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SPECIFICATION 562

ATTACHMENT SPECIFICATION

MANUFACTURING QUALITY ASSURANCE PROGRAM
REQUIREMENTS - QUALITY LEVEL I - ELECTRICAL
FOR SAFETY RELATED EQUIPMENT VENDORS
PERRY NUCLEAR POWER PLANT - UNITS NO. 1 & 2

SP-706-4549-00 MAY 3, 1974

SAFETY RELATED
QUALITY PROGRAM REQUIRED

THE CLEVELAND ELECTRIC ILLUMINATING COMPANY
CLEVELAND, OHIO

INFORMATION ONLY

James R. Van Langer 11/2/76
ORIGINATOR DATE

Nicholas C. Kazanas 11/10/76
APPROVED - QA PROGRAM MANAGER DATE

GILBERT ASSOCIATES, INC.
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ATTACHMENTS

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1:01 Purpose

1:01.1 This Specification establishes QUALITY ASSURANCE AND QUALITY CONTROL program requirements for procurement of ITEMS and manufacturing services defined by IEEE 279 and of IE systems as defined by IEEE 308 for the Perry Nuclear Power Plant, Units 1 and 2.

1:01.2 A Quality Program as outlined herein shall be developed by the VENDOR and shall be reviewed and resolved to the satisfaction of the OWNER. The requirements shall include written procedures, processes and any other documents used to describe the VENDOR'S Quality Program.

1:01.3 The VENDOR'S Quality Program shall meet the requirements specified by this Document. In the event the VENDOR'S procedures or methods do not accomplish their objectives, they shall be corrected and resolved to the satisfaction of the OWNER'S QUALITY ASSURANCE ELEMENT or the QA AGENT.

1:02 Scope

1:02.1 This Specification establishes the OWNER'S QUALITY ASSURANCE and QUALITY CONTROL program requirements imposed on the VENDOR as part of the OWNER'S QUALITY ASSURANCE program for procurement of ITEMS and manufacturing services for the Perry Nuclear Power Plant, Units 1 and 2.

1:02.2 The requirements of this Specification are mandatory and shall be imposed by the VENDOR on all SUBVENDORS furnishing safety related ITEMS or services.

1:02.3 The requirements set forth shall be applied to all safety related activity during design, purchasing, fabricating, testing, handling, shipping, storing, cleaning, installing, inspecting, modifying, and repairing.

1:03 Definitions

In addition to the definitions set forth in the Parent Specification, to which this Specification is attached, the following terms shall have the meanings set forth:

1. QUALITY ASSURANCE shall mean all those planned and systematic actions necessary to provide adequate confidence that components, structures, and systems will perform satisfactorily in service.

2. QUALITY CONTROL shall mean those actions (related to the physical characteristics of materials, components, structures, and systems) which provide a means to control the quality of materials, components, structures, and systems to predetermined requirements.

1:03 (Cont'd)

3. OWNER'S QA ELEMENT The OWNER'S organization or group responsible for QUALITY ASSURANCE under the direction of the General Supervising Engineer, QUALITY ASSURANCE.

4. QUALITY CONTROL MANAGER shall mean the QUALITY CONTROL Administration Manager at the construction site.

5. ITEMS shall mean services, materials, equipment (parts, sub-assemblies, assemblies, components, systems), or structures.

6. The QA AGENT is the authorized representative of the OWNER for assigned QUALITY ASSURANCE Functions. Gilbert Associates, Inc., has been assigned as the QA AGENT.

7. NONCONFORMANCE - A deficiency in characteristic, documentation or procedure which renders the quality of an ITEM unacceptable or indeterminate. Examples of NONCONFORMANCES include: physical defects, test failures, incorrect or inadequate documentation or deviation from prescribed processing, inspection or test procedures.

8. REWORK - The process by which a NONCONFORMING ITEM is made to conform to the original requirement by completion, remachining, reassembling or other means.

9. REPAIR - The process of restoring a NONCONFORMING ITEM to a condition such that the capability of an ITEM to function reliably and safely is not impaired, even though that ITEM still may not conform to the original requirement.

10. SCRAP - A disposition which is imposed for NONCONFORMANCE when it is established that the discrepancy renders the ITEM unfit for its intended use and it is either uneconomical (or impossible) to effect corrections such as REPAIR or REWORK.

11. USE-AS-IS - A disposition which may be imposed for a NONCONFORMANCE when it can be established that the discrepancy will result in no adverse conditions and that the ITEM under consideration will continue to meet all engineering functional requirements including performance, maintainability and fit.

12. SALVAGE - Parts, components, or assemblies which are contained in material designated as unfit for intended use or not economically repairable may be reclaimed through disassembly procedures and used only if such action is approved by OWNER'S Agent.

13. SUBVENDOR - any organization under contract for supplying items or services to the VENDOR.

1:04 Quality Assurance Program Administrative Requirements

1:04.1 This section establishes the VENDOR'S interfaces with the OWNER'S activities, which provide the control and data to fulfill the responsibility of the OWNER to maintain a complete QUALITY ASSURANCE Program.

1:04.2 Documentation to be Submitted with Proposals:

With the Proposal submittal, the Bidder shall supply two copies of his QUALITY ASSURANCE program which will be utilized to implement the requirements of this Specification. This submittal will be in the form of a QUALITY ASSURANCE or QUALITY CONTROL Manual or equivalent. This document will be reviewed by the OWNER or the QA AGENT and will be evaluated for adequacy of the QA/QC Program and will be considered in the selection of the successful bidder. Requirements for an acceptable program are outlined in Item 1:06.

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1:04.3 Documentation to be Submitted after Award of Contract:

1. Within 60 calendar days after award of Contract, the VENDOR shall submit for review and acceptance his detailed Manufacturing Plan which shall include the following information:

   a. All ITEMS to be furnished for the Contract and by whom they are provided (VENDOR or SUBVENDOR).

   b. Manufacturing, inspection, and test flow chart (or equivalent).

   c. A listing of detailed procedures, tests, specifications, instructions, and other documentation by title which apply to this Contract.

   d. A list of suggested hold and witness points. A review of this list may suggest additional and/or alternative hold or witness points which are considered significant to the OWNER or QA AGENT.

   e. A listing by title and control of all of the above documents.

2. Subsequent changes of the above Manufacturing Plan or any related documents shall be reviewed and accepted by the OWNER or QA AGENT prior to implementation of these changes. WORK performed prior to this approval will be subject to rejection.

3. As a guide in the preparation of the Manufacturing Plan, the following typical points shall be addressed:

   a. The inspection and tests to be performed.

   b. When, during the activity, the inspection and tests will be performed.

1:04.3 3. (Cont'd)

c. A list of written instructions to be utilized by persons performing the inspections and tests to verify the ITEM'S acceptability.

d. DELETED.

e. The types of reports that will be prepared to indicate that inspection and test results are acceptable, if not referenced and included in subitem 3.c. above.

f. The tests and test procedures, which will be conducted under special environmental conditions, and under what conditions these will be conducted.

g. Outdoor or long term preservation, packaging, and shipping procedures.

h. DELETED.

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1:04.4 Documentation to be Submitted Prior to Manufacturing:

The following listing represents the minimum VENDOR procedures which are considered typical of special processes which may be applicable to the ITEM being procured. Clarification and/or additional procedures may be specifically required by the Parent Specification. Upon notification of award, a copy of the "VENDOR'S QA DATA IDENTIFICATION REPORT" form will be sent to the VENDOR to assist him in preparing a listing of procedures which are applicable to this Contract. The QA AGENT will approve this list and finalize it at the post award conference. At least 60 calendar days prior to the start of fabrication, the VENDOR shall furnish the applicable procedures as listed below. These procedures will be submitted in accordance with item 1:04.8 of this Specification and dispositioned by the QA AGENT in accordance with item 1:04.9.

1. Procedures

a. Welding and weld repair procedures.

b. Welding procedure qualifications and weld operator qualification procedure (actual welder qualifications will be the responsibility of the VENDOR to maintain, subject to surveillance/audit by CEI/QA and its QA AGENT).

c. Nondestructive examination (NDE) procedures.

d. Procedure for NDE operator qualifications (actual operator qualifications will be the responsibility of the VENDOR to maintain, subject to surveillance/audit by CEI/QA and its QA AGENT).

e. Cleaning procedures.

1:04.4 1. (Cont'd)

f. Heat treating procedures.

g. DELETED

h. Packaging, shipping, painting, and storage procedures.

i. Performance test procedures.

j. Hydrostatic and leak test procedures (when applicable).

k. Electrical test procedures (when applicable).

l. SUBVENDOR quality evaluation and monitoring procedures - complex and/or critical items purchased from SUBVENDORS may require that the QA Plan be submitted and accepted by the QA AGENT.

m. Procedures for methods to be used to verify design (when applicable).

n. Procedure for verifying wall thickness of pressure boundaries of castings and forgings for valve bodies, pump casings, pipe and pipe fittings, etc.

o. Inspection and test procedures, including process monitoring at specific points (when applicable).

p. Sampling plan details, if applicable. INFORMATION ONLY

q. Special inspection, tooling, test equipment and instrumentation details.

r. Marking and identification procedures.

s. The sources for purchased material and/or subcontracted work and the Purchase Orders (unpriced).

t. SUBVENDOR procedures for control of quality, when required by the OWNER.

