

QUALITY ASSURANCE MANUAL
DIVERSIFIED TECHNOLOGIES SERVICES, INC.

ISSUED TO


Revision 1

March 8, 1996

Diversified Technologies Services, Inc.
2680 Westcott Blvd
Knoxville, TN 37931-3111

QUALITY ASSURANCE MANUAL

REVISIONS

Revision Level	Description of Changes	Signature	Date
0	Original Quality Assurance Manual	NA	6/1/89
1	Editorial revisions; added controls established by DTS to control design and fabrication of components and systems.	 _____ _____ _____ _____	3/8/96

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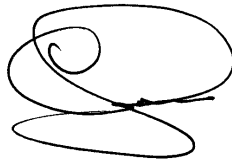
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POLICY STATEMENT

The management of Diversified Technologies Services, Inc. is in full agreement with the principles set forth in this Quality Assurance Program. The Quality Assurance Manager has the authority and responsibility to administer the Quality Assurance Program so as to assure compliance with all applicable regulatory requirements.

The Quality Assurance Manager shall have the authority for revising the provisions of the Quality Assurance Program.

The Quality Assurance Manual shall be reviewed by Diversified Technologies Services Inc.'s management annually to assess the scope, status, implementation and the effectiveness of the program.



Charles E. Jensen
President

3/8/96

Date

INTRODUCTION

This program defines and describes the basic policies and procedures used by Diversified Technologies Services, Inc. (DTS) to establish quality assurance requirements for all activities affecting safety related and non-safety related functions of DTS supplied technical services, systems, components, and computer software. DTS may design and fabricate waste management systems or components or may have such items designed and/or fabricated by a subcontractor or vendor.

It is intended that the requirements described meet or exceed the requirements of 10 CFR 50 Appendix B, 10 CFR 71 Subpart H, Mil Q-45082, ANSI NQA-1, ANSI N-45.2-1977 and their related documents, as applicable to DTS activities. These requirements shall be imposed upon both safety and non-safety related items and services, as applicable. DTS shall perform or have performed all those controls, inspections and tests as required to substantiate deliverable conformance.

This Quality Assurance Program (hereinafter referred to as Program) is subject to review and comment by DTS client representatives.

Revisions or amendments to the Program will be made as necessary to conform to the current requirements placed on the company. All revisions will be dated and signed on the Revision page.

Copies of this program will be issued to client and government representatives, as required and requested. When required, serialized, controlled copies of the Program will be issued and upgraded with all revisions. Controlled copy issuance will be shown on the Controlled Copy List.

This Program is reviewed by DTS management at least annually to assure conformance with current requirements.

The DTS Program has been established and implemented under the direction of the President of DTS. It has the full support of DTS management, and all employees shall adhere to its provisions.

1.0 ORGANIZATION

The organizational structure within DTS has been established to ensure that all activities associated with each project are defined and controlled by the responsible Project Manager (PM). This organizational structure ensures that specified quality requirements are achieved and maintained by those who have been assigned the responsibility of performing the work, and conformance to those established requirements is verified by the Quality Assurance (QA) group. The DTS Organization Chart is shown in Figure 1.

1.1 Quality Assurance Organization

The QA organization consists of the Quality Assurance Manager (hereinafter referred to as QAM) with the overall responsibility for development and implementation of the Program. Personnel performing QA activities report to the QAM, who reports directly to the President of DTS.

This reporting route has been established to allow the QAM sufficient authority and autonomy to implement the DTS Program to assure conformance to quality requirements, and to function independently of undue influence and responsibility for cost and schedule.

1.2 Responsibilities

In addition to developing and implementing the Program, the QAM shall be responsible for establishing and using systems which effectively and economically assure that the requisite quality of the furnished deliverable is achieved. With respect to all such matters, the QAM's authority shall be final. The QAM's duties include:

