UNITED STATES ENRICHMENT CORPORATION

AVLIS QUALITY ASSURANCE PROGRAM DESCRIPTION

TABLE OF CONTENTS

INTRODUCTION

The Quality Assurance Program (QAP) described herein applies to the siting, design, construction, operation, modification and decommissioning of the United States Enrichment Corporation (USEC) Atomic Vapor Laser Isotope Separation (AVLIS) uranium enrichment plant.

USEC commits to meet the Basic and Supplementary Requirements of ASME NQA-1-1994 Edition and NQA-1a-1995 Addenda, "Quality Assurance Requirements for Nuclear Facility Application" Part I, and 10 CFR Part 71, "Packaging and Transportation of Radioactive Material" Subpart H, "Quality Assurance", as described in this Quality Assurance Program Description (QAPD).

The QAP is applied using a graded approach as described in Sec. 2.

1. ORGANIZATION

USEC is a wholly owned corporation of the United States that was created by the Energy Policy Act of 1992. As the owner of the AVLIS plant, USEC maintains overall responsibility for siting, design, construction, operation, modification and decommissioning.

The USEC AVLIS Enrichment Plant Project organization has been established utilizing resources from USEC, Lawrence Livermore National Laboratory (LLNL), and private industry contractors. A single line of authority exists from the USEC Board of Directors to the Director, AVLIS Enrichment Plant Project as shown in Fig. 1. The AVLIS enrichment plant project execution organization is shown in Fig. 2. The Project Team positions shown in Fig. 2 are initially located in the project office in Livermore, California. These positions will relocate to the construction site as the project progresses, with the intention of transitioning many key personnel to the plant operating organization. The plant operating organization is shown in Fig. 3.

The Executive Vice President, Operations has designated the Vice President, Advanced Technology responsible for the overall life cycle of the AVLIS Plant and associated support activities. The Executive Vice President has oversight responsibility for the AVLIS Quality Assurance Program with the Manager, Quality Assurance reporting directly.

The Vice President, Advanced Technology is responsible for the overall AVLIS Program, including headquarters support for the AVLIS Enrichment Plant Project. The Vice President, Advanced Technology is responsible for implementation of the AVLIS QAP. The QAP is binding on all USEC and project personnel involved with the AVLIS Enrichment Plant.

The Director, AVLIS Enrichment Plant Project reports to the Vice President, Advanced Technology and is responsible for development, design, construction, and startup of the AVLIS plant. This includes implementation of the QAP for the project.

The Manager, Process Engineering, who reports administratively to the LLNL, is responsible for technology development, design of process equipment and demonstration and piloting activities conducted at the Lawrence Livermore National Laboratory.

The Manager, Project Engineering is responsible for site characterization, conventional plant design, configuration control, A/E contract management, and acceptance test coordination.

The Manager, Construction & Startup is responsible for the construction, inspection and startup testing of the plant. This includes management of the plant construction contract.

The Manager, Plant Operations is responsible for operational input to the AVLIS plant design, planning the operating staff and the transition from construction to operation of the AVLIS plant.

The Manager, Procurement, who reports functionally to the corporate Manager of Procurement and Materials, is responsible for providing procurement services including supplier qualification coordination, purchasing, contracting, receiving and material control.

The Manager. Supply Assurance is responsible for supply strategy and development of qualified long-lead-time and complex-system suppliers. This includes quality control activities for purchased items.

The Manager, AVLIS Nuclear Regulatory Policy and Licensing, reporting to the Vice President, Advanced Technology, is responsible for AVLIS Enrichment Plant licensing.

The Manager, Environment, Safety & Health, who reports functionally to the Manager, AVLIS Nuclear Regulation, is responsible for licensing and safety analysis.

The Director, AVLIS Fuel Cycle, reporting to the Vice President, Advanced Technology, is responsible for feed and product interfaces, including implementation of the AVLIS QAP for radioactive material packaging and transportation.

The General Manager, AVLIS Enrichment Plant (when operation begins) is responsible for plant operations, maintenance, and technical and administrative support. This includes implementation of the Quality Assurance Program for the operating plant. A Quality Control organization reporting to the General Manager is responsible for quality control planning and inspection.

The Manager, Quality Assurance, reporting to the Executive Vice President, is responsible for the overall QAP and assessing its effectiveness. This includes the responsibility and authority for:

- Formulating the QAP documented in the AVLIS Quality Assurance Program Manual;
- Reviewing and concurring with QAP implementing procedures;
- Concurrence with A/E and Construction contractor's quality assurance programs;
- Implementing the QA audit program and assuring the effectiveness of the QAP;
- Monitor QAP implementation, attend status meetings, and keep abreast of day-to-day activities to ensure adequate coverage.
- Investigating any aspect of the QAP to identify problems with execution and to verify that corrective action is taken in a timely manner; and
- Stopping unsatisfactory work or controlling further processing when warranted for safety considerations.

The organizational philosophy is based on the following principles:

- Quality is achieved by those responsible for performing work. This includes identifying, correcting, or recommending solutions for quality problems
- Quality verification and control are performed by persons who are independent of the work performance activities, but who may report to the management of the same organization. QC personnel in line organizations receive QA program direction from the Manager, Quality Assurance.
- Persons responsible for assurance and verification of quality have sufficient organizational freedom to identify problems, initiate solutions, verify solutions and control further processing when necessary.
- Quality related activities may be delegated to others but responsibility for overall effectiveness of the QAP is retained by USEC management.
- Suppliers and contractors are required to have quality assurance programs consistent with USEC's quality assurance program.

Specific organizational responsibilities are defined in the implementing project procedures in accordance with Section 5.

2. QUALITY ASSURANCE PROGRAM

The Quality Assurance Program is based on, and meets, the Basic and Supplemental Requirements of ASME NQA-1-1994 Part I, and 10 CFR 71 Subpart H, as described herein. The NRC is to be provided prior notification of any reduction of commitment described in this QAPD.