NOTE: These procedures shall demonstrate how the applicable requirements will be met.

2. Manufacturing Sequence Sheets, unless included in the Manufacturing Plan.

3. DELETED

4. A sample documentation package and details of how and when required documentation will be turned over to the OWNER.

1:04.5 Notification of Inspection Hold Points, Audits, and Shop Tests:

1. Based on manufacturing sequence and/or Manufacturing Plan provided by the VENDOR, the OWNER, or the QA AGENT may establish hold or witness points at which inspections or the witnessing of special processes are required. The VENDOR shall provide at least seven calendar days advance notice to the OWNER and QA AGENT of the readiness for accomplishing these required inspection or witnessing points or processes. Audits of the VENDOR'S quality program may be performed by the OWNER or QA AGENT in conjunction with any of the above.

2. Manufacturing shall not proceed beyond these hold points without inspection by the OWNER or QA AGENT or waiver of the subject hold point. Notification of upcoming inspection hold points or requests for waiver shall be made to QA Program Management, PNPP, Gilbert Associates, Inc.

1:04.6 Documentation to be Submitted at Completion of Manufacturing:

1. A complete documentation package shall be prepared by the VENDOR and will be made available to the OWNER or the QA AGENT during final inspection and prior to shipment of the ITEM. The documentation package shall consist of such items as the following, plus other documents as listed in the Parent Specification and other CONTRACT DOCUMENTS:

   a. NDE reports.

   b. Material test reports (shall be available for review prior to fabrication).

   INFORMATION ONLY

   c. Final inspection reports/certificates.

   d. Performance test reports.

   e. Code data inspection reports.

   f. Hydrostatic and leak test reports (when applicable).

   g. Electrical test reports.

   h. As-built Drawings.

   i. Design changes/specification deviations (requests).

   *j. Radiographs.

* Radiographs shall be available for review by the OWNER's or QA AGENT'S inspector during manufacturing, and subsequent to shipment to the QUALITY CONTROL MANAGER.

1:04.6 1. (Cont'd)

k. Weld maps and joint history records.

l. Verification of wall thicknesses.

2. The document package, exclusive of radiographs, shall be sent by the VENDOR to Gilbert Associates, Inc., P.O. Box 1498, Reading, Pennsylvania, 19603, Attention: QA Program Manager, PNPP, c/o Project Services. A copy of the documentation package, including radiographs, shall be sent by the VENDOR to the QUALITY CONTROL MANAGER at the construction site. Both documentation packages shall be sent by a certified U.S. Mail or other preapproved conveyance prior to each shipment from the VENDOR'S shipping point.

1:04.7 Certificate of Inspection and Certificate of Conformance:

1. Based on the VENDOR identified documentation package per item 1:04.6, the VENDOR shall provide a written certificate of conformance for each shipment. This certificate must:

   a. Identify the items covered by the certificate by name, identification number, and purchase order number.

   b. Identify specific requirements met by the purchased ITEM by Parent Specification and Bill of Material. In addition, the OWNER or engineering approved changes incorporated into the ITEM must be listed by reference to the Engineering Change Notice or approved deviation request or equivalent.

   c. Be authorized by the VENDOR'S representative who is responsible for the QUALITY ASSURANCE function related to the ITEM. This individual should be identified in the VENDOR'S QUALITY ASSURANCE Program by title.

   d. Contain an itemized index of all other VENDOR documents transmitted for the shipment, as required per item 1:04.6, to support the quality of the ITEM purchased.

2. Completed Certificate of Inspection (Attachment A) or Certificate of Inspection with Waiver (Attachment B) or Special Certificate of Inspection (Attachment C) provided and authorized by the QA AGENT. The Certificate of Inspection with Waiver, Certificate of Inspection, or Special Certificate of Inspection must accompany each shipment. These documents may be presented by the QA AGENT'S representative during final inspection, be provided by Telecopy and/or Mail, or be provided to the VENDOR for his use over a discrete period of time.

   NOTE: The latter only applies to the Special Certificate of Inspection.

1:04.7 (Cont'd) 3. The OWNER reserves the right to reject and return all ITEMS received at the construction site which do not have a QA Certificate of Inspection included with the shipment.

4. This documentation must be received at the construction site prior to final acceptance of the ITEM(S).

1:04.8 Submittals:

The VENDOR shall provide copies of all data, documents, transmittals, and notifications required by this Quality Level Attachment Specification and by the Parent Specification. Documents are to be distributed as defined within the Parent Specification. Additionally, procedures and other documents submitted for review shall be submitted as follows:

1. Two copies for review and disposition:

Gilbert Associates, Inc.
P. O. Box 1498
Reading, Pa. 19603

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Attention: QA Program Manager, PNPP
c/o Project Services

2. One copy of transmittal letters only, and after review and acceptance by the QA Program Manager, two controlled copies of the final accepted documents (this submittal is made after receipt of "Release of Fabrication Procedures"):

The Cleveland Electric Illuminating Co.
P. O. Box 5000
Cleveland, Ohio 44101

Attention: Mr. John G. Marjenin
General Supervising Engineer, Quality Assurance

1:04.9 Procedure Dispositions:

Review by GAI/QAD may result in one of several dispositions, each of which requires a different response by the VENDOR. The dispositions and type of response required are as follows:

	Disposition by GAI/QAD	Response Required from VENDOR
1.	Acceptable.	None.
2.	Acceptable, with comment.	Consider comments, no revision or resubmittal required. If revision is made, resubmittal before use is required.

1:04.9 (Cont'd)	Disposition by GAI/QAD	Response Required from VENDOR
3.	Conditionally acceptable.	Revise and resubmit to GAI/QAD, or acknowledge comment and at next revision. Resubmit when revision is made.
4.	Not acceptable.	Revise and resubmit.

The VENDOR will provide a controlled copy of each procedure used in the manufacture of the ITEM to the QA AGENT and CE/QA.

1:05 General QUALITY ASSURANCE Requirements

1:05.1 For inspection, witnessing of tests, and audit purposes, the OWNER and/or QA AGENT shall have free access to the VENDOR'S and SUBVENDOR'S WORK and documentation. Inspectors from the Nuclear Regulatory Commission shall be permitted to accompany the OWNER or QA AGENT during these visits. Inspection by the OWNER or QA AGENT is not a waiver of any warranty or other rights of the OWNER. Access to SUBVENDORS will be requested through and coordinated by the VENDOR.

1:05.2 Access to Quality Assurance Information:

Access to data or information which affects QUALITY ASSURANCE will be insisted on by the OWNER or its AGENTS. Failure to comply with this requirement shall be sufficient reason for cancellation of Contract. Written agreements not to divulge proprietary information will be entered into if necessary to obtain access to such quality information.

1:05.3 Significant Deficiencies:

1. In the event that significant deficiencies are discovered in the VENDOR'S QUALITY ASSURANCE Program the OWNER or QA AGENT shall order the VENDOR to "stop all affected contract work" until such deficiencies are resolved to the satisfaction of the OWNER. (See 10 CFR 50 paragraph 50.55e.)

2. If the OWNER warrants it necessary, a "resident" inspector will be placed in the VENDOR'S facilities until the resolution of such deficiencies is satisfactory to the OWNER.

1:05.4 Release for Fabrication:

The VENDOR shall not begin manufacture of the ITEM(S) until a QUALITY ASSURANCE "Release For Fabrication" has been received from GAI Engineering. To expedite production under special circumstances, a partial release to fabricate may be provided.

1:05.5 Material Furnished by OWNER:

When material is furnished by the OWNER or any of its AGENTS, the VENDOR'S procedures shall include as a minimum, provisions for the following:

1. Examination upon receipt:

   a. To detect shipping damage.

   b. For completeness and proper type.

   c. For conformance to Specification and contract requirements.

   d. For verification of quantity and quality with notification in writing to the OWNER within twenty days of receipt or before VENDOR use, whichever is earlier.

2. Periodic inspection and precautions to assure adequate storage and to guard against loss, damage from handling, or deterioration during storage.

3. Functional testing, either prior to or after installation, or both, as required by the Parent Specification to determine satisfactory operation.

4. Identification and protection from improper use or disposition.

5. At the time of installation or shipment of the respective unit or assembly, the VENDOR shall provide the OWNER with a written certification that the material used in the respective unit or assembly is in fact that which was furnished by the OWNER or its AGENTS.

6. The VENDOR shall report in writing, to the OWNER, any OWNER-furnished material found damaged, malfunctioning, or otherwise unsuitable for use, at receipt, during, or after installation. The VENDOR shall determine and report probable cause and necessity for withholding material from use. Such material shall not be used without written authority from the OWNER.

1:05.6 Delay of Shipments:

The OWNER or QA AGENT shall have the right to delay the shipment of ITEMS from the VENDOR'S or SUBVENDOR'S shop or to delay final acceptance pending corrections of errors or omissions in manufacture, test, drawings, shipping preparations or documentation.

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1:05.7 Corrective Action Requests:

The VENDOR shall correct NONCONFORMANCES to the Contract, as noted and reported on a Corrective Action Request (Attachment D) issued by the QA AGENT. The action taken to correct the NONCONFORMANCE shall be entered on the Corrective Action Request form and returned to the QA AGENT for acceptance of the action taken. The VENDOR shall take corrective action in response to an Audit Action Request (Attachment E) issued by CEI/QA or its QA AGENT, normally within 30 calendar days of receipt or as noted. The action taken to correct the NONCONFORMANCE shall be entered on the Audit Action Request form and returned to the QA AGENT for acceptance of action taken. The Audit Action Request, unlike the Corrective Action Request, does not have to be accepted prior to making an ITEM shipment.