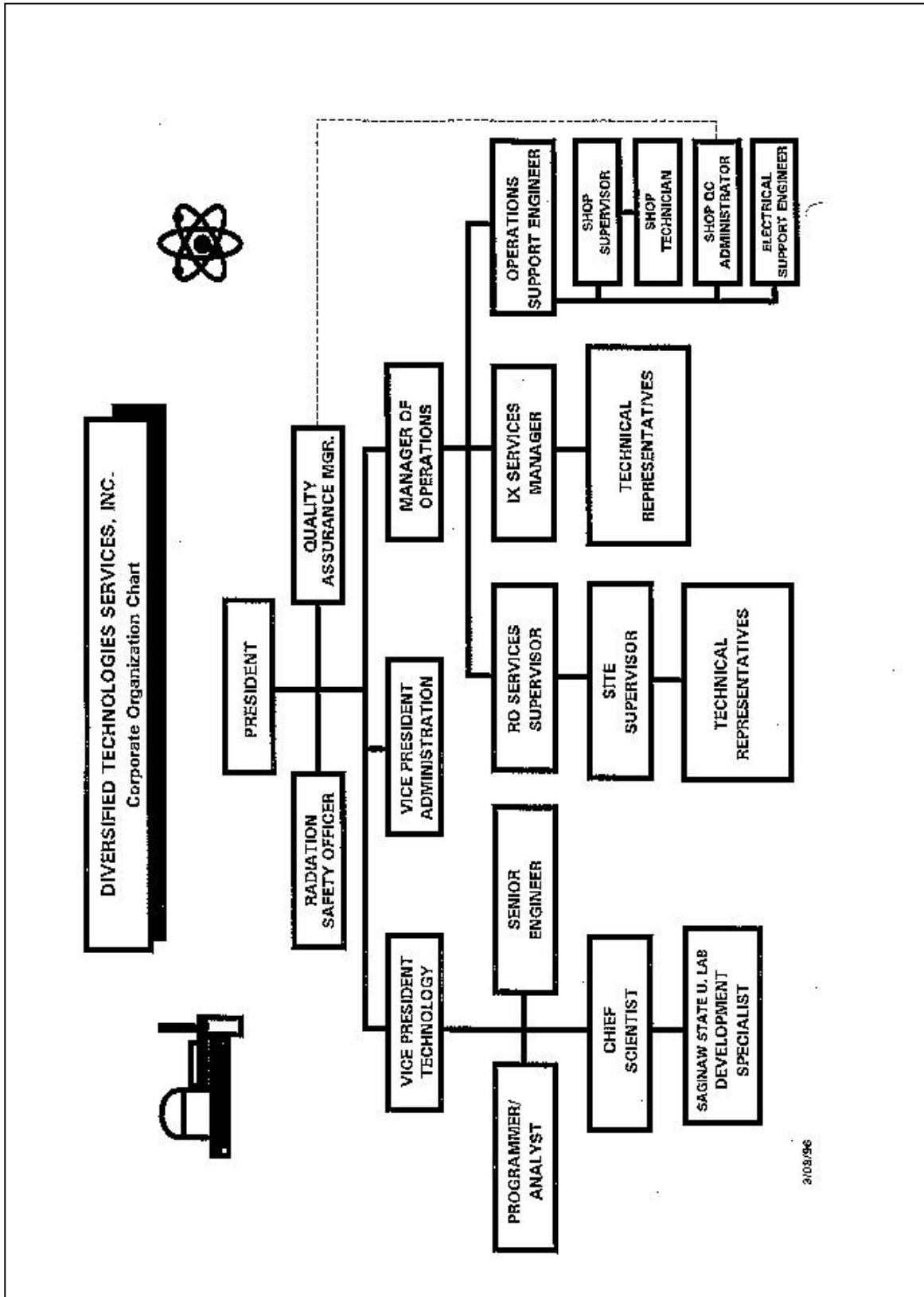
- 1.2.1 liaison and coordination with other DTS personnel;
- 1.2.2 liaison with client and third party quality representatives;
- 1.2.3 communication with DTS subcontractors and vendors related to control of quality related activities, including the activities important to safety.

Personnel assigned to vendor inspection are responsible for those quality assurance activities which assure DTS that all vendor and/or subcontractor activities are properly conducted in accordance with a vendor internal QA program that addresses the applicable criteria of the DTS Program.

Personnel assigned to quality assurance for fabricated items are responsible for verifying that equipment has been designed, fabricated, tested and inspected in accordance with DTS procedures and design documents.

- 1.3 QA personnel shall have the responsibility and authority, as specified in written procedures, to perform the following functions effectively and without hindrance or reservation:
 - 1.3.1 identify quality problems, stop unsatisfactory work, and control further processing, delivery, or installation of nonconforming material;
 - 1.3.2 recommend and/or approve solutions through proper channels;
 - 1.3.3 verify implementation of solutions.

- 1.4 Position descriptions of the QAM and QA personnel shall include prerequisite experience and/or required training to ensure competence commensurate with assigned responsibilities. Qualifications for the position of QAM are as follows:
 - 1.4.1 minimum 1 year engineering/quality control experience;
 - 1.4.2 knowledge of applicable quality related codes, standards, and regulatory requirements;
 - 1.4.3 ability to prescribe, apply and assess compliance with the applicable requirements;
 - 1.4.4 good verbal and written communication skills.



2.0 QUALITY ASSURANCE PROGRAM

The Program is comprised of those planned and systematic actions necessary to assure adequate confidence that all DTS activities will be conducted in a satisfactory manner, and that all DTS project deliverables will perform satisfactorily in service. It is the intent of this Program to insure that all activities necessary to provide project deliverables which meet client requirements are conducted in a manner that has the degree of reliability on which the safety and performance of these activities were evaluated. Those required activities are conducted in accordance with written and approved procedures.

