Engineer is also responsible for performing surveillance of Construction testing, as directed by the DOE, to ensure compliance with technical specifications and drawings.

11.1.2 The Construction Manager is responsible for providing surveillance to ensure that testing is performed and documented as required by technical specifications and drawings. The Construction Manager will be responsible for proper disposition of those tests which have been identified as Contracting Officer Hold and Witness Points. The Construction Manager will require the Construction Contractor to use only approved independent testing laboratories when so designated.

11.1.3 Construction Contractors are responsible for planning, performing, and documenting all testing required by technical specifications and drawings and to ensure that components, systems, and structures meet the requirements of the technical specifications and drawings. Where required, the Construction Contractors will use only approved independent testing laboratories to perform the testing.

11.1.4 The Scientific Advisor is responsible for the preparation of test procedures and the performance of tests associated with the experimental functions delegated to the Scientific Advisor by DOE.

11.2 Tests procedures shall include or reference test objectives and provisions for ensuring that prerequisites for the given test have been met, adequate instrumentation is available and used, necessary monitoring is performed, and that suitable environmental conditions are maintained. Prerequisites shall include the following, as applicable:

- o Calibrated instrumentation
- o Appropriate equipment
- o Trained personnel

- o Condition of test equipment and the item to be tested
- o Suitable environmental conditions
- o Provisions for data acquisition

11.3 In lieu of specially prepared written test procedures, appropriate sections of related documents, such as ASTM methods, Supplier manuals, equipment maintenance instructions, or approved drawings or travelers with acceptance criteria, can be used. Such documents shall include adequate instructions to ensure the required quality of work.

11.4 The responsibility of DOE regarding test control includes the review of selected testing procedures established by Major Project Participants and the witnessing of selected tests. The DOE, or a selected representative, provides surveillance during the construction phase to verify that acceptance tests performed are in accordance with approved test procedures, performed by qualified personnel, and that the results of tests are acceptable and adequately documented.

12.0 CONTROL OF MEASURING AND TESTING EQUIPMENT

12.1 Measures have been established on the WIPP Project by DOE and the Major Project Participants to ensure that gages, instruments, measuring devices, and testing equipment used for the purpose of determining conformance with specified requirements of drawing and specifications or for obtaining test data, are of the proper range, type, and accuracy. To ensure accuracy, selected special measuring and test equipment will be calibrated at prescribed intervals or, prior to use, against certified standards that have a known valid relationship to nationally recognized standards and the results documented.

12.2 The method and interval of calibration for each item shall be defined, and will be based upon the type of equipment stability characteristics, required accuracy, intended use, and other conditions affecting measurement control. When measuring and testing equipment is found to be out of calibration, an evaluation shall be made and documented of the validity of previous inspection or test results and of the acceptability of items previously inspected or tested. Out-of-calibration devices shall be tagged and/or segregated and not used until they have been recalibrated. If any measuring or testing equipment is consistently found to be out of calibration, it shall be repaired or replaced. A calibration shall be performed when the accuracy of the equipment is suspect.

12.3 Calibration and control measures may not be required for rulers, tape measures, levels, and other such devices, if normal commercial equipment provides adequate accuracy.

12.4 As required, provisions for special calibrations of measuring and testing equipment may be placed in the technical specifications by the Architect-Engineer.

12.5 The DOE, or a designated representative, will periodically monitor the inspection and testing activities of the Major Project Participants to ensure that appropriate controls are being exercised over the use and calibration of measuring and testing equipment.

13.0 HANDLING, STORAGE, AND SHIPPING

13.1 Handling, storage, packaging, preservation, and shipping requirements contained in government and industry safety codes and standards apply as required by the contract. These may be supplemented by Contracting Officers' requirements in the Special Provisions. In special circumstances, the specific requirements may be cited in the technical specifications for material, parts, components, or equipment involved. For example, instructions for marking and labeling for packaging, shipment, handling, and storage of items shall be established as necessary to adequately identify, maintain, and preserve the item, including indicating the presence of special environments or the need for special controls.