1:05.8 Records:

The VENDOR shall maintain all records and documentation pertaining to the ITEM. The records shall be provided with security and protection against destruction and deterioration during the manufacturing period until submitted in accordance with item 1:04.6.

1:05.9 Nonconforming Items:

VENDOR NONCONFORMING material dispositions requiring action by the OWNER are those that do not conform to OWNER approved Drawings or specifications and are dispositioned REPAIR, USE-AS-IS, or SCRAP, if the material is furnished by the OWNER. Such dispositions shall require approval through submission of a request for deviation from Contract requirements to the OWNER and the ENGINEER for processing and final approval. NONCONFORMANCE ITEMS shall not be submitted for final inspection until approvals of deviation requests are received by the VENDOR.

1:05.10 Conflicts:

In the event of discrepancies between the Parent Specification and this Specification, with regard to QA requirements, this Specification shall prevail, except where the Parent Specification lists additional requirements. Discrepancies shall be brought to the attention of the OWNER.

1:06 Quality Assurance Program Requirements

1:06.1 Program:

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1. The VENDOR'S QUALITY ASSURANCE Program shall meet the requirements as specified herein. These requirements are consistent with the quality requirements of governing codes, such as ASME B&PV Code Section III, 10CFR50, Appendix B, "Quality Assurance Criteria for Nuclear Power Plants", and ANSI N45.2.

2. The QUALITY ASSURANCE Program shall be described with written policies, procedures, and instructions. The program shall provide for indoctrination and training of personnel performing activities affecting quality to assure that suitable proficiency is achieved and maintained. The program shall provide for regular review by the VENDOR'S management to verify the status, effectiveness and adequacy of the program. The program shall include monitoring of SUBVENDORS to assure compliance to quality requirements.

3. The program shall recognize the OWNER'S and QA AGENT'S right to audit the VENDOR'S QUALITY ASSURANCE Program, as necessary, to comply with the OWNER'S obligation under the applicable codes, standards and regulations. The program shall provide that the necessary documentation and records, referenced in items 1:04.2, 1:04.3, 1:04.4, 1:04.5 and 1:04.6, be furnished to the OWNER on a timely basis.

4. If the VENDOR'S QUALITY ASSURANCE Program is not in effect, no WORK shall be done on ITEMS covered by the Contract until the VENDOR'S QUALITY ASSURANCE Program, as set forth in the VENDOR'S Proposal, has been established, audited, and accepted by the OWNER or QA AGENT. Changes to the VENDOR'S Quality Assurance Program, after WORK commences, shall be submitted by the VENDOR to the OWNER or QA AGENT for review and acceptance.

1:06.2 Organization and Planning:

1. The VENDOR shall have a QUALITY ASSURANCE organization in which persons performing quality functions have well defined responsibility, authority and freedom from production pressures to effectively identify, pursue, and resolve quality related problems, and to assure that the VENDOR'S Quality Program is established, planned, and implemented in accordance with the requirements established in this Specification. The lines of authority, organizational structure, and functional responsibilities shall be clearly established and delineated in writing. The organizational description shall include statements of functions and responsibilities down to the first level of supervision, within the Division or Plant where WORK is to be performed. It is recognized that QUALITY ASSURANCE is an interdisciplinary function involving many organizational groups and not necessarily limited to a single QUALITY ASSURANCE group. However, the organization shall be arranged so that the individual

1:06.2 (Cont'd) 1. or group assigned the responsibility for checking, reviewing, inspecting, auditing, or otherwise verifying that an activity has been correctly performed is independent of the individual or group directly responsible for performing the specific activity.

2. The VENDOR'S Quality Organization shall define in writing all responsibilities and duties of personnel involved in the Quality Program. These personnel shall be fully qualified and properly trained and shall have adequate knowledge of the specific function which they are responsible to perform.

3. The VENDOR, immediately after award of Contract, shall perform a complete review of the Contract and take timely action to ensure that the necessary procedures and provisions are established in accordance with the Parent Specification, Purchase Order, applicable codes and standards, or other CONTRACT DOCUMENTS. The Manufacturing Plan described in 1:04.3 above shall reflect this review. Where there are unique requirements which require special equipment, especially trained personnel, procedures for process control, process or personnel qualifications, or other actions to control quality, they shall be specified and documented as necessary on travelers, process sheets, work instructions, and inspection plans.

1:06.3 Design Control:

1. The VENDOR, when responsible for design activity or for conformance to specified design criteria, shall provide measures to assure that specified design requirements, such as design bases, regulatory requirements, codes, and standards, are correctly translated into specifications, drawings, procedures, and instructions. Design control measures shall provide for, but not necessarily be limited to, design analysis, such as stress analysis, thermal analysis, hydraulic analysis, seismic analysis, and accident analysis; compatibility of materials; accessibility for in-service inspection, maintenance and repair; and, delineation of acceptance criteria for inspection and tests. Means shall also be established for the selection and review for suitability of application of materials, parts, equipment, and processes that are essential to the function of the structure, system, or components.

2. The VENDOR, when responsible for the design activity, shall provide measures approved by the ENGINEER or OWNER to verify the adequacy of the design, by design reviews, calculation verification, or performance testing. The verification of design adequacy shall be performed by individuals or groups who are independent of the original design effort, (but need not be from a different organization). The depth of review performed may vary depending upon the importance and complexity of the design, state-of-the-art, and previously proven designs. The scope of design verification can range from a formalized multiorganization review to an informal, single-person review. As a minimum, the

1:06.3 (Cont'd) 2. verification shall consist of reviewing the design, checking calculations or analyses, and evaluating the results against the original bases and functional requirements. In particular, the VENDOR shall perform design verifications on ITEMS as set forth in the Parent Specification, and then verify by proper documentation that actual conditions meet the specified values. If performance testing is used as a design verification, tests shall be performed under the most adverse design criteria. The VENDOR, when responsible for design activity, shall submit a certification to the ENGINEER that his design has been verified in accordance with these requirements. Documented evidence of the design verification shall be made available on request.

3. The VENDOR shall establish, when the design responsibility required by the Contract of which this Specification is a part is shared, interface control measures which control and coordinate the activity. These measures shall include procedures governing the review, approval, release, distribution, and revision of documents involving design interface information. Similarly, any design changes shall be made by a means of design change control which obtains the necessary notification, review, approval and distribution to the responsible interfacing individuals, groups, or organizations.

1:06.4 Procurement Document Control:

1. The VENDOR is responsible for assuring that all VENDOR procurement documents contain or reference all applicable requirements of this Specification, material specifications, tests, inspections, and other necessary quality requirements.

2. Changes in procurement documents shall be subject to the same controls as the original document.

3. Procurement documents shall require suppliers to provide, as necessary, a QA program consistent with this Specification.

4. Procurement documents shall include provision for the following as applicable:

   a. Define the level of QA program development required for the SUBVENDORS.

   b. Specify technical requirements:

      Drawings, specifications, inspection requirements, standards, special instructions and requirements for designing, fabricating, cleaning, erecting, packaging, handling, shipping, extended field storage, and test equipment.

1:06.4 4. (Cont'd) c. Source Inspection and Audit:

Provision for access to plant facilities and records for source inspection and audit shall include the VENDOR, OWNER and/or the OWNER'S AGENT. Provision shall also be made for imposing mandatory hold points on the SUBVENDOR as required by OWNER or QA AGENT.

d. Documentation:

Provision shall be made for record preparation, retention, and disposition. Records shall include drawings, specifications, inspections, and test results as a minimum.

e. SUBVENDOR Procurement:

Provision shall be made for extending applicable requirements to SUBVENDORS including the OWNER'S right of access to facilities and records.

1:06.5 Procedures, Instructions, and Drawings:

All activities performed by the VENDOR or SUBVENDOR, which affect the quality of ITEMS, shall be prescribed by and performed to clear and complete documented instructions, procedures, or drawings. These documents shall adequately describe the necessary actions and acceptance criteria to affect control of quality. These activities may be described in operating or procedure manuals, test procedures, job specifications, planning sheets, shop or construction drawings, or any other type of written form, provided the description will fulfill the contractual requirements. Procedures, instructions, and drawings shall include acceptance criteria such as dimensions, tolerances, and comparison of workmanship samples. The applicable forms, inspection sheets, reports, or documents that will be used to verify work performance and quality compliance shall also be included.

1:06.6 Document Control:

1. This element requires the establishment of measures that will assure control of the issuance, revision, and distribution of documents including changes thereto affecting quality. These documents, which include drawings, instructions, procedures, etc., require review for adequate coverage to control quality and shall be approved for release by VENDOR authorized personnel. Distribution of these documents shall be to the locations or persons using the documents to perform the prescribed activity. Changes to documents shall be reviewed and approved by the same organizations that performed the original review and approval, unless another responsible organization is designated.

1:06.6 (Cont'd) 2. Listed below are the areas that will be documented for this element of the quality program:

a. Identification of those individuals or organization authorized to approve the issuance and revision of documents.

b. The system that will effect proper distribution of documents and the control of obsolete ones.

c. Identification of the proper documents to be used in performing the activity.

d. The measures that will be exercised to assure that the latest approved documents are being used to perform the activity.

e. Measures to coordinate and control interface documents.