Design and fabrication of safety related waste management systems shall be controlled in accordance with this Program. If equipment is furnished as a DTS deliverable, the vendor or subcontractor furnishing such equipment may be required to provide and implement a Quality Assurance Program covering the criteria of 10 CFR Part 50, Appendix B, and 10 CFR 71, Subpart H, as applicable.

2.1 Program Application

This Program applies, in varying degrees, to all deliverables prepared by DTS in accordance with clients' requirements. These deliverables shall include, but are not limited to:

- 2.1.1 process equipment and components,
- 2.1.2 processing media and supplies,
- 2.1.3 technical support services,
- 2.1.4 vendor fabricated hardware such as liners, shields, tools and manipulators;
- 2.1.5 vendor fabricated systems for filter handling;
- 2.1.6 subcontractor furnished equipment.

Upon receipt, review and acceptance of objective evidence that the deliverables to be provided are in conformance with all applicable client quality requirements, it shall be the responsibility of the QAM to prepare and sign Certificates for Conformance and/or Certificates of Compliance, as appropriate, when required.

The Program and its implementing procedures incorporate the 18 criteria addressed in 10 CFR 71 Subpart H, and 10 CFR 50 Appendix B.

2.2 Management

The President of DTS has assigned the QAM the responsibility to implement the Program and assess its effectiveness. This is done through the use of internal audits. Internal audit reports are distributed to cognizant personnel and to the President of DTS.

2.3 Personnel Training and Qualifications

The personnel assigned to perform quality functions are indoctrinated and trained in accordance with ANSI N45.2.6, ANSI N45.1.12, NRC Reg. Guide 1.58 and other applicable documents. Indoctrination and training is established such that:

- 2.3.1 Personnel responsible for performing quality related activities are instructed as to the purpose, scope and implementation of quality manuals, procedures and instructions;
- 2.3.2 Personnel performing quality affecting activities are trained in the principles and techniques of the activity being performed;
- 2.3.3 The scope, objective and the method of implementing the indoctrination and training are documented;
- 2.3.4 Personnel assigned to perform quality activities shall be qualified to perform those activities. Their qualifications shall be documented, and their proficiency shall be monitored and documented on a periodic basis. Personnel proficiency shall be maintained by re-training, re-examining and re-certifying, as required;

2.3.5 Personnel performing special processes shall be qualified and certified to perform those functions in accordance with the requirements of recognized standards such as ANSI, ASME, and ASNT. Records of their qualification and certification shall be available for review.

The QAM shall be responsible for selecting personnel to perform quality assurance activities.

2.4 Goals and Objectives

It is the goal and objective of the Program to provide those mechanisms necessary to assure the requisite quality of all DTS project deliverables. This is accomplished through the use of written approved procedures. Adherence to project relevant procedures is mandatory for all DTS employees.

2.5 Disputes

Differences of opinion between QA personnel and other DTS personnel which cannot be resolved on a project level shall be resolved at the management level, or in a staff meeting.

3.0 DESIGN CONTROL

DTS has developed procedures to assure that applicable project design criteria are included with the project design package (i.e., engineering or performance specifications, design drawings), and that effective communications are established between the various project disciplines such that design activities are conducted in a planned, controlled and orderly manner.

3.1 Control of the Design Process

The design process is initiated by management review of the contract documents to determine the classification of deliverables to be provided (e.g., safety related, non-safety related, commercial grade). An initial design review meeting is held to establish the design requirements, identify the critical parameters that can be controlled by inspections or tests, and establish inspection and test criteria and quality standards.

For safety related projects, this shall be a formal meeting with discussions documented in the meeting minutes. The initial design review meeting shall also establish the assignment of design responsibilities. Design review meetings are held at regular intervals to ensure that the design process is proceeding in accordance with the prescribed methods. Design review meetings may be called at any time a problem is identified. Records are kept of these design reviews, and measures are taken to ensure that design errors are corrected and not repeated.

3.2 Control of Design Input

Responsibilities for the selection and control for the design parameters and for the development of design documents are assigned as follows:

- 3.2.1 The PM is responsible for:
 - 3.2.1.1 initial interpretation of the design requirements;
 - 3.2.1.2 ensuring that appropriate codes, standards and regulations are utilized and properly translated into design specifications, drawings, procedures and instructions;
 - 3.2.1.3 ensuring that maintenance, repair, in-service inspection, handling, storage and cleaning requirements are specified;
 - 3.2.1.4 developing test procedures to ensure that the deliverables will perform satisfactorily in service;
 - 3.2.1.5 interfacing of all associated internal personnel;
 - 3.2.1.6 interfacing design requirements between DTS and vendors;
 - 3.2.1.7 reviewing and approving design documents.

