NGG Nuclear Generation Group	I Information Use

NUCLEAR GENERATION GROUP

NUCLEAR NDE MANUAL

NGGM-PM-0011

NDEP-0620

VT-1 AND VT-3 VISUAL EXAMINATION OF ASME SECTION XI, SUBSECTION IWE COMPONENTS OF NUCLEAR POWER PLANTS

RECOMMENDED FOR APPROVAL BY Harlan E Bordeaux — 6-10-02
Principal NDE Level III — **Date**

APPROVED FOR USE: — 6-13-02
Chief Mechanical/Materials Engineer — **Date**

0/67

TABLE OF CONTENTS

SECTION PAGE

1.0 PURPOSE

The purpose of this procedure is to delineate the VT-1 and VT-3 visual examination criteria specified by ASME Section XI, Subsection IWE 1992 Edition and A92 Addenda for preservice and inservice visual examination of nuclear power plant components at or for Progress Energy (PGN) nuclear power plants.

1.1 This procedure defines the methods and requirements for performing VT-1 and VT-3 visual examinations of Class MC pressure retaining components and their integral attachments, and Class CC component metallic shell and penetration liners and their integral attachments. These examinations shall apply to surface areas, including welds and base metal.

Note: Paragraph 1.2 applies only to BNP, HNP and RNP.

1.2 When specific methods and details of examinations are defined in approved plant special and/or periodic test procedures, those procedures shall have been reviewed and approved by appropriate plant and/or PGN Level III personnel. When such procedures are used, they shall be used in conjunction with this procedure during performance of the examination. Documentation shall be specified in the special and/or periodic test procedure. If there is a conflict with this procedure and plant documents, plant documents will govern.

Note: Paragraph 1.3 applies only to CR3.

1.3 When plant documents require examinations to be performed in accordance with an approved VT-1 and VT-3 procedure (with no specific details of the examination provided in plant documents), this procedure and associated documentation shall be used.

2.0 REFERENCES

2.1 ASME Boiler and Pressure Vessel (B&PV) Code:

2.1.1 Section V, Nondestructive Examination, 1992 Edition with A92 Addenda.

2.1.2 Section XI, Rules for Inservice Inspection of Nuclear Power Plant Components, 1992 Edition with A92 Addenda.

2.1.3 ASME Section XI, Subsection IWE, Requirements for Class MC and Metallic Liners of Class CC Components of Light Water Cooled Plants, 1992 Edition with A92 Addenda.

2.2 PGN Nuclear Generation Group (NGG) Documents:

2.2.1 NGGM-PM-0011, Nuclear NDE Manual.

2.2.2 NDEP-A, Nuclear NDE Program and Personnel Process.

3.0 DEFINITIONS

3.1 Standard glossary of terms for Visual Examination as contained in ASME Section V, Articles 1 and 9, Mandatory Appendix I, and Article 30 (SE-1316).

3.2 Glossary of terms as contained in ASME Section XI, Article IWA-9000.

4.0 RESPONSIBILITY

4.1 Assigned NDE Level I, II or III personnel are responsible to perform examinations in accordance with this procedure.

4.2 Assigned NDE Level II or III personnel are responsible to oversee the work performed by a NDE Level I person.

5.0 PREREQUISITES

5.1 Personnel who perform visual examination in accordance with this procedure shall be certified to at least ISI VT-1 and VT-3 Visual Examiner Level II Limited, ISI VT-1 and VT-3 Visual Examiner Level II, or a Level III Visual Examiner in accordance with Reference 2.2.2, or other written NDE personnel qualification procedure approved by a PGN Level III Examiner. Examinations performed by ISI VT-1 and VT-3 Level I personnel must be supervised by personnel certified to at least ISI VT-1 and VT-3 Level II.

5.2 Personnel who perform visual examinations shall be knowledgeable regarding the function of the component being examined, and shall be able to identify relevant indications on the component.

5.3 Additional training as directed by a PGN Level III Examiner, may be required to familiarize contractor personnel with requirements of this procedure.

6.0 GENERAL

6.1 This procedure is used to examine Class MC pressure retaining components and their integral attachments, and Class CC component metallic shell and penetration liners and their integral attachments. These examinations shall apply to surface areas, including welds and base metal.

6.2 Unless otherwise noted in an approved plant document, the following components (or parts of components) are exempted from the examination requirements of IWE-2000:

6.2.1 Vessels, parts, and appurtenances that are outside the boundaries of the containment as defined in site procedures or Design Specifications;

6.2.2 Embedded or inaccessible portions of containment vessels, parts, and appurtenances that met the requirements of the original Construction Code;

6.0 GENERAL

6.2.3 Portions of containment vessels, parts, and appurtenances that become embedded or inaccessible as a result of vessel repair or placement if the conditions of IWE-1232 and IWE-5220 are met;

6.2.4 Piping, pumps, and valves that are part of the containment system, or which penetrate or are attached to the containment vessel. These components shall be examined in accordance with the rules of IWB or IWC, as appropriate to the classification defined by Design Specifications.

6.3 Examination areas for a specific plant may be defined by specific plant documents.

6.4 When performing examinations inside a radiation control area (RCA), visual examiners shall observe good health physics practices to maintain radiation exposure as low as reasonably achievable (ALARA).

6.5 The frequency of visual examination performance shall be as determined by ISI Engineering.

7.0 SPECIAL TOOLS AND EQUIPMENT

7.1 The following equipment may be used to aid the visual examiner in evaluating items being examined.

7.1.1 Flashlight or other illuminating device that provides the level of lighting described in paragraph 7.2.

7.1.2 18% neutral gray card with a 1/32" black line, or equivalent.

7.1.3 Magnifying lens.

7.1.4 Borescope, fiberscope, or fiber optics.

7.1.5 Mirror.

7.1.6 Optical comparator.

7.1.7 Micrometer.

7.1.8 Depth Gauge.

7.1.9 6" ruled scale and/or standard machinist scale.

7.1.10 Other equipment if used, must meet applicable conditions of paragraphs 7.2 and 7.3.

7.2 Illumination

Note: When utilizing white light to examine a coated surface, precautions should be taken to minimize glare. Glare resulting from light shined directly on a coated surface could interfere with interpretation of the surface area. It is recommended that the white light be held at some angle to prevent masking of possible indications.

Note: Paragraphs 7.2.1 - 7.2.3 apply to BNP, CR3, HNP, and RNP based on satisfactory Level III demonstration to the ANII.

7.2.1 For procedure demonstration, an 18% neutral gray card based on the photographic standard manufactured by Eastman Kodak Co., or equivalent meeting the following is required.

7.2.2 The ability of the visual examiner to discern a 1/32" black line on an 18% neutral gray card or demonstrated equivalent at a distance not greater than two feet and at an angle not less than 30 degrees from the surface to be examined shall be demonstration that lighting is acceptable for the examination.

7.2.3 When the 1/32" graduation is not clearly discernable with prevailing light, then supplemental lighting shall be used in the examination.

Note: As an alternate to Paragraphs 7.2.1 through 7.2.3 above, BNP, CR3, HNP, and RNP may use the Method described in Paragraphs 7.2.4 through 7.2.7 below.

7.2.4 Light sources for direct VT-1 and VT-3 visual examinations shall be capable of providing a minimum of 50-foot candles of illumination to the surface under examination. Portable light sources may be used to illuminate the surfaces under examination.

7.2.5 The illumination levels from battery powered portable lights shall be checked with a calibrated light meter to ensure the light source is capable of providing a minimum of 50 foot candles of illumination. The checks shall be performed before and after each examination or series of examinations and shall not exceed four hours between checks.