13.2 The Construction Manager routinely monitors the handling, maintenance, storage, and shipping practices of site Construction Contractors, subcontractors, and equipment suppliers to verify that such practices are adequate and in compliance with the contract.

14.0 INSPECTION, TEST, AND OPERATING STATUS

14.1 The status of inspection and test activities shall be identified either on the items or in documents traceable to the items where it is necessary to ensure that required inspections and tests are performed, and to ensure that items which have not passed the required inspections and tests are not inadvertently installed, used, or operated. Status shall be maintained through indicators, such as physical location and tags, markings, shop travelers, stamps, inspection records, or other suitable means.

14.2 The DOE will periodically monitor the controls exercised by the Major Project Participants to ensure inspection and test activities are identified and statused on a continuous basis throughout construction and/or test phases.

15.0 CONTROL OF NONCONFORMING ITEMS

15.1 Nonconforming items or conditions identified by DOE, Major Project Participants, and/or Contractor personnel will be documented and appropriately dispositioned.

15.2 Nonconforming items shall be identified by marking, tagging, or other methods that do not adversely affect the end use of the item. The identification shall be legible and easily recognizable. If identification of each nonconforming item is not practical, the container, package, or segregated storage area, as appropriate, shall be identified.

15.3 Nonconforming items shall be segregated, when practical, by placing them in a clearly identified and designated hold area until properly dispositioned. When segregation is impractical or impossible due to physical conditions, such as size, weight, or access limitations, other precautions shall be employed to preclude inadvertent use of a nonconforming item.

15.4 The responsibility and authority for the evaluation and disposition of nonconforming items shall be clearly defined in the Major Project Participants' and Construction Contractors' QA/QC Plan.

15.5 The final disposition, such as use-as-is, reject, repair, or rework, of nonconforming items shall be identified. Technical justification should be required for those items with use-as-is or repair dispositions. The WIPP as-built drawings shall reflect the accepted deviation.

15.6 The DOE will periodically monitor the controls exercised by the Major Project Participants over nonconforming items and conditions to ensure that deficiencies are promptly documented, contractually administered, and corrected or removed to prevent inadvertent use.

15.7 The Major Project Participants shall include appropriate administrative documents in purchase orders for procurement of materials to ensure control of nonconforming items.

16.0 CORRECTIVE ACTION

16.1 Measures will be established and implemented by the DOE and the Major Project Participants to ensure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material, or equipment are promptly identified and corrected as soon as practicable. In case of significant conditions adverse to quality, the measures will ensure that the cause of the condition is determined and appropriate corrective action taken by the responsible organization to preclude recurrence.

16.2 The identification of all significant conditions adverse to quality, the cause of the condition, corrective action taken, and cost and/or schedule impact of the condition shall be documented and reported to the DOE. Follow-up action shall be taken to verify implementation of corrective action.

16.3 The DOE will review the corrective action systems of the Major Project Participants to verify that they are adequate and effectively implemented.

17.0 QUALITY ASSURANCE RECORDS

17.1 Appropriate measures will be established by the DOE, the MOC, the Architect-Engineer, the Scientific Advisor, and the Construction Manager for the preparation of sufficient records for work being performed to furnish documentary evidence of compliance with applicable codes, standards, drawings, and specifications and shall be adequate for use in management of the WIPP Project. Record requirements for the Construction Contractors shall be specifically identified within contract and/or technical documents, including provisions for submittal to the Contracting Officer.

17.2 The QA records prepared for the WIPP Project shall include as-built drawings and the results of design, procurement, inspections, tests, audits, and change activities. The records shall also include closely related data, such as qualifications of personnel, procedures, equipment, and other documentation as specified in procedures prepared by each Major Project Participant. Required records shall be legible, identifiable, and retrievable. The DOE will delegate a contractor to collect and maintain these records in a Master Records Center.