- 3.2.2 The QAM is responsible for:
 - 3.2.2.1 reviewing the design requirements to ensure that suitable design controls are prescribed in accordance with governing codes, standards and regulations;
 - 3.2.2.2 reviewing the design package to ensure that applicable quality standards have been included and can be inspected and/or verified;
 - 3.2.2.3 verifying that the deliverables meet the applicable quality requirements;
 - 3.2.2.4 maintaining and storing quality documentation.

3.3 Control of Design Verification

The verification of design adequacy shall be determined through one or more of the following methods:

- 3.3.1 formal project design review meeting attended by all design disciplines;
- 3.3.2 alternative calculations, including the use of computer programs, performed by individuals or groups other than the original designer.

3.4 Design Changes

All design changes, including field changes, are subject to the design review and approval criteria placed on the original design, and are performed by the same individuals or groups that approved the original design.

4.0 PROCUREMENT DOCUMENT CONTROL

The procurement of materials, equipment and services which are designed by DTS and become project deliverables is accomplished with a written Purchase Order (hereinafter referred to as PO). Changes are accomplished with a written Purchase Order Change Notice (Hereinafter referred to as POCN).

The President authorizes key personnel to release POs and POCNs. These individuals are responsible for conforming to the established purchasing procedure and controlling PO and POCN forms.

Procurement documents include design drawings and specifications. Drawings and specifications, including their revisions and issuance, are procedurally controlled. The procurement document package shall contain all of the information necessary for the vendor to provide the required equipment and/or services.

4.1 Quality Assurance

QA examines the procurement document package to assure that complete information is provided to identify:

- 4.1.1 scope of work to be performed;
- 4.1.2 design basis technical requirements, including the applicable regulatory requirements, material and components identification requirements, specifications, codes and standards, special process instructions, and test/inspection requirements;
- 4.1.3 applicable requirements of 10 CFR 71, Subpart H and 10 CFR 50 Appendix B which must be addressed;
- 4.1.4 documentation to be prepared, maintained and submitted for review and/or approval;
- 4.1.5 records to be retained, controlled and maintained by the vendor, and those records to be delivered to the DTS prior to installation and use of materials and equipment;
- 4.1.6 right of DTS access to the facilities and records of the vendor and/or sub-

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vendor for inspection and audit purpose;

4.1.7 inspections, and witness and hold points, as applicable;

4.1.8 requirements for reporting and approving disposition of nonconformances.

QA shall document review completion by signing the PO or POCN in the space provided. The PO and/or POCN shall be subject to additional administrative review and approval, as defined in the purchasing procedure.

4.2 Spare Parts

POs and POCNs for spare and replacement parts are subject to the same controls placed on the original equipment.

5.0 INSTRUCTIONS, PROCEDURES AND DRAWINGS

Those activities important to safety and quality are prescribed and accomplished in accordance with documented instructions, procedures and/or drawings of a type appropriate to the circumstances. The instructions, procedures and/or drawings include the methods for complying with the applicable requirements of the governing codes, standards and regulations, as well as appropriate quantitative and/or qualitative acceptance criteria to verify that activities important to safety and quality have been satisfactorily accomplished.

Instructions, procedures and drawings are prepared by the cognizant personnel. QA reviews and concurs with inspection plans, tests, special process procedures, drawings and specifications, including changes, revisions or alternatives to the above. Instructions, procedures and drawings are readily available to personnel at all locations requiring their use.

6.0 DOCUMENT CONTROL

The document control system at DTS provides a procedural means for the control of all documents affecting the Program,

6.1 Document Types Controlled

The documents controlled by the Program include:

- 6.1.1 computer software performance specifications,
- 6.1.2 design documents, including drawings and specifications,
- 6.1.3 design change requests,
- 6.1.4 procurement documents,
- 6.1.5 operation, maintenance and modification procedures,
- 6.1.6 manuals and implementing procedures,
- 6.1.7 inspection and test procedures,
- 6.1.8 Nonconformance Reports,
- 6.1.9 Corrective Action Reports.

6.2 Document Review and Approval

The established procedures include the requirements for review and approval of the original documents and their revisions. All QA documents for safety related equipment are reviewed and approved by cognizant personnel and QA.

6.3 Documentation Identification

Documents covered by the Program are identified by identifier number and complete descriptive title. Documents shall also have provisions for identifying the revision level, the revision date and the revision approval.

6.4 Document Distribution

The number of copies made and issued of a document is controlled by a document distribution list maintained by the QM. The document distribution list has provisions for the document number, title, revision status, transmittal date and the name of the person, organization or company to whom the document was issued.