7.2.6 It is not necessary to measure illumination levels on each examination surface when the same portable light source or similar installed lighting equipment is demonstrated to provide the specified illumination at the maximum examination distance.

7.3 Optical Aids

7.3.1 Illuminators, mirrors and/or other instruments that meet the requirements of paragraphs 7.2 and/or 7.3, may be used to aid in performing the examinations.

7.3 Optical Aids

7.3.2 When mirrors or magnifying lenses are used to improve the angle of vision and/or resolution, care must be taken to ensure the equipment does not shadow the area of interest or otherwise hinder the examination.

7.3.3 Aids such as mirrors, telescopes, periscopes, borescopes, fiber optics, rotating optics, moveable lights, TV cameras and monitoring systems with or without attachments for permanent recording, or any combination thereof may be utilized during remote visual examination. Such systems shall have a resolution capability at least equivalent to that obtainable by direct visual observation.

7.3.4 Visual examinations using remote visual equipment shall be performed in accordance with the equipment manufacturer's instructions and shall be verified for resolution and lighting capabilities prior to use. This verification may be performed at the point of examination or under simulated conditions expected to be encountered during the actual examination.

7.4 Mechanical Aids and Instruments

7.4.1 Mechanical aids used for examination shall have graduated scales in usable increments that are easily discernable (i.e., 1/32", 1/16").

7.4.2 Dial depth gauges, micrometers, optical comparators and other precision mechanical measuring devices used for final acceptance examination shall be calibrated in accordance with specific calibration procedures.

7.4.3 Rules, scales, gauges, and other measuring devices used to aid the visual examiner shall be reasonably accurate, but do not require calibration.

Note: When measuring close tolerances, be sure to use a measuring device that reads in lower increments than required measurements (i.e., drawing has increments of .01; use measuring device in increments of .001).

8.0 EXAMINATION

8.1 Surface Preparation

8.1.1 When clean surfaces or decontamination are needed to ensure valid interpretation of results, surface cleaning and/or decontamination shall be performed in accordance with approved plant documents.

8.1.2 When a containment vessel or liner is painted or coated to protect surfaces from corrosion, preservice and inservice visual examinations shall be performed without the removal of the paint or coating.

8.1.3 When removal of paint or coating is required, it shall be removed in a manner that will not reduce the base metal or weld metal thickness below the design thickness.

8.2 Method

8.2.1 VT-1 and VT-3 visual examination may either be performed directly, or remotely with optical aids.

8.2.2 Direct Visual Examination

1. Direct VT-1 visual examination may be made when access is sufficient to place the eye within 24 inches of the surface to be examined, and at an angle not less than 30 degrees to the surface being examined. Mirrors and magnifying lenses may be used to improve the angle of vision and resolution. Lighting, natural or artificial, sufficient to illuminate the area to be examined is required.

2. Resolution shall be considered adequate when the combination of lighting, access and angles of vision enable the visual examiner to resolve a 1/32 inch black line on an 18% neutral gray card (based on the photographic standard manufactured by Eastman Kodak Co., or equivalent) placed on the surface to be examined.

3. Direct VT-3 visual examination may be made when access is sufficient to place the eye within 48 inches of the surface to be examined, and at an angle not less than 30 degrees to the surface being examined. Mirrors and magnifying lenses may be used to improve the angle of vision and resolution. Lighting, natural or artificial, sufficient to illuminate the area to be examined is required.

4. Resolution shall be considered adequate when the combination of lighting, access and angles of vision enable the visual examiner to clearly resolve the smallest abnormal condition, discern support settings and measurements required to be reported for the given item, part and/or component being examined.

8.2.3 Remote Visual Examination

1. Remote VT-1 and VT-3 visual examination may be substituted for direct VT-1 and VT-3 visual examination.

2. Visual examinations using remote visual equipment shall be performed in accordance with the equipment manufacturer's instructions and shall be verified for resolution and lighting capabilities prior to use. This verification may be performed at the point of examination or under simulated conditions expected to be encountered during the actual examination.

8.2.3 Remote Visual Examination

3. When remote visual examinations are performed using an automated positioning device, the location and dimensions of indications shall be obtained using the position display readouts of the positioning device. If no position display readouts are available, the location of the indication shall be recorded relative to known physical locations on the part, and the dimensions of the indication shall be estimated based on known surface irregularities.

4. In order to determine the size of an indication identified by remote video examination, the distance from the examination area to the face of the camera must be known. This may be accomplished by using a standoff device to hold the camera at a known fixed distance from the indication being viewed, or by using known drawing dimensions to determine this distance.

Note: Paragraphs 5 and 6 apply only to BNP.

5. Remote underwater systems must display a . 001-inch diameter wire both horizontally and vertically with respect to the system and over the entire range of distances used during the examination.

6. When performing a required visual examination remotely, the maximum direct examination distance specified may be extended provided that the conditions or indications for which the visual examination is performed can be detected at the chosen distance and illumination level, even if the illumination level is less than the minimum illumination requirements specified.

8.3 Replication

8.3.1 Surface replication methods shall be considered acceptable when the surface resolution is at least equivalent to that of direct visual observation.

8.3.2 Replication materials and applicable procedures to be used shall be approved by a PGN Level III Examiner.

8.4 Specific Examination Requirements

8.4.1 Appendix I provides specific examination requirements for ASME Section XI, 1992 Edition, with A92 Addenda.

9.0 DATA AND REPORTING

9.1 As specified in the applicable Appendix and/or approved plant documents, discontinuities and/or relevant indications visible on Class MC pressure retaining components and their integral attachments, Class CC component metallic shell and penetration liners and their integral attachments, and other surfaces or components requiring examination shall be recorded.

Note: Photographs can ultimately reduce radiation exposure (ALARA) and should be considered where practical in assisting documentation of a discontinuity.

9.2 Where erosion, corrosion, or wear is observed, it is recommended that recorded data be supplemented with photographs or sketches. A benchmark shall be included in photographs to provide a scale of relative size.

9.3 When performing underwater remote visual examinations, a videotape **and** accurate voice recording to supplement the documentation (if required by the plant) shall be made of abnormalities encountered during the examination.

9.4 A visual examination report or other approved form shall be prepared. Reports shall list areas examined, and descriptions of relevant indications/potential defect conditions. Data recorded shall describe the nature of the relevant indication, location on the component, area, and size (length and width and depth).

9.5 Data shall be recorded on the following form(s), or other form(s) approved by ISI engineering or a ISI Level III:

9.5.1 QA NDE ISI 7 - Visual Examination Data Sheet for External and Interior Surfaces

9.5.2 QA NDE ISI 16 - Visual Examination Data Sheet for MC and CC Surfaces

9.5.3 Other form(s) as provided by specific plant documents.

9.6 As a minimum, the following data shall be recorded on the appropriate examination form:

9.6.1 Project and unit identification.

9.6.2 Weld or item identification.

9.6.3 Examination procedure and revision number.

9.6.4 Date of examination.

9.6.5 Equipment used for visual aids, if any.

9.6.6 Replication materials used, if any.

9.0 DATA AND REPORTING

9.6.7 Examination results, including detailed description, size (length, width and depth) and location of relevant indications.

9.6.8 Signature and certification level of examiner.

9.6.9 Pertinent comments, if any.

9.6.10 Signature of reviewer (if required by plant procedures).

10.0 REVIEW OF DATA AND EVALUATION OF INDICATIONS

10.1 Evaluation of identified relevant indications or flaws shall be performed by engineering on a case-by-case basis to determine final disposition.

10.2 Supplemental examinations shall be performed when specified as a result of the engineering evaluation or as directed by the NDE/ISI Level III.

11.0 RECORDS

11.1 NDE forms completed for each inspection are QA Records with exception of those inspections performed for "Information Only".