The QAP applies to the structures, systems and components (SSC), and activities affecting these features, identified in the Integrated Safety Analysis section of the NRC License Application. This includes other items and activities that affect the ability of SSCs to perform their intended function. The program provides measures to ensure the quality of items and activities to an extent commensurate with their importance to safety. A graded approach is used by establishing Quality Assurance Levels (QAL) as follows:

Level	Criteria - (Failure or malfunction could cause)
QAL –1	—Loss of nuclear criticality control. —Total effective dose equivalent (TEDE) to an off-site individual exceeding 5 rem. —Uptake by an off-site individual of greater than 10 mg of soluble uranium. (Note: Any basic component, as defined in 10 CFR 21, "Reporting of Defects and Noncompliance", in which a defect could create a substantial safety hazard is identified in the Integrated Safety Analysis)
QAL-2	—TEDE to an off-site individual exceeding 100 mrem. —TEDE to a worker exceeding 5 rem.
QAL-3	—Other than criteria for QAL-1 and QAL-2.

All requirements of the QAP apply to QAL-1 SSCs. Selected modifications to QAP requirements for QAL-2 are described in this QAPD where applicable. QAL-3 SSCs are outside the scope of this QAPD.

Procedures provide for a graded application of resources taking into consideration: 1) the QAL (importance); 2) applicable regulations, code and standards; 3) complexity or uniqueness of an item or activity and the environment in which it has to function; 4) quality history of the item in service; 5) the degree to which functional compliance can be demonstrated or assessed by test, inspection or maintenance methods; 6) anticipated life span; 7) degree of standardization; 8) importance of data generated; 9) reproducibility of results; and 10) the consequence of failure. By appropriately balancing considerations of importance and process capability, resources are efficiently applied to achieve the desired benefit.

The results of the application of the graded approach to quality are incorporated into design requirements documents, specifications, procedures, instructions, drawings, inspection plans, test plans and other documents that establish the requirements for items or activities.

The QAP is implemented and communicated through policies (AVLIS Quality Assurance Program Manual), procedures, instructions, and contract documents. These documents provide measures that ensure work is planned and accomplished under suitably controlled conditions. This includes use of appropriate equipment, suitable environmental conditions, satisfactory prerequisites and work process controls.

Compliance with QAP requirements and associated procedures is mandatory. Questions on QAP requirements are referred for resolution the Manager, Quality Assurance who has final authority on QAP requirements.

The terms used in the QAP are as defined in ASME NQA-1-1994, Introduction. The term "design output" is interpreted to mean "drawings, specifications and other documents used to define technical requirements of structures, systems, components, and *plant process control* computer programs".

Each organization manager is responsible for providing indoctrination and training in accordance with ASME NQA-1-1994, Supplement 2S-4. This is to ensure work is performed in accordance with applicable procedures with suitable proficiency. On-the-job training and formal training are provided as necessary. Records of formal training (content, attendance and date) are maintained. In addition, records of proficiency evaluation are maintained for personnel who operate, maintain, or modify QAL-1 items.

The following additional qualification and certification requirements apply for QAL-1 items:

Inspection and Test Personnel:	ASME NQA-1-1994, Supplement 2S-1
Nondestructive Examination Personnel:	ASME NQA-1-1994, Supplement 2S-2, and American Society of Nondestructive Testing Recommended Practice No. SNT-TC-1A, December 1988
Quality Assurance Auditors and Lead Auditors:	ASME NQA-1-1994, Supplement 2S-3

Senior management, including the Executive Vice President and the Vice President, Advance Technology, regularly appraise the status of the AVLIS QA Program through project review meetings, audit reports, and corrective action reports. Annually senior AVLIS management assesses the status and adequacy of the AVLIS QA Program. The results are reviewed by the Vice President, Advanced Technology. Required actions resulting from this assessment are documented and implementation is verified.

3. DESIGN CONTROL

Approved procedures provide for performing the design process in a planned, controlled and documented manner. The design process includes the Integrated Safety Analysis.

Design inputs, such as design bases, performance requirements, regulatory requirements, codes and standards, are identified and documented as design requirements (e.g. primary requirements, functional requirements, and system requirements). Design requirements documents are reviewed and approved on a timely basis and to the level of detail necessary to permit the design activity to be carried out correctly and to provide a consistent basis for making design decisions, accomplishing design verification measures, and evaluating design changes. Changes including the reason for the changes, are identified, approved, documented and controlled.

Design process activities are planned on a timely basis and to the level of detail necessary to permit the design process to be carried out correctly; permit verification that the design inputs are correctly translated into design documents; and to support interfacing design, procurement, fabrication, construction, and operation. Appropriate quality standards are identified and documented. Design methods, materials, parts, equipment, and processes that are essential to the function of the SSC are selected and reviewed for suitability of application. Assemblies, subassemblies and parts are clearly identified. Commercial grade items that have been modified or which need to meet special verification requirements are uniquely identified.

Final design output documents including changes thereto are relatable to the design input by documentation in sufficient detail to permit design verification.

Design outputs that consist of computer programs are developed, validated, and managed in accordance with ASME NQA-1-1994, Part II, Subpart 2.7, "Quality Assurance Requirements of Computer Software for Nuclear Facility Application".

Design analyses documents (e.g. calculations) contain sufficient detail as to the purpose, method, assumptions, design input, references, and units such that a person technically qualified in the subject can understand the analyses and verify the adequacy of the results without recourse to the originator. Design analysis performed with computer systems list the software and version, hardware, inputs and outputs and evidence of computer program verification/validation or alternate verification of the results. Design analysis documents are identifiable by subject, originator, reviewer, and date or by other identification such that the documents are retrievable.