The removal of obsolete documents is accomplished immediately when such documents are made obsolete by new or revised documents. A history copy of the original document shall be retained in the document file. Obsolete documents are to be destroyed, returned or marked VOID, as directed on the document transmittal form.

All documents are distributed in a timely manner such that all documents required to perform an activity are available at the location where such work will be performed prior to commencement of work, and obsolete documents are removed from use.

7.0 CONTROL OF PURCHASED MATERIAL, EQUIPMENT AND SERVICES

Measures have been established to assure that purchased items and services are clearly defined in the procurement document, and that those items and services are furnished by vendors capable of manufacturing items which conform to the procurement document.

7.1 Vendor Qualification

Vendor qualification is based on or more of the following:

- 7.1.1 vendor's capability to comply with the requirements of 10 CFR 71 Subpart H, as applicable to the items or services being furnished;
- 7.1.2 vendor's capability to comply with the requirements of 10 CFR 50 Appendix B, as applicable to the items or services being furnished;
- 7.1.3 vendor's capability to comply with the requirements of ANSI N45.2 1977, as applicable to the items or services being furnished;
- 7.1.4 review of the records and past performance of vendors who have provided similar items or services of the type being purchased.

The results of vendor audits/evaluations are documented and kept on file for future reference, and to assure that corrective action has been implemented on all deficiencies found prior to commencement of vendor fabrication of ordered items.

7.2 Inspection Requirements

Prior to issuance of procurement documents, a determination is made concerning the requirements of surveillance inspections. This determination is based on the complexity and the importance to safety and quality level of the deliverable being furnished. Surveillance inspections, including witness and hold points, if required, are clearly stated in the procurement document. Surveillance inspections may include:

- 7.2.1 software operations testing,
- 7.2.2 visual inspection,
- 7.2.3 dimensional verification,

- 7.2.4 N.D.T. verification,
- 7.2.5 functional testing,
- 7.2.6 witness or verification of performance of special process operations,
- 7.2.7 verification of the use of established procedures and instructions,
- 7.2.8 inspection of identification nameplates,
- 7.2.9 final packaging inspection,
- 7.2.10 inspection of fabrication records, including inspection and test reports,
- 7.2.11 final documentation audit.

Surveillance inspection records are documented and kept on file.

7.3 Documentation Requirements

The procurement document details which documents are to be provided during the life of the PO. The project specific documentation to be provided may include:

- 7.3.1 Certification of Conformance identifying the item and the specific procurement requirements which are met by the item (e.g., material specification, codes, and standards).
- 7.3.2 NCRs identifying the item and the procurement requirement not met, and a description of nonconformances dispositioned "accept-as-is" or "repair". (Nonconformances shall be documented as prescribed in Section 15 of this Program.)

8.0 IDENTIFICATION AND CONTROL OF MATERIALS, PARTS AND COMPONENTS

DTS has established measures for the identification and control of materials, parts and components. These measures shall assure that only correct and accepted items are used, and that the identification of all materials, parts, and components is evident at all times throughout fabrication, from receipt of materials through final testing, inspection, and packaging.

Identification shall be maintained on the material, part, or component to the greatest extent possible. When this is not possible, the material shall be segregated from all other materials, and procedures shall be established to control that material. Identification (when not on the item) shall be traceable to an applicable drawing, specification, PO, or other pertinent technical document. Expendable items shall be identified to preclude use of items whose shelf life has expired.

8.1 Identification Requirements

Identification requirements shall be included within design specifications and drawings. Identification shall include job number, equipment number and/or heat number, as applicable. Identification shall be permanent and legible, and shall not interfere with fabrication or function. Identification shall be properly transferred to each part of an item (when subdivided) and shall not be obliterated or hidden by surface treatment or coatings unless other methods of identification are substituted.

When material traceability is required by code, standard, or specification, or the material is important to safety related systems, the material identification shall be traceable to the appropriate documentation such as the purchase contract, drawings, specifications, inspection documents and/or Certified Material Test Reports.

8.2 Identification Verification

Identification shall be verified and documented prior to release for fabrication, assembly and installation.

9.0 CONTROL OF SPECIAL PROCESSES

All special processes shall be performed in accordance with written and approved procedures, by qualified personnel.

9.1 Procedure and Personnel Qualifications

Procedures, equipment and personnel are qualified and prepared in accordance with the requirements of applicable codes, standards and specifications. Procedures and qualifications for special processes not controlled by codes and standards shall be developed and approved prior to use.

9.2 Qualification Records

A system has been established for recording the qualifications of all special process procedures, equipment and personnel, including the qualification period and requirements for re-qualification. These records shall be made available for DTS review.