11.2 NDE QA records generated as a result of Work Order activities shall be included with the applicable work package.

11.3 NDE QA records generated as a result of program activities (i.e. ASME Section XI) shall be packaged together for retention.

APPENDIX I
Sheet 1 of 7
ASME Section XI, IWE, 1992 Edition With A92 Addenda

1.0 SCOPE

1.1 This Appendix delineates the specific VT-1 and VT-3 visual examination requirements as identified in ASME Section XI, Subsection IWE, 1992 Edition with A92 Addenda.

2.0 GENERAL

2.1 This Appendix is applicable for VT-1 and VT-3 visual examination of the following items (and other structures/components when required by ASME Section XI, Subsection IWE, 1992 Edition with A92 Addenda.

2.1.1 Containment surfaces.

2.1.2 Pressure retaining welds.

2.1.3 Containment surfaces requiring augmented examination.

2.1.4 Seals, gaskets, and moisture barriers.

2.1.5 Pressure retaining dissimilar metal welds.

2.1.6 Pressure retaining bolting.

2.2 Examinations performed in accordance with Subsection IWE require:

2.2.1 Examination of ½" of base metal on both sides of welds.

2.2.2 Examination of exposed surfaces of bolts not removed.

2.2.3 Examination of bolts, studs, washers, nuts bushings, base metal threads, and flange ligaments (if removed).

3.0 SPECIFIC EXAMINATION ITEMS

3.1 Preservice Examinations:

3.1.1 The following acceptance criteria shall be used to evaluate acceptability of components for service. If approved plant documents specify alternative requirements, the plant documents govern.

3.1 Preservice Examinations:

1. Components whose examination either confirms the absence of or reveals flaws or areas of degradation that do not exceed the acceptance standards shall be acceptable for service, provided the flaws or areas of degradation are recorded in terms of location, size, shape, orientation, and distribution within the component.

2. Components whose examination reveals flaws or areas of degradation that do not meet the acceptance standards shall be unacceptable for service unless such flaws or areas of degradation are removed or repaired, to the extent necessary to meet the acceptance standards, prior to placement of the component in service.

3.2 Inservice Examinations:

3.2.1 Inservice examination results shall be compared with recorded results of the preservice examination and prior inservice examinations. Acceptance of the components for continued service shall be in accordance with acceptance by examination, repair, or evaluation.

1. The first baseline examination may be waived if an exemption to the code has been approved prior to the first baseline exam.

2. Components whose examination results meet the acceptance standards shall be acceptable for continued service. Verified changes of flaws or areas of degradation from prior examinations shall be recorded. Components that do not meet the acceptance standards shall be corrected by repair, replacement, or evaluation.

3.3 Repairs:

3.3.1 Components whose examination results reveal flaws or areas of degradation that do not meet the acceptance standards shall be unacceptable for continued service until the additional examination requirements are satisfied, and the flaw or area of degradation is either removed by mechanical methods or the component repaired to the extent necessary to meet the acceptance standards.

3.4 Replacements:

3.4.1 As an alternative to the repair requirement, the component or the portion of the component containing the flaw or area of degradation shall be replaced.

3.5 Evaluation:

3.5.1 Components whose examination results reveal flaws or areas of degradation that do not meet the acceptance standards shall be acceptable for service without the removal or repair of the flaw or area of degradation or replacement if an engineering evaluation indicates that the flaw or area of degradation is nonstructural in nature or has no effect on the structural integrity of the containment. When supplemental examinations are required, if either the thickness of the base metal is reduced by no more than 10% of the nominal plate thickness or the reduced thickness can be shown by analysis to satisfy the requirements of the Design Specification, the component shall be acceptable by evaluation.

3.5.2 When flaws or areas of degradation are accepted by engineering evaluation, the area containing the flaw or degradation shall be reexamined during the next inspection period. Once the area of degradation, or repairs remain essentially unchanged for three consecutive inspection periods, the areas containing such flaws, degradation, or repairs no longer require augmented examination.

3.5.3 When portions of later editions of the Construction Code or Section III are used, all related portions shall be met. The engineering evaluation shall be subject to review by the enforcement and regulatory authorities having jurisdiction at the plant site.

3.6 Supplemental Examinations:

3.6.1 Examinations that detect flaws or evidence of degradation that require evaluation may be supplemented by other examination methods and techniques to determine the character of the flaw (i.e., size, shape, and orientation) or degradation. Visual examinations that detect surface flaws or areas that are suspect shall be supplemented by either surface or volumetric examination.

4.0 ACCEPTANCE STANDARDS FOR CATEGORY E-A, CONTAINMENT SURFACES

Note: Limits for excessive corrosion will be determined by engineering.

4.1 General:

4.1.1 General visual examinations shall be performed by, or under the direction of, a Registered Professional Engineer or other individual, knowledgeable in the requirements for design, inservice inspections, and testing of Class MC and metallic liners of Class CC components. The examinations shall be performed either directly or remotely, by an examiner with visual acuity sufficient to detect evidence of degradation that may affect either the containment structural integrity or leak tightness.

4.1.2 Prior to proceeding with a Type A test, conditions that may affect containment structural integrity or leak tightness shall be accepted by engineering evaluation or corrected in accordance with repair or replacement requirements.

4.2 VT-3 Visual Examinations on Coated Areas:

4.2.1 The inspected area, when painted or coated, shall be examined for evidence of flaking, blistering, peeling, discoloration, and other signs of distress. Areas that are suspect shall be accepted by engineering evaluation or corrected by repair or replacement. Supplemental examinations shall be performed when specified as a result of the engineering evaluation or as directed by the ISI Level III.

4.3 VT-3 Visual Examinations on Non-coated Areas:

4.3.1 The inspected area shall be examined for evidence of cracking, discoloration, wear, pitting, excessive corrosion, arc strikes, gouges, surface discontinuities, dents, and other signs of surface irregularities. Areas that are suspect shall be accepted by engineering evaluation or corrected by repair or replacement. Supplemental examinations shall be performed when specified as a result of engineering evaluation.

5.0 ACCEPTANCE STANDARDS FOR E-B, PRESSURE RETAINING WELDS (THIS IS OPTIONAL REQUIREMENT PER 10 CFR 50.55.A.)

Note: Limits for excessive corrosion will be determined by engineering.

5.1 VT-1 Visual Examination on Coated Areas:

5.1.1 The inspected area, when painted or coated, shall be examined for evidence of flaking, blistering, peeling, discoloration, and other signs of distress. Areas that are suspect shall be accepted by engineering evaluation or corrected by repair or replacement. Supplemental examinations shall be performed when specified as a result of engineering evaluation.

5.2 VT-1 Visual Examination on Non-coated Areas:

5.2.1 The inspected area shall be examined for evidence of cracking, discoloration, wear, pitting, excessive corrosion, arc strikes, gouges, surface discontinuities, dents, and other signs of surface irregularities. Areas that are suspect shall be accepted by engineering evaluation or corrected by repair or replacement. Supplemental examinations shall be performed when specified as a result of engineering evaluation.

6.0 ACCEPTANCE STANDARDS FOR E-C, CONTAINMENT SURFACES REQUIRING AUGMENTED EXAMINATION

Note: Limits for excessive corrosion will be determined by engineering.

6.1 VT-1 Visual Examination on Coated Areas:

6.1.1 The inspected area, when painted or coated, shall be examined for evidence of flaking, blistering, peeling, discoloration, and other signs of distress. Areas that are suspect shall be accepted by engineering evaluation or corrected by repair or replacement. Supplemental examinations shall be performed when specified as a result of engineering evaluation.