17.3 The DOE and each Major Project Participant shall define in formal written procedures, provisions for the preparation, collection, interim protection, and timely turnover to the DOE those QA records generated by their respective organizations. Records shall be classified as Permanent or Nonpermanent, as follows:

Permanent Records: Based on WIPP Project's uniqueness as an R&D facility, most records will be considered as permanent and are required to be transferred to National Archives and Records Administration (NARA). Permanent records are identified in DOE Order 1324.2; some examples are:

- Site underground facility characteristics
- Environmental characteristics
- Reports of a research/development nature having scientific, archival, or historical interest

- Documents identifying the location of permanent site boundaries
- Site validation documentation
- Other records or data designated by the Owner (DOE) or Major Project Participants as requiring long-time retention

In addition, these records also will be retained for the following reasons:

- Would be of significant value in demonstrating capability for safe operation including inspection, audit, and other QA records
- Would be of significant value in maintaining, reworking, repairing, replacing, or modifying an item
- Would be of significant value in determining the cause of an accident or malfunction of an item
- Provide baseline data for in-service inspection
- Establish significant technical or administrative decisions

Nonpermanent Records: Records that present evidence of an activity, but do not need to be retained for the life of the facility or longer, because they do not meet the criteria in DOE Order 1324.2. These records shall be submitted to the Records Operations in accordance with requirements established by each Project Participants Records Inventory and Disposition Schedule (RIDS).

17.4 Records stored by the Major Project Participants (until released to the Master Records Center) must be adequately filed and protected to preclude deterioration. As a minimum, the below listed requirements shall apply.

17.4.1 Provisions shall be made in the storage arrangement to prevent damage from moisture, temperature, and pressure.

17.4.2 Records shall be firmly attached in binders or placed in folders or envelopes for storage in steel file cabinets or on shelving in containers.

17.4.3 Provisions shall be made for special processed records (such as radiographs, photographs, negatives, and microfilm) to prevent damage from excessive light, stacking, electromagnetic fields, and temperature.

17.5 Prior to storage of records, the Master Records Center shall prepare written storage instructions that includes the assignment of responsible persons for enforcing the requirements of that procedure. In addition to those requirements outlined in 17.4.1 through 17.4.3, the procedure shall include, as a minimum, the following:

- o A description of the storage facility
- o The filing system to be used
- o A method for verifying that the records received are in agreement with the transmittal document and that the records are legible
- o A method of verifying that the records are those designated
- o The rules governing access to and control of the files
- o A method for maintaining control of and accountability for records removed from the storage facility
- o A method for filing supplemental information and disposing of superseded records.

17.6 The DOE will periodically audit the overall WIPP Project QA Records Program to ensure that adequate records are being prepared and appropriately protected and controlled. These auditing activities are defined in Section 18.0.

18.0 AUDITS

18.1 A program has been established and implemented by the DOE and the Major Project Participants for the performance of audits to verify compliance with the QA Program requirements delineated herein. The audits will include the design, procurement, construction, installation, construction acceptance testing and portions of turnover inspection, and system acceptance testing phases of the WIPP Project not addressed under the operational phase of the project.

18.2 Audits shall be performed in accordance with written procedures utilizing checklists, as defined in WIPP SOPs, by appropriately trained personnel not having direct responsibility for the areas being audited. Audit results shall be documented by auditing personnel and reported to project management. Results shall be reviewed by management personnel having responsibility for the area audited. Responsible management personnel shall take timely and appropriate action to correct and prevent recurrence of deficiencies revealed by the audit. DOE project management

shall perform follow-up reviews as required to ensure that all scheduled corrective actions of DOE project and management audits are satisfactorily accomplished.

18.3 The DOE, or a designated representative acting on behalf of the DOE, is responsible for auditing the quality-related activities of the WIPP Project. The audits shall be performed in accordance with WPO-DOE SOPs and requirements described in this plan.

18.4 The Major Project Participants are responsible for auditing quality-related functions performed by their respective organizations. The Major Project Participants are also responsible for auditing the performance of their subcontractors and suppliers to verify compliance with WIPP requirements.

18.5 Audits shall be scheduled in a manner to provide coverage and coordination with ongoing QA Program activities. Audits shall be scheduled by WPO and Major Project Participants at a frequency commensurate with the status and importance of the activity. The audit schedule shall be reviewed periodically by QA management and revised as necessary to ensure current coverage. Regularly scheduled audits shall be supplemented by additional audits of specific subjects when necessary to provide adequate coverage.