9.3 Procedure Approval

All special process procedures shall be approved prior to use. QA shall review and approve the procedures to assure compliance with applicable codes, standards and specifications.

9.4 Special Process Verification

When required, the performance of special processes shall be verified during in-process surveillance inspection to assure that qualified procedures, equipment and personnel are being utilized.

10.0 INSPECTION

The inspection function at DTS is accomplished through the use of established written procedures and written instructions. The inspection verifies that activities affecting safety and quality have been or are being performed in accordance with the applicable requirements. The inspection function is performed by personnel trained and qualified in accordance with applicable codes and standards.

QA shall be responsible for inspector training. Records of inspection personnel qualifications are maintained and kept current in QA files. Inspection personnel shall be persons other than those performing the activity being inspected.

10.1 Inspection Requirements

Inspection requirements are determined at the beginning of a project. Witness and hold point requirements are incorporated in the appropriate documents, such as the inspection procedures and procurement documents. Work shall not proceed beyond a mandatory hold point until the requirement has been verified and documented.

10.2 Inspection Procedures and Instructions

Inspection procedures and instructions are written documents which provide the following information:

- 10.2.1 identification of characteristics and/or activities to be inspected,
- 10.2.2 description of the inspection method,
- 10.2.3 acceptance and rejection criteria,
- 10.2.4 identification of the individuals or groups responsible for performing the inspection,
- 10.2.5 prerequisites to be satisfied prior to inspection,
- 10.2.6 requirements for data to be recorded,

- 10.2.7 provisions for signature of data recorder and/or inspector,
- 10.2.8 provisions for approval/rejection of data obtained.

10.3 Inspections

Examinations, measurements or tests of fabricated items shall be performed where necessary to assure quality. When inspection of processed items is disadvantageous, indirect control shall be utilized. Indirect control includes monitoring of process methods, equipment and personnel.

Any modifications, repairs and replacements are inspected in accordance with the original design and inspection requirements or acceptable alternatives.

11.0 TEST CONTROL

The test control program has been established to assure that testing required to demonstrate that a project deliverable will perform satisfactorily in service is identified and documented. The program assures that testing is performed in accordance with written test procedures which incorporate or reference the requirements and acceptance criteria contained in the applicable design and procurement documents.

Personnel performing and/or observing a test shall have training commensurate with the requirements of the test to be performed and/or observed. QA shall be responsible for the required training.

11.1 Test Procedure Preparation and Approval

Test procedures are prepared by cognizant personnel and reviewed and approved by QA. The procedures include the following requirements, as applicable,

- 11.1.1 acceptance limits as contained in design documentation,
- 11.1.2 detailed instructions for performing the test,
- 11.1.3 requirements for witnessing test performance,
- 11.1.4 requirements for recording, documenting, and reporting test reports.

11.2 Test Requirements

Test control requirements for procured items are defined in procurement documents. The procurement document identifies all tests which shall be performed and reported, requirements for procedure submittal and approval prior to test performance, and qualifications of test personnel, as applicable.

11.3 Test Results

Actual test results are signed by qualified test personnel and/or test observers. The test results are evaluated by QA and the PM. The test shall not be considered acceptable until the results are evaluated and approved by QA and the PM.

11.4 Modifications, Repairs and Replacements

Modifications, repairs and replacements shall be tested in accordance with the original design and test requirements, or approved alternatives.

12.0 CONTROL OF MEASURING AND TEST EQUIPMENT

Measuring and test equipment utilized for inspections, test and acceptance of materials, parts, components and systems shall be of the proper type, range, and accuracy, and shall be used by qualified personnel.

Procedures are established to control issuance, inspection and calibration of tools, gauges and test equipment. Records are maintained, and equipment is suitably marked to reflect calibration status.

12.1 Equipment Accuracy and Calibration

Equipment accuracy shall be assured by equipment identification, calibration stickers and calibration records traceable to national standards. Where national standards do not exist, the basis for calibration shall be documented.

Calibration reference and transfer standards shall be traceable to nationally recognized standards. Where national standards do not exist, the basis for calibration is documented.

Measures shall be established to assure that when measuring and test equipment is found to be out of calibration, QA is formally notified, and that the validity of inspection performed using the defective equipment is documented.

12.2 Calibration Status

A status file shall be maintained for all measuring and test equipment. The file shall indicate the equipment identification, frequency of calibration required, date of last calibration, date of next required calibration, and the present calibration status. The frequency of calibration is based on the manufacturers' recommendations, required accuracy, purpose, degree of usage, stability characteristics, and specification requirements.

12.3 Measuring and Test Equipment Verification

The above requirements shall be subject to surveillance by QA.