6.2 VT-1 Visual Examination on Non-coated Areas:

6.2.1 The inspected area shall be examined for evidence of cracking, discoloration, wear, pitting, excessive corrosion, are strikes, gouges, surface discontinuities, dents, and other signs of surface irregularities. Areas that are suspect shall be accepted by engineering evaluation or corrected by repair or replacement. Supplemental examinations shall be performed when specified as a result of engineering evaluation.

6.3 Ultrasonic Examination:

6.3.1 Containment vessel examinations that reveal material loss exceeding 10% of the nominal containment wall thickness or material loss that is projected to exceed 10% of the nominal containment wall thickness prior to the next examination shall be documented. Such areas shall be accepted by engineering evaluation or corrected by repair or replacement. Supplemental examinations shall be performed when specified as a result of engineering evaluation.

7.0 ACCEPTANCE STANDARDS FOR EXAMINATION CATEGORY E-D, SEALS, GASKETS, AND MOISTURE BARRIERS

7.1 VT-3 Visual Examinations:

7.1.1 Seals, gaskets, and moisture barriers shall be examined for wear, damage, erosion, tear, surface cracks, or other defects that may violate the leak-tight integrity. Defective items shall be repaired or replaced.

8.0 ACCEPTANCE STANDARDS FOR CATEGORY E-F, PRESSURE RETAINING DISSIMILAR METAL WELDS (THIS REQUIREMENT IS OPTIONAL PER 10 CFR 50.55.A.)

8.1 Surface Examinations:

8.1.1 The acceptance standards of IWB shall apply within the examination boundary of Figure IWE-2500-1.

9.0 ACCEPTANCE STANDARDS FOR CATEGORY E-G, PRESSURING RETAINING BOLTING

Note: Criteria for bolted connection defects, belt torque or belt tension will be determined by engineering.

9.1 Visual Examinations:

9.1.1 Bolting materials shall be examined in accordance with the material specification for defects that may cause the bolted connection to violate either the leak tight or structural integrity. Defective items shall be replaced.

9.2 Bolt Torque or Bolt Tension:

9.2.1 Either bolt torque or bolt tension shall be within the limits specified by approved documents for the original design. If no limits have been specified, acceptable bolt torque or bolt tension limits shall be determined by engineering and utilized.

10.0 DATA, RECORDING, REVIEW AND INDICATION EVALUATION

Examination results shall be documented and evaluated in accordance with paragraphs 9.0 and 10.0 in the body of NDEP-0620.

REVISION SUMMARY

The following is a list of the item(s) affected by this revision. Changes or additions are indicated by a vertical bar in the right-hand margin. This record is to be retained as the last page to this procedure until the affected pages are made obsolete by a subsequent revision.

- On cover page, replaced CP&L with NGG; changed title; changed from Reference Use to Information Use.
- Revised Table of Contents to be consistent with revised procedure.
- Revised 1.0 for minor wording changes and to add Notes boxes.
- Revised 2.0 to include additional references and provide titles to some existing references.
- Revised 3.0 to add reference to ASME XI Article IWA 9000 definitions.
- Revised 4.0 for minor wording changes.
- Revised 5.0 for minor wording changes and changed titles of Sections 5.0 and 6.0 so that "Prerequisites" precedes "General".
- Revised 6.0 for minor wording changes.
- Revised 7.1 for wording and structure changes, to list additional tools and equipment, and numbering.
- Revised 7.2 to add section title, for minor wording changes, to add additional description, and to add/revise Notes boxes, numbering, and to move Illumination information contained in Section 8.0 to Section 7.2.
- Added 7.3 and 7.4 to include section titles "Optical Aids", and "Mechanical Aids and Instruments", descriptions, and Notes boxes, numbering, and to move similar information contained in Section 8.0 to Section 7.3 and 7.4.
- Revised 8.0 - 8.4 to revise section titles, for minor wording changes, and to add provisions for surface preparation.
- Consolidated section 9.0 with 8.0.
- Renumbered section 10.0 to now be section 9.0. Also performed wording changes, re-sequencesing some paragraphs, and revised Notes box.
- Renumbered section 11.0 to now be section 10.0. Revised for minor wording changes.
- Renumbered section 12.0 to now be section 11.0. Revised for minor wording changes.
- Revised Attachment 1 for inclusion of CR3 and for minor changes to data fields.
- Renamed as Appendix I. Deleted 2.0 References (already incorporated into main procedure body) and rename as "General". Consolidated applicable scope of IWE under 2.0. Renumbered and structured Appendix per Writer's Guide. Minor wording changes for clarification.
- Removed form and added to Appendix A

ATTACHMENT 4
Sheet 1 of 1
Procedure Review Form

Type of Review: Tech - HNP, BNP Checker - RNP	Reviewer Name/Organization/Plant/ Extension: Harlee Bordeaux/NAS/QC/BNP/850-2359	Page 1 of 1
Procedure Number:NDEP-620	Revision:2	Due Date:6/14/02
Impacted Procedures:N/A		

Comment	Resolution
Incorporated all comments from CR3	Complete

Reviewer (Sign and Date, For Affected Organization Review, signature documents concurrence with the procedure): Harlee Bordeaux 5/20/02

Writer/Sponsor/Peer Group Champion/PRC (Sign and Date): _____

Procedure Sponsor for Periodic Reviews (Sign and Date): _____

(A site specific form, signed by an approved reviewer, may be attached to this form to document the required review. In this case simply identify "See Attached" on this form.)

QA RECORD when completed to document a periodic review. This form will also become part of a QA Record package when completed to document Technical Reviews[BNP&HNP], Affected Organization Reviews[HNP], Checker Reviews[RNP], and Qualified Reviews[CR3].

(Form PRO-NGGC-0202-4-7)

ATTACHMENT 4
Sheet 1 of 1
Procedure Review Form

Type of Review: Technical CR3 6-13-02	Reviewer Name/Organization/Plant/ Extension: B.P. Komara/NAS/CR3/8731	Page 1 of 2
Procedure Number: NDEP-0620	Revision: 2 (draft)	Due Date: 06/14/02

Impacted Procedures:
Florida Power Corporation Special Process Specifications (SPS):
SPS VT-N17, Visual Examination of ASME Section XI, Subsection IWE Components, Revision 2.
SPS VA-N18, Visual Examination Acceptance Criteria of ASME Section XI, Subsection IWE Components, Revision 1.

Comment	Resolution
Cover Page: Needs updated.	On cover page, replaced CP&L with NGG; changed from Reference Use to Information Use.
Table of Contents: Needs updated to reflect procedure changes.	Revised Table of Contents to be consistent with revised procedure.
1.0: Minor wording changes recommended.	Revised 1.0 for minor wording changes and to add Notes boxes.
2.0: Additional references for CR3 and titles to some references needed.	Revised 2.0 to include additional references and provide titles to some existing references.
3.0: Add reference to ASME XI Article IWA 9000 definitions.	Revised 3.0 to add reference to ASME XI Article IWA 9000 definitions.
4.0: Minor wording changes recommended.	Revised 4.0 for minor wording changes.
5.0: Minor wording changes recommended.	Revised 5.0 for minor wording changes and changed titles of Sections 5.0 and 6.0 so that "Prerequisites" precedes "General".
6.0: Minor wording changes recommended.	Revised 6.0 for minor wording changes.
7.1: Wording and structure changes recommended, list additional tools and equipment, and conform paragraph numbering.	Revised 7.1 for wording and structure changes, to list additional tools and equipment, and numbering.
7.2: Recommend revising for consistency with other similar NDEPs to add section title, Notes boxes, and moving some information contained in Section 8.0 to Section 7.0.	Revised 7.2 to add section title, for minor wording changes, to add additional description, and to add/revise Notes boxes, numbering, and to move Illumination information contained in Section 8.0 to Section 7.2.
	Added 7.3 and 7.4 to include section titles "Optical Aids", and "Mechanical Aids and Instruments", descriptions, and Notes boxes, numbering, and to move similar information contained in Section 8.0 to Section 7.3 and 7.4.