Design verification is performed and documented, in accordance with approved procedures, by competent individuals or groups other than those who performed the original design. The extent and method of the design verification is a function of the importance to safety, the complexity of the design, the degree of standardization, the state of the art, past performance, and similarity with previous proven designs. Where changes to previously verified designs are made, design verification is performed for the changes, including an evaluation of the effects of the changes on the overall design and on any design analysis on which the design is based. Methods of design verification include any one or a combination of the following (as defined in Supplement 3 S-1 of ASME NQA-1-1994): design reviews, alternate calculations, and qualification testing. Verification by testing is performed when deemed necessary and demonstrates adequacy of performance under conditions that simulate the most adverse design requirements. Verification of computer programs includes appropriate testing and validation. Design verification is performed in a timely manner (e.g., prior to release for use) and is completed in all cases prior to relying upon the component, system, structure, or computer program to perform its function.

Verifiers are knowledgeable in the areas to be verified. The verifier may be a supervisor, provided the supervisor was not directly responsible for the design (i.e., did not specify a singular design approach or rule out certain design consideration and did not establish the design inputs used in the design) or provided the supervisor is the only individual in the organization competent to perform the verification. However, verification is more than a cursory supervisory review. A supervisor with direct responsibility for the design may verify QAL-2 designs.

Changes to final designs, field changes, modifications, and nonconforming items dispositioned "use-as-is" or "repair" are justified, documented, and subject to the design control measures commensurate with the original design. Changes are reviewed and approved by the person or group with assigned design authority. Changes to designs that have been approved or certified by the Nuclear Regulatory Commission (e.g., 10 CFR 71 package design) are subject to the necessary additional controls. When a significant design change is found to be necessary because of an incorrect design, the design process and verification procedure is reviewed and modified as necessary.

Internal and external design interfaces are identified and controlled and design efforts are coordinated among participating organizations. Design information transmitted across interfaces is reviewed, approved, documented and controlled. Incomplete, preliminary, or unverified design information is appropriately identified.

Final design documentation and records that provide evidence that the design and design verification processes were performed in accordance with this section are collected, stored and maintained.

4. PROCUREMENT DOCUMENT CONTROL

Procurement documents include those requirements necessary to assure that the items and services to be provided will be of the desired quality. These include the following as appropriate:

1. Scope of Work.

2. Basic Technical Requirements — These include drawings, specifications, codes and industrial standards with applicable revision data; test and inspection requirements; special processes; and special requirements such as for designing, fabricating, cleaning, identification marking, erecting, packaging, handling, shipping, and storage.

3. Quality Assurance Requirements — These include the requirements for the supplier to have an acceptable quality assurance program consistent with the applicable portions of USEC's QA Program (the requirement for the supplier to have a documented quality assurance program may be waived for commercial grade items); provisions for access to the supplier's facilities and records for source inspection and audit; requirements for reporting

nonconformances and requesting changes; and provisions for extending applicable quality assurance and other requirements of procurement documents to subtier suppliers. If the procurement is for a basic component as defined in 10 CFR 21, applicability of 10 CFR 21 is specified in the procurement document.

4. Documentation Requirements — These include documents to be submitted for information, review or approval; instructions on record retention, turnover and disposition; and the requirements for delineating the technical and quality data required for ordering recommended spare and replacement parts and assemblies.

Procurement documents and changes thereto are reviewed to ensure they include the appropriate requirements as listed above. The review and documented concurrence is performed by independent personnel having an understanding of the requirements and intent of the procurement document.

Changes to procurement documents, including changes made during bid review, contract negotiations or post award, are subject to the same control as the original document.

5. INSTRUCTIONS, PROCEDURES, AND DRAWINGS

Activities affecting quality are prescribed by and accomplished in accordance with documented procedures, instructions, and drawings of a type appropriate to the circumstances. These documents include or reference appropriate acceptance criteria for determining that prescribed activities have been satisfactorily accomplished. Standard guidelines for the format, content, and review and approval processes are established.

The AVLIS Quality Assurance Program Manual establishes the policy requirements approved by the Vice President, Advanced Technology. Procedures are the second tier that implement the QA Program. Third tier Instructions provide specific step-by-step directions when deemed necessary. Procedure and Instruction preparation, review, and approval are the responsibility of the applicable manager. Quality-related Procedures are reviewed and concurred with by the Quality Assurance organization for compliance and alignment with the QA program.

Adherence to Policy, Procedures, and Instructions is mandatory. In the case of conflict the higher tier document governs, unless the exception is approved otherwise.

Activities that require skills normally possessed by qualified personnel do not require detailed step-by-step delineation in a procedure. They are performed in accordance with documents of a type appropriate to the circumstances such as planning sheets, job descriptions, vendor manuals or other form.

6. DOCUMENT CONTROL

Documents and changes to documents that prescribe or specify quality requirements or activities affecting quality are controlled in a manner that assure the use of correct documents. Such documents include design documents including as-builts, computer codes, procurement documents, instructions and procedures.

Procedures and instructions assure that documents are prepared; reviewed for adequacy, correctness, and completeness by a qualified individual other than the person who generated the document; approved for release by authorized personnel; distributed to the location where the activity is performed prior to commencing work; and used in performing the activity. Obsolete or superseded documents are removed or appropriately identified. Procedures identify documents to be controlled; responsibility for preparing, reviewing, approving, and issuing documents to be used; and require the establishment of current and updated distribution lists.

Changes to documents are reviewed and approved in the same manner as the original. Reviewing personnel have access to the pertinent background information. Procedures provide for simplified approval of editorial or inconsequential changes.

7. CONTROL OF PURCHASED ITEMS AND SERVICES

Procurement activities are planned and documented to assure a systematic approach to the procurement process. Procurement document control is described in Section 4.

Supplier selection is based, in part, on a pre-award evaluation of capability to provide items or services in accordance with the requirements of procurement documents. The evaluation includes one or more of the following:

1. An evaluation of the potential supplier's history of providing an identical or similar product which performs satisfactorily in actual use.

2. The potential supplier's current quality records supported by documented qualitative and quantitative information that can be objectively evaluated.

