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35.0 QUALITY MANAGEMENT

35.1 INTRODUCTION

The objective of the project Quality Management Program is to ensure management and regulatory authorities that project activities (e.g. engineering) are in compliance with project requirements, especially federal and state stipulations. Within these stipulations, references are made to other requirements (e.g., DOT 49 CFR, Parts 191 and 192) which in turn dictate design and construction requirements.

The basic precept of the Quality Management Program is that each group takes responsibility for the quality of the work they perform. Individuals responsible for verifying conformance will be independent of those responsible for performing the work. The program will apply ISO 9001 principles to the extent they are applicable and practical.

Quality management will apply to all phases of the work from the beginning to end. For each phase or component of the work, the quality management process will require identification of all technical requirements, describe the process for achieving those technical requirements, how performance relative to those requirements will be measured and how changes in technical requirements will be managed. An important part of this process will be to identify how it will be verified that processes have been complied with and technical requirements have been met.

The following sections are intended to convey the overall scope of quality management activities, however the organization and responsibilities may not be exactly as described.

35.2 CODES AND CRITERIA

35.2.1 Codes

- Code of Federal Regulations, Title 18 – Conservation of Power and Water Resources
- Code of Federal Regulations, Title 49, Transportation, Part 191, Transportation of Natural and Other Gas by Pipeline; Annual Reports, Incident Reports, and Safety-Related Condition Reports
- Code of Federal Regulations, Title 49, Transportation, Part 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards
- Federal Right-of-Way Grant for the Alaska Natural Gas Transportation System Alaska Segment, Serial No. F-24538 (December 1, 1980), as such may be updated and/or amended from time to time
- Federal Energy Regulatory Commission conditional certificate of public convenience and necessity, issued on December 16, 1977, as such is finalized
- International Standards Organization (ISO) 9001: 2000 Quality Management Systems – Requirements

35.3 SCOPE OF DOCUMENT

The Quality Management Program will apply to all phases of the project. This section of the Technical Information Supplement describes the quality management approach for the following aspects of the project:

- Quality program development – Section 35.4
- Field test programs – Section 35.5
- Engineering/design – Section 35.6
- Procurement – Section 35.7
- Construction – Section 35.8
- Operation/maintenance/termination – Section 35.9
- Documentation – Section 35.9

35.4 QUALITY MANAGEMENT PROGRAM DEVELOPMENT

The Quality Management Program will be developed to ensure compliance with environmental and technical stipulations. Leadership will be provided by the Manager of Quality Management Systems. This manager will have overall accountability for quality management and will have the following quality management objectives:

- Establish project quality management policy.
- Formulate and implement monitoring and auditing programs.
- Assure that quality-related documentation is adequate, complete, and auditable.

The Manager of Quality Management Systems will also be responsible for developing and implementing a Quality Management Program and will assure management and government agencies that:

- Plans for quality monitoring and auditing are comprehensive and are directed toward critical technical and environmental areas.
- ANNGTC staff, Engineering and Construction Management Contractors, and their supervisory project personnel are aware of all of the requirements applicable to their work, including restraints and limitations imposed by state and federal stipulations.
- Non-conformances are being reported, and corrective actions implemented.
- All quality-related documents are comprehensive, with sufficient detail to provide accurate status and adequate traceability.
- Work is being performed in accordance with approved policies, procedures, drawings and specifications.
- The Quality Management staff is promptly notifying management when issues arise regarding non-conformance with quality requirements.

35.4.1 Development of Quality Manuals and Procedures

Quality management responsibilities and processes will be contained in an integrated set of quality manuals. These manuals will describe the quality processes as they relate to each part of the organization and will be revised as necessary to assure compliance with applicable federal, state, and local regulations. The following identifies some of the areas to be covered by the manuals and/or accompanying procedural guides:

- Responsibilities and organization
- Manual Control
- Work Process Description and Key Requirements
- Quality Management Training
- Quality Program Management Review
- Project Interface Controls
- Design Control and Audit
- Nonconformance Reporting and Corrective Action
- Control of Special Processes
- Procurement
- Procurement Document Control
- Vendor Quality Program Requirements
- Material Traceability
- Vendor Surveillance
- Auditing and Auditor Training
- Field Surveillance
- Regulatory and Governmental Interfaces
- Inspection Criteria
- Documentation Requirements
- Control of Measuring and Test Equipment
- Handling, Storage, Packaging and Shipping
- Inspection, Test and Operating Status
- Nonconforming Items and Nonconformance Reporting
- Corrective Action
- Quality-Related Records
- Audits

- Field Surveillance
- Welder Certification
- NDE Personnel Certification
- Quality Training and Orientation

35.4.2 Review of Manuals and Procedures Within the Project Organization

It is important that manuals and procedures are reviewed and approved by the appropriate organization within ANNGTC. The reviews will answer the following questions:

- Does the document embody all applicable requirements?
- Are responsibilities defined?
- If the document describes a working procedure, are controls established that will ensure completion of each step?
- Is specified documentation adequate for in-process control and subsequent verification?
- Are audit requirements defined?