13.0 HANDLING, STORAGE AND SHIPPING

The activities associated with handling, storage, shipping, packaging, marking, cleaning, and preservation shall be performed using written procedures and/or instructions to prevent damage, deterioration and loss. QA shall assure conformance to specified requirements during surveillance inspections.

13.1 Handling, Storage and Shipping Requirements

The PM shall establish and document the requirements for the above activities within engineering specifications and procurement documents.

All required shipping papers (e.g. bills of lading, detailed packing lists) shall be prepared and copies maintained on file.

Copies of installation, operating and maintenance manuals, packing lists, and quality documentation shall be included with the packaged equipment, as appropriate.

14.0 INSPECTION, TEST AND OPERATING STATUS

Measures to identify inspection and test status shall be documented and implemented. These measures shall provide a means for assurance that required inspections and tests are performed, and that the acceptability of items with regard to inspections and tests performed is known throughout manufacturing, installation and operation. Nonconforming items shall be clearly identified, documented and reported.

14.1 Fabrication Status

The inspection and test status shall be maintained through the use of status indications such as physical location, tags, marking, shop travelers, stamps, or inspection records traceable to the equipment. The measures shall assure that only those items which have passed the required inspections and tests are used, installed and operated. The measures shall include procedures for the control of status indicators, including the authority for the application and removal of tags, markings, labels, and stamps.

14.2 Installation, Test and Start-Up Status

During installation, pre-operational testing, and system start-up, the facility's established tagging procedures shall be utilized.

The status of nonconforming, inoperative or malfunctioning equipment, sub-system, or systems shall be identified to prevent inadvertent use.

14.3 Waiving Inspection and/or Tests

Bypass of required inspections, tests or other critical operations is procedurally controlled. Bypassing shall be avoided to the greatest extent possible. However, when it becomes necessary, those steps bypassed shall be documented and evaluated by QA and the PM.

15.0 NONCONFORMING MATERIALS, PARTS, OR COMPONENTS

A planned procedure for action on non-conforming items shall be established to control the identification, segregation, disposition, and notification of nonconforming items. Nonconforming items shall be tagged and physically segregated from all other material whenever possible. When physical segregation is not possible, the item shall be tagged or another means of identification shall be utilized, such as annotated drawings and production control documents.

15.1 Nonconformance Notification and Disposition

Personnel identifying a nonconformance shall provide formal notification to QA. The formal notification shall include a complete description of the nonconformance and recommended disposition and justification. If repair or re-work is required, written procedures shall also be submitted.

QA shall generate a Nonconformance Report (NCR) and submit the report to the PM for his recommended disposition. When the PM submits his recommended disposition, QA shall make the formal disposition, and notify the vendor of the required action to be taken. The completed NCR, including the formal disposition, shall be maintained in QA files.

15.2 Inspection of Dispositioned Nonconformances

All nonconforming items requiring repair or rework shall be re-inspected and re-tested by a method at least equal to the original requirements.

15.3 Assessments of Nonconformances

NCRs shall be analyzed periodically by QA to determine quality trends. Adverse quality trends shall be reported to management for review and assessment.

16.0 CORRECTIVE ACTION

DTS has established measures to assure that significant conditions adverse to quality and safety such as failures, malfunctions, deficiencies, deviations, defective materials and equipment, are promptly identified, reported and corrected as soon as practicable.

16.1 External Corrective Action

When any of the above adverse conditions occur, it shall be the responsibility of QA to document the adverse condition, investigate the problem to determine the cause, determine the action required to correct the problem, and initiate the required corrective action to preclude repetition of the adverse condition. All of the above shall be documented, reported to management, and maintained in project files.

16.2 Internal Corrective Action

When any of the above adverse conditions occur, it shall be the responsibility of QA to document the adverse condition, investigate the problem to determine the cause, determine the actions required to correct the problem, and initiate the required corrective action to preclude repetition of the adverse condition. All of the above shall be documented, reported to management, and maintained in project files.

16.3 Corrective Action Follow-Up

Effectiveness of corrective actions implemented to preclude repetition shall be verified during subsequent inspections, audits, and evaluations.

17.0 QUALITY ASSURANCE RECORDS

DTS has established measures to assure that sufficient records are prepared as work is performed to furnish documentary evidence of the quality of DTS deliverables and of activities affecting quality. These records shall be consistent with the applicable codes, standards, specifications and/or contracts, and shall be adequate for use in management of the project. QA shall prepare a list of the required in-house records as well as the required project records.