3. The potential supplier's technical and quality capability as determined by a direct evaluation of the facility, personnel, and implementation of the supplier's quality assurance program.

Suppliers with acceptable technical, quality and commercial qualifications are placed on a Qualified Supplier list maintained by Procurement. Retention on the list is based on performance. Suppliers that are not pre-qualified may be used with appropriate compensatory controls as agreed upon by the Quality Assurance organization.

Bids are evaluated and unacceptable conditions are resolved prior to award of the contract. Depending on the type of procurement, bids are evaluated for technical response, quality assurance requirements, supplier personnel, supplier production capability, past performance, alternates and exceptions, as well as commercial, cost and schedule considerations. Communication interfaces are established with suppliers, as required to include:

1. Establishing an adequate understanding between USEC and the supplier of the provisions and specifications of the procurement documents.

2. Requirements for the supplier to identify the methods and processes to be used by the supplier in fulfilling the requirements of the procurement.

3. Reviewing the supplier documents generated or processed during activities fulfilling procurement requirements.

4. Identifying and processing necessary change information.

5. Establishing methods for exchange of information with the supplier.

6. Establishing the extent of source surveillance and inspection activities.

Supplier-generated documents required for submittal are reviewed for acceptability. Measures ensure that submittal of these documents is accomplished as required by the procurement documents. Evaluation depends on the type of documents submitted. The three categories are engineering documents requiring USEC technical approval (e.g., shop drawings, test procedures), quality verification documents (e.g., test reports, inspection reports) and information documents (e.g., vendor manuals, parts lists).

Acceptability verification activities are based on importance to safety, complexity, and quantity of items or services provided.

Acceptance of items, including spare and replacement parts, includes one or more of the following methods:

1. Certificate of Conformance — When this method is utilized, the following minimum criteria are met:
   a. The certificate identifies the purchased material or equipment or purchase order number.
   b. The certificate identifies the specific procurement requirements met.
   c. The certificate identifies any procurement requirements that were not met and approved waiver.
   d. The certificate is authenticated by a person responsible for this quality assurance function.
   e. The procedures used for the preparation, review, and approval of the certificate are described in the supplier's quality assurance program or the purchase order.

f. The validity of the supplier's certificates and effectiveness of certification system is verified, and the interval of verification is based on the supplier's past quality performance.

2. Source Verification — When this method is utilized, it is performed at intervals consistent with the importance to safety and complexity of the item or service. This method provides plans to perform inspections, examinations, or tests at predetermined points. Source inspection may be performed at lower tier suppliers when necessary. Results may be utilized at receiving inspection.

3. Receiving Inspection — When this method is utilized, purchased items are inspected to verify conformance to procurement documents. This method verifies by objective evidence such features as proper configuration; identification; dimensional, physical, or other critical characteristics; freedom of damage from shipping; cleanness; and review of supplier documentation when procurement documents require the documentation to be furnished.

4. Post-Installation Testing — When this method is utilized, post-installation test requirements and acceptance criteria are established in conjunction with the supplier.

5. Supplier qualification and performance history. For QAL-1 items, at least one of the other methods of acceptance is used.

Documented evidence of acceptability must be complete prior to placing an item in service. Controls are established for conditional release such as for post-installation testing.

Acceptance of services is based on one or more of the following methods:

1. Technical verification of data produced.

2. Surveillance and/or audit of the activity.

3. Review of objective evidence for conformance to procurement document requirements.

Acceptance of services includes review of contractor deliverables (including documentation and records), determination of acceptability for project use, completion of acceptance testing, completion of startup testing, turnover, etc.

Supplier nonconformances are processed in accordance with Sec. 15. Supplier nonconformances consist of one or more of the following:

1. Violation of technical or material requirement.

2. Violation of requirement of purchaser-approved supplier document.

3. Nonconformances which cannot be corrected by continuation of the manufacturing process or by rework.

4. Items which do not conform to the original requirements even though the item can be restored to a condition such that the capability of the item to function is unimpaired.

Supplier nonconformance may be identified either by USEC or by the supplier. For supplier identified nonconformances, USEC expects a supplier recommended disposition and technical justification. Nonconforming items are not released for use until implementation of the disposition is verified. Records of supplier nonconformances are maintained.

Commercial grade items are subject to the following controls:

1. Changes to commercial grade items specified in design documents are subject to design control measures in accordance with Section 3.
2. Supplier evaluation, when deemed necessary, is in accordance with this Section 7.
3. Commercial grade items are identified in procurement documents by manufacturer's published product descriptions, in accordance with Section 4.
4. Acceptance of commercial grade items is accomplished in accordance with this Section 7 using receiving inspection and one or more of the following:

    a. Special test
    b. Commercial grade survey of the supplier
    c. Source verification
    d. Acceptable supplier/item performance record

8. IDENTIFICATION AND CONTROL OF ITEMS

Items are identified and controlled as necessary from initial receipt and fabrication of the items up to and including installation and use to assure that only correct and accepted items are used or installed. When physical identification is either impractical or insufficient to control the item, physical separation, procedural controls, or other means are employed. When markings are used, measures are established to ensure that the markings are clear, legible and do not have a detrimental effect on the function or service life of the item. Markings are transferred to each part of an identified item when subdividing and are not to be obliterated by surface treatments or coatings unless other means of identification are provided.

When specified by codes, standards or specifications, traceability of items to specific records is provided.

Items which have a limited operating life or shelf-life are identified and controlled to preclude use of items whose operating life or shelf-life has expired.

Identification of stored items is consistent with the planned duration and conditions of storage such as (1) provisions for maintenance or replacement of markings and identification records due to damage during handling or aging, (2) protection of identifications on items subject to excessive deterioration due to environmental exposure, and (3) provision for updating existing records. Documentation is provided to show that items released for use are the items specified.