18.6 The auditing organization shall select and assign auditors who are independent of any direct responsibility for performance of the activities they will audit. In the case of internal audits, personnel having direct responsibility for performing the activities being audited shall not be involved in the selection of the audit team.

Audit personnel shall have sufficient authority and organizational freedom to make the audit process meaningful and effective.

18.7 An audit team shall be identified prior to the beginning of each audit. This team shall contain one or more auditors and shall have an individual appointed to lead the team who organizes and directs the audit, coordinates the preparation and issuance of the audit report, and evaluates responses. The audit team leader shall ensure that the audit team is prepared prior to initiation of the audit.

18.8 The audit report shall be signed by the audit team leader and issued and shall include the following information, as appropriate:

- o Description of the audit scope
- o Identification of the auditors

- o Identification of persons contacted during audit activities

- o Summary of audit results, including a statement on the effectiveness of the QA Program elements which were audited

- o Description of each reported audit finding in sufficient detail to enable corrective action to be taken by the audited organization

- o Identification of a reply date for audit findings by the audited organization

18.9 Management of the audited organization or activity shall investigate audit findings, schedule corrective action, including measures to prevent recurrence, and notify the appropriate organization (in writing) of action taken or planned. The adequacy of audit responses shall be evaluated by or for the auditing organization.

Follow-up action shall be taken to verify whether corrective action is accomplished as scheduled.

18.10 Audit records shall include audit plans, audit reports, written replies, and the record of completion of corrective action.

18.11 Each responsible auditing organization shall determine the audit personnel qualifications for their organization. Auditors shall have, or be given, appropriate training or orientation to develop their competence for performing required audits. Competence of personnel for performance of the various auditing functions shall be developed by one or more of the methods given below:

- o Orientation to provide a working knowledge and understanding of this document and the auditing organizations procedures for implementing audits and reporting results.

- o Training programs to provide general and specialized training in audit performance. General training shall include fundamentals, objectives, characteristics, organization, performance, and results of quality auditing. Specialized training shall include methods of examining, questioning, evaluating, and documenting specific audit items and methods of closing out audit findings.

- o On-the-job training, guidance, and counseling under the direct supervision of a Lead Auditor. Such training shall include planning, performing, reporting, and follow-up action involved in conducting audits.

18.12 A Lead Auditor shall have the capability to communicate effectively, both in writing and orally. This determination shall be made by the responsible auditing organization.

Lead Auditors shall have training to the extent necessary to assure their competence in auditing skills. Training in the following areas shall be given (based upon management evaluation) for:

- o Knowledge and understanding of this document and other related codes, standards, regulations, and regulatory guides, as applicable
- o General structure of QA Programs as a whole and applicable elements as defined in this document
- o Auditing techniques of examining, questioning, evaluating, and reporting; methods of identifying and following up on corrective action items; and closing out audit findings

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NQA-1 BASIC REQUIREMENT	D (3)	B (2)	S (2)	W (2)	CM (2)	CC (1)
1. Organization	X	X	X	X	X	
2. Quality Assurance Program	X	X	X	X	X	X
3. Design Control		X	X	X		
4. Procurement Document Control		X	X	X	X	
5. Instructions, Procedures and Drawings		X	X	X	X	
6. Document Control		X	X	X	X	
7. Control of Purchased Items and Services	X	X	X	X	X	
8. Identification and Control of Items		X	X	X	X	
9. Control of Processes		X		X	X	X
10. Inspection		X	X	X	X	X
11. Test Control		X	X	X	X	X
12. Control of Measuring and Test Equipment		X	X	X	X	X
13. Handling, Storage and Shipping		X	X	X	X	X
14. Inspection, Test and Operating Status		X	X	X	X	
15. Control of Nonconforming Items	X	X	X	X	X	X
16. Corrective Action	X	X	X	X	X	
17. Quality Assurance Records	X	X	X	X	X	
18. Audits	X	X	X	X	X	

LEGEND:

D-DOE
B-Bechtel
S-Sandia
W-Westinghouse, MOC
CM-Construction Manager
CC-Construction Contractor

NOTE:

(1) Fixed price Construction Contractors are required to address only first line quality control activities in their quality program.