35.5 FIELD TEST PROGRAMS

Up to the completion of design and construction, field investigations provide geotechnical, environmental and construction feasibility data necessary to develop design requirements. Although many of these studies are complete, additional studies may be required to update project plans. These field test programs may include:

- Geotechnical field programs.
- Environmental programs such as stream, fish and wildlife studies, air and water quality surveys.
- Archaeological studies.
- Construction feasibility programs.

The field programs will be formulated by Engineering and Construction Management Contractors, Environmental Management Contractors and technical consultants as directed by ANNGTC. The programs will be largely implemented by contractors.

ANNGTC or its representatives will monitor the programs to ensure compliance with permit documents, job plans and procedures.

35.5.1 Quality Aspects of Field Test Program

ANNGTC's Quality Management staff will have input during the development of monitoring and inspection procedures by:

- Identification of characteristics to be inspected and acceptance criteria to be used.

- Description of methods of inspection and equipment to be used.
- Frequency of inspection, or sampling plan.
- Relative to TAPS Proximity, ANNGTC will develop procedures for:
- Federal and State Permitting.
- Notification of, and request for, an Alyeska representative.
- Safety training for personnel.
- Setting a safe offset from Alyeska facilities.
- Safe operation of equipment on ROW.
- Relative to waterway proximity, ANNGTC will develop procedures for:
- Federal and State Permitting.
- Notifying field personnel of environmental requirements.
- Keeping travel across streams restricted to the permitted access route.
- Oil spill contingency planning and reporting.

35.6 ENGINEERING/DESIGN

35.6.1 Quality Management Approach

- The project Quality Management Program will require that controls be established on engineering/design activities and that the design requirements set forth be met. QA policy relating to engineering/design will be formulated based on these requirements and implemented with written procedures. Procedures will include provisions for interface with management and design contractor personnel.

The quality monitoring and audit program for engineering/design will be designed to ensure that:

- Engineering/design and procedures properly fulfill the requirements of the project Quality Management Program.
- Field testing programs are performed according to plans and procedures to ensure reliable data for engineering design.
- Design includes the essentials of stipulations, regulations, codes, and other project documents.
- Design changes receive a level of review and approval that is consistent with the original design.
- Design documents are controlled such that all design document holders receive the latest changes or revisions.
- Design and design change documentation is adequate to provide final as-builts.

Engineering and design will be performed by the Pipeline Engineering and Construction Management Contractor and the Facilities Engineering and Construction Management Contractor under the direction of ANNGTC's Senior Engineering and Construction Manager. Engineering and design activities will be conducted and controlled in accordance with approved ANNGTC policies, manuals and procedures. This will ensure that work processes are properly documented.

The initial task of Engineering/Design is to identify the required items or services. Engineering/Design must then identify the design criteria applicable for each design element. These criteria will be obtained from regulations, stipulations, and project requirements and they will identify the codes and standards that will influence Engineering/Design.

Depending upon the nature of the item, certain activities and products that directly affect quality will be reviewed for compliance with design criteria. When an item is approved for acquisition, a purchase order or contract will be initiated. As the project develops, Engineering/Design changes will occur that may require changes to the procurement documents. The changes will be controlled in the same manner as the original requirements.

Nonconformances will be documented, and tracked until there is satisfactory resolution of the problem.

35.6.1.1 Management of Engineering and Construction Management Contractor Organizations

Each Engineering/Design contractor will be required to develop standards and procedures for their portion of the work. Prior to implementation, of engineering/design work, these standards and procedures will be reviewed by ANNGTC to ensure that they are compatible with the established project policies, specifications and project quality management processes. Throughout the project, contractors' activities and documentation will be audited for compliance with their quality management programs.

35.6.1.2 Engineering/Design Checks

Checking procedures will be established for Engineering and Design documents. Individuals other than the individuals who develop the documents check these documents for accuracy, completeness and clarity of requirements. These procedures require that errors and omissions be identified, corrected, and rechecked. Documents will not be issued without a check and approval in accordance with procedures and instructions. Parts of the total checking activity will be performed during engineering/design reviews discussed elsewhere in this section.

35.6.1.3 Engineering/Design Review

There will be joint design reviews by ANNGTC and engineering/design contractors for the purpose of monitoring and accepting engineering work. This will include engineering/design reviews of the drawings and specifications included in the construction bid packages.

Design reviews for critical items will occur early in the Engineering/Design activity. The purpose of an early review is to establish the design criteria, responsibilities and further actions.

The design reviews may include such subjects as:

- Quality requirements
- Design criteria
- Configuration
- Engineering/design analyses
- Specifications
- Drawings
- Inter-discipline interfaces
- Inter-contractor interfaces
- Environmental requirements
- Constructability
- Procurement
- Logistics transport/handling
- Vendor information
- Status
- Documentation
- Schedule

35.6.1.4 Engineering/Design Interfaces

There are several types of interfaces that require coordination and control. Interfaces must be documented, since a change on one drawing can cause many changes or inputs to other engineering documents. These could include:

- Configuration Control (Change Management)
- Alignment drawings
- Field testing
- Station plot plan
- Construction drawings

35.6.1.5 Configuration Control

Procedures are required to identify and document baseline configuration of the pipeline system. A program to manage engineering changes will contain provisions to initiate, review, and approve/reject the changes.