9. CONTROL OF PROCESSES

Work processes such as design, operation and maintenance are controlled by procedures, instructions, checklists, work orders or other appropriate means.

Special processes that control or verify quality, such as those used in welding, heat treating, and nondestructive examination, are performed by qualified personnel using qualified procedures in accordance with specified requirements, codes, or standards. When the outcome of the process is highly dependent on personal skills, such people are certified in accordance with specified requirements. When the outcome is highly dependent on control of process parameters, the process and equipment are pre-qualified, in accordance with specified requirements. Special process procedures prescribe the necessary equipment, process parameters, calibration and acceptance criteria.

Records are maintained of currently qualified personnel, processes, and equipment for special processes.

10. INSPECTION

Planned inspections are performed as required to verify conformance of items or activities to specified requirements. Inspection for acceptance is performed by persons, certified in accordance with Sec. 2, other than those who performed or directly supervised the work being inspected and who did not report directly to these supervisors.

Inspection planning provides for hold points to ensure that work does not bypass required inspections. The hold points are established in work controlling documents. Work does not proceed beyond an inspection hold point without specific documented consent of the designated inspection representative.

The planning of inspection activities, methods, and attributes is based on the importance of the item or activity to be inspected; mandatory inspections required by codes, standards, regulatory requirements and commitments; the complexity of the item or activity; and the quality history of the process. Inspection planning includes characteristics to be inspected, responsibility, method, measuring and test equipment, acceptance criteria, and referenced instructions and design documents.

If inspection of completed work is impossible or disadvantageous, indirect verification by process monitoring is provided. Both inspection and process monitoring are provided when necessary to ensure quality.

Final inspections include records review of the results and resolution of nonconformances identified by prior inspections. Acceptance by final inspection verifies conformance of the item to specified requirements.

Repairs, replacements, and modifications performed subsequent to final inspection require re-inspection or re-test, appropriate to the circumstances, to verify acceptability.

When a sample is used to verify acceptability of a group of items, the sampling procedure is documented and clearly identifies the sampling basis (typically based on recognized standard/practices).

Inspection records contain the following as a minimum:

1. Item inspected
2. Date of inspection
3. Inspector
4. Type of observation and inspection plan
5. Results or acceptability
6. Action taken in connection with nonconformances.

11. TEST CONTROL

Planned tests are performed as required to verify conformance with specified requirements, to demonstrate satisfactory performance, or to collect data. Tests include design verification tests, acceptance tests, pre-operational tests, post-maintenance tests and operational tests. Planning for tests may include mandatory hold points as required.

Test procedures contain the following information as appropriate to the test:

1. Test purpose or objectives, responsibilities, characteristics to be tested, hold points and test methods to be employed.
2. References and related documents.

3. Provisions for ensuring that prerequisites for a given test have been met. These include, as applicable: calibrated instrumentation, appropriate equipment, trained personnel, condition of test equipment and the item to be tested, and provisions for data acquisition.

4. Adequate instrumentation is available and suitable environmental conditions are maintained

5. Provisions for documenting and evaluating the test results for conformance with acceptance criteria.

In lieu of written test procedures, appropriate sections of related documents, such as ASTM methods, vendor manuals, maintenance instructions, or approved drawings or travelers with acceptance criteria may be used. Such documents must include adequate instructions to ensure the required quality of work.

Test records contain the following information: item tested, test date, tester or data recorder, type of observation, test procedure, results and acceptability, actions taken in connection with any deviations noted, and person evaluating the results.

Computer Program Testing is carried out in accordance with ASME NQA-1-1994, Supplement 11S-1.

12. CONTROL OF MEASURING AND TEST EQUIPMENT

Measuring and test equipment used in activities affecting quality are controlled, calibrated, and adjusted at specified intervals to maintain equipment performance within required limits. Procedures ensure that devices and standards used for measurement, tests, and calibration activities are of the proper type, range and accuracy. In addition, calibration control requirements are also applied to permanently installed facility instrumentation that are used to control plant operations. Calibration control is not necessary for rulers, tape measures, levels, and other such fixed calibration devices.

A list of devices is established to identify those items within the calibration control system. This identification listing includes, as a minimum, the due date of the next calibration and any use limitations (when it is calibrated for limited use).

M&TE is calibrated at specified intervals or prior to use against equipment having known valid relationship to nationally recognized standards. The calibration standard is four times more accurate than the M&TE being calibrated or an accuracy that ensures the equipment being calibrated will be within the required tolerance. If no nationally recognized standard exists, the bases for calibration are documented. M&TE is properly handled and stored to maintain accuracy.

When M&TE is found to be out of calibration, as-found data are recorded and an evaluation is made and documented as to the validity of previous inspection and test results and of the acceptability of items previously inspected or tested. Out-of-calibration devices are tagged or segregated and are not used until recalibrated. When M&TE is consistently found to be out of calibration, it is repaired or replaced. Also, calibrations are performed when the accuracy of the equipment is deemed suspect by personnel performing measurements and tests.

Records are maintained and equipment is suitably marked to indicate its calibration status.

13. HANDLING, STORAGE AND SHIPPING

Material and equipment are handled, stored and shipped in accordance with design and procurement requirements in a manner that will prevent damage, deterioration, or loss.

Special coverings, equipment, and protective environments are specified and provided where necessary for the protection of particular items from damage or deterioration. When such special protective features are required, their existence is verified and monitored as necessary to ensure they continue to serve the intended function.

Special handling tools and equipment are provided where necessary to ensure items can be handled safely and without damage. Special handling tools and equipment are controlled and maintained in a manner such that they will be ready and fit to serve the intended function when needed. Such control includes periodic inspection and testing to verify that special handling tools and equipment have been properly maintained. Operators of special equipment are experienced or trained as required.

Attention is given to marking and labeling items during packaging, shipment, and storage. Additional marking or labeling is provided as necessary to ensure that items can be properly maintained and preserved. This includes indication of the presence of special environments or the need for special control.

