A revision log is required to assure revision control of the quality system manual. The log should contain sufficient space for date, description and section of revision, company approval, and National Board acceptance.

c) **Contents Page**

The contents page should list and reference, by paragraph and page number, the subjects and exhibits contained therein.

d) **Statement of Authority and Responsibility**

A statement of authority and responsibility shall be dated and signed by an officer of the company. It shall include:

1) A statement that the "VR" stamp shall be applied only to pressure relief valves that meet both of the following conditions:

a. Are stamped with an ASME "V", "UV", or "NV" Code symbol or marked with an ASME "HV" symbol and have been capacity certified by the National Board; and

b. Have been disassembled, inspected, and repaired by the Certificate Holder such that the valves' condition and performance are equivalent to the standards for new valves.

2) The title of the individual responsible to ensure that the quality system is followed and who has authority and freedom to effect the responsibility;

3) A statement that if there is a disagreement in the implementation of the written quality system, the matter is to be referred to a higher authority in the company for resolution; and

4) The title of the individual authorized to approve revisions to the written quality system and the method by which such revisions are to be submitted to the National Board for acceptance before implementation.

e) **Organization Chart**

A chart showing the relationship between management, purchasing, repairing, inspection, and quality control personnel is required and shall reflect the actual organization in place.

f) **Scope of Work**

1) The scope of work section shall indicate the scope and type of valve repairs, including conversions the organization is capable of

and intends to perform. The location of repairs (shop, shop and field, or field only), ASME Code Section(s) to which the repairs apply, the test medium (air, gas, liquid, or steam, or combinations thereof), and special processes (machining, welding, postweld heat treatment, or nondestructive examination, or combinations thereof) shall be specifically addressed.

2) The types and sizes of valves to be repaired, pressure ranges and other limitations, such as engineering and test facilities, should also be addressed.

g) **Drawings and Specification Control**

The drawings and specification control system shall provide procedures assuring that the latest applicable drawings, specifications, and instructions required are used for valve repair, including conversions, inspection, and testing.

h) **Material and Part Control**

The material and part control section shall describe purchasing, receiving, storage, and issuing of parts.

1) State the title of the individual responsible for the purchasing of all
material.

2) State the title of the individual responsible for certification and other records as required.

3) All incoming material and parts shall be checked for conformance with the purchase order and, where applicable, the material specifications or drawings. Indicate how material or part is identified and how identity is maintained by the quality system.

i) **Repair and Inspection Program**

The repair and inspection program section shall include reference to a document (such as a report, traveler, or checklist) that outlines the specific repair and inspection procedures used in the repair of pressure relief valves. Repair procedures shall require verification that the critical parts meet the valve manufacturer's specification. Supplement S7.14 outlines recommended procedures covering some specific items. Provisions shall be made to retain this document for a period of at least five years.

1) Each valve or group of valves shall be accompanied by the document referred to above for processing through the plant. Each valve shall have a unique identifier (i.e., repair serial number, shop order number, etc.) appearing on the repair documentation and repair nameplate such that traceability is established.

2) The document referred to above shall describe the original nameplate information, including the ASME Code symbol stamping and the repair nameplate information, if applicable. In addition, it shall include material checks, replacement parts, conversion parts (or both), reference to items such as the welding procedure specifications (WPS), fitup, NDE technique, heat treatment, and pressure test methods to be used. Application of the "VR" stamp to the repair nameplate shall be recorded in this document. Specific conversions performed with the new Type/Model number shall be recorded on the document. There shall be a space for "signoffs" at each operation to verify that each step has been properly performed.

3) The system shall include a method of controlling the repair or replacement of critical valve parts. The method of identifying each spring shall be indicated.

4) The system shall also describe the controls used to ensure that any personnel engaged in the repair of pressure relief valves are trained and qualified in accordance with Supplement S7.

j) **Welding, NDE, and Heat Treatment** (when applicable)

The quality system manual shall indicate the title of the person(s) responsible for and describe the system used in the selection, development, approval, and qualification of welding procedure specifications, and the qualification of welders and welding operators in accordance with the provisions of S7.

1) The quality system manual may include controls for the "VR" Certificate Holder to have the pressure relief valve part repaired by a National Board "R" Certificate Holder, per Supplement S7.

2) The completed Form R-1 shall be noted on and attached to the "VR" Certificate Holder's document required in 1.7.4.5(i). Similarly, NDE and heat treatment techniques must be covered in the quality system manual. When outside services are used for NDE and heat treatment, the quality system manual shall describe the system whereby the use of such services meet the requirements of the applicable section of the ASME Code.

k) **Valve Testing, Setting, and Sealing**

The system shall include provisions that each valve shall be tested, set, and all external adjustments sealed according to the requirements of the applicable ASME Code Section and the National Board. The seal shall identify the "VR" Certificate Holder making the repair. Abbreviations or initials shall be permitted, provided such identification is acceptable to the National Board.

l) **Valve Repair Nameplates**

An effective valve stamping system shall be established to ensure proper stamping of each valve as required by 5.9.2. The manual shall include a description of the nameplate or a drawing.

m) **Calibration**

1) The manual shall describe a system for the calibration of examination, measuring, and test equipment used in the performance of repairs. Documentation of these calibrations shall include the standard used and the results.

2) All calibration standards shall be calibrated against certified equipment having known valid relationships to nationally recognized standards.

n) **Manual Control**

The quality system shall include:

1) Measures to control the issuance of and revisions to the quality system manual;

2) Provisions for a review of the system in order to maintain the manual current with these rules and the applicable sections of the ASME Code;
3) The title(s) of the individual(s) responsible for control, revisions, and review of the manual;

4) Provision of a controlled copy of the written quality system manual to be submitted to the National Board; and
5) Revisions shall be submitted for acceptance by the National Board prior to being implemented.

o) **Nonconformities**

The system shall establish measures for the identification, documentation, evaluation, segregation, and disposition of nonconformities. A nonconformity is a condition of any material, item, product, or process in which one or more characteristics do not conform to the established requirements. These may include, but are not limited to, data discrepancies, procedural and/or documentation deficiencies, or material defects. Also, the title(s) of the individual(s) involved in this process shall be included.

p) **Exhibits**

Forms used in the quality system shall be included in the manual with a written description. Forms exhibited should be marked SAMPLE and completed in a manner typical of actual valve repair procedures.

q) **Testing Equipment (See Supplement 8)**

The system shall include a means to control the development, addition, or modification of testing equipment to ensure the requirements of 4.5.1(b) are met.

r) Field Repairs (See Supplement S7.7)

If field repairs are included in the scope of work, the system shall address any differences or additions to the quality system required to properly control this activity, including the following:

1) Provisions for annual audits of field activities shall be included;

2) Provisions for receipt and inspection of replacement parts, including parts received from the owner-user, shall be addressed;

3) If owner-user personnel will assist with repairs, provisions for the use of owner-user personnel shall be included; and

4) Provisions for use of owner-user measurement and test equipment, if applicable, shall be addressed.

1.8 "NR" ACCREDITATION REQUIREMENTS

1.8.1 SCOPE

a) ~~This section provides~~ The requirements ~~that must~~ to be met for an organization to obtain a National Board Certificate of Authorization to use the "NR" Symbol Stamp for the Repair/Replacement activities performed in accordance with this Part and ASME Section XI requirements.

b) The issuance of the "NR" stamp is not restricted to organizations whose primary business is to perform repair/replacement activities or to manufacturers or assemblers that hold an ASME "N"-type Code symbol stamp. Owners and users of nuclear components and other organizations that qualify in accordance with these rules may also obtain the "NR" stamp may be obtained from the National Board.

~~1.8.2 PREREQUISITES FOR ISSUING A NATIONAL BOARD "NR" CERTIFICATE OF AUTHORIZATION~~

~~Before an organization can obtain a National Board "NR" Certificate of Authorization, the organization shall:~~

~~a) Have and maintain an inspection agreement with an accredited Nuclear Inspection Agency in accordance with NB-360[4], NB-369[5], and ASME Section XI;~~

~~b) Have in the English language a written Quality System Program that complies with the requirements of this Section and addresses controls for the intended scope of activities;~~

~~c) Have a current edition and addenda of the NBIC, all parts; and~~
~~d) Have available copies of the original code of construction appropriate to the intended scope of work and the applicable edition and addenda of ASME Section XI, as required by the regulatory authority.[6]~~

~~1.8.3 PROCEDURES FOR OBTAINING OR RENEWING A NATIONAL BOARD "NR" CERTIFICATE OF AUTHORIZATION~~

~~a) Prior to issuance or renewal of a National Board "NR" Certificate of Authorization, the organization and its facilities are subject to a review of its Quality System Program. The implementation of the Quality System Program shall be satisfactorily demonstrated by the organization. Demonstration of implementation shall meet the most stringent code requirements for the scope of work to be performed by the organization. The National Board reserves the absolute right to cancel, refuse to issue,~~

1.8.2 ~~1.8.4~~ NATIONAL BOARD "NR" SYMBOL STAMP

a) All "NR" Symbol Stamps shall be obtained from the National Board of Boiler and Pressure Vessel Inspectors. Authorization to use the "NR" Symbol Stamp may be granted by the National Board at its absolute discretion.

~~b) The National Board, for a nominal fee, furnishes the "NR" Symbol Stamp. Each organization shall agree, if authorized to use the "NR" Symbol Stamp, that the "NR" Symbol Stamp is at all times the property of the National Board and will be promptly returned upon demand. If the organization discontinues the use of the "NR" Symbol Stamp or if the Certificate of Authorization has expired and no new Certificate of Authorization has been issued, the "NR" Symbol Stamp shall be returned to the National Board.~~

~~c) The organization's Quality System Program shall provide for adequate control of the "NR" Symbol Stamp.~~

~~d) The organization authorized to use the "NR" Symbol Stamp may obtain more than one "NR" Symbol Stamp provided the organization's Quality System Program describes how the use of such stamps are controlled from the location shown on the "NR" Certificate of Authorization.~~

b) ~~e)~~ The organization shall not permit other organizations to use the "NR" Symbol Stamp loaned to it by the National Board.

1.8.3 ~~1.8.5~~ QUALITY SYSTEM PROGRAM

A holder of a National Board Certificate of
Authorization shall have and maintain a written Quality System Program. The system shall satisfactorily meet the requirements of the NBIC, jurisdictional requirements, and shall be available for review. The Quality System Program may be brief or voluminous, depending on the circumstances. It shall be treated confidentially by the National Board.

1.8.3.1 ~~1.8.5.1~~ OUTLINE OF REQUIREMENTS FOR A QUALITY SYSTEM PROGRAM FOR QUALIFICATION FOR THE NATIONAL BOARD "NR" SYMBOL STAMP

These rules set forth the requirements for planning, managing, and implementing the organization's Quality System Programs for controlling the quality of activities performed during repair/replacement activities of components and systems in nuclear power plants within the scope of the applicable edition and addenda of Section XI of the ASME Code. These

rules are to be the basis for evaluating such programs prior to the issuance of the National Board "NR" Certificate of Authorization.

a) **Organization**

1) The authority and responsibility of those in charge of the Quality System Program and activities affecting quality shall be clearly established and documented. The person and organization performing Quality System functions shall have sufficient and well-defined responsibility, authority, and organizational freedom to:

a. Identify quality problems;

b. Initiate action which results in solutions;

c. Verify implementation of solutions to those problems; and

d. Control further processing, delivery or installation of a nonconforming item, deficiency or unsatisfactory condition until proper disposition has been made.

2) The person and organization responsible for defining and for measuring the overall effectiveness of the Quality System Program shall be designated sufficiently independent from the pressure of production, have direct access to responsible management at a level where appropriate action can be required and report regularly on the effectiveness of the program. Assurance of quality requires management measures which provide that the individual or group assigned the responsibility of inspection, testing, checking, or otherwise verifying that an activity has been correctly performed, is independent of the individual or group directly responsible for performing the specific activity. The specific responsibilities of the Quality Assurance organization of the "NR" Certificate Holder shall include the review of written procedures and monitoring of all activities concerned with the Quality System Program as covered in these rules.

b) **Quality System Program**

1) Before becoming a holder of an "NR" Certificate of Authorization, the applicant shall establish a Quality System Program for the control of the quality of work to be performed. The program shall define the organizational structure within which the Quality System Program is to be implemented and shall clearly delineate the responsibilities, levels of authority, and lines of communication for the various individuals involved. The program shall be documented in detail in a Quality System Manual that shall be a major basis for

demonstration of compliance with the NBIC. The applicant's Quality System Program shall be documented by written policies, procedures, and instructions and shall be based on the organization's scope of work to be performed.