35.6.1.6 Specifications and Drawings

Specifications and drawings formally document the engineering requirements necessary for vendor or contractor use. Specifications and drawings become part of the procurement documents. The procured item or service is expected to conform to the requirements contained in the specifications and drawings.

The purchase order or contract, specifications, and drawings provide the criteria on which inspection and acceptance is based. Specifications and drawings may contain the requirements for several items and/or activities. When specified, management approval will be required on certain specifications and drawings. Specifications and drawings will be reviewed and included in configuration control.

The Quality Management organization will periodically audit the drawing approval process to ensure that documented requirements are met.

The review and approval of specifications, drawings, and revisions will be documented and shown on the specification or drawing. A file, starting with the original issue of a specification or drawing and ending with the final revision, will be maintained.

35.6.1.7 Records and Document Control

The Quality Management Program will define requirements necessary to assure that sufficient records are maintained to document activities affecting quality and to provide documentary evidence of the quality of items and activities affecting the functions of critical items and services. Changes to documents will be controlled in the same manner as the original issue of the document.

Document control will ensure controlled release, receipt and distribution of engineering/design documents. Transmittal forms will be used to forward drawings, specifications, procedures, and instructions, and may require that signed receipts be returned from the addressee.

Documents are controlled by logs for traceability of closeout action. Vendor submitted documents are entered in control logs, which provide identification and status of vendor documents.

Engineering contractors may formally request and transmit copies of applicable vendor/supplier documents to the jobsite for use. The construction management organization will use approved procedures for control and distribution of approved documents to and from the Construction Contractors.

When vendors retain custody of certain records adequate storage capabilities will be required and access provided.

Control of documents in the engineering offices and at the job-site will be periodically audited by ANNGTC. Access for review by management and regulatory agencies will be maintained.

35.6.1.8 Nonconformance

Nonconformance may be divided into:

- Procedural nonconformance
- "Hardware" nonconformance.
 - Hardware nonconformance is discussed under the Procurement and Construction sections of this plan. Procedural nonconformance may be identified by participants and users of the procedure or by audit activities. A nonconformance exists when the activity or document does not conform to approved policies, procedures, or instructions.

35.6.1.9 Track/Report Quality Status

Logs will be maintained summarizing quality control activities. The logs will provide a basis for periodic reports to Project Management.

When a situation is detrimental to the project and is widespread, project management will be advised.

35.7 PROCUREMENT APPROACH

The procurement activity starts when engineering or other organizations determine the need to acquire structures, systems, equipment, components, materials, or services. The activity is complete when the requirements of the procurement documents are satisfied.

The approach, from a quality management perspective will be to ensure that all bidders for the supply of materials, equipment and services are qualified and sufficiently experienced to provide the materials, equipment and services in accordance with project requirements. All suppliers will be required to have ANNGTC-approved quality management programs and processes that are appropriate to the materials, equipment or services to be provided. Performance measures will be identified and vendor compliance will be verified by audit, as the work proceeds. The audit effort will be consistent with the criticality of the item or service to be provided. In some cases vendors will be required to be certified in accordance with ISO 9001: 2000, or future versions of ISO 9001.

35.7.1 Vendor's Quality Management Program

The purpose of the vendor's quality management program is to ensure that the vendor will deliver items that are in compliance with the approved requirements of their contract. ANNGTC will perform audits to verify compliance with the vendor's quality program and the procurement documents' requirements, and conduct planned inspections of vendor shops during fabrication, inspection, testing and shipment preparations.

Inspection and audit activities will be in accordance with approved policies and procedures. Inspection files will be active throughout the inspection process.

Rejections and acceptances of products are reported in writing. Each product must have an acceptance report prior to release for shipment. Management may elect to contract for certain shop inspection services.

35.7.1.1 Vendor Shop Audits

Vendor Shop Audits apply to purchased equipment, components and materials at source. The purpose of the audits is to ensure that the vendor's quality management program is functioning properly.

The audit staff evaluates the vendor's quality management practices, including:

- Purchasing
- Material identification
- Nonconformance control
- Material storage
- Document control
- Welding consumables storage and handling
- Overall inspection capabilities
- Quality control procedures and practices
- Understanding by vendor's personnel of inspection requirements and methods.

35.7.1.2 Inspection Instructions

Written inspection instructions include the characteristics or processes to be witnessed, inspected, and accepted/rejected. These instructions describe the inspection method, acceptance criteria, the extent and frequency of evaluation, the documentation required, and the responsible inspection personnel.

35.7.1.3 Vendor Inspection Reports

Vendor Inspection Reports are part of the Job Completion Documentation. The inspector's report shows activities performed, such as inspection, witness and review of the fabrication, testing, and other manufacturing steps.