ATTACHMENT 4
Sheet 1 of 1
Procedure Review Form

Type of Review: Technical	Reviewer Name/Organization/Plant/ Extension: B.P. Komara/NAS/CR3/8731	Page 2 of 2
Procedure Number: NDEP-0620	Revision: 2 (draft)	Due Date: 06/14/02

Comment	Resolution
8.0 – 8.4: Recommend section title changes, minor wording changes, and add provisions for surface preparation.	Revised 8.0 - 8.4 to revise section titles, for minor wording changes, and to add provisions for surface preparation.
9.0: Consolidate this section with 8.0.	Consolidated section 9.0 with 8.0.
10.0: Renumber this section as 9.0 and complete minor wording changes.	Renumbered section 10.0 to now be section 9.0. Also performed wording changes, re-sequencing some paragraphs, and revised Notes box.
11.0: Renumber this section as 10.0 and complete minor wording changes.	Renumbered section 11.0 to now be section 10.0. Revised for minor wording changes.
12.0: Renumber this section as 11.0 and complete minor wording changes.	Renumbered section 12.0 to now be section 11.0. Revised for minor wording changes.
Recommend revising Attachment 1 for inclusion of CR3 and for minor changes to data fields.	Revised Attachment 1 for inclusion of CR3 and for minor changes to data fields.
Appendix A: Change to Appendix I. Delete 2.0 References (already incorporated into main procedure body) and rename as "General". Consolidate applicable scope of IWE under 2.0. Renumber and structure Appendix per Writer's Guide. Minor wording changes recommended for clarification.	Renamed as Appendix I. Deleted 2.0 References (already incorporated into main procedure body) and rename as "General". Consolidated applicable scope of IWE under 2.0. Renumbered and structured Appendix per Writer's Guide. Minor wording changes for clarification.

Reviewer (Sign and Date, For Affected Organization Review, signature documents concurrence with the procedure.): B.P. Komara / B.P. Komara 5/16/02

Writer/Sponsor/Peer Group Champion/PRC (Sign and Date): _____

Procedure Sponsor for Periodic Reviews (Sign and Date): _____

(A site-specific form, signed by an approved reviewer, may be attached to this form to document the required review. In this case simply identify "See Attached" on this form.)

QA RECORD when completed to document a periodic review. This form will also become part of a QA Record package when completed to document Technical Reviews[BNP&HNP], Affected Organization Reviews[HNP], Checker Reviews[RNP], and Qualified Reviews[CR3].

(Form PRO-NGGC-0202-4-7)

TITLE

VISUAL EXAMINATION OF ASME SECTION XI, SUBSECTION IWL COMPONENTS

1.0 PURPOSE

This specification provides instructions for visual examination of ASME Section XI, Subsection IWL, Class CC Concrete Components of Light-Water Cooled Plants.

2.0 SCOPE

This specification describes the basic requirements for visual examination to determine the condition of component surfaces. This procedure meets the VT-1, VT-1C and VT-3C examination requirements for ASME Section XI, Subsection IWL and applies only to Crystal River Nuclear Unit 3.

3.0 REFERENCE DOCUMENTS

(1) ASME Section XI, Subsection IWL, Requirements for Class CC Concrete Components of Light-Water Cooled Plants, 1992 Edition through 1992 Addenda

(2) ASME Section V, Article 9, Visual Examination, 1992 Edition through 1992 Addenda

(3) ASME Section XI, Section IWA-2240, Alternative Examinations

(4) American Concrete Institute, ACI 201.1R-92, Guide for Making a Condition Survey of Concrete in Service,

(5) American Concrete Institute, ACI 349.3R-96, Evaluation of Existing Nuclear Safety-Related Concrete Structures

4.0 PERSONNEL QUALIFICATIONS

Personnel performing examinations to this specification shall be qualified and certified in accordance with following Material Technology Administrative Procedures:

(1) MTAP No. 6, Certification Of NDT Personnel In Accordance With SNT-TC-1A, in the visual VT-1, VT-1C and VT-3C examination method

Only personnel certified as Level II or Level III in the visual methods shall record, evaluate and interpret examination results.

5.0 SURFACE PREPARATION

All surfaces shall be free from extraneous material that would interfere with the examination.

TITLE

VISUAL EXAMINATION OF ASME SECTION XI, SUBSECTION IWL COMPONENTS

6.0 LIGHTING

The lighting shall illuminate the area to be examined at right and oblique angles. This lighting can be accomplished using normal lighting, flashlights, drop lights, flood lights, etc. Reflections from the piece being examined must not interfere with the visual examination. The lighting and resolution requirements for the visual examinations are specified in Section 7.0. It is not necessary to measure illumination levels on each examination surface when using the same portable light source or similar installed lighting is demonstrated to provide the specified illumination at the maximum examination distance. The resolution demonstrations should be performed in the least discernible location of the examination area.

When using portable battery powered lights, the illumination resolution capabilities shall be checked before and after each examination or series of examination, not to exceed 4 hours of continuous use between checks.

7.0 EXAMINATION TECHNIQUES

Concrete surface areas shall be VT-3C visual examined for evidence of damage or degradation. Visual examinations may be performed from floors, roofs, platforms, walkways, ladders, ground surface or other permanent vantage points. Selected areas, such as those that indicate suspect conditions, shall receive a
VT-1C examination.

7.1 ASME SECTION XI VISUAL VT-1 and VT-1C EXAMINATIONS

VT-1C examinations are conducted to determine concrete deterioration and distress for suspect areas detected by VT-3C. VT-1 examinations are conducted to determine conditions of tendon anchorage and wires or strands.

7.2 ASME SECTION XI VISUAL VT-3C EXAMINATIONS

VT-3 examinations are conducted to determine the general structural condition of concrete surfaces of containments by identifying areas of concrete deterioration and distress.

7.3 DIRECT VT-1 and VT-1C VISUAL EXAMINATION

Direct visual examination may be conducted when access is sufficient to place the eye within 24 inches of the examination surface and at an angle not less than 30 degrees to the examination surface. The lighting level shall be a minimum lighting level of 50 foot-candles (fc). Resolution shall be sufficient to resolve a 1/32nd inch graduation on a standard machinist steel rule at the examination surface.

7.3 DIRECT VT-3C VISUAL EXAMINATION

Direct visual examination may be conducted when access is sufficient to place the eye within 48 inches of the examination surface. The lighting level shall be a minimum of 50 foot-candles (fc). Resolution shall be sufficient to resolve a 1/10th inch graduation on a standard machinist steel rule at the examination surface.

7.5 REMOTE VISUAL EXAMINATION

Remote visual examination may be substituted for direct examination. Remote visual examination may use visual aids such as mirrors, binoculars, telescopes, borescopes, fiber optics, video cameras, or other suitable instruments. The lighting and resolution capability of remote systems shall be able to detect the conditions or indications for which the visual examination is being performed.

TITLE

VISUAL EXAMINATION OF ASME SECTION XI, SUBSECTION IWL COMPONENTS

When remote visual examinations are performed using an automated positioning device, the location and dimensions of indications shall be obtained using the position display readouts of the positioning device. If no position display readouts are available, the location of the indication shall be recorded relative to known physical locations on the part, and the dimensions of the indication shall be estimated based on known surface irregularities.

8.0 SIZING OF INDICATIONS BY REMOTE VIDEO EXAMINATION

In order to determine the size of the indication, the distance from the examination area to the face of the camera must be known. This may be accomplished by using a stand-off device to hold the camera at a known fixed distance from the indication being viewed or by using known drawing dimensions to determine this distance.