2) The applicant's program need not be in the same format or sequential arrangement as the requirements in these rules as long as all applicable program requirements have been covered. The program shall provide for the accomplishment of activities affecting quality under suitably controlled conditions. Controlled conditions include the use of appropriate equipment, suitable environmental conditions for accomplishing the activity and assurance that prerequisites for the activity have been satisfied. The program shall take into account the need for special controls, processes, test equipment, tools, and skills to attain the required quality and need for the verification of quality by inspection and test. The program shall provide for ready detection of nonconforming material and items and for timely and positive corrective actions.

3) The program shall provide for indoctrination and training of personnel performing activities affecting quality as necessary to assure that suitable proficiency is achieved and maintained. It shall be the responsibility of the "NR" Certificate Holder to ensure that all personnel performing quality functions within the scope of these rules, including personnel of subcontracted services, are qualified as specified in these rules. The assignment of qualified personnel shall be at the discretion of the "NR" certificate holder.

4) The "NR" Certificate Holder shall be responsible for advising his Authorized Nuclear Inspection Agency of any proposed changes to the Quality System Manual and shall have acceptance of the Authorized Nuclear Inspection Agency's Authorized Nuclear Inspector Supervisor before putting such changes into effect. The "NR" Certificate Holder shall make a current copy of the Quality System Manual available to the Authorized Nuclear Inspector. The "NR" Certificate Holder shall be responsible for promptly notifying the Authorized Nuclear Inspector of such accepted changes, including evidence of acceptance by the Authorized Nuclear Inspection Agency.

5) The quality of all repair/replacement activities shall be controlled at all points necessary to ensure conformance with the requirements of these rules and the "NR" Certificate Holder's Quality System Manual.

6) The Certificate Holder shall make available to the Authorized Nuclear Inspector such drawings and process sheets as are necessary to make the Quality System Program intelligible.

c) **Design Control**

1) ASME Section XI establishes that the owner is responsible for design in connection with repair/replacement activities. The "NR" Certificate Holder must ensure that the design specification, drawings, or other specifications or instructions furnished by the owner satisfy the code edition and addenda of the owner's design specification. To satisfy this requirement, the "NR" Certificate Holder shall establish requirements that correctly incorporate the owner's design specification requirements into their specifications, drawings, procedures, and instructions, which may be necessary to carry out the work. The "NR" Certificate Holder's system shall include provisions to ensure that the appropriate quality standards are specified and included in all quality records. These records shall be reviewed for compliance with the owner's design specification and the requirements of Section XI of the ASME Boiler and Pressure Vessel Code.

2) If the "NR" Certificate Holder's specifications, drawings, procedures, and instructions conflict with the owner's design specification, a system must be implemented that will resolve or eliminate the deficiency. This system must be reconciled with the owner and the "NR" Certificate Holder in accordance with IWA-4000 of Section XI of the ASME Code.

d) **Procurement Document Control**

Documents for procurement of materials, items, and subcontracted services shall include requirements to the extent necessary to ensure their compliance with the owner's design specifications and IWA-4000 of Section XI of the ASME Code. To the extent necessary, procurement documents shall require suppliers to maintain a Quality System Program consistent with the applicable requirements of the edition and addenda of the code of construction to which the items are constructed. Measures shall be established

to ensure that all purchased material, items, and services conform to these requirements.

e) **Instructions, Procedures and Drawings**

Activities affecting quality shall be prescribed by documented instructions, procedures or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative and qualitative criteria for determining that activities affecting quality have been satisfactorily accomplished. The "NR" Certificate Holder shall maintain a written description of procedures, instructions, or drawings used by his organization for control of quality and examination requirements detailing the implementation of the Quality System requirements. Copies of these procedures shall be readily available to the Authorized Nuclear Inspector.

f) **Document Control**

The program shall include measures to control the issuance, use, and disposition of documents, such as specifications, instructions, procedures, and drawings, including changes thereto. These measures shall ensure that the latest applicable documents, including changes, are reviewed for adequacy and approved for release by authorized personnel and distributed for use at the location where the prescribed activity is performed.

g) **Control of Purchased Material, Items, and Services**

Measures shall be established to ensure that all purchased material, items, and services conform to the requirements of the owner's design specifications and applicable edition and addenda of the code of construction and Section XI of the ASME Code. These measures shall include identification for material traceability. Provisions shall be identified for source evaluation and objective evidence shall be provided evidencing quality standards for material examination upon receipt.

h) **Identification and Control of Material and Items**

1) Measures shall be established for identification and control of material and items, including partially fabricated assemblies. These measures shall ensure that identification is maintained and traceable, either on the material or component, or on records throughout the repair/replacement activity. These measures shall be designed to prevent the

use of incorrect or defective items and those which have not received the required examinations, tests, or inspections.
2) Permanent or temporary unit identification marks shall be applied using methods and materials that are legible and not detrimental to the component or system involved. Such identification shall be located in areas that will not interfere with the function or quality aspects of the item.

3) Certified Material Test Reports shall be identified as required by the applicable material specification in Section II of the ASME Code and shall satisfy any additional requirements specified in the original code of construction. The Certified Material Test Report or Certificate of Compliance need not be duplicated for submission with compliance documents when a record of compliance and satisfactory reviews of the Certified Material Test Report and Certificates of Compliance is provided. Documents shall provide a record that the Certified Material Test Report and Certificates of Compliance have been received, reviewed, and found acceptable. When the "NR" Certificate Holder Scope authorizes the organization to perform examinations and tests in accordance with the original code of construction, the "NR" Certificate Holder shall certify compliance either on a Certified Material Test Report or Certificate of Conformance that the material satisfies the original code of construction requirements.

i) **Control of Processes**

1) The "NR" Certificate Holder shall operate under a controlled system such as process sheets, checklists, travelers, or equivalent procedures. Measures shall be established to assure that processes such as welding, nondestructive examination, and heat treating are controlled in accordance with the rules of the applicable section of the ASME Code and are accomplished by qualified personnel using qualified procedures.

2) Process sheets, checklists, travelers, or equivalent documentation shall be prepared, including the document numbers and revisions to which the process conforms with space provided for reporting results of completion of specific operations at checkpoints of repair/replacement activities.

j) **Examinations, Tests and Inspections**

1) In-process and final examinations and tests shall be established to assure conformance with specifications, drawings, instructions, and procedures which incorporate or reference the requirements and acceptance limits contained in applicable design documents. Examination activities to verify the quality of work shall be performed by persons other than those who performed the activity being examined. Such persons shall not report directly to the immediate supervisors responsible for the work being examined.

2) Process sheets, travelers, or checklists shall be prepared, including the document numbers and revision to which the examination or test is to be performed, with space provided for recording results.

3) Mandatory hold/inspection points at which witnessing is required by the "NR" Certificate Holder's representative or the Authorized Nuclear Inspector shall be indicated in the controlling documents. Work shall not proceed beyond mandatory hold/inspection points without the consent of the "NR" Certificate Holder's representative or the Authorized Nuclear Inspector, as appropriate.

k) **Test Control**

1) Testing shall be performed in accordance with the owner's written test procedures that incorporate or reference the requirements and acceptance limits contained in applicable design documents.

2) Test procedures shall include provisions for assuring that prerequisites for the given test have been met, that adequate instrumentation is available and used, and that necessary monitoring is performed. Prerequisites may include calibrated instrumentation, appropriate equipment, trained personnel, condition of test equipment and the item to be tested, suitable environmental conditions, and provisions for data acquisition.

3) Test results shall be documented and evaluated to assure that test requirements have been satisfied.

l) **Control of Measuring and Test Equipment**

Measures shall be established and documented to assure that tools, gages,

instruments, and other measuring and testing equipment and devices used in activities affecting quality are of the proper range, type, and accuracy to verify conformance to established requirements. A procedure shall be in effect to assure that they are calibrated and properly adjusted at specified periods or use intervals to maintain accuracy within specified limits. Calibration shall be traceable to known national standards, where these standards exist, or with the device manufacturer's recommendation.
m) Quality Records

1) The owner is responsible for designating records to be maintained. Measures shall be established for the "NR" Certificate Holder to maintain these records [See 1.8.5.1(m)(2)] required for Quality Assurance of repair/replacement activities. These shall include documents such as records of materials, manufacturing, examination, and test data taken before and during repair/replacement activity. Procedures, specifications, and drawings used shall be fully identified by pertinent material or item identification numbers, revision numbers, and issue dates. The records shall also include related data such as qualification of personnel, procedures, equipment, and related repairs. The "NR" Certificate Holder shall take such steps as may be required to provide suitable protection from deterioration and damage for all records while in his care. Also, it is required that the "NR" Certificate Holder have a system for correction or amending records that satisfies the owner's requirements. These records may be either the original or a reproduced, legible copy and shall be transferred to the owner at his request.

2) Records to be maintained as required in 1.8.5.1(m)(1) above may include the following:

a. An index that details the location and who is responsible for maintaining the records;

b. Data reports, properly executed, for each replacement component, part, appurtenance, piping system, and piping
assembly, when required by the design specification or the owner;

c. The required as-constructed drawings certified as to correctness;

d. Copies of applicable Certified Material Test Reports and Certificates of Compliance;

e. As-built sketch(es) including tabulations of materials repair/replacement procedures, and instructions to achieve compliance with Section XI of the ASME Code;

f. Nondestructive examination reports including results of examinations shall identify the ASNT, SNT-TC-1A, CP-189, or ACCP level of personnel interpreting the examination results. The ASNT Central Certification Program (ACCP) may be used to fulfill the examination and demonstration requirement of the employer's written practice. Final radiographs shall be included where radiography has been performed;

g. Records of all heat treatments may be either the heat treatment charts or a summary description of heat treatment time and temperature data certified by the "NR" Certificate Holder. Heat treatments performed by the material manufacturer to satisfy requirements of the material specifications may be reported on the Certified Material Test Report; or

h. Any and all nonconformance reports shall satisfy IWA-4000 of Section XI of the ASME Code and shall be reconciled by the owner
prior to certification of the Form NR-1 or NVR-1, as applicable.

3) After a repair/replacement activity, all records including audit reports required to verify compliance with the applicable engineering documents and the "NR" Certificate Holder's Quality System Program, except those required by the owner or listed in 1.8.5.1(m)(2)(a) thru (g) above, shall be maintained at a place mutually agreed upon by the owner and the "NR" Certificate Holder. These records shall be maintained for a period of five years after completion of the repair/replacement activity.

4) The original of the completed Form NR-1 or Form NVR-1, as applicable, shall be registered with the National Board and, if required, a copy forwarded to the Jurisdiction where the nuclear power plant is located.

n) **Examination or Test Status**

Measures shall be established to indicate examination and test status of parts, items, or components during the repair/replacement activity. The system used shall provide positive identification of the part, item, or component by means of stamps, labels, routing cards, or other acceptable methods. The system shall include any procedures or instructions to achieve compliance. Also, measures shall be provided for the identification of acceptable and unacceptable items. They shall also include procedures for control of status indicators, including the authority for application and removal of status indicators.

o) **Nonconforming Materials or Items**

Measures shall be established to control materials or items that do not conform to requirements in order to prevent their inadvertent use, including measures to identify and control the proper installation of items and to preclude nonconformance with the requirements of these rules. These measures shall include procedures for identification, documentation, segregation, and disposition. Nonconforming items shall be reviewed for acceptance, rejection, or repair in accordance with documented procedures. The responsibility and authority for the disposition of nonconforming items shall be defined. Repaired or modified items shall be re-examined in accordance with the applicable procedures. Measures that control further processing of a nonconforming or defective item, pending a decision on its disposition, shall be established and maintained. Ultimate disposition of nonconforming items shall be documented.

p) **Corrective Action**

1) Measures shall be established to ensure that conditions adverse to quality such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and other nonconformances are promptly identified and corrected.

2) In the case of significant conditions adverse to quality, the measures shall also ensure that the cause of these conditions be determined and corrected to preclude repetition. The identification of significant conditions adverse to quality, the cause, and condition and the corrective action taken shall be documented and reported to the appropriate levels of management.