35.7.1.4 Rejection Reports

A rejection report may require disposition from the Engineering/Design organization. Disposition may be rejection of the item, repair, rework, or accept as is, or by a written waiver of the applicable requirements.

35.7.1.5 Acceptance Reports

Materials are accepted once all the requirements of the procurement documents are met. Acceptance reports will reflect any or all of the following:

- Compliance with applicable specifications, codes, drawings and procedures.
- Record of accepted deviations.
- List of applicable attachments for Quality verification.
- Item is rejected on a rejection report but subsequently judged to be acceptable.

35.7.1.6 Shop Checkouts/Product Acceptance Tests (PAT)

Tests are sometimes required to demonstrate and ensure the quality of procured items. The tests are defined in engineering drawings, specifications, or test procedures.

For certain critical items, vendors and contractors are required to establish and submit for review written test control procedures. These procedures will include:

- Instructions covering the test method and designated test equipment, instrumentation, and test setup.
- Provisions for calibrated instrumentation and test equipment.
- Provisions for trained, qualified and certified test personnel as specified.
- Provisions for test data collection and storage.

35.7.1.7 Inspection by Pipe Manufacturer

Due to the large quantity of pipe required, it is expected that pipe may be purchased from a number of manufacturers. Each pipe manufacturer will be required to submit a manufacturing plan for his plate and pipe mill operations. Also, the pipe manufacturer will submit a quality management plan that will include a listing of quality control procedures. These procedures will include, as applicable:

- Inspection and documentation of plate material and welding wire.
- Inspection and documentation of manufacturing activities.
- Welding procedures, welder qualifications, and documentation.
- NDE procedures, personnel qualifications, and documentation.
- Documentation storage and retrieval.
- Procurement control.
- Material control.
- Calibration of gauges and measuring equipment.

The inspection performed by the pipe manufacturers will be thoroughly documented.

35.7.1.8 Traceability

The Quality Management program requires complete traceability of the pipe material and pipe welds. Each pipe joint will be uniquely marked for tracking purposes. Instructions will be given to the pipe shops and the field that the identification number remains when a pipe joint is cut and that a second ID number is placed on the cut piece if it is to be used.

Documenting traceability will be closely controlled by the pipe manufacturer. For each pipe joint, information will be filed containing the identification number, all of the NDE reports, X-ray film, test reports, weld traceability information, repair data and reference to mill certification number. The purpose of this file is to provide a history on that pipe joint from the time the plate material was made until the pipe joint was prepared for shipment. The pipe manufacturer will normally retain this documentation. Final disposition will be made at the end of the production run.

35.7.1.9 Pipe Mill Audit

Audit criteria will include:

- NDE methods, procedures, personnel and equipment.
- Documentation of material certifications, manufacturing processes, and testing.
- Qualification of welding procedures and welders.
- Welding process control and records.
- Identification of welds and pipe joints.
- Testing for material properties (e.g., CTOD).
- Preparations for shipment.
- Inspection Points

The following points in the manufacturing sequence may be subject to audits as required:

- Plate Material
 - Chemistry and physical properties
 - Slab heating
 - Plate rolling
 - Plate cooling
 - Service condition of each plate
 - Plate dimensions
 - Ultrasonic testing
 - Visual inspection

- Welding Material
 - Mill certificates
 - Service condition of welding wire
 - Sample tests
- Pipe Manufacturing
 - Forming of plate
 - Tack welding
 - Inside and outside welding
 - Weld inspection (NDE and visual)
 - Pipe expansion
 - Hydrostatic testing
 - End facing
 - Preparation for shipment

35.7.1.10 Fabrication Shop Inspection

A fabrication shop will assemble pipe, fittings, and flanges into prefabricated spool pieces, which will be used at the compressor and metering stations.

Fabrication shops will be pre-qualified by ANNGTC and will be required to have quality management programs that are approved by ANNGTC. Areas to be evaluated include, but are not limited to:

- NDE methods, procedures, personnel and equipment.
- Qualification of welding procedures and personnel.
- Material traceability.
- Documentation.

The fabricator personnel will implement the fabricator's inspection procedures. Mandatory inspection points will be identified and agreed upon with the fabricator. ANNGTC will require the fabricator to have a material traceability program. Evidence will be required to show that:

- Pipe, fittings and flanges comply with applicable material specifications.
- Proper parts were used in the fabrication of each spool.
- Proper consumables were used.
- Fabrication, including NDE, was in accordance with agreed-upon procedures.

ANNGTC auditors will be responsible for confirming that the shops are complying with their quality management plans, and that they are using qualified fabrication and NDE procedures and personnel. Detailed fabrication records will be stored at the shops for specified periods.

35.7.1.10.1 Vendor/Contractor Qualification

The need for vendor/contractor qualification surveys will be determined by the nature of the product or service procured.

The procedures for vendor/contractor qualification will include provisions for:

- Reviews of documentation furnished by the vendor/contractor, in particular, the vendor's quality management program.
- ANNGTC's access to the vendors' and sub-vendors' facilities and contractors' and subcontractors' offices and sites for inspection.
- Visits to vendor facilities and meetings with vendor staff.
- Vendor's technical capabilities and financial status.
- Vendor/contractor evaluation and selection.