Special handling, preservation, storage, cleaning, packaging, or shipping instructions are established and used when essential to maintain acceptable quality

14. INSPECTION, TEST AND OPERATING STATUS

Procedures are established to ensure that the status of inspection and test activities are either marked or labeled on the item or in documents traceable to the item. This activity is required when it is necessary to ensure that required inspections and tests are performed, and ensure that items which have not passed the inspections and tests are not inadvertently installed, used, or operated.

Status indicators, such as physical location and tags, markings, work controlling documents, stamps, inspection records, or other suitable means are utilized when required. This includes indicating the operating status of systems and components, such as by tagging valves and switches, to prevent inadvertent operation. Authority for the application and removal of tags, markings, labels, and stamps, is specified.

15. CONTROL OF NONCONFORMING ITEMS

Items and related activities that do not conform to specified requirements are controlled to prevent inadvertent installation or use.

Nonconforming items are identified in a manner that does not adversely affect the end use of the item, by markings, tagging, and other appropriate methods.

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

Nonconforming items are reviewed and dispositioned as "reject", "rework", "repair" or "use-as-is". Further processing, delivery, installation or use of the nonconforming item is controlled pending an evaluation and approved disposition by authorized personnel, and documented notification to affected organizations is provided.

The responsibility and authority for the evaluation and disposition of nonconforming items are defined. The personnel performing evaluations to determine the dispositions have demonstrated competence in the specific area they are evaluating, have an adequate understanding of the requirements, and have access to pertinent background information. The disposition of nonconforming items is identified and documented as required to carry out the disposition. Technical justification for the acceptability of nonconforming items dispositioned "repair" or "use-as-is" is documented and subject to design control measures as described in Sec. 3. The disposition process includes consideration of the need for design documents to be "as-built" to facilitate operations, maintenance, modification, or decommissioning. The as-built records, if the disposition determines such records to be required, reflect the accepted deviation.

Repaired or reworked items are re-examined in accordance with the original acceptance criteria unless the nonconforming item disposition has established alternate acceptance criteria.

Nonconformance documentation identifies the nonconforming item, describes the nonconformance, contains the disposition and any reinspection requirements, and contains the signature(s) approving the disposition.

Nonconforming items or services are evaluated to determine whether reporting to the NRC is required.

16. CORRECTIVE ACTION

Conditions adverse to quality are identified and corrected as soon as practical. In the case of significant conditions adverse to quality, the cause of the condition is determined and corrective action is taken to preclude recurrence. These actions are documented and reported to appropriate levels of management. This system also ensures that follow-up actions are taken to verify implementation of the corrective action.

17. QUALITY ASSURANCE RECORDS

The quality assurance records system ensures that records are specified, prepared and maintained in a manner to provide protection and retrievability. Design specifications, procurement documents, test procedures, operational procedures or other documents specify the records to be generated, supplied, or maintained.

Records are considered valid when they are complete, identified, authenticated and legible. Lifetime records are entered into records storage within six months after receipt or validation. Nonpermanent records are retained by the responsible organization until they are no longer useful.

Lifetime records are defined in accordance with ASME NQA-1-1994, supplement 17S-1, Sec. 2.7.1 The applicable document that specifies the record indicates those to be forwarded for lifetime storage by USEC. In the case of specified records produced by suppliers, an agreement for records turnover is established.

Lifetime records are retained for the life of the item to which they apply or as required by a regulatory agency. An indexing system ensures the record can be retrieved. Storage is in a central location unless the applicable procedure specifies otherwise. Records may be originals, copies, or electronic format.

Corrections to records are approved by the originating organization. The corrections include the date and the identification of the individual authorized to issue the correction.

Custodianship responsibility is assigned for lifetime records storage. Custodianship includes receipt and status control, storage, preservation, and safekeeping using hard copy, microfilm, or electronic document management system.

Storage facilities minimize the risk of loss or deterioration of lifetime records. Hard copy or microfilm storage facilities meet the requirements of ASME NQA-1-1994, supplement 17S-1, Sec. 4.4. For electronic storage, backups or duplicate files are generated. Lost or damaged records are replaced, unless deemed impractical with the concurrence of the Quality Assurance organization.

Single copy records are allowed to be checked out of storage only if they cannot be copied and then only for a maximum of 90 days. Temporary protection in such cases is provided by prudent business practices (e.g., record of custody, office environment, workplace security).

18. AUDITS

Planned and scheduled audits are performed by the Quality Assurance organization to verify compliance with all aspects of the quality assurance program and to determine its effectiveness. Internal audits of organizational units performing quality program activities and external audits of QAL-1 suppliers are performed at a frequency commensurate with the status and importance of the activity. Third party audits may be used to satisfy the supplier audit requirement. QAL-2 suppliers need not be audited provided their performance continues to be acceptable. Regularly scheduled audits are supplemented by additional audits of specific subjects when necessary to provide adequate coverage.

The audit is conducted in accordance with a documented procedure. A plan is prepared for each audit to identify the audit scope, audit personnel, activities to be audited, applicable documents, organizations to be audited, and schedule.

The audit team contains one or more auditors and a qualified lead auditor who prepares, organizes, and directs the audit; coordinates the preparation and issuance of the audit report; and evaluates responses. Auditors (including technical specialists) have experience commensurate with the scope, complexity, or special nature of the audit. The audit team leader is certified in accordance with Sec. 2.

Audits are performed in accordance with checklists or equivalent. Organizations being audited provide access and assistance to the audit team. Objective evidence is examined to determine if the QAP elements are being implemented effectively. The primary focus is on the quality of results (compliance with specified acceptance criteria), with procedural compliance as a secondary focus. Conditions requiring prompt corrective action are reported immediately to management of the audited organization. The results of the audit are discussed with management of the audited organization.