Measure the actual size of the indication as viewed on the video monitor screen.

Perform sizing calibration by placing a graduated scale in the camera's field of view under the same conditions as the indication was viewed (water, air, or gaseous atmosphere), the same distance, and in the same plane as the measured indication.

Determine/calculate the sizing correction factor by taking a measurement of a one inch length of the graduated scale as viewed on the video monitor screen.

To obtain actual indication size, divide the indication measurement by the sizing correction factor.

Example: Correction factor as measured on video monitor screen 1 inch on graduated scale = 1.85 inches as measured on monitor screen. Indication dimensions as measured on monitor screen = 0.34 inches.

0.34 / 1.85 = 0.18 inches corrected indication length/size

9.0 AREAS OF EXAMINATION

Work request documentation and/or engineering instructions which reference this procedure will specify the areas required to be examined.

10.0 REPORTS OF EXAMINATION

Visual examinations shall be documented on an appropriate visual examination report. Indications of discontinuities shall be evaluated in accordance with the appropriate SPS acceptance criteria specified in the Work Request documentation and/or engineering instructions.

Discontinuities and unacceptable defects shall have their dimensions and orientations accurately documented.

Photography or video tape recording may be used to record questionable discontinuities or imperfections for future evaluations. Where possible, graduated scale should be recorded to document an accurate dimension. The photograph or videotape shall be adequately identified to describe the area viewed, component identification, and accurate orientation of the area.

TITLE

VISUAL EXAMINATION OF ASME SECTION XI, SUBSECTION IWL COMPONENTS

The examiner shall complete an examination report (similar to Attachment 1 or 2) containing the minimum information listed below:

- Plant
- Unit
- System
- Procedure and Revision
- ISI Figure Number (if applicable)
- Work Request Number
- Examination Purpose
- Acceptance Criteria
- Examination Technique
- Examination Equipment
- Examination Results
- Examination Limitations
- Examiner Signature, Certification Level, and Date

The examination report shall be submitted to the responsible engineer for evaluation. If the evaluation identifies unacceptable conditions, the precursor card number must be identified on the examination report.

11.0 ATTACHMENTS

Attachment No. 1	Visual Examination Data Sheet - Concrete (Example)
Attachment No. 2	Visual Examination Data Sheet - Tendon (Example)

12.0 REVISION HISTORY

Revision 0	Original

TITLE

VISUAL EXAMINATION OF ASME SECTION XI, SUBSECTION IWL COMPONENTS

Attachment 1

Florida Power Corporation

VISUAL EXAMINATION DATA SHEET
ASME SECTION XI, SUBSECTION IWL - CONCRETE

Plant Crystal River Unit 3 Page ____ of ____
System ____ Exam. Data Sheet No. ____
Procedure SPS VT-N18 Revision ____

Component ____ WR No. ____
Component Description ____ DWG. ____
Examination Purpose: ☐ ISI ☐ PSI ☐ OTHER ____
Acceptance Criteria SPS VA-N19 Rev. ASME Section XI 1992 ' 92 Addenda

Technique: ☐ VT-1C ☐ VT-3C ☐ Direct ☐ Remote Resolution: ☐ 1/32" ☐ 1/10" ☐ N / A
Equipment: ☐ Flashlight ☐ Mirror ☐ Magnifier ☐ Light Meter ☐ Other: ____

Examination Results

Cracking	☐ YES	☐ NO	☐ N / A	Abrasion, Impact, or Cavitation	☐ YES	☐ NO	☐ N / A
Leaching	☐ YES	☐ NO	☐ N / A	Stains, Efflorescence	☐ YES	☐ NO	☐ N / A
Stalactites/Stalagmites	☐ YES	☐ NO	☐ N / A	Exposed Reinforcement	☐ YES	☐ NO	☐ N / A
Scaling	☐ YES	☐ NO	☐ N / A	Curling or Warping	☐ YES	☐ NO	☐ N / A
Spalls or Popouts	☐ YES	☐ NO	☐ N / A	Tendon Grease Leakage	☐ YES	☐ NO	☐ N / A
Chemical Attack	☐ YES	☐ NO	☐ N / A	Coatings Degradation	☐ YES	☐ NO	☐ N / A
Corrosion (Wastage)	☐ YES	☐ NO	☐ N / A	Other:			☐ N / A

Sketch / Comment Area

Recordable Indications Present ☐ YES ☐ NO Supplemental Data Attached ☐ YES ☐ NO

Examiner (print & sign) ____ Level ____ Date ____
Reviewer (print & sign) ____ Level ____ Date ____
ANIC If Required (sign) ____ Date ____

IF Not Acceptable by Examination, Engineering Evaluation Required. PC# (if required) ____
Acceptable by Evaluation : ☐ YES ☐ NO (Provide basis and / or rework / repair method)
Engineering (print & sign) ____ Date ____

TITLE

VISUAL EXAMINATION OF ASME SECTION XI, SUBSECTION IWL COMPONENTS

Attachment 2

Florida Power Corporation

VISUAL EXAMINATION DATA SHEET
ASME SECTION XI, SUBSECTION IWL - TENDONS

Plant Crystal River Unit 3 Page ____ of ____
System ____ Exam. Data Sheet No. ____
Procedure SPS VT-N18 Revision ____

Component ____ WR No. ____
Component Description ____ DWG. ____
Examination Purpose: ☐ ISI ☐ PSI ☐ OTHER ____
Acceptance Criteria SPS VA-N19 Rev. ASME Section XI 1992 ' 92 Addenda

Technique: ☐ VT-1 ☐ VT-1C ☐ VT-3C ☐ Direct ☐ Remote Resolution: ☐ 1/32" ☐ 1/10" ☐ N / A
Equipment: ☐ Flashlight ☐ Mirror ☐ Magnifier ☐ Light Meter ☐ Other: ____

Examination Results

Concrete Cracks Greater than 0.01" Width	☐ YES	☐ NO	☐ N / A	Corrosion	☐ YES	☐ NO	☐ N / A
Missing Buttonheads	☐ YES	☐ NO	☐ N / A	Broken Wires	☐ YES	☐ NO	☐ N / A
Cracks in Tendon Anchorage Hardware	☐ YES	☐ NO	☐ N / A	Protruding Wires	☐ YES	☐ NO	☐ N / A
Water in Anchorage Caps	☐ YES	☐ NO	☐ N / A	Broken Strands	☐ YES	☐ NO	☐ N / A
Water Draining from Tendons	☐ YES	☐ NO	☐ N / A	Grease Leakage	☐ YES	☐ NO	☐ N / A
Grease Cap Damage/Deformation	☐ YES	☐ NO	☐ N / A	Other:			☐ N / A

Sketch / Comment Area

Recordable Indications Present ☐ YES ☐ NO Supplemental Data Attached ☐ YES ☐ NO

Examiner (print & sign) ____ Level ____ Date ____
Reviewer (print & sign) ____ Level ____ Date ____
ANIC If Required (sign) ____ Date ____

If Recordable Indications Present, Engineering Evaluation Required. PC# (if required) ____
Acceptable by Evaluation : ☐ YES ☐ NO (Provide basis and / or rework / repair method)
Engineering (print & sign) ____ Date ____

TITLE

VISUAL EXAMINATION OF ASME SECTION XI, SUBSECTION IWL COMPONENTS

1.0 PURPOSE

This specification provides instructions for visual examination of ASME Section XI, Subsection IWL, Class CC Concrete Components of Light-Water Cooled Plants.

2.0 SCOPE

This specification describes the basic requirements for visual examination to determine the condition of component surfaces. This procedure meets the VT-1, VT-1C and VT-3C examination requirements for ASME Section XI, Subsection IWL and applies only to Crystal River Nuclear Unit 3.