The vendor's evaluation report will be maintained by ANNGTC. The evaluation of the quality management programs of bidders will be based on one or more of the following:

- Personnel qualifications, physical conditions of the offices or plant, ability to produce on schedule, records of previous performance, and management attitude toward quality.
- A review and evaluation of the vendor's/contractor's current quality program to determine his capability to supply products or services which meet design, manufacturing/construction, and quality requirements.

35.7.1.10.2 RFQ's, POs, Contracts, and Changes

Procurement documents will formally require the vendor and contractor to furnish their quality programs. The procurement documents also communicate the requirements for material traceability data packages and other vendor or contractor data requirements.

Quality reviews will be performed in accordance with written procedures/checklists. The procedures/checklists are developed to ensure that the procurement documents include directions to vendors/contractors to perform appropriate action items.

On a sampling basis, the procurement documents are reviewed to determine if the format and other requirements are in accordance with written policies, procedures, and instructions.

35.7.1.11 Vendor/Contractor Investigations

In addition to the activities discussed under vendor/contractor qualification, there will be a review of the vendor/contractor quality program for critical items.

The activity consists of visiting selected vendors'/contractors' places of business. The visit will occur after the procurement documents have been issued but prior to substantial involvement by the vendor/contractor in the manufacture of the item(s). The purpose of the visit is to gain assurance that the vendor/contractor is implementing his quality plans and procedures in a satisfactory manner.

35.7.1.12 Vendor Information Requirements Surveillance and Expediting

The activity may include any of the following:

For Vendor Information Control

- Identifying and documenting each piece of vendor information required.
- Due date of item or service.
- Current delivery status (received/not received).
- Information transmitted to disciplines for approval.
- Information returned to vendor with approval and/or comments.
- Record copy.

For Engineering/Design Discipline(s)

- Identifying vendor information required.
- Due date of item or service.
- Current delivery status (received/not received)
- Discipline approval status.
- Release for shipment.

For Traffic

- Documenting releases for shipment
- Shipping instructions.

35.7.1.13 Review of Inspection Reports

Surveillance/Review of inspection reports will cover technical content and continuity to verify conformance. Potential problem areas will be identified and, if further action is necessary, the requirement for and the resulting action will be documented.

A "hardware nonconformance" (frequently termed a "deviation") exists when the item does not conform to the engineering/design requirements. The deviation will be documented and the "hardware" to be identified as "nonconforming." There are three possible disposition types that can be used to classify a deviation.

- Type 1 Unacceptable –Replace.
- Type 2 Unacceptable – Repair.

- Type 3 Acceptable - Use as is.

The engineer/design organization has the authority to specify disposition of nonconforming items. For non-critical items and Type 1 dispositions, the engineering/design organization has the authority to act without further approval.

The engineering/design organization recommendation for types 2 and 3 dispositions and resulting actions will be controlled and tracked.

35.7.2 Quality Assurance Activities

Quality management policy relative to vendor surveillance will define type, extent, and timing of QA activities and will specify the interface requirement.

35.7.2.1 Vendor Audits for Major Procurements

The Quality Management Program will include a procedure for vendor audits for the evaluation of the compliance of vendor activities and documentation.

Vendor audits will provide assurance that the vendor will provide a product with the required level of quality. Any activity or process under the control of the vendor may be subject to audit. This may include:

- Material tests
- Material traceability
- Welder/weld procedure qualifications
- NDE personnel/procedure qualifications
- In-process inspection
- Acceptance tests
- Nonconformance reporting
- Document control
- Handling/ Storage/ shipping/ packaging.

35.8 CONSTRUCTION

35.8.1 Pre-Construction

For the purpose of this plan, pre-construction activities are defined as those construction infrastructure-related activities that precede mainline construction. Procedures and specifications will ensure that technical and environmental concerns are addressed. The Engineering and Construction Management Contractors will establish procedures for the inspection of pre-construction activities as directed by the Quality Management Program. ANNGTC will audit the activities as the work proceeds.

- Activities covered will include the following:

- Camp construction
- Stockpile site preparation
- Granular materials extraction
- Access road construction
- Communications site construction
- Oil/hazardous materials handling

35.8.2 Mainline and Facilities Construction

Construction inspection will be performed in accordance with the ROW stipulations and the project Quality Management Plan. The Pipeline Engineering and Construction Management Contractor will perform construction inspection for pipeline construction work. The Compression and Facilities Engineering and Construction Management Contractor will perform construction inspection for compression and metering stations, and for operation and maintenance facilities.

The quality requirements and acceptance criteria for construction activities will be contained in the specifications and drawings prepared by the Engineering and Construction Management Contractors and furnished to the Construction Contractors.

Construction inspection plans, procedures and training will emphasize the early recognition and resolution of potentially serious problem areas.

The Manager of Quality Management Systems will ensure the development of quality management processes and associated auditing is in compliance with approved project processes and procedures.