3) The requirements shall also extend to the performance of subcontractors' corrective action measures.

q) **Audits**

A comprehensive system of planned and periodic audits shall be carried out by the "NR" Certificate Holder's organization to ensure compliance with the Quality System Program and to determine its effectiveness. Audits shall be performed in accordance with written procedures or checklists by personnel not having direct responsibilities in the areas being audited. Audit results shall be documented by the auditing personnel for review by management having responsibility in that area. Follow-up action, including re-audit of deficient areas, shall be taken where indicated. Audit results shall be made available to the Authorized Nuclear Inspector.

r) **Authorized Nuclear Inspector**

Measures shall be taken to reference the commissioned Rules for National Board Authorized Nuclear Inspector, qualified in accordance with the Rules for National Board Inservice and New Construction Commisioned Inspectors, to ensure that the latest documents including the Quality System Program will be made available to the inspector. The Authorized Nuclear Inspector shall be consulted prior to the issuance of a repair/replacement program in order that the Inspector may select any inspection or hold points in the program. The Authorized Nuclear Inspector shall not sign Form NR-1 or Form NVR-1, as applicable, unless satisfied that all work carried out is in accordance with the NBIC, ASME Section XI, and any jurisdictional requirements.

s) **Exhibits**

Forms referenced in the Quality System Manual shall be explained in the text and included as part of the referencing document or as an appendix. Forms shall be controlled and identified to show the latest approved revision, exhibit name, and other corresponding references as stated in the Quality System manual.

1.8.6 INTERFACE WITH THE OWNER'S REPAIR/REPLACEMENT ~~PROGRAM~~

~~Interface with the owner's repair/replacement program shall meet the following:~~

~~a) The repair/replacement plan shall be subject to the acceptance of the Jurisdiction and the owner's Authorized Nuclear In-service Inspector (ANII).~~

b) Repair/replacement activities of nuclear components shall meet the requirements of Section XI of the ASME Boiler and Pressure Vessel Code and the Jurisdiction where the nuclear power plant is located.

c) Documentation of the repair/replacement activities of nuclear components shall be recorded on the National Board Report of Nuclear Repair/Modification or Replacement activities, Form NR-1, or Form NVR-1, as applicable. The completed forms shall be signed by a representative of the authorized nuclear repair organization and the Authorized Nuclear Inspector if the repair/replacement activity meets the requirements of ASME Section XI. For repair/replacement activities that involve design changes as specified in 1.8.5.1(c), Form NR-1, or Form NVR-1, as applicable, shall indicate the responsible organization satisfying the owner's design specification requirements.

d) The authorized nuclear repair organization shall provide a copy of the signed Form NR-1 or Form NVR-1, as applicable, to the owner, if required, the Jurisdiction, and the Authorized Nuclear Inspection Agency. The original Form NR-1 or Form NVR-1, as applicable, shall be registered with the National Board by the authorized nuclear repair organization.

e) The authorized nuclear repair organization shall provide a nameplate/stamping for repair/replacement activities for each nuclear component unless otherwise required by the Owner's Quality System Program. The required information and format shall be as shown in Section 5 of this Part.

1.8 "NR" ACCREDITATION REQUIREMENTS

1.8.1 SCOPE

a) The requirements to be met for an organization to obtain a National Board Certificate of Authorization to use the "NR" Symbol Stamp for the Repair/Replacement activities performed in accordance with this Part and ASME Section XI requirements.

b) The issuance of the "NR" stamp is not restricted to organizations whose primary business is to perform repair/replacement activities or to manufacturers or assemblers that hold an ASME "N"-type Code symbol stamp. Owners and users of nuclear components and other organizations that qualify in accordance with these rules may also obtain the "NR" stamp may be obtained from the National Board.

1.8.2 NATIONAL BOARD "NR" SYMBOL STAMP

a) All "NR" Symbol Stamps shall be obtained from the National Board of Boiler and Pressure Vessel Inspectors. Authorization to use the "NR" Symbol Stamp may be granted by the National Board at its absolute discretion.

b) The organization shall not permit other organizations to use the "NR" Symbol Stamp loaned to it by the National Board.

1.8.3 QUALITY SYSTEM PROGRAM

A holder of a National Board Certificate of
Authorization shall have and maintain a written Quality System Program. The system shall satisfactorily meet the requirements of the NBIC, jurisdictional requirements, and shall be available for review. The Quality System Program may be brief or voluminous, depending on the circumstances. It shall be treated confidentially by the National Board.

1.8.3.1 OUTLINE OF REQUIREMENTS FOR A QUALITY SYSTEM PROGRAM FOR QUALIFICATION FOR THE NATIONAL BOARD "NR" SYMBOL STAMP

These rules set forth the requirements for planning, managing, and implementing the organization's Quality System Programs for controlling the quality of activities performed during repair/replacement activities of components and systems in nuclear power plants within the scope of the applicable edition and addenda of Section XI of the ASME Code. These rules are to be the basis for evaluating such programs prior to the issuance of the National Board "NR" Certificate of Authorization.

a) **Organization**

1) The authority and responsibility of those in charge of the Quality System Program and activities affecting quality shall be clearly established and documented. The person and organization performing Quality System functions shall have sufficient and well-defined responsibility, authority, and organizational freedom to:

a. Identify quality problems;

b. Initiate action which results in solutions;

c. Verify implementation of solutions to those problems; and

d. Control further processing, delivery or installation of a nonconforming item, deficiency or unsatisfactory condition until proper disposition has been made.

2) The person and organization responsible for defining and for measuring the overall effectiveness of the Quality System Program shall be designated sufficiently independent from the pressure of production, have direct access to responsible management at a level where appropriate action can be required and report regularly on the effectiveness of the program. Assurance of quality requires management measures which provide that the individual or group assigned the responsibility of inspection, testing, checking, or otherwise verifying that an activity has been correctly performed, is independent of the individual or group directly responsible for performing the specific activity. The specific responsibilities of the Quality Assurance organization of the "NR" Certificate Holder shall include the review of written procedures and monitoring of all activities concerned with the Quality System Program as covered in these rules.

b) **Quality System Program**

1) Before becoming a holder of an "NR" Certificate of Authorization, the applicant shall establish a Quality System Program for the control of the quality of work to be performed. The program shall define the organizational structure within which the Quality System Program is to be implemented and shall clearly delineate the responsibilities, levels of authority, and lines of communication for the various individuals involved. The program shall be documented in detail in a Quality System Manual that shall be a major basis for demonstration of compliance with the NBIC. The applicant's Quality System Program shall be documented by written policies,

procedures, and instructions and shall be based on the organization's scope of work to be performed.

2) The applicant's program need not be in the same format or sequential arrangement as the requirements in these rules as long as all applicable program requirements have been covered. The program shall provide for the accomplishment of activities affecting quality under suitably controlled conditions. Controlled conditions include the use of appropriate equipment, suitable environmental conditions for accomplishing the activity and assurance that prerequisites for the activity have been satisfied. The program shall take into account the need for special controls, processes, test equipment, tools, and skills to attain the required quality and need for the verification of quality by inspection and test. The program shall provide for ready detection of nonconforming material and items and for timely and positive corrective actions.

3) The program shall provide for indoctrination and training of personnel performing activities affecting quality as necessary to assure that suitable proficiency is achieved and maintained. It shall be the responsibility of the "NR" Certificate Holder to ensure that all personnel performing quality functions within the scope of these rules, including personnel of subcontracted services, are qualified as specified in these rules. The assignment of qualified personnel shall be at the discretion of the "NR" certificate holder.

4) The "NR" Certificate Holder shall be responsible for advising his Authorized Nuclear Inspection Agency of any proposed changes to the Quality System Manual and shall have acceptance of the Authorized Nuclear Inspection Agency's Authorized Nuclear Inspector Supervisor before putting such changes into effect. The "NR" Certificate Holder shall make a current copy of the Quality System Manual available to the Authorized Nuclear Inspector. The "NR" Certificate Holder shall be responsible for promptly notifying the Authorized Nuclear Inspector of such accepted changes, including evidence of acceptance by the Authorized Nuclear Inspection Agency.

5) The quality of all repair/replacement activities shall be controlled at all points necessary to ensure conformance

with the requirements of these rules and the "NR" Certificate Holder's Quality System Manual.

6) The Certificate Holder shall make available to the Authorized Nuclear Inspector such drawings and process sheets as are necessary to make the Quality System Program intelligible.

c) **Design Control**

1) ASME Section XI establishes that the owner is responsible for design in connection with repair/replacement activities. The "NR" Certificate Holder must ensure that the design specification, drawings, or other specifications or instructions furnished by the owner satisfy the code edition and addenda of the owner's design specification. To satisfy this requirement, the "NR" Certificate Holder shall establish requirements that correctly incorporate the owner's design specification requirements into their specifications, drawings, procedures, and instructions, which may be necessary to carry out the work. The "NR" Certificate Holder's system shall include provisions to ensure that the appropriate quality standards are specified and included in all quality records. These records shall be reviewed for compliance with the owner's design specification and the requirements of Section XI of the ASME Boiler and Pressure Vessel Code.

2) If the "NR" Certificate Holder's specifications, drawings, procedures, and instructions conflict with the owner's design specification, a system must be implemented that will resolve or eliminate the deficiency. This system must be reconciled with the owner and the "NR" Certificate Holder in accordance with IWA-4000 of Section XI of the ASME Code.

d) **Procurement Document Control**

Documents for procurement of materials, items, and subcontracted services shall include requirements to the extent necessary to ensure their compliance with the owner's design specifications and IWA-4000 of Section XI of the ASME Code. To the extent necessary, procurement documents shall require suppliers to maintain a Quality System Program consistent with the applicable requirements of the edition and addenda of the code of construction to which the items are constructed. Measures shall be established to ensure that all purchased material, items, and services conform to these requirements.

e) **Instructions, Procedures and Drawings**

Activities affecting quality shall be prescribed by documented instructions, procedures or drawings of a type appropriate to the circumstances and shall be accomplished in accordance with these instructions, procedures, or drawings. Instructions, procedures, or drawings shall include appropriate quantitative and qualitative criteria for determining that activities affecting quality have been satisfactorily accomplished. The "NR" Certificate Holder shall maintain a written description of procedures, instructions, or drawings used by his organization for control of quality and examination requirements detailing the implementation of the Quality System requirements. Copies of these procedures shall be readily available to the Authorized Nuclear Inspector.

f) **Document Control**

The program shall include measures to control the issuance, use, and disposition of documents, such as specifications, instructions, procedures, and drawings, including changes thereto. These measures shall ensure that the latest applicable documents, including changes, are reviewed for adequacy and approved for release by authorized personnel and distributed for use at the location where the prescribed activity is performed.

g) **Control of Purchased Material, Items, and Services**

Measures shall be established to ensure that all purchased material, items, and services conform to the requirements of the owner's design specifications and applicable edition and addenda of the code of construction and Section XI of the ASME Code. These measures shall include identification for material traceability. Provisions shall be identified for source evaluation and objective evidence shall be provided evidencing quality standards for material examination upon receipt.

h) **Identification and Control of Material and Items**

1) Measures shall be established for identification and control of material and items, including partially fabricated assemblies. These measures shall ensure that identification is maintained and traceable, either on the material or component, or on records throughout the repair/replacement activity. These measures shall be designed to prevent the use of incorrect or defective items and those which have not received the required examinations, tests, or inspections.

2) Permanent or temporary unit identification marks shall be applied using methods and materials that are legible and not detrimental to the component or system involved. Such identification shall be located in areas that will not interfere with the function or quality aspects of the item.

3) Certified Material Test Reports shall be identified as required by the applicable material specification in Section II of the ASME Code and shall satisfy any additional requirements specified in the original code of construction. The Certified Material Test Report or Certificate of Compliance need not be duplicated for submission with compliance documents when a record of compliance and satisfactory reviews of the Certified Material Test Report and Certificates of Compliance is provided. Documents shall provide a record that the Certified Material Test Report and Certificates of Compliance have been received, reviewed, and found acceptable. When the "NR" Certificate Holder Scope authorizes the organization to perform examinations and tests in accordance with the original code of construction, the "NR" Certificate Holder shall certify compliance either on a Certified Material Test Report or Certificate of Conformance that the material satisfies the original code of construction requirements.

i) **Control of Processes**

1) The "NR" Certificate Holder shall operate under a controlled system such as process sheets, checklists, travelers, or equivalent procedures. Measures shall be established to assure that processes such as welding, nondestructive examination, and heat treating are controlled in accordance with the rules of the applicable section of the ASME Code and are accomplished by qualified personnel using qualified procedures.