3.0 REFERENCE DOCUMENTS

(1) ASME Section XI, Subsection IWL, Requirements for Class CC Concrete Components of Light-Water Cooled Plants, 1992 Edition through 1992 Addenda

(2) ASME Section V, Article 9, Visual Examination, 1992 Edition through 1992 Addenda

(3) ASME Section XI, Section IWA-2240, Alternative Examinations

(4) American Concrete Institute, ACI 201.1R-92, Guide for Making a Condition Survey of Concrete in Service,

(5) American Concrete Institute, ACI 349.3R-96, Evaluation of Existing Nuclear Safety-Related Concrete Structures

4.0 PERSONNEL QUALIFICATIONS

Personnel performing examinations to this specification shall be qualified and certified in accordance with following Material Technology Administrative Procedures:

(1) Nuclear Assessment Procedure (NAP) 6, "CERTIFICATION OF NONDESTRUCTIVE EXAMINATION PERSONNEL IN ACCORDANCE WITH SNT-TC-1A", in the visual VT-1, VT-1C and VT-3C examination method

Only personnel certified as Level II or Level III in the visual methods shall record, evaluate and interpret examination results.

5.0 SURFACE PREPARATION

All surfaces shall be free from extraneous material that would interfere with the examination.

REVIEWED BY	DATE	APPROVED BY	DATE
[signature] III	7-19-01	[signature]	7/23/01

TITLE

VISUAL EXAMINATION OF ASME SECTION XI, SUBSECTION IWL COMPONENTS

6.0 LIGHTING

The lighting shall illuminate the area to be examined at right and oblique angles. This lighting can be accomplished using normal lighting, flashlights, drop lights, flood lights, etc. Reflections from the piece being examined must not interfere with the visual examination. The lighting and resolution requirements for the visual examinations are specified in Section 7.0. It is not necessary to measure illumination levels on each examination surface when using the same portable light source or similar installed lighting is demonstrated to provide the specified illumination at the maximum examination distance. The *resolution demonstrations should be performed in the least discernible location of the examination area.*

When using portable battery powered lights, the illumination resolution capabilities shall be checked before and after each examination or series of examination, not to exceed 4 hours of continuous use between checks.

7.0 EXAMINATION TECHNIQUES

Concrete surface areas shall be VT-3C visual examined for evidence of damage or degradation. Visual examinations may be performed from floors, roofs, platforms, walkways, ladders, ground surface or other permanent vantage points. Selected areas, such as those that indicate suspect conditions, shall receive a
VT-1C examination.

7.1 ASME SECTION XI VISUAL VT-1 and VT-1C EXAMINATIONS

VT-1C examinations are conducted to determine concrete deterioration and distress for suspect areas detected by VT-3C. VT-1 examinations are conducted to determine conditions of tendon anchorage and wires or strands.

7.2 ASME SECTION XI VISUAL VT-3C EXAMINATIONS

VT-3 examinations are conducted to determine the general structural condition of concrete surfaces of containments by identifying areas of concrete deterioration and distress.

7.3 DIRECT VT-1 and VT-1C VISUAL EXAMINATION

Direct visual examination may be conducted when access is sufficient to place the eye within 24 inches of the examination surface and at an angle not less than 30 degrees to the examination surface. The lighting level shall be a minimum lighting level of 50 foot-candles (fc). Resolution shall be sufficient to resolve a 1/32nd inch graduation on a standard machinist steel rule at the examination surface.

7.4 DIRECT VT-3C VISUAL EXAMINATION

Direct visual examination may be conducted when access is sufficient to place the eye within 48 inches of the examination surface. The lighting level shall be a minimum of 50 foot-candles (fc). Resolution shall be sufficient to resolve a 1/10th inch graduation on a standard machinist steel rule at the examination surface.

7.5 REMOTE VISUAL EXAMINATION

Remote visual examination may be substituted for direct examination. Remote visual examination may use visual aids such as mirrors, binoculars, telescopes, borescopes, fiber optics, video cameras, or other suitable instruments. The lighting and resolution capability of remote systems shall be able to detect the conditions or indications for which the visual examination is being performed.

When remote visual examinations are performed using an automated positioning device, the location and dimensions of indications shall be obtained using the position display readouts of the positioning device. If no position display readouts are available, the location of the indication shall be recorded relative to known physical locations on the part, and the dimensions of the indication shall be estimated based on known surface irregularities.

8.0 SIZING OF INDICATIONS BY REMOTE VIDEO EXAMINATION

In order to determine the size of the indication, the distance from the examination area to the face of the camera must be known. This may be accomplished by using a stand-off device to hold the camera at a known fixed distance from the indication being viewed or by using known drawing dimensions to determine this distance.

Measure the actual size of the indication as viewed on the video monitor screen.

Perform sizing calibration by placing a graduated scale in the camera's field of view under the same conditions as the indication was viewed (water, air, or gaseous atmosphere), the same distance, and in the same plane as the measured indication.

Determine/calculate the sizing correction factor by taking a measurement of a one inch length of the graduated scale as viewed on the video monitor screen.

To obtain actual indication size, divide the indication measurement by the sizing correction factor.

Example: Correction factor as measured on video monitor screen 1 inch on graduated scale = 1.85 inches as measured on monitor screen. Indication dimensions as measured on monitor screen = 0.34 inches.

0.34 / 1.85 = 0.18 inches corrected indication length/size

9.0 AREAS OF EXAMINATION

Work request documentation and/or engineering instructions which reference this procedure will specify the areas required to be examined.

10.0 REPORTS OF EXAMINATION

Visual examinations shall be documented on an appropriate visual examination report. Indications of discontinuities shall be evaluated in accordance with the appropriate SPS acceptance criteria specified in the Work Request documentation and/or engineering instructions.

Discontinuities and unacceptable defects shall have their dimensions and orientations accurately documented.

Photography or video tape recording may be used to record questionable discontinuities or imperfections for future evaluations. Where possible, graduated scale should be recorded to document an accurate dimension. The photograph or videotape shall be adequately identified to describe the area viewed, component identification, and accurate orientation of the area.

TITLE

VISUAL EXAMINATION OF ASME SECTION XI, SUBSECTION IWL COMPONENTS

The examiner shall complete an examination report (similar to Attachment No's 1 or 2) containing the minimum information listed below:

- Plant
- Unit
- System
- Procedure and Revision
- ISI Figure Number (if applicable)
- Work Request Number
- Examination Purpose
- Acceptance Criteria
- Examination Technique
- Examination Equipment
- Examination Results
- Examination Limitations
- Examiner Signature, Certification Level, and Date

The examination report shall be submitted to the responsible engineer for evaluation. If the evaluation identifies unacceptable conditions, the Nuclear Condition Report number must be identified on the examination report.

11.0 ATTACHMENTS

Attachment No. 1	Visual Examination of IWL
Attachment No. 2	Visual Examination Data Sheet - Tendon (Example)

12.0 REVISION HISTORY

Revision 0	12/29/97	Original
Revision 1	Replaced MTAP No. 6 with NAP-6 for the certification procedure. Added the new electronic form.	