35.8.2.1 Material Handling

The Construction Contractors will be responsible for handling, lifting and rigging operations on the construction site. Written procedures and instruction will be prepared for items determined to require special handling. Material handling will be included in audits by ANNGTC.

35.8.2.2 Identification and Control of Material, Parts and Components

Procedures to control items received by the construction contractors will be developed and implemented. The measures will be designed to ensure that only acceptable items are issued, installed, and used.

When item traceability is required, the construction contractors will provide and/or maintain such traceability.

35.8.3 Weld Traceability

A coherent and comprehensive traceability program is required. The goal is to develop a weld traceability program for the pipeline system that will prevent the uncertainties that lead to costly rework and re-inspection. The weld traceability program will provide for (1) documented evidence of the conformance of welding operations; (2) documentation for weld and joint ID numbers; and (3) the location of the weld within the pipeline system.

35.8.3.1 Elements of Weld Traceability Program

The weld traceability program will include, but not be limited to, the following elements:

- Unique numbering system, which will preclude more than one weld being assigned the same number.
- Inclusion of pipe joint or equipment identification numbers on primary weld record documents. (This will provide an audit trail to the pipe material or equipment data package and thus to vendor welding, NDE, and qualification records.)
- Identification of pups cut from original pipe.
- Inspection and NDE documentation associated with each weld.
- Inclusion of physical location data in the weld documentation.
- Control of welding.
- Adequate welder and NDE personnel qualification program.
- Development and implementation of document handling, storage, and retrieval methods which provide security of weld and NDE documentation, including radiographic film.

35.8.3.2 Computerized Weld Traceability System

A computerized database will be used to the extent possible to monitor weld traceability. Key information from each weld and weld related record will be saved and include weld number, joint number, acceptability status, weld location, and other parameters deemed important for retrieval or evaluation. Weld-related records such as NDE records or separate inspection records will also be saved. Welder and NDE personnel qualification records will be part of the overall computerized weld traceability data base as will procedure qualifications and vendor weld related records.

35.8.4 Environmental Protection

ANNGTC is committed to protecting and preserving the environment while constructing and operating a pipeline system. Environmental safeguards stated in the federal, state and local stipulations will impact all construction and operation disciplines.

ANNGTC's Quality Management, Environmental and Engineering staff will ensure that:

- Planning and design address environmental stipulations and regulations

- Appropriate documentation of the pre-construction environment is accomplished to be used as the model for re-vegetation and rehabilitation
- Procedures are developed to control and document compliance with environmental and ecological safeguards.

35.8.4.1 Training and Indoctrination

The Environmental Management Contractor will develop an environmental briefing program for presentation to supervisory and field personnel and federal field representatives. Quality Management personnel will receive additional training in the applicable stipulations, regulations and restrictions, QC procedures, and engineering documents.

35.8.4.2 Re-vegetation and Rehabilitation

Pre-construction documentation of environmental conditions will be developed to provide data for use in design and construction planning. The resulting plans for restoration of disturbed sites will be an integral part of the construction plan.

Inspectors will have the responsibility for monitoring implementation of environmental controls. Procedures will be developed to ensure that:

- Environmental requirements are included in training, design reviews, specifications, drawings, and construction plans.
- Environmental requirements are contractually imposed on contractors.
- Contractors have adequate environmental protection procedures and contingency plans.
- Records are in accordance with project requirements.

35.8.4.3 Safety Policy

Employees will be thoroughly familiarized with all project safety requirements. Emphasis on the use of safe operational methods to avoid potential hazards will be included.

In addition, ANNGTC is committed to take the necessary precautions to protect the TAPS from damage resulting from construction, operation, maintenance, and termination of the pipeline system.

35.8.4.4 Safeguard Procedures

Potentially hazardous operations activities will be carried out in accordance with prescribed procedures, drawings and specifications. Organizational personnel will monitor these activities for compliance.

- Blasting - Procedures will be developed to address considerations such as qualification of personnel, safety zone, instrumentation, protective measures, storage of blasting materials, use of blasting materials, and records.

- Equipment and Personnel Traffic - Access to the pipeline alignment via the TAPS workpad will be required. Control of project personnel will be required to limit access to personnel necessary to perform work. Speed limits will be established for vehicles. Traveling cranes and drills will be required to travel in a safe manner. Protective barriers may be used to separate the work area from established safety zones.
- Pipeline Crossings - Where it is necessary for the pipeline to cross the TAPS pipeline, precautions will be taken to ensure the safety and integrity of TAPS. Construction methods will be developed to minimize the time ditches will be open above or below the TAPS line. APSC will be notified of construction schedules for crossings. The Pipeline Engineering and Construction Management Contractor will provide inspection of construction activities for crossings.

35.8.5 Stream Crossings

Stream crossings are a special interest area because of the environmental sensitivity.

Decisions regarding watercourse protection, anadromous and native fish protection, water quality, and visual impact will be made with input from technical expertise. Procedures will be established to monitor and document activities to verify that:

- Permits are obtained and followed.
- Work done is in accordance with requirements.
- Nonconforming activities are identified and resolved.