1:06.7 Control of Purchased Materials, Equipment, and Services:

1. The VENDOR shall assure that all ITEMS and services conform to Contract requirements. The selection of SUBVENDORS and the degree of control to be exercised by the VENDOR is dependent upon the type of ITEM, how well the SUBVENDOR has demonstrated his capability to perform, and the quality evidence made available. The VENDOR shall review and assess all SUBVENDORS as frequently as is deemed necessary to assure that the established controls for quality are effective, and that the integrity of the procured ITEMS is maintained.

2. The procedure for control of this element shall adequately describe how the following will be accomplished:

a. Selection of SUBVENDORS, including the criteria used to determine that they are qualified.

b. The forwarding of design, quality requirements, and other data pertinent to the procured ITEM to the SUBVENDOR.

c. Evaluation of the procured ITEM for conformance to Contract requirements, obtainable through the VENDOR'S inspection or surveillance of procured ITEMS, and/or review of the SUBVENDOR'S documents related to quality, i.e., test reports, certificates, and inspection reports.

d. Early detection, feedback of information, and correction of nonconforming conditions.

e. Provisions to update Purchase Order requirements to comply with latest revisions to applicable specifications, drawings, and codes.

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1:06.8 Identification and Control of Materials, Parts, and Components:

1. The measures established for identification and control of materials, parts, and components, including partially fabricated subassemblies, shall be documented and provide a means for assuring that only correct and acceptable ITEMS are used in the fabrication, assembly, processing, installation, and repair. These measures shall at all times be capable of relating the ITEM to any stage of production activity to the applicable specifications, drawings, or other documents, from initial receipt of materials through final acceptance upon completion and/or installation. When required by Contract, these measures shall provide traceability of the ITEMS to specific inspection and test records, such as performance qualification data, material test reports, quality records, certifications, drawings, or other pertinent documents.

2. Contained within the procedure for this quality program element shall be a description of the following:

   a. Identification methods:

      Permanent low-stress die stamps, vibro etching, stenciling, paint, tags, etc.

   b. Those stages or points at which verification of identification is performed by VENDOR QUALITY CONTROL personnel.

   c. Unique numbering systems when used (coded letters or numbers in lieu of actual part or component numbers).

   d. Method for determining the fabrication, installation, or inspection status at all stages, such as special tags, travelers, process sheets, etc.

   e. Method of providing traceability, when required by Contract.

1:06.9 Control of Special Processes:

1. The manufacture of certain ITEMS may dictate the need for special processes such as welding, nondestructive examination, heat treating, and cleaning. These special processes are of complex and specialized nature and require more precise detailing than ordinary work instructions, as well as qualifications of the personnel, procedures, and equipment. Written instructions for

1:06.9 (Cont'd) 1. these processes will be necessary and require the ENGINEER, the OWNER, or the QA AGENT'S review and acceptance. The procedures for the control of this quality program element shall describe how the following will be accomplished:

a. Identify methods for controlling manufacturing, construction, and special processes.

b. Describe special processes, procedures, and personnel qualifications which will be used.

2. When welding is used during fabrication, or for major repair, the VENDOR will, when required by Contract, prepare a weld map identifying each weld by number. A composite list will amplify this map and will include, but not necessarily be limited to, the following for each weld: The identifying number of the approved weld procedure; cleaning and heat treatments, if required; methods and frequency of the non-destructive tests; identifying number of the pertinent NDT procedures, including radiographic outline and shooting sketches; and, the NDT acceptance standard. These documents will be kept current and a copy of each will be forwarded to the QA AGENT for information.

1:06.10 Control of Inspections and Tests:

1. A complete and current program of inspections and tests shall be prepared for all activities affecting quality, and shall identify those inspection and test points to be verified for conformance to documents, such as instructions, procedures, drawings, specifications, etc., that are used to perform the activity. The inspection and tests shall be performed by individuals other than those who performed the activity being inspected or tested and who do not report to the supervisor who directed the original work. There shall be an adequate number of inspections and tests performed to assure that all operations of the activity fulfill the predetermined quality requirements. Mandatory inspection hold or witness points, requiring the witnessing or inspection of a specific activity by the OWNER and/or QA AGENT, shall be indicated in appropriate documents. The VENDOR shall submit a recommended list of inspection hold points to the OWNER and QA AGENT prior to the start of fabrication. The VENDOR, for ITEMS fabricated in his shop, shall notify the QA AGENT in writing at least 1 week in advance of readiness for inspection at a hold point. WORK shall not proceed beyond the approved inspection hold point until the WORK has been inspected and accepted or the inspection is waived in writing.

2. The procedure for control of inspection and tests shall, as a minimum, include the following:

a. Inspections and tests which will be performed.

b. When, during the activity, inspections and tests will be performed.

1:06.10 2. (Cont'd)

c. What written instruction the person performing the inspections and tests will be working to, including the specific acceptance criteria, tolerances, etc., which must be verified.

d. The personnel, who are qualified to perform the inspections and tests, to whom they report.

e. The type of reports that will be prepared to indicate that inspection and test results are acceptable.

f. When inspection of processed material or products is impossible or disadvantageous, what indirect controls by monitoring processing methods, equipment, and personnel shall be provided. Both inspection and process monitoring shall be provided when control is inadequate without both.

g. What tests will be conducted under special environmental conditions, and under what conditions these will be conducted.

INFORMATION ONLY

1:06.11 Control of Measurements, Inspection, and Test Equipment:

1. Measures shall be established by the VENDOR to assure that tools, gages, instruments, and other measuring and testing devices affecting quality are controlled. To assure accuracy, these devices shall be calibrated and adjusted at a VENDOR specified frequency, or prior to use. The measuring devices shall be the proper type, range, and accuracy for the application, to verify conformance to established requirements. Calibration of measuring devices shall be to equipment that is CERTIFIED to standards recognized by the National Bureau of Standards. If the device cannot be calibrated to a national standard, the calibration method shall be documented to provide justification for the use of the measuring device.

2. If production devices such as jigs, fixtures, templates, and patterns are used as media for inspection, such devices shall also be checked and proved accurate at periodic intervals. Records of such actions shall be maintained for verification.

3. Listed below are the areas to be defined for this element of the quality program:

   a. A listing of all measuring and test devices affecting quality that require calibration. (This does not include measuring equipment such as steel rules, levels, and similar devices that will not require calibration when their usage does not require a precise degree of accuracy.)

   b. The method of calibration for each ITEM in the listing specified in subitem a. above, including recognized standard use, for certification of calibrating equipment.

1:06.11 3. (Cont'd)

c. The established frequency of calibration.

d. The method of identification for each ITEM under calibration control.

e. The method for determining the calibration status of each ITEM, such as the attachment of a sticker showing the last calibration date, date when due for recalibration, and the person's stamp or signature who performed the last calibration.

f. The type of records that will be maintained.

g. The method for determining and recalling equipment when calibration is due.

h. The measures to be exercised when equipment that is out of calibration has been found to have been used to accept ITEMS.

1:06.12 Handling, Storage, and Shipping:

1. Handling, storage, and shipping, including cleaning, packaging, and preservation of ITEMS, shall be controlled by the VENDOR through documented measures to protect the ITEM from damage, deterioration, or loss or substitution of parts. When the nature of the ITEM dictates the need for special environmental control or special handling equipment, they shall be specified by the VENDOR and their use verified. Special handling equipment shall be programmed for periodic inspection and testing as necessary to ensure that it is adequately maintained. The identification, marking, and labeling of ITEMS shall be in a manner that will assure no loss of identity and permit permanent and easy recognition of special handling and storage requirements.

2. The areas to be described for this activity are:

a. The measures that will be utilized to protect ITEMS, requiring special handling, packing, cleaning, preservation, storage, and shipping techniques.

b. Measures that will be used to protect identification, marking and labeling from deterioration and loss of recognition when the method is not a permanent type.

:06.13 Inspection, Test, and Operating Status:

The VENDOR shall maintain a system for identifying the inspection and test status of ITEMS. This may be accomplished by marking, tagging travelers, inspection records, etc., of the ITEMS. Where the identification is removed, as a result of the process, the material/component shall be reidentified as soon as the in-process step (such as machining) has been completed. During storage, the material

1:06.13 (Cont'd) shall be identified to the Contract or Purchase Order; a permanent method shall be used when practical. If marking methods other than those permitted or specified by applicable codes or specifications are to be used, the method of marking and its location shall be approved by the OWNER or QA AGENT prior to use.

1:06.14 Control of Nonconforming Materials, Parts, or Components:

1. Measures shall be established and documented by the VENDOR to control ITEMS when there is evidence of nonconforming conditions to established requirements. These measures shall provide a means of identifying, documenting, segregating, dispositioning, and notifying all concerned parties of nonconforming conditions. The nonconforming ITEM shall be reviewed by the VENDOR to determine appropriate disposition. The dispositioning of nonconforming ITEMS shall be by persons so authorized by the VENDOR. Nonconforming ITEMS may be resolved by acceptance USE-AS-IS, REPAIR, REWORK, or SCRAP. ITEMS considered acceptable USE-AS-IS, repaired, or reworked require documentation that will verify their acceptability and provide a permanent record of the ITEMS "as built". Appropriate controls and measures shall be established and maintained for the nonconforming ITEMS to prevent any further processing until the disposition of the nonconforming condition has been approved.