2) Process sheets, checklists, travelers, or equivalent documentation shall be prepared, including the document numbers and revisions to which the process conforms with space provided for reporting results of completion of specific operations at checkpoints of repair/replacement activities.

j) **Examinations, Tests and Inspections**

1) In-process and final examinations and tests shall be established to assure conformance with specifications,

drawings, instructions, and procedures which incorporate or reference the requirements and acceptance limits contained in applicable design documents. Examination activities to verify the quality of work shall be performed by persons other than those who performed the activity being examined. Such persons shall not report directly to the immediate supervisors responsible for the work being examined.

2) Process sheets, travelers, or checklists shall be prepared, including the document numbers and revision to which the examination or test is to be performed, with space provided for recording results.

3) Mandatory hold/inspection points at which witnessing is required by the "NR" Certificate Holder's representative or the Authorized Nuclear Inspector shall be indicated in the controlling documents. Work shall not proceed beyond mandatory hold/inspection points without the consent of the "NR" Certificate Holder's representative or the Authorized Nuclear Inspector, as appropriate.

k) **Test Control**

1) Testing shall be performed in accordance with the owner's written test procedures that incorporate or reference the requirements and acceptance limits contained in applicable design documents.

2) Test procedures shall include provisions for assuring that prerequisites for the given test have been met, that adequate instrumentation is available and used, and that necessary monitoring is performed. Prerequisites may include calibrated instrumentation, appropriate equipment, trained personnel, condition of test equipment and the item to be tested, suitable environmental conditions, and provisions for data acquisition.

3) Test results shall be documented and evaluated to assure that test requirements have been satisfied.

l) **Control of Measuring and Test Equipment**

Measures shall be established and documented to assure that tools, gages,
instruments, and other measuring and testing equipment and devices used in activities affecting quality are of the proper range,

type, and accuracy to verify conformance to established requirements. A procedure shall be in effect to assure that they are calibrated and properly adjusted at specified periods or use intervals to maintain accuracy within specified limits. Calibration shall be traceable to known national standards, where these standards exist, or with the device manufacturer's recommendation.
m) Quality Records

1) The owner is responsible for designating records to be maintained. Measures shall be established for the "NR" Certificate Holder to maintain these records [See 1.8.5.1(m)(2)] required for Quality Assurance of repair/replacement activities. These shall include documents such as records of materials, manufacturing, examination, and test data taken before and during repair/replacement activity. Procedures, specifications, and drawings used shall be fully identified by pertinent material or item identification numbers, revision numbers, and issue dates. The records shall also include related data such as qualification of personnel, procedures, equipment, and related repairs. The "NR" Certificate Holder shall take such steps as may be required to provide suitable protection from deterioration and damage for all records while in his care. Also, it is required that the "NR" Certificate Holder have a system for correction or amending records that satisfies the owner's requirements. These records may be either the original or a reproduced, legible copy and shall be transferred to the owner at his request.

2) Records to be maintained as required in 1.8.5.1(m)(1) above may include the following:

a. An index that details the location and who is responsible for maintaining the records;

b. Data reports, properly executed, for each replacement component, part, appurtenance, piping system, and piping
assembly, when required by the design specification or the owner;

c. The required as-constructed drawings certified as to correctness;

d. Copies of applicable Certified Material Test Reports and Certificates of Compliance;

e. As-built sketch(es) including tabulations of materials repair/replacement procedures, and instructions to achieve compliance with Section XI of the ASME Code;

f. Nondestructive examination reports including results of examinations shall identify the ASNT, SNT-TC-1A, CP-189, or ACCP level of personnel interpreting the examination results. The ASNT Central Certification Program (ACCP) may be used to fulfill the examination and demonstration requirement of the employer's written practice. Final radiographs shall be included where radiography has been performed;

g. Records of all heat treatments may be either the heat treatment charts or a summary description of heat treatment time and temperature data certified by the "NR" Certificate Holder. Heat treatments performed by the material manufacturer to satisfy requirements of the material specifications may be reported on the Certified Material Test Report; or

h. Any and all nonconformance reports shall satisfy IWA-4000 of Section XI of the ASME Code and shall be reconciled by the owner
prior to certification of the Form NR-1 or NVR-1, as applicable.

3) After a repair/replacement activity, all records including audit reports required to verify compliance with the applicable engineering documents and the "NR" Certificate Holder's Quality System Program, except those required by the owner or listed in 1.8.5.1(m)(2)(a) thru (g) above, shall be maintained at a place mutually agreed upon by the owner and the "NR" Certificate Holder. These records shall be maintained for a period of five years after completion of the repair/replacement activity.

4) The original of the completed Form NR-1 or Form NVR-1, as applicable, shall be registered with the National Board and, if required, a copy forwarded to the Jurisdiction where the nuclear power plant is located.

n) **Examination or Test Status**

Measures shall be established to indicate examination and test status of parts, items, or components during the repair/replacement activity. The system used shall provide positive identification of the part, item, or component by means of stamps, labels, routing cards, or other acceptable methods. The system shall include any procedures or instructions to achieve compliance. Also, measures shall be provided for the identification of acceptable and unacceptable items. They shall also include procedures for control of status indicators, including the authority for application and removal of status indicators.

o) **Nonconforming Materials or Items**

Measures shall be established to control materials or items that do not conform to requirements in order to prevent their inadvertent use, including measures to identify and control the proper installation of items and to preclude nonconformance with the requirements of these rules. These measures shall include procedures for identification, documentation, segregation, and disposition. Nonconforming items shall be reviewed for acceptance, rejection, or repair in accordance with documented procedures. The responsibility and authority for the disposition of nonconforming items shall be defined. Repaired or modified items shall be re-examined in accordance with the applicable procedures. Measures that control further processing of a nonconforming or defective item, pending a decision on its disposition, shall be established and maintained. Ultimate disposition of nonconforming items shall be documented.

p) **Corrective Action**

1) Measures shall be established to ensure that conditions adverse to quality such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and other nonconformances are promptly identified and corrected.

2) In the case of significant conditions adverse to quality, the measures shall also ensure that the cause of these conditions be determined and corrected to preclude repetition. The identification of significant conditions adverse to quality, the cause, and condition and the corrective action taken shall be documented and reported to the appropriate levels of management.

3) The requirements shall also extend to the performance of subcontractors' corrective action measures.

q) **Audits**

A comprehensive system of planned and periodic audits shall be carried out by the "NR" Certificate Holder's organization to ensure compliance with the Quality System Program and to determine its effectiveness. Audits shall be performed in accordance with written procedures or checklists by personnel not having direct responsibilities in the areas being audited. Audit results shall be documented by the auditing personnel for review by management having responsibility in that area. Follow-up action, including re-audit of deficient areas, shall be taken where indicated. Audit results shall be made available to the Authorized Nuclear Inspector.

r) **Authorized Nuclear Inspector**

Measures shall be taken to reference the commissioned Rules for National Board Authorized Nuclear Inspector, qualified in accordance with the Rules for National Board Inservice and New Construction Commisioned Inspectors, to ensure that the latest documents including the Quality System Program will be made available to the inspector. The Authorized Nuclear Inspector shall be consulted prior to the issuance of a repair/replacement program in order that the Inspector may select any inspection or hold points in the program. The Authorized Nuclear Inspector shall not sign Form NR-1 or Form NVR-1, as applicable, unless satisfied that all work carried out is in accordance with the NBIC, ASME Section XI, and any jurisdictional requirements.

s) **Exhibits**

Forms referenced in the Quality System Manual shall be explained in the text and included as part of the referencing document or as an appendix. Forms shall be controlled and identified to show the latest approved revision, exhibit name, and other corresponding references as stated in the Quality System manual.

1.5.1 ACCREDITATION PROCESS

a) The National Board administers accreditation programs for authorization of organizations performing repairs and alterations to pressure-retaining items and/or pressure relief valves.

b) Any organization may apply to the National Board to obtain a Certificate of Authorization for the requested scope of activities. A review shall be conducted to evaluate the organization's quality system. The individual assigned to conduct the evaluation shall meet the qualification requirements prescribed by the National Board. Upon completion of the evaluation, any deficiencies within the organization's quality system will be documented and a recommendation will be made to the National Board regarding issuance of a Certificate of Authorization.

c) As part of the accreditation process, an applicant's quality system is subject to a review. National Board procedures provide for the confidential review resulting in recommendations to issue or not issue a Certificate of Authorization.

d) When the quality system requirements of this Section have been met, a Certificate of Authorization and appropriate National Board symbol stamp shall be issued.

e) The accreditation programs provide requirements for organizations performing repairs and alterations to pressure-retaining items. Depending upon the expected scope of activities at the time of review, organizations may be authorized to perform design only, metallic or non-metallic repairs, and/or alterations either in the shop only, field only, or shop and field. Repairs and/or alterations to metallic and non-metallic pressure-retaining items are made by welding, bonding and/or mechanical assembly.

1.5.2 SCOPE ISSUANCE AND REVISION TO A QUALITY SYSTEM

a) Any scope revision shall require authorized inspection agency acceptance of quality system changes. These changes shall be submitted to the National Board for acceptance. A program review may be required by the National Board or the Jurisdiction to ensure quality system requirements are met for scope changes. Upon acceptance of the changes, the National Board will issue a Certificate of Authorization with a revised scope.

b) The "VR" accreditation program provides requirements for organizations performing repairs to pressure relief valves. For scope issuance and revisions, refer to 1.7.

1.6 ACCREDITATION OF "R" REPAIR ORGANIZATIONS

1.6.1 SCOPE

a) This section provides requirements that must be met by organizations in order to obtain a National Board Certificate of Authorization to use the "R" Symbol Stamp for the

repair or alteration of pressure-retaining items. Organizations may be authorized to perform repairs only, or repairs and alterations.

b) The issuance of the "R" Stamp is not restricted to organizations whose primary business is to repair and alter pressure-retaining items, nor to manufacturers of pressure-retaining items. Owners and Users of pressure-retaining items and other organizations that qualify in accordance with these rules may also obtain the "R" Stamp.

c) Owners or users may be accredited for both a repair and inspection program provided the owner or user complies with the requirements of the "R" program and the National Board requirements of NB 371 for an Owner-User Inspection Organization. The requirements of 1.6.2(a) do not apply if the owner or user chooses to use the Owner-User Inspection Organization to accept the repair quality system when:

1) There is no conflict with jurisdictional requirements.

2) The line of authority for the Owner-User Inspection Organization shall be independent of the organization responsible for execution of "R" program work.

3) The process and Inspector limitations are described in the written Owner-User Inspection Organization's quality system manual.

1.6.2 PREREQUISITES FOR ISSUING A NATIONAL BOARD CERTIFICATE OF AUTHORIZATION

Before an organization can obtain a National Board "R" Certificate of Authorization, the organization shall:

a) Have and maintain an Inspection Agreement with an Authorized Inspection Agency;

b) Have, in the English language, a written Quality System that complies with the requirements of this section and includes the expected scope of activities;

c) Have the current edition and addendum of the National Board Inspection Code, all parts; and

d) Have available a copy of the code of construction appropriate to the intended scope of work.

1.6.3 PROCEDURE FOR OBTAINING OR RENEWING A NATIONAL BOARD CERTIFICATE OF AUTHORIZATION

a) Prior to issuance or renewal of a National Board "R" Certificate of Authorization, the organization and its facilities are subject to a review of its Quality System. The implementation of the Quality System shall be satisfactorily demonstrated by the

organization. The National Board reserves the absolute right to cancel, refuse to issue, or renew such authorization.

b) Organizations desiring to renew or obtain a National Board Certificate of Authorization shall apply to the National Board using forms obtained from the National Board. Application for renewal shall be made prior to the expiration date of the Certificate of Authorization.

c) When an organization has plants or shops in more than one location, the organization shall submit separate applications for each plant or shop. The organization may perform repairs or alterations in its plants, shops, or in the field, provided such operations are described in the organization's Quality System.

d) Upon notification of the review dates from the National Board, it is the responsibility of the organization to make arrangements for the review.

e) The Review Team, as a minimum, shall consist of one representative each from the Authorized Inspection Agency and the Jurisdiction.[2]

f) The Review Team shall conduct an evaluation of the organization's Quality System. The organization shall demonstrate sufficient implementation of the Quality System to provide evidence of the organization's knowledge of welding, nondestructive examination, postweld heat treatment, and other repair or alteration activities performed appropriate for the requested scope of work. The demonstration may be performed using current work, a demonstration mock-up, or a combination of both.

g) A recommendation to issue, renew, or withhold the National Board Certificate of Authorization shall be included in a Review Report prepared by the Review Team. The completed Review Report shall be forwarded to the National Board.

h) If proper administrative fees are paid and all other requirements are met, a Certificate of Authorization will be issued evidencing permission to use the "R" Symbol Stamp. The certificate shall expire on the triennial anniversary date.

i) When an organization holding a National Board Certificate of Authorization changes ownership, name, location, or address, the National Board shall be notified. The Certificate of Authorization may be revised by submitting an application for National Board "R" Certificate of Authorization; however, a re-review may be required.

j) The holder of an ASME Code Symbol Stamp, whose facilities were reviewed (with the exception of "V," "UV," "HV," "NV," and "H" [cast iron]) may obtain National Board authorization without a review of its facilities, provided:

1) The organization has a Quality System to cover the scope of the repairs or alterations to be made, subject to review by the Jurisdiction; and

2) The application for the "R" Certificate of Authorization is submitted within 12 months from the issuance of the ASME Certificate of Authorization. The initial Certificate of Authorization shall be issued to expire concurrent with the ASME Certificate of Authorization. Subsequent certificates shall be renewed upon a successful review and implementation of its Quality System by a National Board Representative.

k) The Jurisdiction may audit the Quality System and activities of an organization upon a valid request from an owner, user, inspection agency, or the National Board.

l) The NBIC Committee may at any time change the rules for the issuance of Certificates of Authorization and use of the "R" Symbol Stamp. These rules shall become binding on all certificate holders.