The audit report is signed by the audit team leader and issued to the appropriate levels of management. The audit report includes the following information, as appropriate:

1. Description of the audit scope.

2. Identification of the auditors.

3. Identification of persons contacted during audit activities.

4. Summary of audit results, including a statement on the effectiveness of the quality assurance program elements which were audited.

5. Description of each reported adverse audit finding in sufficient detail to enable corrective action to be taken by the audited organization.

Management of the audited organization or activity investigates adverse audit findings, schedules corrective action including measures to prevent recurrence, and notifies the Quality Assurance organization in writing of action taken. Adequacy of audit responses is evaluated by the Quality Assurance organization and verification of corrective action is documented.

Follow-up action is taken by the Quality Assurance organization to verify the implementation and effectiveness of the corrective action and to determine if repetitive problems require further corrective action in accordance with Section 16. Audit records include audit reports and the record of completion of corrective action.

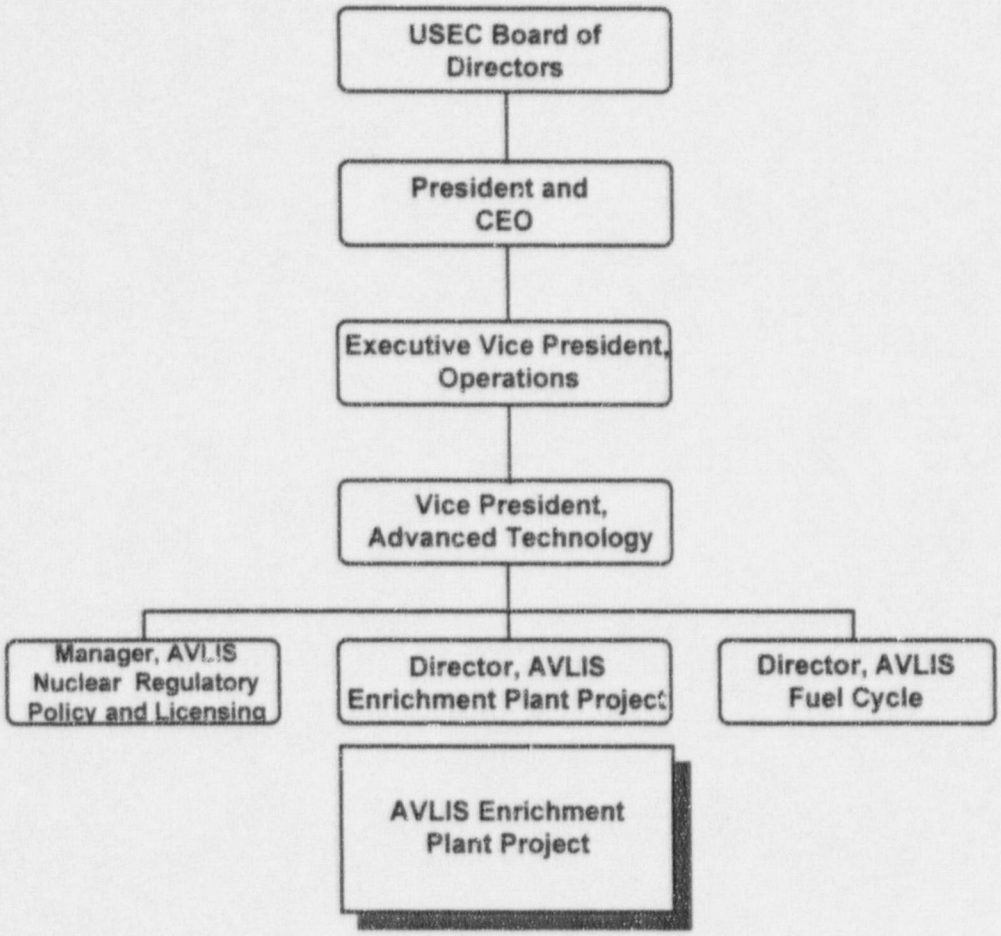

Figure 1 - USEC Organization

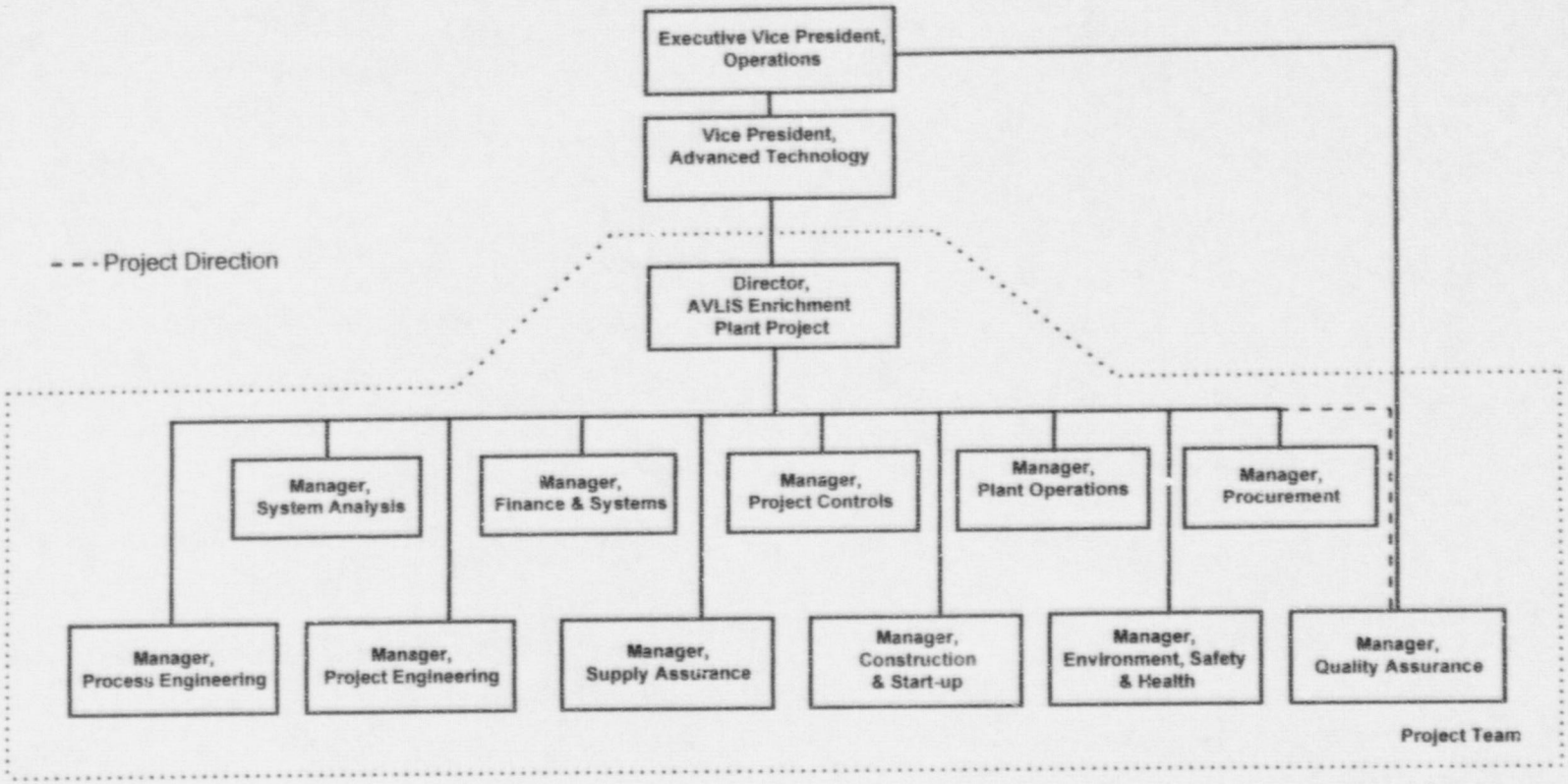

Figure 2 - AVLIS Project Organization

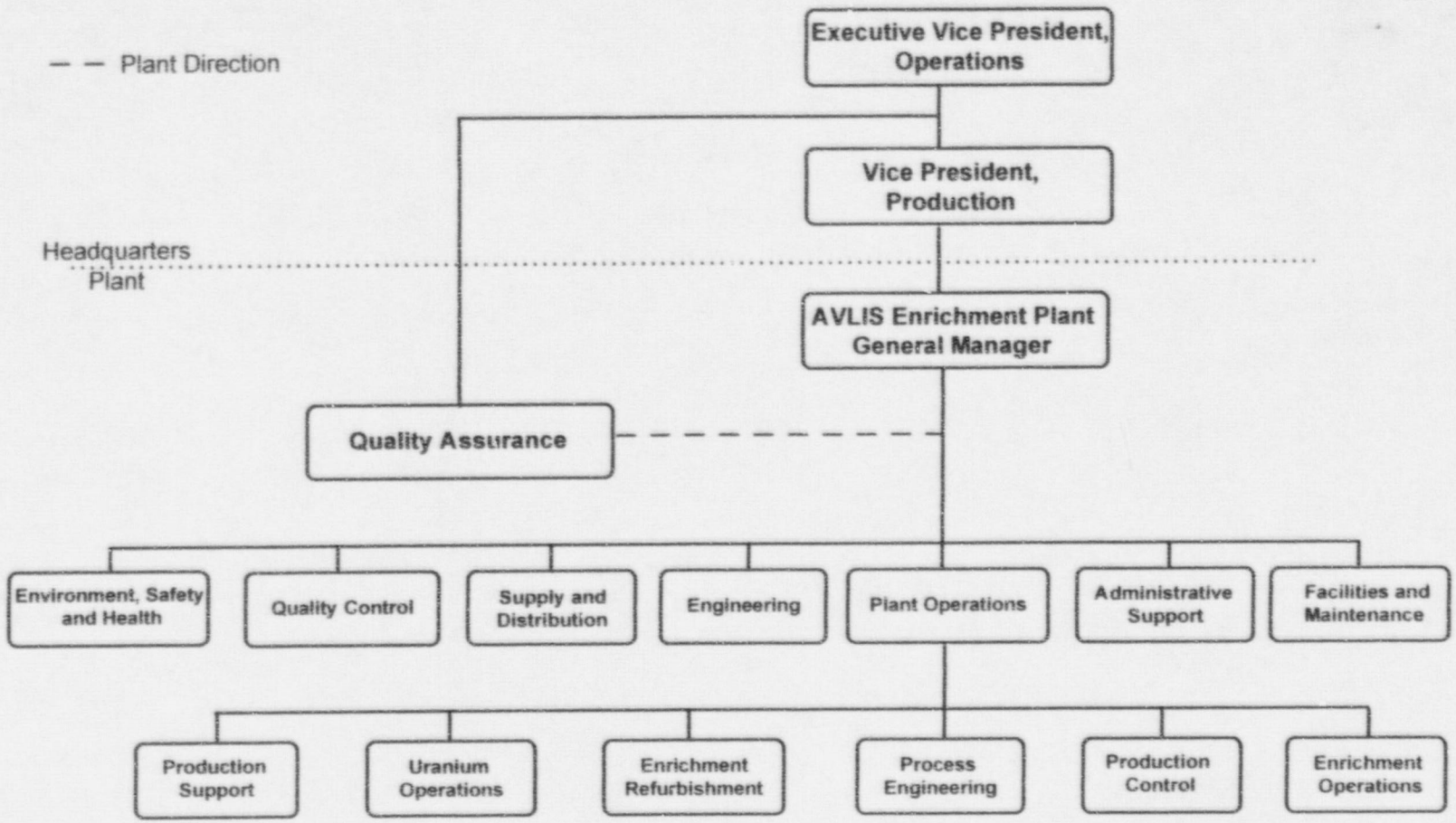

Figure 3 - AVLIS Plant Organization During Operation