2. When material is first found to depart from requirements, it shall be identified and withheld from normal production channels. A means for recording each action shall be provided and maintained by the VENDOR, reflecting the condition of material and action(s) taken to correct the condition. Provision will also be taken for recording the disposition action taken, i.e., USE-AS-IS, REWORK, REPAIR (see item 1:05.9).

3. A description of the following shall be included in the Quality Program:

   a. Method for identifying, reporting, and processing nonconforming ITEMS.

   b. Individuals or organizations responsible for the actions specified in subitem a. above.

   c. Individuals or organizations authorized to prepare and approve the dispositioning of nonconforming ITEMS.

   d. The type of form (include sample) to be used for reporting and dispositioning nonconforming ITEMS.

   e. The distribution of the initial report, disposition, and verification of acceptability for the nonconforming ITEMS.

1:06.14 3. (Cont'd)

f. The measures for control of the ITEMS to prevent further processing of the ITEM until disposition has been approved; i.e., segregation, tagging, marking, or other positive means.

g. The measures for control of the documentation that verifies and supports all actions relative to the nonconforming ITEM.

1:06.15 Corrective Action:

1. Measures shall be established by the VENDOR to assure that conditions adverse to quality are identified and corrected. Nonconforming conditions, deviations, deficiencies, and defective material, and equipment are considered adverse to quality, and upon detection shall be documented and appropriate action taken to correct the condition. When the condition is significant and dictates the need for corrective action to preclude repetition, these actions shall be documented, initiated, and monitored to assure that the corrections are adequate and effective. The prescribed corrective action may involve SUBVENDORS, and, should this be the case, the VENDOR'S quality program shall provide the necessary measures to assure control of quality. Records of corrective action shall be available for review by the OWNER or QA AGENT.

2. The procedure shall adequately describe the following:

a. The list of individuals or organizations responsible for identifying those conditions requiring corrective action.

b. The list of individuals or organizations responsible for preparing and approving the corrective action measures.

c. Guidelines for determining the need for corrective action.

d. Type of form (include sample) to be used for documenting this activity.

e. Distribution list including the appropriate levels of management.

f. Measures that will assure the prescribed corrective actions, including those that extend to the performance of subcontractors and suppliers, are properly initiated, adequate, and effective.

1:06.16 Documentation and Records:

1. Documentation and records shall be prepared concurrent with the activities they describe and maintained at the VENDOR'S shop. The documentation and records shall furnish evidence that the activities affecting quality have been performed, monitored, inspected, tested, audited, analyzed (materials), etc., as

1:06.16 1. (Cont'd) prescribed. Inspection and test records shall be dated and, as a minimum, include the results and acceptability, the nature and type of acceptances and deficiencies found, the nonconformances approved and rejected, identify the inspector or data recorder, the type of observation performed, and the action taken to resolve nonconforming conditions. Data related to the qualification of personnel, procedures, and equipment used to perform nondestructive examination, welding, or other special processes shall be a part of the records. Records and requirements, concerning transmittal, retention, and storage, shall be consistent with the codes, standards, and other requirements of these specifications and procurement documents. All documents shall bear the name of the OWNER, the OWNER'S Purchase Order Number, and the name, Perry Nuclear Power Plant - Unit 1 or 2, for ready identification by the OWNER and the QA AGENT.

2. The VENDOR shall have written procedures covering the preparation, control, storage, and disposition of all records. These procedures shall describe what steps will be taken to insure that the records he retains will be identifiable, retrievable, and adequately stored to preclude loss or deterioration of records. The VENDOR shall also provide the following in his Proposal:

   a. Listing of all documents and records affecting quality that are to be a part of the record system. This list shall include and identify records which will be submitted to the OWNER and those which will be retained.

   b. Identification of the applicable forms that will be used to record the quality data obtained for each activity.

1:06.17 Audits: **INFORMATION ONLY**

1. VENDOR Quality Programs require planned and systematic audits by the VENDOR in order to determine their effectiveness. Auditing shall be performed in accordance with procedures and check lists that will enable auditors to verify all aspects of the quality program. Auditors shall be trained personnel and have no direct responsibility for that area or activity being audited. The results of the audit shall be documented and reviewed by management having responsibility for the area or activity audited. Appropriate actions shall be taken to correct deficient areas or activities, with followup action to insure that the deficiency has been satisfactorily corrected.

2. A description of the following items shall be required:

   a. The criteria for determining when and at what frequency (periodic, random, etc.) audits shall be performed, i.e.:

      (1) When extensive changes are made to the Quality Program (procedures, methods, organization).

1:06.17 2. a. (Cont'd)

(2) When the ITEM becomes suspect of its quality being jeopardized due to numerous deficiencies or nonconforming conditions.

(3) When an assessment is deemed necessary to evaluate the effectiveness of the Quality Program.

b. The system that will be used to perform the audits.

c. How the audit findings, corrective actions, and results will be documented and to whom they will be distributed.

d. The titles and duties of persons having responsibility for the audit.

INFORMATION ONLY

GILBERT ASSOCIATES, INC.
QUALITY ASSURANCE DIVISION
CERTIFICATE OF INSPECTION

CLIENT _____ UNIT _____

ITEM(S) _____ ORDER NO. _____

IDENTIFICATION NO. _____

VENDOR _____

APPLICABLE DRAWING NO. AND REVISION _____

APPLICABLE DOCUMENT NO. AND REVISION _____

CERTIFICATION IS HEREBY GIVEN THAT THE ITEM(S) LISTED ABOVE HAVE BEEN INSPECTED AND FOUND TO MEET THE APPLICABLE REQUIREMENTS EXCEPT AS NOTED BELOW. THIS CERTIFICATION SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR CONFORMING TO APPLICABLE REQUIREMENTS AND SHALL NOT BE CONSIDERED A WAIVER OF WARRANTY OR OTHER RIGHTS.

EXCEPTIONS: INFORMATION ONLY

REMARKS: _____

BY: _____
QUALITY ASSURANCE INSPECTOR

REPORT NO. _____

DATE: _____

GAI/QA(F) 11.53
11-1269
REV 3-1-75

GILBERT ASSOCIATES, INC.
QUALITY ASSURANCE DIVISION
CERTIFICATE OF INSPECTION
WITH WAIVER

INFORMATION ONLY

CLIENT The Cleveland Electric Illuminating Company UNIT _____

ITEM(S) _____ ORDER NO. _____

IDENTIFICATION NO. _____

VENDOR _____

APPLICABLE DRAWING NO. AND REVISION _____

APPLICABLE DOCUMENT NO. AND REVISION _____

FINAL INSPECTION OF THE ITEM(S) LISTED IS HEREBY WAIVED. CERTIFICATION IS GIVEN BASED ON INFORMATION SUPPLIED BY VENDOR THAT THE ITEM(S) LISTED ABOVE HAVE BEEN INSPECTED BY THE VENDOR AND FOUND TO MEET THE APPLICABLE REQUIREMENTS EXCEPT AS NOTED BELOW. THIS CERTIFICATION WITH WAIVER SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY FOR CONFORMING TO APPLICABLE REQUIREMENTS, SHALL NOT BE CONSIDERED A WAIVER OF WARRANTY OR OTHER RIGHTS, NOR SHALL IT BE CONSIDERED AS SETTING A PRECEDENT FOR FUTURE INSPECTIONS.

EXCEPTIONS: _____

REMARKS: _____

BY: _____
QUALITY ASSURANCE INSPECTOR

REPORT NO. _____ DATE: _____

MA-51
Rev. 1 8/9/76

GILBERT ASSOCIATES, INC.
QUALITY ASSURANCE DIVISION
SPECIAL CERTIFICATE OF INSPECTION

Client: _____ Unit _____

Issued to: _____ P.O. # _____

Issue No. _____ Issuance Date _____

_____

_____

Date Shipped _____ GAI Mark # _____

Shipment # _____ Drawing # _____

Documents Submitted Prior to Shipment ( )

INFORMATION ONLY

1.	Mill Test Reports (__)	8.	As Built Drawings (__)
2.	NDE Reports (__)	9.	Design Changes/ Specification Deviations (__)
3.	Final Inspection Reports/Certificates (__)	10.	Radiographs* (__)
4.	Performance Test Reports (__)	11.	Weld Maps & Joint History Records (__)
5.	Code Data Inspection Reports (__)	12.	Packing List # _____ (__)
6.	Hydrostatic & Leak Test Reports (__)	13.	Verification of Wall Thicknesses (__)

*Radiographs shall be available for review by the OWNER'S or QA AGENT'S inspector during manufacturing, and subsequent to shipment to the QUALITY CONTROL MANAGER.

Vendor Q.A. Representative _____

_____

_____

Above noted material has been approved based on past performance and implemented Quality Control Systems. The material has been accepted by the Vendor's Quality Control Department. This release represents GAI/QA authorization to ship material from the issuance date to the end date shown below. All required documentation must be forwarded prior to each shipment. This release may be duplicated, as necessary, to satisfy shipping requirements.

End Date _____ By: _____
Quality Assurance Inspector
Manufacturing Surveillance

GILBERT ASSOCIATES INC.