1.6.4 NATIONAL BOARD "R" SYMBOL STAMP

a) All "R" Symbol Stamps shall be obtained from the National Board of Boiler and Pressure Vessel Inspectors. Authorization to use the "R" Symbol Stamp may be granted by the National Board at its absolute discretion.

b) The "R" Symbol Stamp is furnished on loan by the National Board for a nominal fee. Each organization shall agree if authorization to use the "R" Symbol Stamp is granted, that the "R" Symbol Stamp is at all times the property of the National Board and will be promptly returned upon demand. If the organization discontinues the use of the "R" Symbol Stamp, inspection agreement with an Authorized Inspection Agency, or if the Certificate of Authorization has expired and no new certificate has been issued, the "R" Symbol Stamp shall be returned to the National Board.

c) The organization's Quality System shall provide for adequate control of the "R" Symbol Stamp. Provisions may be made for the issuance of the "R" Symbol Stamp for use at various field locations.

d) The holder of a Certificate of Authorization may obtain more than one "R" Symbol Stamp provided the organization's Quality System describes how the use of such stamps is controlled from the location shown on the certificate.

e) An organization shall not permit others to use the "R" Symbol Stamp loaned to it by the National Board.

[2] Jurisdiction: The National Board member jurisdiction where the organization is located. Alternatively, where the Jurisdiction elects not to perform the review or where there is no Jurisdiction or where the Jurisdiction is the organization's Authorized Inspection Agency, the National Board of Boiler and Pressure Vessel Inspectors will represent the Jurisdiction. At the Jurisdiction's discretion, the Jurisdiction may choose to be a member of the review team if the Jurisdiction chooses not to be the team leader.

1.6.5 QUALITY SYSTEM

A holder of a National Board Certificate of Authorization shall have and maintain a written Quality System. The System shall satisfactorily meet the requirements of the NBIC and shall be available for review. The Quality System may be brief or voluminous, depending on the projected scope of work. It shall be treated confidentially by the National Board.

1.6.5.1 OUTLINE OF REQUIREMENTS FOR A QUALITY SYSTEM FOR QUALIFICATION FOR THE NATIONAL BOARD "R" CERTIFICATE OF AUTHORIZATION

The following is a guide for required features of a Quality System which shall be included in the organization's Quality System Manual. As a minimum, each organization shall address the required features relative to the scope of work to be performed. Organizations shall explain their intent, capability and applicability for each required feature outlined in this section. Work may be subcontracted provided controls are clearly defined for maintaining full responsibility for code compliance by the National Board repair organization certifying the work.

a) **Title Page**

The name and complete address of the company to which the National Board Certificate of Authorization is issued shall be included on the Title Page of the Quality System Manual.

b) **Contents Page**

The manual should contain a page listing the contents of the manual by subject, number (if applicable), and revision number of each document.

c) **Scope of Work**

The manual shall clearly indicate the scope and type of repairs or alterations the organization is capable of and intends to carry out.

d) **Statement of Authority and Responsibility**

A dated Statement of Authority, signed by an officer of the organization, shall be included in the manual. Further, the Statement of Authority shall include:

1) A statement that all repairs or alterations carried out by the organization shall meet the requirements of the NBIC and the Jurisdiction, as applicable.

2) A statement that if there is a disagreement in the implementation of the Quality

NB12-0801

Repairs and Alterations of Gasketed PHE's in the Field

By Mike Pischke

Introduction

This is intended to describe the current common industry practices of Plate Heat Exchanger (PHE) users regarding their operation, routine repairs and alterations. Because of the unique design of the PHE, the current ASME Pressure Vessel or NBIC Codes do not specifically address the design of PHE's, nor the potential alterations. The typical industries include, but not limited to the Power, Petrochemical, Maritime, HVAC, Bio-Pharmaceutical , and Food production.

Expansion and Contraction of Plate Packs

One of the primary benefits of the gasketed PHE is that the heating surface can be expanded or contracted in response to changes in fluid flow, process parameters, and/or ambient temperature variations. The plate packs are expanded or reduced due to the increase or decrease in heat transfer requirements, respectively. Also, because turbulence is necessary for effective heat transfer, the quantity of heat transfer plates are critical to ensure the proper flow rates and pressure drops during operation. This is adjusted by adding or subtracting the number of heat transfer plates. Users will often also add plates gradually as production demands are incrementally increased. This avoids the need for repeated and costly replacement of entire heat exchangers. They will also adjust the number based on seasonal temperature variations.

Code Implications: Although the Code does not specifically address the addition or removal of heat transfer plates, this has indirect Code implications. Adding or subtracting plates in no way affects the specific design parameters of Pressure and Temperature, but does change the volume of the heat exchanger and the heat transfer surface area. Unless someone counts every single plate in a PHE and compares it to the number listed on the Data Report, it would not be obvious that a change was made.

Gasket Replacement

The expected life of gaskets within a PHE plate pack may vary from one year to decades; based upon the gasket material selection, process fluid(s), operating parameters, and environmental conditions. Ideally, the gasket replacement coincides with the routine cleaning of the heat transfer plates. At this time, the entire plate pack is removed from the frame, the gaskets removed from the plates, then the plates are mechanically and/or chemically cleaned. The cleaned plates are then re-gasketed using new gaskets. Glued gaskets are typically removed using liquid nitrogen prior to cleaning. After re-gasketing, the plate pack is returned to the frame and typically hydrostatically or pneumatically tested at the MAWP.

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Code Implications: Although the ASME Code does not directly address gaskets or gasket materials, the practical operating parameters are typically limited by the gasket material. Maximum operating temperatures are determined by the degradation rate of the gasket material, and the MAWP set by an adjusted test pressure when the particular gasket-heat transfer plate combination will begin to leak.

Heat Transfer Plate Replacement

Under normal operating conditions, heat transfer plates should last for decades in service. Heat transfer plates typically need to be replaced due to deformation from opening and closing, corrosion, fatigue, and/or fouling. When being replaced, they may be replaced using plates from a different manufacturer and even a different material from the original Code stamped unit. For example, if the original plates were made from 0.4mm thick, 304 stainless steel and they corroded over time due to chloride attacks, the user may choose to replace the corroded plates with something more resistant. Perhaps they would replace these plates with 316L plates and even increase the thickness to 0.5mm. This is a common practice.

Another common practice is to have multiple, identical PHE's in a chemical production facility and rotate out spare plate packs as the glued gaskets break down and need to be replaced over time. Spare plate packs with glued gaskets are kept in stock at the facility, waiting to be swapped out with the plates in production. This allows the chemical company's maintenance personnel to swap out a plate pack during a brief shut down period. The removed plate pack is re-conditioned by cleaning, removing the gaskets and gluing on new gaskets. These plate packs now become the new spares. This allows them to re-use the heat transfer plates which are often made from expensive materials such as nickel alloys, or titanium.

Code Implications: Heat Transfer plates and laser welded cassettes are considered UG-11 "Standard Pressure Parts" per Interpretations VIII-1-89-236 and VIII-1-95-21. There is also an Interpretation (VIII-81-89R) that allows the heat transfer plates to be made from non-Code material. Beyond these Interpretations, there are no rules regarding the material of the heat transfer plates. Because the heat transfer plates are contained between the frame plates, the strength of the PHE relies on the bolts and frame plates and never the strength of the heat transfer plates.

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Subject:	Review Form R-2 and Instructions accepted by Main Committee Letter Ballot September 2010

NB-Item number:	Initiated by NB-staff ➡**NB12-1101**

Explanation of assignment needed:	Mr. Terry Parks initiated this item to revisit the configuration of the "as-published" Form R-2 after receiving numerous comments as to how the Form was to work within the industry as well as within the National Board. To that end, Mr. Parks proposed a TG-approach with N-BD staff to clarify the objectives of the Form R-2 and best use the time between January 2012 and January 2013 to develop or introduce any other changes prior to issuing the 2013-Edition. This assignment represents: ✓ • Affirm the direction of the Committee to portray the natural continuity of work flow, and as described in the book at 5.2.2 when preparing a Form R-2, emphasizing the need to complete the design certification and review PRIOR to the start of construction. ✓ • Enhance the scope of work description fields to better afford the completion of the Form R-2 outside of an electronic format. **No betterment Ø** • Affirm the perception of betterment in separating the form as sheet 1 and sheet 2 for the purpose of expediting communication & registration. ✓ • Interact with N-BD staff as a TG to understand the fallout of the noted tasks and to recognize any obstacles to overcome within the Natl. -BD's EDT-system. ✓ • Review the Instruction sheet developed by N-BD staff for inclusion into the Instructions for completing N-BD Forms @ 5.13.4.1.

Assigned to:	M. Webb, Ron Pulliam, Wayne Jones, Nikki Estep and Donna Radcliff (N-BD staff), Ben Schaefer, Bob Wielgoszinski

Background:	The Form R-2 as published in the 2011-Edition of NB-23 was published in error and does not reflect the accepted Form by MC-Letter Ballot in September 2010. See Ballot Archives, NB08-0304. The N-BD will use the "as-published" Form R-2 until the correction or other action is adopted for the 2013 code Edition.

Existing Text in '11-Edition **5.13.4.1 INSTRUCTIONS FOR COMPLETING NATIONAL BOARD FORM "R" REPORTS**	**Proposed Change #1** (Proposed changes are double-underlined) **5.13.4.1 INSTRUCTIONS: ITEM 2**	Rationale
5.13.4.1 INSTRUCTIONS FOR COMPLETING NATIONAL BOARD FORM "R" REPORTS 2. When registering a Form "R"-Report with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. When the "R"-Form is not to be registered, indicate so by "N/A". As described in 5.6, a log shall be maintained identifying sequentially, any "R"-forms registered with the National Board. For re-rating only, the Design Organization registers the R-2. Where physical work is also performed, the Construction Organization registers the R-2. →	2. When registering a Form "R"-Report with the National Board, this line is solely designated for a unique sequential number assigned by the "R" Certificate Holder. When the "R"-Form is not to be registered, indicate so by "N/A". As described in 5.6, a log shall be maintained identifying sequentially, any "R"-forms registered with the National Board. The requirements for registration can be found at Part 3, 5.5.2. Information is relocated to: ***5.5.2 b) REGISTRATION OF ALTERATIONS*** →	As instructions for line 2, the language specifically identifying registration requirements may be better profiled as a reference to the applicable section of the Code; Part 3, 5.5.2 a) - c). ***RELOCATED TO 5.5.2 b)- PROPOSED CHANGE 2*** -For re-rating only, the Design Organization registers the R-2. Where physical work is also performed, the Construction Organization registers the R-2.