35.8.6 Quality Compliance-Field Inspection

35.8.6.1 Pipeline Construction Inspection

Site specific inspection of Construction Contractor activities will include the following:

35.8.6.1.1 Material Sites

Inspectors will monitor material sites. Materials may be sample-tested before being sent to job sites. Environmental procedures will be monitored to ensure that restoration programs are satisfactorily accomplished.

35.8.6.1.2 Material Handling and Storage

Construction Contractors will be required to protect equipment and material from degradation and from damage during handling operations. Special attention will be given to the corrosion protection of equipment and materials that are stored outside. Inspectors will monitor activities for conformance with requirements.

35.8.6.1.3 Pipe Receiving Areas

Inspectors will inspect pipe received for storage and verify that the pipe is protected from dents, gouges, or damage to the pipe beveled ends. Inspection will also ascertain that the pipe is stacked properly to prevent damage and that the storage area has sufficient drainage.

35.8.6.1.4 Access Roads and Work Pads

Inspectors will verify that the access road, right-of-way, and work pads are clearly staked and the construction areas are cleared using environmentally acceptable methods. They will also verify that material used for construction meets requirements.

35.8.6.1.5 Ditching

Inspectors will verify that the ditch centerline is staked and that depth and width and other parameters meet ditch specifications. Material disposal will be inspected. If required, pipe bedding material will be checked at both the source and the ROW. Depth of material and compaction will be checked at specific intervals along the length of the ditch, depending upon terrain conditions.

35.8.6.1.6 Blasting

Inspectors will verify that federal and state permits have been obtained and verify that contractor personnel engaged in blasting operations are qualified. The maintenance of blasting and instrumentation logs will be monitored for conformance to specifications.

35.8.6.1.7 Road Crossings

Road crossings will be inspected during installation operations to ensure that the work conforms to the job specifications.

35.8.6.1.8 Weld Procedure

Welding procedures will be qualified in accordance with API 1104. Pipeline construction welding inspectors will confirm the contractors' use of authorized procedures.

35.8.6.1.9 Welder Qualification

Each construction contractor will be responsible for qualifying its own welders. Pipeline construction welding inspectors will monitor the testing facility activities for compliance to applicable codes, standards and contract specifications. The Construction Contractors will be responsible for the acquisition and placement of welders to be qualified. The construction contractors will be responsible for providing and administering testing services to the contractors; maintaining the official records of the qualified welders, providing a copy of the welder qualification records, and periodically updating welder qualifications.

35.8.6.1.10 Non-Destructive Examination (NDE)

The NDE contractor will prepare NDE procedures that will be approved by ANNGTC or its representatives. The NDE contractor will be responsible for training and qualification of NDE personnel. These personnel will perform the NDE of the Construction Contractors' welding.

35.8.6.1.11 Welding

Pipeline construction welding inspectors will provide continuous inspection of welding activities. Prior to welding, inspection will verify that welding procedures have been approved, welders are qualified, welding consumables are acceptable and acceptable preheating is accomplished.

35.8.6.1.12 Girth Weld Coating

Pipeline construction coating inspectors will check pipe surfaces for proper preparation prior to coating. Inspection equipment will be checked for valid calibration. Inspectors will check the coating for defects.

35.8.6.1.13 Lowering-In, Padding, and Backfill

Inspectors will verify that the correct materials are used for padding and backfill and that the operation provides for placement, compaction, and testing in accordance with drawings and specifications.

35.8.6.1.14 Mainline Block Valves

Valve assemblies and sites, supports, and equipment will be inspected to verify compliance with installation requirements and equipment specifications.

35.8.6.1.15 Pressure Testing

The Construction Contractor will perform pressure testing in accordance with approved procedures. Engineering Contractor staff will monitor the test activities. Engineering Contractor staff will control quality by inspecting calibration of testing instruments, documenting test results, proper acquisition and disposal of water, any required water additives are as specified, and required environmental precautions are in place. The Engineering Contractor staff will have the authority for starting and terminating the tests.

35.8.6.1.16 Environmental

Throughout construction, inspectors will inspect and monitor the Construction Contractors' activities related to the environment and report problems requiring corrective action. An Environmental Management Contractor will assist ANNGTC's Senior Environmental

Manager in developing environmental inspection requirements and will participate in monitoring activities and provide the technical evaluations and final dispositions.

35.8.6.1.17 Double-Jointing

Single pipe lengths will be welded together to form double joints of pipe where required by the construction plan. The same type of inspection will be performed in this area as those activities discussed under pipeline welding and girth weld coating. The double jointing inspection and associated documentation will require weld traceability.

35.8.6.1.18 Pipe Bending

Pipe bending will be inspected to ensure that the pipe bends are within specifications (e.g., wall thickness, roundness, surface defects).