QUALITY ASSURANCE
CORRECTIVE ACTION REQUEST

SERIAL NO.	DATE
0208	

CLIENT	UNIT	CONTRACTOR

GOVERNING REQUIREMENT:

1. MANUFACTURING PROCEDURE ☐
2. QUALITY CONTROL PROCEDURE ☐
3. ENGINEERING DRAWING ☐
4. SPECIFICATION ☐
5. PURCHASE ORDER ☐
6. CODES ☐
7. _____

REQUIREMENT NO. _____

CORRECTIVE ACTION REQUESTED TO RESOLVE THE CONDITIONS NOTED BELOW:

REQUIREMENT: _____

CONDITION: _____

PREPARED BY:	QUALITY CONTROL ACKNOWLEDGMENT	DATE

DISTRIBUTION: (NAME AND TITLE)

NO.1 GAI/QA OFFICE FILE

INFORMATION ONLY

OCT. 1970

RESPONSE TO REQUEST: (CORRECTIVE ACTION MEASURES SHALL BE SUSTAINING AND PROVIDE NON-RECURRENCE OF THE CONDITION NOTED.)

	C/A EFFECTIVITY DATE
	DATE

PREPARED BY:	DATE	RESPONSIBILITY	

REMARKS:

NO. 1626
REV. 2-76

ATTACHMENT E
Page 1 of 1
AAR ___

The Cleveland Electric Illuminating Company
QUALITY ASSURANCE
AUDIT ACTION REQUEST

File No. 300 ___ Activity Name ___

Audit Number ___ B Criteria No. ___ Initials ___ Audit Date ___

Appendix B Criteria ___

Prepared By ___ Acknowledged By ___

Observation: ___

Review for Significance ___

Justification: ___

Recommendation: ___

Follow-Up: Last Action Date 1) ___ Comment ___ INFORMATION ONLY

2) ___ Comment: ___

3) ___ Comment: ___

Corrective Action Reply Action Due By Date ___

Response By ___ CEI / QA Approval ___

Response Date ___ Close-out Date ___

Copy Distribution: WHITE - Quality Assurance File CANARY - Follow-up PINK - Audited Activity - Action Copy

TABLE 1

LOAD LIST FOR DIESEL GENERATORS LOADING

Step or Block No.	Time of Application	Type of Load & Voltage	Starting kVA	Starting p.f.	Running kVA	Running p.f.	Cumulative Total-Running
Em. Start Sig.	-10 sec.	(Diesel-Generator unit start, accelerate, and ready for loading)					
No. 0	t < 0 sec.	2-1500 kVA (70 Amperes, maximum, inrush - per transformer)					
		Load Center Transformers					
No. 1	0 sec.	Misc.-480V	115	1.00	115	1.00	
		Motors-480V	2,425	0.30	373	0.83	
		Motors-4kV	10,238	0.20	1,575	0.90	2,063 kVA
No. 2	5 sec.	Motors-4kV	5,265	0.20	810	0.90	2,923 kVA
		Motors-480V	325	0.30	50	0.83	
No. 3	50 sec.	Motors-480V	1,320	0.30	203	0.83	3,126 kVA
No. 4	60 sec.	Motors-480V	234	0.30	36	0.83	
		Motors-4kV	4,378	0.20	675	0.90	3,706 kVA
No. 5	90 sec.	Motors-480V	488	0.30	75	0.83	4,303 kVA
		Motors 4kV	3,393	0.20	522	0.90	
No. 6	100 sec.	Motors-480V	910	0.30	140	0.83	4,443 kVA

Explanatory notes for diesel-generator loading sequence table.

1. The engine shall be capable of starting and accelerating a future load. The future load shall be equal to the difference between actual nameplate rating and tabulated cumulative total running kVA, but not greater than the tabulated load of Load Block No. 1.

2. The future load of Note 1 may be substituted for any of the tabulated load blocks, No. 1 through No. 6, and the tabulated load blocks considered as being increased from 6 to 7. The time interval between load blocks shall be identical to the time interval allowed prior to the addition of the substituted (future) load.

3. Tabulated motor loads are pump loads.

4. Short time loads, such as motor operated valves, have been deleted from the cumulative total running for all steps beginning with Step 4.

5. For the purpose of item 2:09.5, subitem 2.a., a plot of the test load versus time shall equal or exceed a plot of cumulative total running versus time, i.e., the test load application rate shall exceed the cumulative total running load application rate.

ASME III Designed Components

ATTACHMENT A

For Active Class 2 & 3 Pumps, Non-Active Class 2 & 3 Pumps
Class 2 & 3 Pressure Vessels

1.00 Seismic Requirements and Combined Loading Design Limits

INFORMATION ONLY

1. Seismic Qualification Testing and Analysis

   a. The _____ (component) shall be seismically qualified in accordance with SP-750-4549-00. The option of testing or seismic analysis shall be left to the VENDOR: however, complete documentation and certification required by SP-750-4549, Item 1:05, shall be supplied by the VENDOR. The method, seismic analysis or testing, proposed for qualifying the equipment shall be stated in the Proposal. If analysis is proposed, a detailed description of the method shall be incorporated with the VENDOR'S proposal.

   b. If a seismic modal analysis is performed, the information requested in Item 1:04.2, Subitem 6-c of attached Specification SP-750-4549-00 shall be supplied.

   c. The VENDOR shall supply the dynamic models and preliminary analysis of his equipment to the ENGINEER for incorporation in the piping analysis as set forth in SP-750-4549-00.

   d. The _____ (component) and all attached accessories shall be considered as one piece of equipment in designing to the seismic conditions.

   e. The attached Floor Response Spectras (Figures ____, ____, and ____) shall be used for seismic analysis or testing of the equipment. The _____ (component) will be located in the _____ building at a floor elevation of _____ ft.

2. Design Load Combinations and Allowable Stress Limits

   a. The _____ (component) is defined as an (active or non-active class ____ pump (or) class _____ pressure vessel. This equipment shall be designed for the following load combinations per US/AEC Regulatory Guide 1.48.

      (1) Normal:
      Fluid loads (Press., Temp., Flow)
      (reference section in Specification where performance data is given)
      +Deadweight
      +Nozzle loads (see Subitem 2b)

      (2) Upset:
      Fluid loads (Press., Temp., Flow)
      +Deadweight
      +Nozzle loads (see Subitem 2b)
      +Loads associated with an earthquake of intensity

equivalent to Operating Basis Earthquake (OBE) (intensity per Subitem 1e)

(3) Emergency:
Fluid loads (Press., Temp., Flow)
+Deadweight
+Nozzle loads (see Subitem 2b)

(4) Faulted: (Use for Active Class 2 & 3 Pumps and for Class 2 & 3 Pressure Vessels)
Fluid loads (Press., Temp., Flow) under faulted conditions.
+Deadweight
+Nozzle loads at faulted plant condition (see Subitem 2b)
+Loads associated with an earthquake of intensity equivalent to Safe Shutdown Earthquake (SSE) (intensity per Subitem 1e)

OR

(4) Faulted: (Use for Non-Active Class 2 & 3 Pumps)
Fluid loads (Press., Temp., Flow) under normal operating conditions
+Deadweight
+Nozzle loads at faulted condition (see Subitem 2b)
+Loads associated with an earthquake of intensity equivalent to Safe Shutdown Earthquake (SSE) (intensity per Subitem 1e)

b. Nozzle loads

(1) Nozzle loads due to connecting piping are specified below. The z axis is oriented with the nozzle centerline, the y axis mutually perpendicular, and the x axis horizontal. The VENDOR is requested to supply at a minimum the capability to withstand the forces and moments listed below. The VENDOR is additionally requested to supply maximum permissible nozzle loadings in the attached Equipment Data Form.

(2) Each _____ (component) shall be designed to withstand piping forces and moments at their nozzles as defined below:

(a) $\frac{F}{F_o} + \frac{M}{M_o} \geq 1$

(b) $F = (Fx)^2 + (Fy)^2 + (Fz)^2$ (vector sum of the VENDOR'S allowable nozzle forces)

(d) Mo, Fo = Piping design loads as per the following table:

Piping Design Loads

	Normal	Upset	Emergency	Faulted
_____ Connection				
(_____ inch diameter)				
Fo Kips	_____	_____	_____	_____
Mo in-Kips	_____	_____	_____	_____

etc.

(Note to Engineer!! Fill in blanks for all connections to piping systems that will see pipe stresses; i.e., vent and drain connections generally do not see pipe stresses).

c. Allowable Stress Limits:

INFORMATION ONLY

The VENDOR shall design all _____ (component) pressure retaining components and supports to sustain the maximum combined loads outlined in Subitem a without exceeding the allowable stress limits given in table 1, 2 and 3.

3. Assurance of Operability Certification for Active Pumps

a. In addition to compliance with the design limits specified above, the VENDOR shall provide assurance of operability verification and certification for the pump-motor assembly as required by Regulatory Guide 1.48. Operability of the equipment is defined as being able to perform the safety function under all design load combinations. The assurance of operability may be verified by one of the following methods:

(1) Test

(a) An individual pump, selected as a full or reduced scale prototype pump, may be tested in the shop, provided the test conditions imposed are equivalent to the combined plant conditions which the pump is expected to withstand at the time when the "active functon is required.