Accepted Text NB-item: NB10-0701 **5.5.2 REGISTRATION FOR ALTERATIONS**	**Proposed Change #2** (Proposed changes are double-underlined) **5.5.2 REGISTRATION FOR ALTERATIONS**	Rationale
a) If the pressure retaining item is originally registered with the National Board, an original Form R-2, together with attachments, shall be registered with the National Board. *b)* If the item was not *originally* registered with the National Board, one original Form R-2 *meeting the requirements of the Code*, together with attachments *when the exact scope of work is not described,* may be registered with the National board or retained as required by *The Quality Manual System.* As shown the ***italicized script*** represents item NB10-0701 accepted by Main Committee **"b" is relocated as "d".**	a) No Change b) For re-rating or design-only where no physical work is performed, the Design Organization assigns a unique sequential number shown on the Form R-2; front and back, as instructed at 5.13.4.1 item 2 and when required, is responsible for registering the Form R-2 Report with the National Board. c) Where physical work is also performed, the Construction Organization assigns a unique sequential number shown on the Form R-2; front and back, as instructed at 5.13.4.1 item 2 and when required, is responsible for registering the Form R-2 Report with the National Board. d) If the item was not *originally* registered with the National Board, one original Form R-2 *meeting the requirements of the Code*, together with attachments *when the exact scope of work is not described,* may be registered with the National board or retained as required by *The Quality Manual System.*	The proposed relocation of information shown as "b" and "c" is from Instruction item #2. The subject matter @ 5.5.2 "REGISTRATION FOR ALTERATIONS" goes beyond an Instruction item for line 2 and describes Code-responsibilities of the Design and Construction organizations. The Task Group suggests it may be better suited as Code-text rather than as an instruction item.

Existing Text in '11-Edition **5.2.2 PREPARATION OF FORM R-2**	**Proposed Change #3** (Proposed changes are double-underlined)	Rationale
c) …The construction organization shall complete the Form R-2 provided by the design organization, including the "Construction Certification" section of the form. When no construction work is performed (e.g., a re-rating with no physical changes), the "R" Certificate Holder responsible for the design shall prepare the Form R-2, including the gathering and attaching of the supporting reports.	c) …The construction organization shall complete the Form R-2 provided by the design organization, including the "Construction Certification" section of the form. When no construction work is performed (e.g., a re-rating or design-only with no physical changes), the "R" Certificate Holder responsible for the design shall prepare the Form R-2, including the gathering and attaching of the supporting reports and other information pertaining to the work.	Adding design only merely represents consistency to the thought of limited scope throughout the section. The addition reflecting the reports and other information pertaining to the work. merely affirms instruction item-12 and instruction item-15 @ 5.13.4.1.

Accepted by MC by Letter Ballot, (NOT PUBLISHED) for '11-Edition- 2-Page, single side

Separated Form R-2- DESIGN REPORT- Sheet 1

FORM R-2 REPORT OF ALTERATION
in accordance with provisions of the *National Board Inspection Code*

DESIGN REPORT SHEET 1 OF 2

1. Design performed by _____ (name of "R" organization responsible for design) _____ (Form "R" Registration No.)
_____ (address) _____ (P.O. No., Job No., etc.)
2. Owner _____ (name)
_____ (address)
3. Location of installation _____ (name)
_____ (address)
4. Item identification _____ (boiler, pressure vessel, or piping) Name of original manufacturer _____
5. Identifying nos.: _____ (mfg. serial no.) _____ (National Board No.) _____ (jurisdiction no.) _____ (other) _____ (year built)
6. NBIC Edition / Addenda: _____ (edition) _____ (addenda)
Original Code of Construction for Item: _____ (name / section / division) _____ (edition / addenda)
Construction Code Used for Alteration Performed: _____ (name / section / division) _____ (edition / addenda)
7. Description of Design Scope: _____
(use supplemental sheet, Form R-4, if necessary) ☐ FORM R-4, REPORT SUPPLEMENTARY SHEET IS ATTACHED
_____
_____
_____
Pressure Test, if applied _____ psi MAWP _____ psi
8. Replacement Parts. Attached are Manufacturer's Partial Data Reports or Form R-3's properly completed for the following items of this report:
_____ (name of part, item number, data report type or Certificate of Compliance, mfg's. name and identifying stamp)
_____
_____
9. Remarks: _____
_____

DESIGN CERTIFICATION

I, _____ certify that to the best of my knowledge and belief the statements in this report are correct and that the Design Change described in this report conforms to the *National Board Inspection Code*.
National Board "R" Certificate of Authorization No. _____ expires on _____
Date _____ _____ (name of design organization) Signed _____ (authorized representative)

CERTIFICATE OF DESIGN CHANGE REVIEW

I, _____ holding a valid Commission issued by The National Board of Boiler and Pressure Vessel Inspectors and certificate of competency issued by the jurisdiction of _____ and employed by _____ of _____ have reviewed the design change as described in this report and state that to the best of my knowledge and belief such change complies with the applicable requirements of the *National Board Inspection Code*.
By signing this certificate, neither the undersigned nor my employer makes any warranty, expressed or implied, concerning the work described in this report. Furthermore, neither the undersigned nor my employer shall be liable in any manner for any personal injury, property damage or loss of any kind arising from or connected with this inspection.
Date _____ Signed _____ (inspector) Commissions _____ (National Board and jurisdiction no.)

Separated form R-2- CONSTRUCTION REPORT- Sheet 2

FORM R-2 REPORT OF ALTERATION
in accordance with provisions of the *National Board Inspection Code*

CONSTRUCTION REPORT SHEET 2 OF 2

1. Construction performed by _____ (name of "R" organization responsible for construction) _____ (Form "R" Registration No.)
_____ (address) _____ (P.O. No., Job No., etc.)
2. Owner _____ (name)
_____ (address)
3. Location of installation _____ (name)
_____ (address)
4. Item identification _____ (boiler, pressure vessel, or piping) Name of original manufacturer _____
5. Identifying nos.: _____ (mfg. serial no.) _____ (National Board No.) _____ (jurisdiction no.) _____ (other) _____ (year built)

CERTIFICATE of DESIGN _____ (Identify the design organization's Form "R" Registration No.) **, ACKNOWLEDGED by CONSTRUCTION OGANIZATION** (or referencing P.O., job, or tracking number if the Form "R" Report is not registered)
I, _____ acknowledge the provisions and requirements of design described on the DESIGN REPORT, sheet 1, and the design was introduced into the construction scope as required by the *National Board Inspection Code*.
Date _____ _____ (name of construction organization) Signed _____ (authorized representative)

7. Description of Construction Scope: _____
(use supplemental sheet, Form R-4, if necessary) ☐ FORM R-4, REPORT SUPPLEMENTARY SHEET IS ATTACHED
_____
_____
_____
Pressure Test, if applied _____ psi MAWP _____ psi
8. Replacement Parts. Attached are Manufacturer's Partial Data Reports or Form R-3's properly completed for the following items of this report:
_____ (name of part, item number, data report type or Certificate of Compliance, mfg's. name and identifying stamp)
_____
_____
9. Remarks: _____
_____

CONSTRUCTION CERTIFICATION

I, _____ certify that to the best of my knowledge and belief the statements in this report are correct and that all material, construction, and workmanship on this Alteration conforms to the *National Board Inspection Code*.
National Board "R" Certificate of Authorization No. _____ expires on _____
Date _____ _____ (name of alteration organization) Signed _____ (authorized representative)

CERTIFICATE OF INSPECTION

I, _____ holding a valid Commission issued by the National Board of Boiler and Pressure Vessel Inspectors and certificate of competency issued by the jurisdiction of _____ and employed by _____ of _____ have inspected the work described in this report on _____ and state that to the best of my knowledge and belief this work complies with the applicable requirements of the *National Board Inspection Code*.
By signing this certificate, neither the undersigned nor my employer makes any warranty, expressed or implied, concerning the work described in this report. Furthermore, neither the undersigned nor my employer shall be liable in any manner for any personal injury, property damage or loss of any kind arising from or connected with this inspection.
Date _____ Signed _____ (inspector) Commissions _____ (National Board and jurisdiction no.)

PROPOSED Change #4 - RETURN TO 1-PAGE, 2-SIDED FORM (See objectives page 1)

Repair & Alteration

PROPOSED- Front page

FORM R-2 REPORT OF ALTERATION
in accordance with provisions of the *National Board Inspection Code*

(Form "R" Registration No.)

(P.O. No., Job No., etc.)

1a. Design performed by: _____
(name of "R" organization responsible for design)
(address)

1b. Construction performed by _____
(name of "R" organization responsible for construction)
(address)

2. Owner of Pressure Retaining Item _____
(name)
(address)

3. Location of installation _____
(name)
(address)

4. Item identification _____ Name of original manufacturer _____
(boiler, pressure vessel, or piping)

5. Identifying nos.: _____ _____ _____ _____ _____
(mfg. serial no.) (National Board No.) (Jurisdiction No.) (other) (year built)

6. NBIC Edition / Addenda: _____ _____
(edition) (addenda)

Original Code of Construction for Item: _____ _____
(name / section / division) (edition / addenda)

Construction Code Used for Alteration Performed: _____ _____
(name / section / division) (edition / addenda)

7a Description of Design Scope: _____

☐ Form R-4, Report Supplementary Sheet is attached

7b Description of Construction Scope: _____

☐ Form R-4, Report Supplementary Sheet is attached

Pressure Test, if applied _____ psi MAWP _____ psi

8. Replacement Parts. Attached are Manufacturer's Partial Data Reports or Form R-3's properly completed for the following items of this report:

(name of part, item number, data report type or Certificate of Compliance, mfg's. name and identifying stamp)

PROPOSED- Back page

Form R-2 (back)

(Form "R" Registration No.)

(P.O. No., Job No., etc.)

9. Remarks: _____

DESIGN CERTIFICATION

I, _____ certify that to the best of my knowledge and belief the statements in this report are correct and that the Design Change described in this report conforms to the *National Board Inspection Code*.
National Board "R" Certificate of Authorization No. _____ expires on _____
Date _____ _____ Signed _____
(name of design organization) (authorized representative)

CERTIFICATE OF DESIGN CHANGE REVIEW

I, _____ holding a valid Commission issued by The National Board of Boiler and Pressure Vessel Inspectors and certificate of competency issued by the jurisdiction of _____ and employed by _____ of _____ have reviewed the design change as described in this report and state that to the best of my knowledge and belief such change complies with the applicable requirements of the *National Board Inspection Code*.
By signing this certificate, neither the undersigned nor my employer makes any warranty, expressed or implied, concerning the work described in this report. Furthermore, neither the undersigned nor my employer shall be liable in any manner for any personal injury, property damage or loss of any kind arising from or connected with this inspection.
Date _____ Signed _____ Commissions _____
(inspector) (National Board and jurisdiction no.)

CONSTRUCTION CERTIFICATION

I, _____ certify that to the best of my knowledge and belief the statements in this report are correct and that all material, construction, and workmanship on this Alteration conforms to the *National Board Inspection Code*.
National Board "R" Certificate of Authorization No. _____ expires on _____
Date _____ _____ Signed _____
(name of alteration organization) (authorized representative)

CERTIFICATE OF INSPECTION

I, _____ holding a valid Commission issued by the National Board of Boiler and Pressure Vessel Inspectors and certificate of competency issued by the jurisdiction of _____ and employed by _____ of _____ have inspected the work described in this report on _____ and state that to the best of my knowledge and belief this work complies with the applicable requirements of the *National Board Inspection Code*.
By signing this certificate, neither the undersigned nor my employer makes any warranty, expressed or implied, concerning the work described in this report. Furthermore, neither the undersigned nor my employer shall be liable in any manner for any personal injury, property damage or loss of any kind arising from or connected with this inspection.
Date _____ Signed _____ Commissions _____
(inspector) (National Board and jurisdiction no.)

85/95

NB12-2001

a) Proposed Revision:

Existing Text from Part 3, Section 5.13.4.1 (12) under *Instructions for Completing National Board Form "R" Reports:*

12. Provide a summary describing the exact scope of work that was completed to a Pressure-Retaining Item (PRI). The information to be included when describing the scope of work shall consider items such as the nature of the repair or alteration characterized by the listed examples, the specific location of the work performed to the PRI, the method of repair used to include as applicable, the steps taken to remove a defect or as allowed by NBIC Part 3, 3.3.4.8 to remain in place, the welding process and procedure when used, any special processes required such as PWHT; noting the soak time and temperatures recorded, and any acceptable in-process and final NDE-examinations or tests performed. When additional space is needed to fully describe the scope of work, a Form R-4 shall be used and attached.