17.1 QA Records

QA records shall, as applicable, include:

- 17.1.1 procedures,
- 17.1.2 personnel training and qualification records,
- 17.1.3 In-Process Inspection Reports,
- 17.1.4 Assembly Inspection Reports,
- 17.1.5 Final Inspection Reports,
- 17.1.6 Packaging/Shipping Inspection Reports,
- 17.1.7 Nondestructive Test Reports,
- 17.1.8 Functional Test Reports,
- 17.1.9 Material Test Reports,
- 17.1.10 design and manufacturing specifications,
- 17.1.11 design and manufacturing drawings,
- 17.1.12 as built, layout, and interface drawings,
- 17.1.13 procurement documents,
- 17.1.14 operating procedures,
- 17.1.15 NCRs and their resolutions,
- 17.1.16 Audit/Evaluation and Corrective Action Reports.

Project records, at the completion of the project, shall provide the "as-built" condition of any item. All records shall be legible and complete to reflect the work accomplished.

17.2 Inspection and Test Reports

Inspection and test records shall identify the item being inspected and/or tested, the type of inspection or test, date of inspection and/or test, results of inspection and/or test with appropriate data, and the signature initials or stamp of the inspector or data recorder and evidence of acceptability. Deficiencies found shall be documented as well as those actions necessary to correct the deficiency, including verification of re-inspection and or re-test.

17.3 Record Identification, Receipt, Retrieval, and Disposition

QA records are identifiable and retrievable. They shall be available for review by the client and/or his authorized representative. Records shall be submitted to the client, as required by DTS's contract.

17.3.1 All records received are reviewed by the PM and/or QA to assure compliance with established requirements.

17.3.2 Lifetime records include design specifications, calculations, as-built drawings, Material Test Reports, Inspection and Test Reports, Nondestructive Examination Reports and NCRs, as applicable. Lifetime records shall be maintained for the life of the equipment plus three years, or in accordance with client requirements.

17.3.3 Non-permanent records include those records required to verify that an activity has been performed but do not meet the requirements of lifetime records. Non-permanent records shall be maintained for the life of the project, unless otherwise specified.

17.4 Record Storage

QA records shall be stored in a suitable environment to minimize the risk of loss, damage or destruction by severe natural conditions such as fire and flood. As an alternative, duplicate sets of records may be maintained in separate locations. Precautions are taken to preclude the entry of unauthorized personnel into record storage locations.

18.0 AUDITS

The audit system at DTS consists of planned internal and external audits and evaluations. Audits and evaluations are conducted to assure compliance with requirements of the Program and to assess the effectiveness of the Program.

18.1 Audit/Evaluation Frequency

Audits and evaluations are conducted at periodic intervals, based on the complexity of the activities being performed.

18.1.1 Internal audits are normally conducted once every 12 months. However, unscheduled project specific audits may be performed more frequently. All internal audits shall be performed on a random, unannounced basis to assure effectiveness and a prompt disclosure of deficiencies. Internal audits are performed in accordance with established checklists.

Audit results are documented on the checklist and reviewed by the responsible manager. All audit findings are documented as well as the action required to correct the deficiency. Deficient areas are re-audited on a timely basis, and the results are documented. Internal audit records are maintained in QA files.

18.1.2 External audits and/or evaluations shall be performed on those vendors that provide custom built components or components/services of significant importance. The frequency of such audits and evaluations is dependent upon project specific needs and performance. Vendor audits and evaluations are performed in accordance with established checklists.

Audit results, including deficiencies, are documented on the checklist and audit finding reports. Audit deficiencies are reviewed with vendor management. Corrective action required shall be documented and the implementation of corrective action shall be verified on a timely basis. Vendor audit and evaluation reports are reviewed by QA to determine acceptability of the vendors' capabilities.

Audits may be performed more frequently, as deemed necessary by QA. Audits shall be performed when significant changes are made in function areas of the Program, or when it is suspected that the quality of a deliverable is in jeopardy due to deficiencies in the Program, or when necessary to verify the implementation of corrective action. Vendor audits and evaluations are maintained in QA files.

18.2 Audit Personnel

All audits are performed by qualified personnel not having direct responsibilities in the areas being audited. Audit personnel shall have experience or training commensurate with the scope, complexity or special nature of the activities to be audited. When required, representatives from various departments may be called upon for technical advice or assistance. QA shall be responsible for the selection and training of audit personnel.

18.3 Audit Performance

The audit sequence shall consist of a pre-audit conference between the management of the entity (i.e. PM or vendor) being audited and the audit team, audit performed in accordance with the agreed to agenda, and post-audit conference between the audit team and the management of the audited entity. Deficient or nonconforming areas are identified, discussed and documented on the audit report. The audited entity shall be requested to resolve deficient or nonconforming areas, and, if corrective action cannot be taken immediately, the response shall include

scheduled dates for implementation of the corrective action.

18.4 Audit Follow-Up

Deficient or nonconforming areas are re-audited or verified to ensure that corrective actions have been implemented and are effective.