35.8.6.2 Metering and Compressor Station Inspection

Inspection personnel at metering and compressor stations will have duties similar to pipeline inspectors but the specifications may differ. For example, some pipe welding will be performed in accordance with ASME Boiler and Pressure Vessel Code. Therefore, exchanging pipeline inspectors and station inspectors will be limited. There will be added inspection coverage for civil, electrical, structural and mechanical construction activities. Inspection activities for metering and compressor stations not already covered under pipeline inspection are as follows:

35.8.6.2.1 Civil and Foundation

The inspection activities associated with station civil and foundation work will include verification of plant layout and construction limits and the compliance to requirements for soil and concrete material, placement, construction, testing, and documentation established by the contract drawings and specifications.

35.8.6.2.2 Equipment and Installation

Station inspection activities involving equipment and installation will include ensuring compliance for code stamped equipment, drawings, instructions, and specifications. Equipment installation, alignment, test, and checkout activities will be witnessed and documented by inspectors to ensure that equipment installation is in compliance with drawings and specifications.

35.8.6.2.3 Electrical/Control Systems

Equipment installations including calibration and testing will be inspected for compliance with codes and procedures established by contract specification. Electrical tests will be documented and periodically witnessed by inspectors (e.g., meggering electrical cables).

35.8.6.2.4 Mechanical Startup

Mechanical start-up will be conducted under the direction of ANNGTC's and the Engineering and Construction Management Contractors' engineering and commissioning staff. Documentation relating to startup and operation will be available to appropriate personnel. Testing will be monitored for compliance with procedures.

35.8.7 Quality Audit

An audit program will be set up by the Manager of Quality Management to verify that quality processes and documentation are in compliance with the overall Quality Management Program.

35.9 OPERATIONS, MAINTENANCE AND TERMINATION

Detailed operational requirements will be written for inclusion in the Quality Management Program. These requirements will be completed in time to allow for the development and implementation of necessary audit processes prior to initiating pipeline operations. These requirements and procedures will address:

- Pipeline and station operations
- Preventive maintenance
- Corrective maintenance
- Environmental controls
- Pipeline system modifications
- Damage prevention
- Personnel training and qualification
- Health and safety
- Equipment control
- Emergency contingency plan
- Security
- Fire protection
- Applicable standards
- Administration/management controls
- Applicable design and construction phase controls
- Spare part/inventory control
- Interface controls (TAPS, ANGTS segments, governmental representation)

Special Interest Areas

Certain activities considered to be of special interest will receive added emphasis throughout the project. These activities are weld traceability, environmental protection, proximity to TAPS, stream crossings, and documentation.

35.9.1 Documentation

The importance of documentation is recognized in the implementation of the Quality Management Program and in the substantiation of compliance with Quality Management Program requirements. Documents may be in electronic or hard-copy form.

Two types of documentation will be recognized

35.9.1.1 Quality-Related Documentation

The definition of quality-related documentation is documentation that is created and controlled by groups other than formal quality organizations. For example, specifications, design drawings, purchase orders, contracts, data, engineering calculations, and environmental and other special studies.

35.9.1.2 Quality Documentation

The definition of quality documentation is “documentation that is created and controlled by a formal quality organization”. Examples of quality documentation are Quality Manuals and Procedures, field inspection reports, vendor inspection reports, field and engineering surveillance reports, quality training and qualification records, weld records, and NDE records.

Requirements: Quality documentation requirements will be set forth in quality manuals and procedures. Detailed review of these manuals and procedures prior to use will ensure that the specified documentation requirements are adequate. Proper implementation will provide objective evidence of the conformance of work to established design, engineering, code, and regulatory requirements.

Controls will be established to assure that all inspectors and other users are provided manuals, procedures and current revisions thereto. Reference standards, regulatory requirements and other documents will be maintained in sets and located so as to be readily available to inspectors and other users.

Preparation Handling and Distribution: The completion of quality documents will be facilitated by careful forms design and training of personnel. Handling procedures will stress a smooth flow of records to personnel and storage. The originals of quality documents will be defined as the "ORIGINAL" for the purpose of filing and storage to ensure good quality records for subsequent records research. Records handling practices will be routinely monitored.

Security: Transfer of quality records will be tightly controlled and no transfer will take place unless a backup record exists. Access to storage areas for hard copy records will be limited to authorized personnel.

35.9.2 Training

Orientation and training sessions covering the Quality Management Program will be given to company and contractor personnel.

- Vendor Shop Audit - A training program will be developed, which will include familiarization with inspection manuals and procedures, maintenance of NDE qualifications and certification records and additional training requirements unique to the project.
- Field Inspection and Audit - Field inspectors and auditors will require training and orientation specific to the arctic environment in addition to specialized training in their specific inspection assignments.
- Engineering and Vendor Audit - Engineers and technologists engaged in engineering or vendor audit will be trained in engineering and procurement procedures as well as quality audit procedures. Emphasis in training will be on evaluating engineering activities for conformance with procedures, evaluating vendor activities for conformance with requirements of the purchase order, and evaluating the performance of inspectors.

Interfaces will be developed as required with other organizations involved with training. Compliance with training requirements will be subject to monitoring and auditing by the Quality Management organization.