(b) An individual pump, selected as a full or reduced scale prototype pump, may be tested partially (a) in the shop under those test conditions as limited by the test facility (e.g., pressure and temperature loading) and (b) in a testing laboratory for simulated seismic excitation loadings. Such a test program should be supplemented by analysis as required under test program (a) above.

(2) Analysis

If the pump including all accessories is designed and proven, either by test and/or an accepted analytic method, to have a fundamental frequency greater than 33Hz, analysis is acceptable for assurance operability. The assurance of operability shall be conducted with combined loads defined in subitem 2a.

Although analysis as defined above is acceptable, testing is the preferred method for the following:

(a) Assurance that the component's natural frequency is greater than 33Hz.

(b) Assurance of operability (ref. item 1 above).

(3) Pumps that can be demonstrated to be equivalent to a prototype pump, which has successfully met the test requirements of a pump operability assurance program, may be exempted from testing provided (a) the test results of the prototype pump are documented and available and (b) the loading conditions for the exempted pump are equivalent to or less than those imposed during testing of the prototype pump.

(4) The prototype pump may be selected from a group of similar pumps which will be used in the plant. A prototype pump used in one nuclear power plant qualifies as a prototype pump for another plant provided the system operating conditions of both plants, and pump loading conditions at te time when the "active" function is required are equivalent.

b. The prototype that has undergone testing shall be disassembled, inspected, and certified to be within acceptable manufacturing tolerances prior to actual service application.

c. The VENDOR shall prepare a proposed design bases describing the methods and procedures that are proposed to verify the assurance of operability under all design loading combinations. It shall include a description of any mathematical modesl analysis, test procedures, etc. The proposed design basis shall be brief yet with sufficient information to define a design basis for the component supplied. This proposed design basis shall be submitted with the Proposal.

d. The VENDOR shall prepare and provide a final report certifying the assurance of operability and design requirements. This report shall contain all final analysis and test results that demonstrate pump operability under all loading combinations.

OR

3. Pressure Retaining Integrity for Pressure Vessels and Non-Active Pumps

   a. Proof of compliance for pressure retention integrity shall be established for the _____ (component) subject to the Combined Loadings referenced in subitem 2a. Analysis is acceptable to establish design pressure retention integrity. The analysis is to be independently reviewed, and a detailed analytic report documented for the OWNER'S review, comment, and file retention.

   b. If a similar analysis has been previously completed for an identical _____ (component), the previous analysis will be acceptable provided:

      (1) Results are documented and available for review.
      (2) The combined loads for the previous _____ (component) were equal or greater than those specified in subitem 2 of this Specification.

   c. The VENDOR shall prepare proposed design bases describing the methods and procedures that are proposed to satisfy the requirements of pressure retaining integrity of each _____ (component) under all combined loads. They shall include a description of any mathematical models, analysis, test procedures, etc. The proposed design basis shall be submitted with the Proposal.

INFORMATION ONLY

ASME Code Class 2 & 3 Vessels

Table 1

Load Combinations and Allowable Stress Limits:

Load Combination	Stress Limits for Pressure Retaining _____ (Component, per Regulatory Guide 1.48)	Structural Supports
a. Normal	$Pm \leq 1.10S$ (1) $Pm + Pb \leq 1.65S$	ASME B&PV Code Section III Subsection NF
b. Upset	$Pm \leq 1.10S$ $Pm + Pb \leq 1.65S$	ASME B&PV Code Section III Subsection NF
c. Emergency	$Pm \leq 1.10S$ $Pm + Pb \leq 1.65S$	ASME B&PV Code Section III Subsection NF
d. Faulted	$Pm \leq 1.50S$ $Pm + Pb \leq 2.25S$	ASME B&PV Code Section III Subsection NF

NOTES:

(1) S = Allowable Stress from ASME B&PV Code Section III
Pb = Primary Bending Stress from ASME B&PV Code Section III
Pm = Primary Membrane Stress from ASME B&PV Code Section III

Table 2

Load Combinations and Allowable Stress Limits:

Load Combination	Stress Limits for Pressure Retaining Pump Components (per Reg. Guide 1.48)	Stress Limits for Structural Supports
a. Normal	$P_m \leq 1.0S$ (1) $P_m + P_b \leq 1.5OS$	ASME B&PV Code, Section III, Subsection NF
b. Upset	$P_m \leq 1.0S$ $P_m + P_b \leq 1.5OS$	ASME B&PV Code, Section III, Subsection NF
c. Emergency	$P_m \leq 1.0S$ $P_m + P_b \leq 1.5OS$	ASME B&PV Code, Section III, Subsection NF
d. Faulted	$P_m \leq 1.0S$ $P_m + P_b \leq 1.5OS$	ASME B&PV Code, Section III, Subsection NF

NOTES:

(1) S = Allowable Stress from ASME B&PV Code Section III
Pb = Primary Bending Stress from ASME B&PV Code Section III
Pm = Primary Membrane Stress from ASME B&PV Code Section III

Non-Active Class 2 & 3 Pumps

Table 3

Load Combinations and Allowable Stress Limits:

Load Combination	Stress Limits for Pressure Retaining Pump Components (per Reg. Guide 1.48)	Stress Limits for Structural Supports
a. Normal	$P_m \leq 1.10S$ (1) $P_m + P_b \leq 1.65S$	ASME B&PV Code, Section III, Subsection NF
b. Upset	$P_m \leq 1.10S$ $P_m + P_b \leq 1.65S$	ASME B&PV Code, Section III, Subsection NF
c. Emergency	$P_m \leq 1.10S$ $P_m + P_b \leq 1.65S$	ASME B&PV Code, Section III, Subsection NF
d. Faulted	$P_m \leq 1.2S$ $P_m + P_b \leq 1.8S$	ASME B&PV Code, Section III, Subsection NF

NOTES:

(1) S = Allowable Stress from ASME B&PV Code Section III
Pb = Primary Bending Stress from ASME B&PV Code Section III
Pm = Primary Membrane Stress from ASME B&PV Code Section III

ASME III Designed Components

ATTACHMENT B

For Active and Non- Active Class 1, 2, 3 Valves

1.00 Seismic Requirements and Combined Loading Design Limits:

1. Seismic Qualification Testing and Analysis

Each valve assembly (including actuator and accessories) shall withstand the inertial load caused by an Operating Basis Earthquake (OBE) and Safe Shutdown Earthquake (SSE). The actual loadings imposed by the OBE and SSE shall be determined in accordance with the attached Specification SP-750-4549-00 with the following exceptions, limitations or additions:

a. Each valve assembly shall be designed to withstand vibratory or oscillatory motions in any direction, due to a seismic event equivalent to 10 cycle sine beats at 3.0g input acceleration for all frequencies from 2 to 30 cps. Any seismic testing (sine beat or other) shall utilize an input having a spectral response no lower than the sine beats herein specified. Input accelerations of less than 3.0g's maximum shall not be used unless approved by the ENGINEER. These 3.0g accelerations shall be used in lieu of the levels given by the Floor Response Spectra Curves.

b. The seismic analysis shall determine that the fundamental frequency of the valve (including actuator and accessories) is greater than 33 Hz.

c. When valves are furnished with a chain and chainwheel, as required by the Valve and Specialty List, the seismic analysis shall consider this device to be part of the actuatory. The VENDOR shall suggest a method of stabilizing the chain or may suggest a non-metallic material for the chain designed to minimize the impact force the chain will have upon surrounding equipment, when subjected to the OBE or SSE.

2. Design Load Combinations and Allowable Design Limits

a. The valve classification (safety class, active or non-active) is listed in the Valve and Specialty List. All valves shall be designed for the following load combinations per US/AEC Regulatory Guide 1.48.

(1) Normal:

Pressure and Temperature at design conditions
+Deadweight
+Valve end loads
+Loads due to fluid motion (flows given on the Valve and Specialty List)
+Loads due to valve actuation

(2) Upset:

Pressure and temperature at design conditions
+Deadweight
+Valve end loads
+Loads due to fluid motion (flows given on the Valve and Specialty List)
+Loads due to valve actuation
+Loads associated with an earthquake of intensity equivalent to operating basis earthquake (OBE) (intensity per item 1).

(3) Emergency:

Pressure and temperature at design conditions
+Deadweight
+Valve end loads
+Loads due to fluid motion (flow given on the Valve and Speciality List)
+Loads due to valve actuation

(4) Faulted:

Normal plant conditions (Reference 2.a.1. above)
+Loads assocated with an earthquake of intensity equivalent to safe shutdown earthquake (SSE) (intensity per item 1).
+Dynamic loads due to the faulted plant condition.

b. Valve End Loads:

The stresses in Safety Classes (Code Classes) 1, 2, and 3 valves caused by pipe reactions shall be those calculated by the method of NB-3545.2(b) of Section III of the Code. Axial, bending and torsional load effects to be used for the analysis of mechanical loading qualification shall be so calculated. The material of connecting pipe necessary to determine these pipe reactions will be given on the Valve and Specialty List.

c. The design pressure and temperature for each valve is given on the Valve and Specialty List.

d. The dynamic loads due to the faulted plant condition will be given on the Design Specification, if applicable.

e. Allowable stress limits or pressure-temperature ratings.

In accordance with US/AEC Regulatory Guide 1.48, Code Class 1 valves may be designed by analysis or by standard/alternate design rules. Class 2 and 3 valves shall only be designed for pressure-temperature limitations.