TITLE

VISUAL EXAMINATION OF ASME SECTION XI, SUBSECTION IWL COMPONENTS

Attachment No. 1

Florida Power
A Progress Energy Company

Visual Examination of IWL

Site/Unit: ____ / ____ Procedure: ____ Outage No.: ____

Summary No.: ____ Procedure Revision/FC: ____ / ____ Report No.: ____

Workscope: ____ Work Order No.: ____ Page: ____ of ____

Code: ____ Code Cat.: ____ Location: ____

Drawing No.: ____ Description: ____

System ID: ____

Component ID: ____

Limitations: ____

General Exam ☐ VT-1C ☐ VT-3C ☐ Resolution: ____

Surface Condition: ____ Visual Equipment/Aids: ____

Inspected From: Outside Containment ☐ Both ☐

Light Meter Mfg.: ____ Serial No.: ____ Illumination: ____ FL/CDS

Light Verification Times: ____ / ____ Cal In ☐ Cal Out ☐

Vent System Or Containment Surfaces

Coated Areas ____ Non-Coated Areas ____

	Sat	Unsat	N/A	See Comments		Sat	Unsat	N/A	See Comments
1) Spalling					12) Reinforcing Bar Corrosion				
2) Cracking					13) Rust Bleeding				
3) Delaminations					14) Tendon Surface Cracking				
4) Honeycomb					15) Efflorescense				
5) Water In Leakage					16) Cosmetic Patch Bond				
6) Chemical Leaching					17) Voids				
7) Popouts					18) Erosion				
8) Deflection					19) Pitting				
9) Staining					20) Abrasion				
10) Discoloration					21) Segregation				
11) Vibration Damage					22) Other				

Comments:

Results: Sat ☐ Unsat ☐ ____

Percent Of Coverage Obtained > 90%: ____ Reviewed Previous Data: ____

Examiner	Level	Signature	Date	Reviewer	Signature	Date
			/			/
Examiner	Level	Signature	Date	Site Review	Signature	Date
			/			/
Other	Level	Signature	Date	ANII Review	Signature	Date
			/			/

TITLE

VISUAL EXAMINATION OF ASME SECTION XI, SUBSECTION IWL COMPONENTS

Attachment No. 2

Florida Power
A Progress Energy Company

VISUAL EXAMINATION DATA SHEET
ASME SECTION XI, SUBSECTION IWL - TENDONS

Plant _____ Unit _____ Page ____ of ____
System _____ Exam. Data Sheet No. _____
Procedure _____ Revision _____

Component _____ WR No. _____
Component Description _____ DWG. _____
Examination Purpose: ☐ ISI ☐ PSI ☐ OTHER _____
Acceptance Criteria _____

Technique: ☐ VT-1 ☐ VT-1C ☐ VT-3C ☐ Direct ☐ Remote Resolution: ☐ 1/32" ☐ 1/10" ☐ N / A
Equipment: ☐ Flashlight ☐ Mirror ☐ Magnifier ☐ Light Meter ☐ Other: _____

Examination Results

Concrete Cracks Greater than 0.01" Width	☐ YES	☐ NO	☐ N / A	Corrosion	☐ YES	☐ NO	☐ N / A
Missing Buttonheads	☐ YES	☐ NO	☐ N / A	Broken Wires	☐ YES	☐ NO	☐ N / A
Cracks in Tendon Anchorage Hardware	☐ YES	☐ NO	☐ N / A	Protruding Wires	☐ YES	☐ NO	☐ N / A
Water in Anchorage Caps	☐ YES	☐ NO	☐ N / A	Broken Strands	☐ YES	☐ NO	☐ N / A
Water Draining from Tendons	☐ YES	☐ NO	☐ N / A	Grease Leakage	☐ YES	☐ NO	☐ N / A
Grease Cap Damage/Deformation	☐ YES	☐ NO	☐ N / A	Other:			☐ N / A

Sketch / Comment Area

Recordable Indications Present ☐ YES ☐ NO Supplemental Data Attached ☐ YES ☐ NO

Examiner (print & sign) _____ Level ____ Date _____
Reviewer (print & sign) _____ Level ____ Date _____
ANIC If Required (sign) _____ Date _____

If Recordable Indications Present, Engineering Evaluation Required. PC# (if required) _____
Acceptable by Evaluation : ☐ YES ☐ NO (Provide basis and / or rework / repair method)
Engineering (print & sign) _____ Date _____

TITLE

VISUAL EXAMINATION ACCEPTANCE CRITERIA OF ASME SECTION XI, SUBSECTION IWL COMPONENTS

1.0 PURPOSE

This procedure specifies ASME Section XI, Subsection IWL minimum acceptance/recording criteria for visual examination of Class CC Concrete Components of Light-Water Cooled Plants. The examinations are performed to identify and define areas of distress.

2.0 SCOPE

This document only applies to the visual examination of ASME Section XI, Subsection IWL Class CC Concrete Components at Crystal River Nuclear Unit 3:

3.0 REFERENCE DOCUMENTS

This specification has been developed with the following documents as a reference:

(1) ASME Section XI, Subsection IWL, Requirements for Class CC Concrete Components of Light-Water Cooled Plants, 1992 Edition through 1992 Addenda

(2) American Concrete Institute, ACI 201.1R-92, Guide for Making a Condition Survey of Concrete in Service

(3) American Concrete Institute, ACI 349.3R-96, Evaluation of Existing Nuclear Safety-Related Concrete Structures

4.0 PERSONNEL QUALIFICATIONS

Personnel evaluating the examination results to the requirements of this specification shall be qualified and certified in accordance with following Material Technology Administrative Procedures:

(1) MTAP No. 6, Certification Of NDT Personnel In Accordance With SNT-TC-1A, in the visual VT-1, VT-1C and VT-3C examination method.

Only personnel certified as Level II or Level III in the visual methods shall record, evaluate and interpret examination results.

5.0 ACCEPTANCE / RECORDING CRITERIA

Visual examinations shall be performed to document areas of deterioration. Suspect areas will be accepted by engineering evaluation or corrected by repair/replacement. The engineering evaluation will determine the acceptability of the condition and determine the need for supplemental examinations.

TITLE

VISUAL EXAMINATION ACCEPTANCE CRITERIA OF ASME SECTION XI, SUBSECTION IWL COMPONENTS

5.1 EXAMINATION CATEGORY L-A, CONCRETE

5.1.1 Visual Examination of Concrete Surfaces

Concrete surfaces shall be examined for the purpose of identifying and defining areas of distress. The following conditions shall be recorded for engineering evaluation. However, the examination should not be limited to the items listed below, thereby possibly overlooking other conditions of degradation.

(1) Cracks - Record the location, frequency, type, size, Leaching
(2) Stalactites or Stalagmites
(3) Scaling - Record the area, depth, and type.
(4) Spalls and Popouts - Record the number, size, depth, and type.
(5) Extent of corrosion or chemical attack, abrasion, impact, impact or cavitation.
(6) Stains, Efflorescence - Record possible source (heat from steam piping, fire, rebar rust, etc.)
(7) Exposed Reinforcement
(8) Curling and warping
(9) Tendon Grease Leakage
(10) Coatings Degradation
(11) Other conditions of Degradation

5.2 EXAMINATION CATEGORY L-B, UNBONDED POST-TENSIONING SYSTEM

5.2.1 Visual Examination of Anchorage Hardware and Surrounding Concrete

The VT-1 examination of the tendon anchorage hardware includes bearing plates, anchor heads, wedges, buttonheads, and shims. The VT-1C examination includes the concrete extending outward for a distance of 2 feet from the edge of the bearing plate. The following conditions shall be recorded for engineering evaluation:

(1) Concrete cracks having widths greater than 0.01 inch,
(2) Corrosion,
(3) Broken or protruding wires,
(4) Missing buttonheads,
(5) Broken strands,
(6) Cracks in tendon anchorage hardware,
(7) The amount of water contained in the anchorage end cap,
(8) The amount of water that drains from the tendon during the examination process,
(9) Other conditions of Degradation.
(10) Grease Cap Damage or Deformation
(11) Grease Leakage
(12) Other conditions of Degradation

6.0 REVISION HISTORY

Revision 0 Original