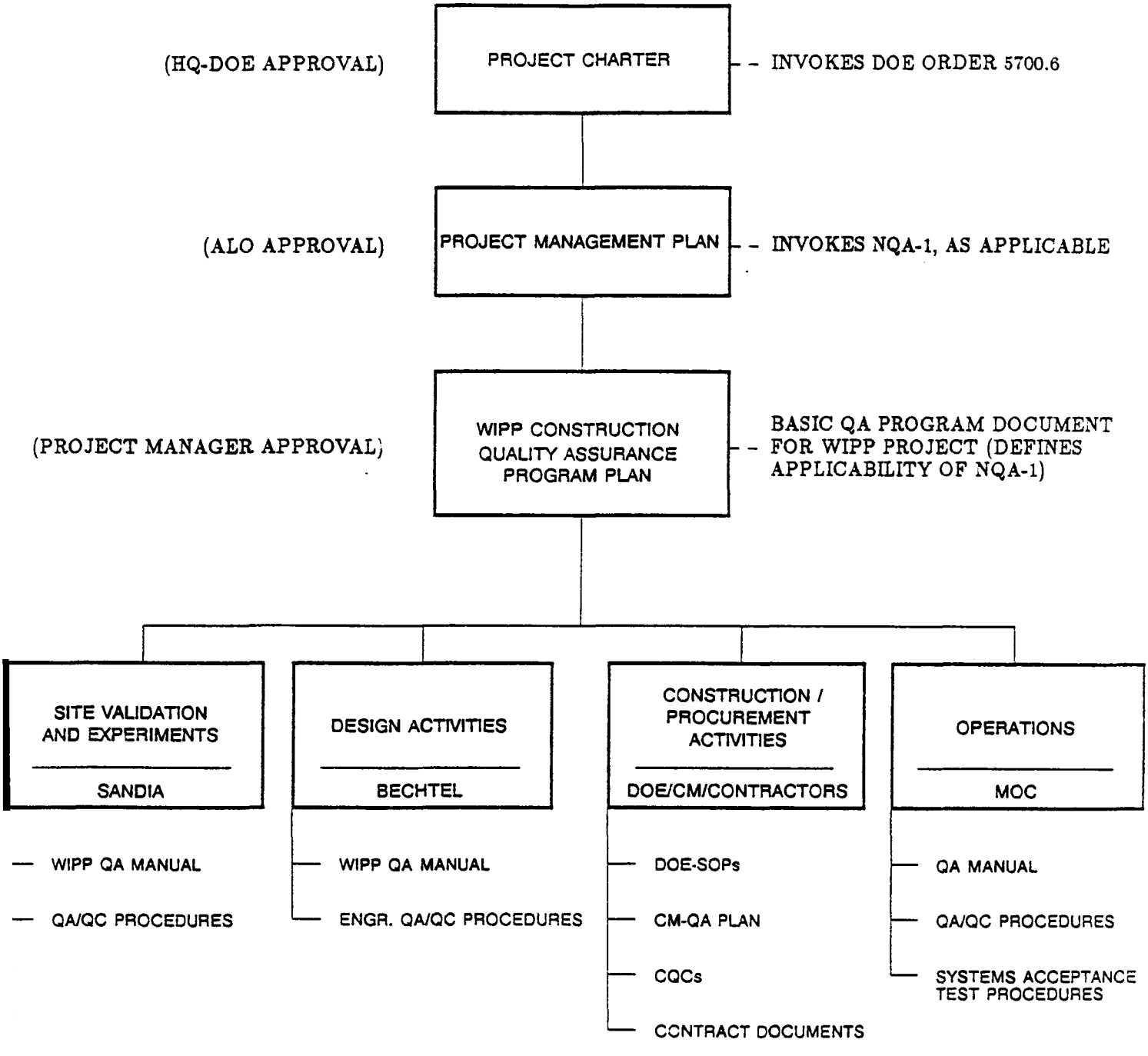
(2) Each participant's program will address the elements shown above and supplemental requirements deemed necessary.