Proposed Revised Text:

12. Provide a summary describing the ~~exact~~ scope of work that was completed to a Pressure-Retaining Item (PRI). The information to be included when describing the scope of work ~~shall~~ should consider items such as the nature of the repair or alteration (i.e. welding, grinding, plugging) ~~characterized by the listed examples~~, the specific location of the work performed to the PRI, ~~the method of repair used to include as applicable~~, the steps taken to remove a defect or as allowed by NBIC Part 3, 3.3.4.8 to remain in place, ~~the welding process and procedure when used~~, and any special welding, NDE, PWHT or Pressure Test processes performed NOT in accordance with the original Code of Construction, but in accordance with the NBIC. ~~with required such as PWHT; noting the soak time and temperatures recorded, and any acceptable in-process and final NDE-examinations or tests performed~~. When additional space is needed to fully describe the scope of work, a Form R-4 shall be used and attached.

b) Statement of Need:

Some AIA's are interpreting the latest words as being "mandatory" due to the use of the words "exact" and "shall". In discussing the issue with the Task Group assigned to address this issue in the past, it is my understanding that the intent was to encourage a summary of the Scope of Work and not a list of specific information that is already contained in customer turnover packages and Certificate Holders' historical records. The additional pages in the final Code Document submitted to the NB also adds costs to the Certificate Holder in preparation man hours as well as page charges incurred during the filing process with NB.

c) Background Information:

Code Document packages have tripled in size due to the need to re-list every work scope detail that is already contained in documentation provided to the customer, as well as that retained in the historical records of the Certificate Holder. Discussions with various AIA's also reveals an inconsistent interpretation of Instruction #12, with some seeing the latest words as clarifying past understandings, while others view the latest words as a totally new requirement and are demanding extensive detail never before included in the R-form document package. (A good example will be available to present to the Sub-group/committee at the July meeting).

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NB 12-2101

Toledo
Refining Company

May 30, 2012

Shawn Tiedeken
Inspection Superintendent
Toledo Refining Company, LLC
1819 Woodville Road
Oregon, OH 43616

Secretary, NBIC Committee
The National Board of Boiler and Pressure Vessel Inspectors
1055 Crupper Avenue
Columbus, OH 43229
NBICinquiry@nationalboard.org

Re: Revision inquiry to 2011 National Board Inspection Code (NBIC), Part 3, Section 4, Subsection 4.2, Nondestructive Examination

Dear NBIC Committee Secretary,

National Board Inspection Code (NBIC), 2011 edition, Part 3, Section 4, Repairs and Alterations – Examination and Testing, Subsection 4.2 Nondestructive Examination, paragraph (b) states, " NDE personnel shall be qualified and certified in accordance with the requirements of the original code of construction. When this is not possible or practicable, NDE personnel may be qualified and certified in accordance with their employer's written practice. ASNT SNT-TC-1A, Recommended Practice Non-destructive Testing Personnel Qualification and Certification (~~2001~~ 2006 edition), or ASNT CP-189, Standard for Qualification and Certification of Nondestructive Testing Personnel (~~2001~~ 2006 edition), shall be used as a guideline for employers to establish their written practice."

It is recommended to revise the "2001 edition" requirements to state "2006 edition" requirements. (See Attachment 1)

This revision is being requested such that there will be consistency between the NBIC required editions of ASNT SNT TC-1A and those specified in the latest versions of ASME Section VIII, ASME Section V, B31.1 codes of construction. The following provides background requirements from the applicable codes of construction. The numbering of each code reference is consistent the attached references.

1. Within the 2010 with 2011 Addenda, ASME Boiler and Pressure Vessel Code, Section VIII, Rules for the Construction of Pressure Vessels, Table U-3, the 2006 edition is specified for both ASNT CP-189 and SNT-TC-1A.
2. In 2010 ed., ASME B31.1, Power Piping, Chapter VI, Inspection, Examination, and Testing, paragraph 136.3.2, NDE personnel are qualified and certified per a developed program consisting of training, on the job training, oral or written examination, vision acuity examination, and documented certification. As an alternative, Section V, ASME Boiler and Pressure Vessel Code, Section V, Article 1 can be used for the qualification of NDE personnel.

Toledo
Refining Company

3. 2010 with 2011 addenda, ASME Boiler and Pressure Vessel Code, Section V, Nondestructive Examination, Subsection A, Nondestructive Methods of Examination, Article 1, General Requirements, Paragraph T-120, General, sub paragraph (e) requires that NDE personnel are qualified and certified per their employer's written practice, which shall be in accordance with one of the following: (1), SNT-TC-1A (footnote 3) Personnel Qualification and Certification in Nondestructive Testing or (2) ANSI/ASNT CP-189 (footnote 3), ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel. Footnote 3 states that the 2006 edition is required for both SNT-TC-1A and ANSI/ASNT CP-189.
4. ASME B31.3, Process Piping Code, Section 342, Examination Personnel, Paragraph 342.1, it states that NDE personnel or "examiners" shall have training and experience commensurate with the needs of the examination type or method. The footnote reference specifies that SNT-TC-1A may be used as a guide to develop the training and respective experience requirements in performing the examination type or method. No year is specified.

In all the referenced code paragraphs, it is clear that the latest versions of the codes applicable to NBIC specify the 2006 edition of SNT-TC-1A and ANSI/ASNTCP-189.

Should there be any question, please do not hesitate to contact the undersigned at (419) 698-7445.

Sincerely,

Shawn J. Tiedeken
Inspection Superintendent
Toledo Refining Company, LLC

Attachment 1

PART 3, SECTION 4
REPAIRS AND ALTERATIONS — EXAMINATION AND TESTING

4.1 SCOPE

This section provides requirements and guidelines for performing examinations and tests for repairs and alterations to pressure-retaining items.

4.2 NONDESTRUCTIVE EXAMINATION

a) The nondestructive examination (NDE) requirements, including technique, extent of coverage, procedures, personnel qualification, and acceptance criteria, shall be in accordance with the original code of construction for the pressure-retaining item. Weld repairs and alterations shall be subjected to the same nondestructive examination requirements as the original welds. Where this is not possible or practicable, alternative NDE methods acceptable to the Inspector and the Jurisdiction where the pressure-retaining item is installed, where required, may be used.

b) NDE personnel shall be qualified and certified in accordance with the requirements of the original code of construction. When this is not possible or practicable, NDE personnel may be qualified and certified in accordance with their employer's written practice. ASNT SNT-TC-1A, *Recommended Practice Nondestructive Testing Personnel Qualification and Certification* (2001 edition), or ASNT CP-189, *Standard for Qualification and Certification of Nondestructive Testing Personnel* (2001 edition), shall be used as a guideline for employers to establish their written practice. The ASNT Central Certification Program (ACCP, Rev. 3, Nov. 1997) may be used to fulfill the examination and demonstration requirements of the employer's written practice. Provisions for training, experience, qualification, and certification of NDE personnel shall be described in the "R" Certificate Holder's written quality system.

4.3 PRESSURE GAGES, MEASUREMENT, EXAMINATION, AND TEST EQUIPMENT

The calibration of pressure gages, measurement, examination, and test equipment, and documentation of calibration shall be performed, as required, by the applicable standard used for construction.

4.4 EXAMINATION AND TEST FOR REPAIRS AND ALTERATIONS

The following requirements shall apply to all repairs and alterations to pressure-retaining items:

a) The integrity of repairs, alterations, and replacement parts used in repairs and alterations shall be verified by examination or test;

b) Testing methods used shall be suitable for providing meaningful results to verify the integrity of the repair or alteration. Any insulation, coatings, or coverings that may inhibit or compromise a meaningful test method shall be removed, to the extent identified by the Inspector;

c) The "R" Certificate Holder is responsible for all activities relating to examination and test of repairs and alterations;

d) Examinations and tests to be used shall be subject to acceptance of the Inspector and, where required, acceptance of the Jurisdiction.

Reference 1

(10)
(a)

TABLE U-3
YEAR OF ACCEPTABLE EDITION OF REFERENCED STANDARDS IN THIS DIVISION

Title	Number	Year
Seat Tightness of Pressure Relief Valves	API Std. 527	1991 (R2007)(1)
Unified Inch Screw Threads (UN and UNR Thread Form)	ASME B1.1	Latest edition
Pipe Threads, General Purpose (Inch)	ANSI/ASME B1.20.1	Latest edition
Cast Iron Pipe Flanges and Flanged Fittings, Classes 25, 125, and 250	ASME B16.1	2005
Pipe Flanges and Flanged Fittings	ASME B16.5	2009(2)
Factory-Made Wrought Buttwelding Fittings	ASME B16.9	Latest edition
Forged Fittings, Socket-Welding and Threaded	ASME B16.11	Latest edition
Cast Bronze Threaded Fittings, Classes 125 and 250	ASME B16.15	Latest edition
Metallic Gaskets for Pipe Flanges — Ring-Joint, Spiral-Wound, and Jacketed	ASME B16.20	Latest edition
Cast Copper Alloy Pipe Flanges and Flanged Fittings, Class 150, 300, 400, 600, 900, 1500, and 2500	ASME B16.24	2006
Ductile Iron Pipe Flanges and Flanged Fittings, Class 150 and 300	ASME B16.42	1998 (R2006)
Large Diameter Steel Flanges, NPS 26 Through NPS 60	ASME B16.47	2006
Square and Hex Nuts (Inch Series)	ASME B18.2.2	Latest edition
Welded and Seamless Wrought Steel Pipe	ASME B36.10M	Latest edition
Guidelines for Pressure Boundary Bolted Flange Joint Assembly	ASME PCC-1	2010
Repair of Pressure Equipment and Piping	ASME PCC-2	2008
Pressure Relief Devices	ASME PTC 25	2008
Qualifications for Authorized Inspection	ASME QAI-1	Latest edition (3)
ASNT Central Certification Program	ACCP	Rev 7
ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel	ANSI/ASNT CP-189	2006
Recommended Practice for Personnel Qualification and Certification in Nondestructive Testing	SNT-TC-1A	2006
Standard Test Methods for Flash Point by Tag Closed Tester	ASTM D 56	Latest edition
Standard Test Methods for Flash Point by Pensky-Martens Closed Tester	ASTM D 93	Latest edition
Standard Guide for Preparation of Metallographic Specimens	ASTM E 3	2001 (R2007)
Pressure Relieving and Depressuring Systems	ANSI/API Std. 521	5th Ed., January 2007
Reference Photographs for Magnetic Particle Indications on Ferrous Castings	ASTM E 125	1963 (R2008)(1)
Hardness Conversion Tables for Metals	ASTM E 140	Latest edition
Standard Reference Radiographs for Heavy-Walled [2 to 4½-in. (51 to 114-mm)] Steel Castings	ASTM E 186	1998 (R2004)
Method for Conducting Drop-Weight Test to Determine Nil-Ductility Transition Temperature of Ferritic Steels	ASTM E 208	2006
Standard Reference Radiographs for Heavy-Walled (4½ to 12-in. (114 to 305-mm)) Steel Castings	ASTM E 280	2010
Standard Reference Radiographs for Steel Castings up to 2 in. (51 mm) in Thickness	ASTM E 446	2010
Marking and Labeling Systems	ANSI/UL-969	1995

Reference 2

Chapter VI
Inspection, Examination, and Testing

136 INSPECTION AND EXAMINATION

136.1 Inspection

136.1.1 General. This Code distinguishes between "examination" and "inspection." Inspection is the responsibility of the Owner and may be performed by employees of the Owner or a party authorized by the Owner, except for the inspections required by para. 136.2. Prior to initial operation, a piping installation shall be inspected to ensure compliance with the engineering design and with the material, fabrication, assembly, examination, and test requirements of this Code.

136.1.2 Verification of Compliance. Compliance with the requirements of this Code shall be verified by an Authorized Inspector when a Code stamp is required by Section I of the ASME Boiler and Pressure Vessel Code. The rules of this Code and the quality control system requirements of Appendix A-300 of Section I of the ASME Boiler and Pressure Vessel Code shall apply. The quality control system requirements are shown in Appendix J of this Code. The duty of the Inspector shall be as defined in PG-90, Section I, of the ASME Boiler and Pressure Vessel Code. Data Report Forms are included in the Appendix of ASME Section I for use in developing the necessary inspection records. The Inspector shall assure himself/herself that the piping has been constructed in accordance with the applicable requirements of this Code.

136.1.3 Rights of Inspectors. Inspectors shall have access to any place where work concerned with the piping is being performed. This includes manufacture, fabrication, heat treatment, assembly, erection, examination, and testing of the piping. They shall have the right to audit any examination, to inspect the piping using any appropriate examination method required by the engineering design or this Code, and to review all certifications and records necessary to satisfy the Owner's responsibility as stated in para. 136.1.1.

136.1.4 Qualifications of the Owner's Inspector

(A) The Owner's Inspector shall be designated by the Owner and shall be an employee of the Owner, an employee of an engineering or scientific organization, or of a recognized insurance or inspection company acting as the Owner's agent. The Owner's Inspector shall not represent nor be an employee of the piping manufacturer, fabricator, or erector unless the Owner is also the manufacturer, fabricator, or erector.