(1) Class 1 valves designed by analysis

If the VENDOR chooses to provide Class 1 valves designed by analysis, Tables 1 and 2 shall be referenced for

maximum allowable stresses when the valve is subject to the combined loadings referenced in item 2.

(2) Class 1 valves designed by standard or alternate design rules.

If the VENDOR chooses to provide Class 1 valves designed by standard or alternate design rules, Tables 3 and 4 shall be referenced for the maximum pressure rating limitations when the valve is subject to the combined loadings referenced in item 2.

(3) The VENDOR shall design the Class 2 & 3 valves subject to the maximum pressure rating limitations referenced in Tables 3 and 5 when the valve is subjected to the combined loadings referenced in item 2.

3. Assurance of Operability Certification for Active Valves:

a. In addition to compliance with the design limits specified above, the VENDOR shall provide assurance of operability verification and certification for the active valves under all plant loading combinations as defined in AEC Regulatory Guide 1.48. Method of test or analysis to verify operability shall consider the structural interaction of the entire assembly (valve and actuator). The assurance of operability may be verified by one of the following methods:

(1) Test

INFORMATION ONLY

(a) An individual valve, selected as a full or reduced scale prototype valve, may be tested in the shop, provided the test conditions imposed during the demonstration of valve opening and/or closing are equivalent to the combined plant conditions which the valve is expected to withstand at the time when the "active" function is required.

(b) An individual valve, selected as a full or reduced scale prototype valve, may be tested in the shop under test conditions which simulate separately each of the plant loadings which the valve is expected to withstand in combination during valve opening and/or closing.

Such a test program should be supplemented by analyses which demonstrate that the individual test loadings are sufficiently higher than the plant loadings, to provide adequate margins for assurance of operability under combined loading conditions. In addition, the analyses should demonstrate that the strains in critical component parts of the valve under individual test loadings are greater, by a substantial margin than those which the valve may experience under the combined plant loading conditions.

(2) Analysis

If the valve assembly including all accessories is designed and proven, either by test and/or an accepted analytic method, to have a fundamental frequency greater than 33 Hz, analysis is acceptable for assurance of operability. The assurance of operability shall be conducted with combined loads defined in item 2.

Although analysis as defined above is acceptable, testing is the preferred method for the following:

(a) Proof that the component's natural frequency is greater than 33 Hz.

(b) Assurance of operability reference item 1 above.

(3) Valves that can be demonstrated to be equivalent to a prototype valve, whic has successfully met the test requirements of a valve operability assurance program, may be exempted from testing provided:

(a) The test results of the prototype valve are documented and available, and

(b) The loading conditions for the exempted valve are equivalent or less severe to those imposed during testing of the prototype valve.

The prototype valve may be selected from a group of similar valves which will be used in the plant. A prototype valve used in one nuclear power plant qualifies as a prototype valve for another plant provided the system operating conditions of both plants, and the valve loading conditions at the time when the "active" function is required are equivalent.

b. The valve that has undergone assurance of operability testing shall subsequently be tested to demonstrate proper operation after the mechanical load testing by being actuated to the fully open and closed position 3 times without exceeding the specified operating force or normal actuating power of the valve actuators.

c. The VENDOR shall prepare proposed design bases describing the methods and procedures that are proposed to satisfy the requirements of operability of each valve under all design loading combinations. They shall include a description of any mathematical models, analysis, test procedures, etc. The proposed design bases shall be brief yet with sufficient information to define a design bases for each valve. These proposed design bases shall be submitted with the Proposal.

d. The VENDOR shall prepare and provide a final report supporting the assurance of operability and design requirements. This report shall contain all final analysis and test results that demonstrate valve operability under all loading conditions.

4. Pressure Retaining Integrity for Non-Active Valves

a. Proof of compliance for pressure retention integrity shall be established for the valves subject to the combined loadings referenced. Analysis is acceptable to establish design pressure retention integrity. The analysis is to be independently reviewed and a detailed analytic report documented for the OWNER'S review, comment and file retention.

b. If a similar analysis has been previously completed for an identical valve, the previous analysis will be acceptable provided:

(1) Results are documented and available for review.

(2) The combined loads for the previous valves wer equal or greater than those specified in this specification.

c. The VENDOR shall prepare proposed design bases describing the methods and procedures that are proposed to satisfy the requirements of pressure retaining integrity of each valve under all Combined Loads. They shall include a description of any mathematical models, analysis, test procedures, etc. The proposed design basis shall be submitted with the Proposal.

Active Class I Valves Designed by Analysis

Table 1

Load Combinations and Allowable Stress Limits:

Load Combination	Stress Limits for Pressure Retaining Components
a. Normal	$P_m + P_b + Q \leq 3.0\ Sm$ (1) $P_e \leq 3.0\ Sm$ $P_m + P_b + P_e + Q + F \leq Sa$
b. Upset	$P_m + P_b + Q \leq 3.0\ Sm$ $P_e \leq 3.0\ Sm$ $P_m + P_b + P_e + Q + F \leq Sa$
c. Emergency	$P_m + P_b + Q \leq 3.0\ Sm$ $P_e \leq 3.0\ Sm$ $P_m + P_b + P_e + Q + F \leq Sa$
d. Faulted	$P_m + P_b + P_e + Q \leq 3.0\ Sm$ $P_e \leq 3.0\ Sm$ $P_m + P_B + P_e + Q + F \leq Sa$

Stress Limits per ASME III subarticle NB 3222, 3223, 3224, 3225.

NOTES: (1) P_m = Primary general membrane stress (can be interchanged with P_L = primary local membrane stress)
P_b = Primary bending stress
P_e = Secondary expansion stress
Q = Secondary membrane plus bending stress
F = Peak stress
Sm = Stress intensity
Sa = Alternating stress due to fatigue

Non-Active Class I Valves Designed by Analysis

Table 2

Load Combinations and Allowable Stress Limits:

Load Combination	Stress Limits for Pressure Retaining Components
a. Normal	$P_m + P_b + P_e + Q \leq Sm$ (1) $P_e \leq 3.0\ Sm$ $P_m + P_b + P_e + Q + F \leq Sa$
b. Upset	$P_m + P_b + P_e + Q \leq 3.0\ Sm$ $P_e \leq 3.0\ Sm$ $P_m + P_b + P_e + Q + F \leq Sa$
c. Emergency	$P_m \leq 1.2\ Sm$ $P_L \leq 1.8\ Sm = 1.5\ Sy$ $P_L + P_B \leq 1.8\ Sm = 1.5\ Sy$
d. Faulted	Limits per Section NB-3225

Stress Limits per ASME III, subarticle NB-3222, 3223, 3224, 3225.

NOTES: (1) P_m = Primary general membrane stress (can be interchanged with P_L = primary local membrane stress)
P_b = Primary bending stress
P_e = Secondary expansion stress
Q = Secondary membrane plus bending stress
F = Peak stress
Sm = Stress intensity
Sa = Alternating stress due to fatigue
Sy = yield stress

Active Class I Valves Designed by Standard or Alternate Design Rules and Active Class II and III Valves

Table 3

Load Combinations and Allowable Stress Limits:

Load Combination		Pressure Rating Limitation	
a.	Normal	Valve Pressure/Temperature $\leq$ Pr	(1)
b.	Upset	Valve Pressure/Temperature $\leq$ Pr	
c.	Emergency	Valve Pressure/Temperature $\leq$ Pr	
d.	Faulted	Valve Pressure/Temperature $\leq$ Pr	

Stress Limits per US/AEC Regulatory Guide 1.48

NOTES: (1) Pr = The primary pressure rating corresponding to the maximum transient temperature for each plant condition as specified in Section III of the ASME B&PV Code, Tables NB-3531-1 to NB-3531-7, for Code Class I valves or as specified in NC-3511 and ND-3511 for Code Class II and III valves, respectively.

Non-Active Class I Valves Designed by Standard or Alternate Design Rules

Table 4

Load Combinations and Allowable Stress Limits:

Load Combination	Pressure Rating Limitation	
a. Normal	Valve Pressure/Temperature $\leq$ 1.10 Pr	(1)
b. Upset	Valve Pressure/Temperature $\leq$ 1.10 Pr	
c. Emergency	Valve Pressure/Temperature $\leq$ 1.20 Pr	
d. Faulted	Valve Pressure/Temperature $\leq$ 1.50 Pr	

Stress Limits per US/AEC Regulatory Guide 1.48

NOTES: (1) Pr = The primary pressure rating corresponding to the maximum transient temperature for each plant condition as specified in Section III of the ASME Boiler and Pressure Vessel Code, Tables NB-3531-1 to NB-3531-7, for Code Class I valves.

Non-Active Class II & III Valves

Table 5

Load Combinations and Allowable Stress Limits:

Load Combinations		Pressure Rating Limitation	
a.	Normal	Valve Pressure/Temperature $\leq$ 1.10 Pr	(1)
b.	Upset	Valve Pressure/Temperature $\leq$ 1.10 Pr	
c.	Emergency	Valve Pressure/Temperature $\leq$ 1.10 Pr	
d.	Faulted	Valve Pressure/Temperature $\leq$ 1.20 Pr	

Stress Limits per US/AEC Regulatory Guide 1.48

NOTES: (1) Pr = The primary pressure rating corresponding to the maximum transient temperature for each plant condition as specified in Section III of the ASME B&PV Code, NC-3511, and ND-3511 for Code Class II and III valves, respectively.