(3) DOE elements are addressed in the WIPP Standard Operating Procedures.

MINIMUM BASIC REQUIREMENTS OF NQA-1
APPLICABLE TO PROJECT PARTICIPANTS' QA PROGRAMS FOR WIPP

Figure 1-1

WIPP CONSTRUCTION QA PROGRAM PLAN



HIERARCHY OF WIPP PROJECT
QUALITY ASSURANCE REQUIREMENTS DOCUMENTS

Figure 1-2

DESIGN CLASSES

Design Class I	Items essential to the prevention or mitigation of the consequences of accidents or severe natural phenoma that could result in a 50-year dose commitment beyond the Zone 1 boundary in excess of 25 Rem to the whole body or 75 Rem to specific organs.
Design Class II	Items not included in Class I that are relied upon to: o Provide permanent confinement, monitoring and control of radioactive effluents. o Provide permanent shielding. o Monitor variables to: - Verify that selected WIPP operational limits are not exceeded. - Indicate the status of safety system bypasses that are not automatically removed as a part of safety system operation. - Indicate status of Class I items during all plant conditions. - Verify that off-site radiological dose limits are not exceeded following accidental releases of radioactive material.
Design Class IIIA	Items not included in Design Class I or Class II for which a higher level of quality is desired beyond that expected in commercial-industrial practice. Functional considerations pertinent to assigning items to Class IIIA include the following: o Monitoring variables to determine onsite radiological dose rates including airborne radioactivities following accidental releases of radioactive materials. o Where failure could cause a major sustained stoppage of waste handling and storage operations. o Design and fabrication complexity or uniqueness. o Potential for contamination if component fails. o Where special considerations beyond those contained in nationally recognized codes and standards are required to insure the health and safety of operating personnel. o Where failure could be of special significance to health and safety of operations personnel.
Design Class IIIB	Items not included in previous classes. Conventional design, fabrication and construction practices, as employed in commercial-industrial facilities where high standards of quality control and adherence to recognized codes and standards are enforced, are utilized for these items.

DESIGN CLASSIFICATION SYSTEM

Figure 1-3

DESIGN CLASSIFICATION (DC)

DC IIIB Off-the-Shelf DC II or IIIA (See Note 3)	DC IIIA	DC II and Complex or Unique DC IIIA	QUALITY CONTROL REQUIREMENT
		X	Material Test Reports (MTR)
	X		Certificates of Compliance Materials (CCM)
X			Manufacturer's Certification of Compliance
	X	X	Test Procedures and Reports
		X	Inspection Reports
		X	Qualified Welders and Procedures
	X		Qualified Welders
		X	Qualified NDE Personnel and Procedures
	X		Qualified NDE Personnel
	X	X	Performance Tests
		X	00 Hold and Witness Points (In-Progress & Final)
	X		00 Hold and Witness Points (Final Inspections)
	X	X	Inspection
	X	X	Design Documentation
		X	Fabrication and/or Installation Procedures
		X	Special Process Procedures
X	X	X	O & M Manuals
		X	Packaging and Shipping Instructions/Requirements
X	X	X	Standard Catalog Data
	X	X	Standard Shop/Field Inspection & Testing Paragraphs
	X	X	Shop Drawings

NOTES:

1. As of this issuance date, there are no Class I items identified in the WIPP Program.

2. For all items, the listed provisions should be considered for inclusion in the technical specifications on a case-by-case basis.

3. Design Class IIIB does not normally require the inclusion of specialized quality control requirements. Such requirements should be considered on a case-by-case basis depending on complexity or uniqueness of components.

4. Some Design Class II and IIIA items are available as off-the-shelf manufacturer's standard products; required pedigrees may also be available off-the-shelf, but at a higher cost.

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ASSOCIATED QUALITY CONTROL REQUIREMENTS

Figure 1-4