(B) The Owner's Inspector shall have not less than 10 years of experience in the design, manufacture, erection, fabrication, or inspection of power piping. Each year of satisfactorily completed work toward an engineering degree recognized by the Accreditation Board for Engineering and Technology shall be considered equivalent to 1 year of experience, up to 5 years total.

(C) In delegating the performance of inspections, the Owner is responsible for determining that a person to whom an inspection function is delegated is qualified to perform that function.

136.2 Inspection and Qualification of Authorized Inspector for Boiler External Piping

136.2.1 Piping for which inspection and stamping is required as determined in accordance with para. 100.1.2(A) shall be inspected during construction and after completion and at the option of the Authorized Inspector at such stages of the work as he/she may designate. For specific requirements see the applicable parts of Section I of the ASME Boiler and Pressure Vessel Code, PG-104 through PG-113. Each manufacturer, fabricator, or assembler is required to arrange for the services of Authorized Inspectors.

136.2.1.1 The inspections required by this Section shall be performed by an Inspector employed by an ASME accredited Authorized Inspection Agency.

136.2.2 Certification by stamping and Data Reports, where required, shall be as per PG-104, PG-105, PG-109, PG-110, PG-111, and PG-112 of Section I of the ASME Boiler and Pressure Vessel Code.

136.3 Examination

136.3.1 General. Examination denotes the functions performed by the manufacturer, fabricator, erector, or a party authorized by the Owner that include nondestructive examinations (NDE), such as visual, radiography, ultrasonic, eddy current, liquid penetrant, and magnetic particle methods. The degree of examination and the acceptance standards beyond the requirements of this Code shall be a matter of prior agreement between the manufacturer, fabricator, or erector and the Owner.

136.3.2 Qualification of NDE Personnel. Personnel who perform nondestructive examination of welds shall be qualified and certified for each examination method in accordance with a program established by the

Reference 2

employer of the personnel being certified, which shall be based on the following minimum requirements:

(A) instruction in the fundamentals of the nondestructive examination method.

(B) on-the-job training to familiarize the NDE personnel with the appearance and interpretation of indications of weld defects. The length of time for such training shall be sufficient to ensure adequate assimilation of the knowledge required.

(C) an eye examination performed at least once each year to determine optical capability of NDE personnel to perform the required examinations.

(D) upon completion of (A) and (B) above, the NDE personnel shall be given an oral or written examination and performance examination by the employer to determine if the NDE personnel are qualified to perform the required examinations and interpretation of results.

(E) certified NDE personnel whose work has not included performance of a specific examination method for a period of 1 yr or more shall be recertified by successfully completing the examination of (D) above and also passing the visual examination of (C) above. Substantial changes in procedures or equipment shall require recertification of the NDE personnel.

As an alternative to the preceding program, the requirements of the ASME Boiler and Pressure Vessel Code, Section V, Article 1 may be used for the qualification of NDE personnel. Personnel qualified to AWS QC1 may be used for the visual examination of welds.

136.4 Examination Methods of Welds

136.4.1 Nondestructive Examination. Nondestructive examinations shall be performed in accordance with the requirements of this Chapter. The types and extent of mandatory examinations for pressure welds and welds to pressure retaining components are specified in Table 136.4. For welds other than those covered by Table 136.4, only visual examination is required. Welds requiring nondestructive examination shall comply with the applicable acceptance standards for indications as specified in paras. 136.4.2 through 136.4.6. As a guide, the detection capabilities for the examination method are shown in Table 136.4.1. Welds not requiring examination (i.e., RT, UT, MT, or PT) by this Code or the engineering design shall be judged acceptable if they meet the examination requirements of para. 136.4.2 and the pressure test requirements specified in para. 137. NDE for P-Nos. 3, 4, 5A, 5B, and 15E material welds shall be performed after postweld heat treatment unless directed otherwise by engineering design. Required NDE for welds in all other materials may be performed before or after postweld heat treatment.

136.4.2 Visual Examination. Visual examination as defined in para. 100.2 shall be performed in accordance with the methods described in Section V, Article 9, of the ASME Boiler and Pressure Vessel Code. Visual examinations may be conducted, as necessary, during the fabrication and erection of piping components to provide verification that the design and WPS requirements are being met. In addition, visual examination shall be performed to verify that all completed welds in pipe and piping components comply with the acceptance standards specified in (A) below or with the limitations on imperfections specified in the material specification under which the pipe or component was furnished.

(A) Acceptance Standards. The following indications are unacceptable:

(A.1) cracks — external surface.

(A.2) undercut on surface that is greater than $\frac{1}{32}$ in. (1.0 mm) deep.

(A.3) weld reinforcement greater than specified in Table 127.4.2.

(A.4) lack of fusion on surface.

(A.5) incomplete penetration (applies only when inside surface is readily accessible).

(A.6) any other linear indications greater than $\frac{3}{16}$ in. (5.0 mm) long.

(A.7) surface porosity with rounded indications having dimensions greater than $\frac{3}{16}$ in. (5.0 mm) or four or more rounded indications separated by $\frac{1}{16}$ in. (2.0 mm) or less edge to edge in any direction. Rounded indications are indications that are circular or elliptical with their length less than three times their width.

136.4.3 Magnetic Particle Examination. Whenever required by this Chapter (see Table 136.4), magnetic particle examination shall be performed in accordance with the methods of Article 7, Section V, of the ASME Boiler and Pressure Vessel Code.

(A) Evaluation of Indications

(A.1) Mechanical discontinuities at the surface will be indicated by the retention of the examination medium. All indications are not necessarily defects; however, certain metallurgical discontinuities and magnetic permeability variations may produce similar indications that are not relevant to the detection of unacceptable discontinuities.

(A.2) Any indication that is believed to be nonrelevant shall be reexamined to verify whether or not actual defects are present. Surface conditioning may precede the reexamination. Nonrelevant indications that would mask indications of defects are unacceptable.

(A.3) Relevant indications are those that result from unacceptable mechanical discontinuities. Linear indications are those indications in which the length is more than three times the width. Rounded indications are indications that are circular or elliptical with the length less than three times the width.

(A.4) An indication of a discontinuity may be larger than the discontinuity that causes it; however, the size of the indication and not the size of the discontinuity is the basis of acceptance or rejection.

Reference 3

SUBSECTION A NONDESTRUCTIVE METHODS OF EXAMINATION

ARTICLE 1
GENERAL REQUIREMENTS

T-110 SCOPE

(a) This Section of the Code contains requirements and methods for nondestructive examination (NDE), which are Code requirements to the extent they are specifically referenced and required by other Code Sections or referencing document. These NDE methods are intended to detect surface and internal imperfections in materials, welds, fabricated parts, and components. They include radiographic examination, ultrasonic examination, liquid penetrant examination, magnetic particle examination, eddy current examination, visual examination, leak testing, and acoustic emission examination. See Nonmandatory Appendix A of this Article for a listing of common imperfections and damage mechanisms, and the NDE methods that are generally capable of detecting them.

(b) For general terms such as *Inspection*, *Flaw*, *Discontinuity*, *Evaluation*, etc., refer to Mandatory Appendix I.

T-120 GENERAL

(a) Subsection A describes the methods of nondestructive examination to be used if referenced by other Code Sections or referencing documents.

(b) Subsection B lists Standards covering nondestructive examination methods which have been accepted as standards. These standards are nonmandatory unless specifically referenced in whole or in part in Subsection A or as indicated in other Code Sections or referencing document.

(c) Any reference to a paragraph of any Article in Subsection A of this Section includes all of the applicable rules in the paragraph.[1] In every case, reference to a paragraph includes all the subparagraphs and subdivisions under that paragraph.

(d) Reference to a standard contained in Subsection B is mandatory only to the extent specified.[2]

(e) For those documents that directly reference this Article for the qualification of NDE personnel, the qualification shall be in accordance with their employer's written practice which must be in accordance with one of the following documents:

(1) SNT-TC-1A,[3] Personnel Qualification and Certification in Nondestructive Testing; or

(2) ANSI/ASNT CP-189,[3] ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel

(f) National or international central certification programs, such as the ASNT Central Certification Program (ACCP), may be alternatively used to fulfill the examination requirements of the documents listed in T-120(e) as specified in the employer's written practice.

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[1] For example, reference to T-270 includes all the rules contained in T-271 through T-277.3.

[2] For example, T-233 requires that Image Quality Indicators be manufactured and identified in accordance with the requirements or alternatives allowed in SE-747 or SE-1025, and Appendices, as appropriate for the style of IQI to be used. These are the only parts of either SE-747 or SE-1025 that are mandatory in Article 2.

[3] SNT-TC-1A (2006 Edition), "Personnel Qualification and Certification in Nondestructive Testing;" and ANSI/ASNT CP-189 (2006 Edition), "ASNT Standard for Qualification and Certification of Nondestructive Testing Personnel;" published by the American Society for Nondestructive Testing, 1711 Arlingate Lane, P.O. Box 28518, Columbus, OH 43228-0518.

Reference 4

(c) *Progressive Sampling for Examination.* The provisions of para. 341.3.4 are applicable.

(d) *Welds to Be Examined.* The locations of welds and the points at which they are to be examined by spot radiography shall be selected or approved by the Inspector.

341.5.2 Hardness Tests. The extent of hardness testing required shall be in accordance with para. 331.1.7 except as otherwise specified in the engineering design.

341.5.3 Examinations to Resolve Uncertainty. Any method may be used to resolve doubtful indications. Acceptance criteria shall be those for the required examination.

342 EXAMINATION PERSONNEL

342.1 Personnel Qualification and Certification

Examiners shall have training and experience commensurate with the needs of the specified examinations.[1] The employer shall certify records of the examiners employed, showing dates and results of personnel qualifications, and shall maintain them and make them available to the Inspector.

342.2 Specific Requirement

For in-process examination, the examinations shall be performed by personnel other than those performing the production work.

343 EXAMINATION PROCEDURES

Any examination shall be performed in accordance with a written procedure that conforms to one of the methods specified in para. 344, including special methods (see para. 344.1.2). Procedures shall be written as required in the BPV Code, Section V, Article 1, T-150. The employer shall certify records of the examination procedures employed, showing dates and results of procedure qualifications, and shall maintain them and make them available to the Inspector.

344 TYPES OF EXAMINATION

344.1 General

344.1.1 Methods. Except as provided in para. 344.1.2, any examination required by this Code, by the engineering design, or by the Inspector shall be performed in accordance with one of the methods specified herein.

344.1.2 Special Methods. If a method not specified herein is to be used, it and its acceptance criteria shall be specified in the engineering design in enough detail to permit qualification of the necessary procedures and examiners.

344.1.3 Definitions. The following terms apply to any type of examination:

100% examination: complete examination of all of a specified kind of item in a designated lot of piping[2]

random examination:[3] complete examination of a percentage of a specified kind of item in a designated lot of piping[2]

spot examination:[3] a specified partial examination of each of a specified kind of item in a designated lot of piping,[2] e.g., of part of the length of all shop-fabricated welds in a lot of jacketed piping

random spot examination:[3] a specified partial examination of a percentage of a specified kind of item in a designated lot of piping[2]

344.2 Visual Examination

344.2.1 Definition. Visual examination is observation of the portion of components, joints, and other piping elements that are or can be exposed to view before, during, or after manufacture, fabrication, assembly, erection, examination, or testing. This examination includes verification of Code and engineering design requirements for materials, components, dimensions, joint preparation, alignment, welding, bonding, brazing, bolting, threading, or other joining method, supports, assembly, and erection.

344.2.2 Method. Visual examination shall be performed in accordance with the BPV Code, Section V, Article 9. Records of individual visual examinations are not required, except for those of in-process examination as specified in para. 344.7.

344.3 Magnetic Particle Examination

Examination of castings is covered in para. 302.3.3. Magnetic particle examination of welds and of components other than castings shall be performed in accordance with BPV Code, Section V, Article 7.

[1] For this purpose, SNT-TC-1A, Recommended Practice for Nondestructive Testing Personnel Qualification and Certification, may be used as a guide.

[2] A designated lot is that quantity of piping to be considered in applying the requirements for examination in this Code. The quantity or extent of a designated lot should be established by agreement between the contracting parties before the start of work. More than one kind of designated lot may be established for different kinds of piping work.

[3] Random or spot examination will not ensure a fabrication product of a prescribed quality level throughout. Items not examined in a lot of piping represented by such examination may contain defects which further examination could disclose. Specifically, if all radiographically disclosable weld defects must be eliminated from a lot of piping, 100% radiographic examination must be specified.

Repair & Alteration

95/95