



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION II
101 MARIETTA STREET, N.W.
ATLANTA, GEORGIA 30303

Report No.: 50-302/85-23

Licensee: Florida Power Corporation
3201 34th Street, South
St. Petersburg, FL 33733

Docket No.: 50-302

License No.: DPR-72

Facility Name: Crystal River

Inspection Conducted: May 13 - 17, 1985

Inspector: W. P. Kleinsorge

MAY 29, 1985
Date Signed

Approved by: J. J. Blake
J. J. Blake, Section Chief
Engineering Division
Division of Reactor Safety

5/30/85
Date Signed

SUMMARY

Scope: This routine, unannounced inspection entailed 37 inspector-hours on site in the areas of licensee action on previous enforcement matters, modification progress, welding (55050), and nondestructive examination.

Results: One violation was identified - "Failure to Follow WPS Requirements" - paragraph 6e.

REPORT DETAILS

1. Persons Contacted

Licensee Employees

- *P. F. McKee, Plant Manager, Florida Power Corporation (FPC)
- *K. F. Lancaster, Manager, Site Quality Assurance (QA)
- *J. G. Bradley, Manager, Site Quality Control (QC)
- *W. L. Rossfield, Manager, Site Nuclear Compliance
- *J. May, Welding Engineer

Other licensee employees contacted included construction craftsmen, engineers, technicians, and office personnel.

Other Organization

Fluor

- *J. Warren, Project Engineer
- *B. E. Drake, Engineer

NRC Resident Inspectors

- *T. Stetka, Senior Resident Inspector
- *J. E. Tedrow, Resident Inspector

*Attended exit interview

2. Exit Interview

The inspection scope and findings were summarized on May 17, 1985, with those persons indicated in paragraph 1 above. The inspector described the areas inspected and discussed in detail the inspection findings listed below. No dissenting comments were received from the licensee.

(Open) Inspector Followup Item 50-302/85-23-01: "Weld Undercut Acceptance Criteria" - paragraph 6a

(Open) Unresolved Item 50-302/85-23-02: "WPS Validity" - paragraph 6c(1)

(Open) Inspector Followup Item 50-302/85-23-03: "WPS Thickness Range" - paragraph 6c(2)

(Open) Violation 50-302/85-23-04: "Failure to Follow WPS Requirements" - paragraph 6e

(Open) Inspector Followup Item 50-302/85-23-05: "Post Weld Heat Treatment Program Inconsistencies" - paragraph 6f

The licensee did not identify as proprietary any of the materials provided to or reviewed by the inspector during this inspection.

3. Licensee Action on Previous Enforcement Matters

(Open) Unresolved Item 302/85-17-02: "Control of Filler Material".

This item involves the staff's concern over the adequacy of the licensee's welding filler material control program. The welding filler material is controlled by two procedures, MOP-412, "Control of Welding Consumables", Rev. 0, dated March 27, 1985, and MP524, "Control and Issue of Welding Materials". MP524 controls welding materials to the point of issue from the welding material issue station; MOP-412 controls welding materials in the field from the point of issue from the welding material issue station to deposition or return to the welding material issue station where MP-524 takes over control. The inspector reviewed both procedures, inspected the welding material issue station, and observed field welding for compliance with both procedures in the applicable areas. The inspector found the following areas of weakness in addition to these identified in IE Report 302/85-17:

- a. The licensee has no documented program to control welding filler material stubs.
- b. There is no statement defining what the authorizing signature on the welding material withdrawal order (WEWO) signifies.
- c. The procedures permit welding filler material issued to one welder to be used by other welders not listed on the WEWO. This is an open invitation for the loss of control of materials.
- d. The procedures permit the WEWOs to be kept with the document packages and not with the material thus providing an additional area of possible loss of control and identification of the material.

The licensee agreed to address these issues in their review of both procedures. This matter remains open.

4. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable or may involve violations or deviations. New unresolved items identified during this inspection are discussed in paragraph 6c(1).

5. Independent Inspection Effort

Modification Progress

The inspector conducted a general inspection of protected area, auxiliary building turbine building and the containment to observe modification progress and activities such as welding, material handling and control, housekeeping and storage.

Within the areas examined no violations or deviations were identified.

6. Welding (55050)

The inspector observed welding work activities as described below, to determine whether applicable code and procedure requirements were being met. The applicable codes standards and specifications are listed below:

The Final Safety Analysis Report (FSAR) indicates the following codes as applicable:

Reactor Coolant Pressure Boundary (RCPB) Piping United States of America Standard (USAS) B31.7 February 1968 Draft

Power Piping USAS B31.1.0 - 1967 (But Fabricated, tested and inspected to USAS B31.7 - February 1968)

Structures American Institute for Steel Construction (AISC) 1963, "Specification for Design, Fabrication, and Erection of Structural Steel for Buildings"

"Requirement Outline for Fabrication of Steel Structures" R.O. - 2968 of March 9, 1970, specifies that welding shall be performed in accordance with American Welding Society (AWS) D1.1-69. RO-2968 is the FPC document that provides requirements for fabrication of structures during construction at the Crystal River Unit 3 site. The licensee indicated that the latest edition of AISC code was used to write RO-2968, that revision of the AISC code referenced AWS D1.1-69.

The licensee indicated the below listed codes are applicable for the present outage:

RCPB Piping - USAS B31.7 - 69

Power Piping - USAS B31.1.0-67

Structures - AWS D1.1-1980

Welder/Procedure Qualification - American Society of Mechanical Engineers Boiler and Pressure Vessel (ASME B&PV) Code Section IX - The latest at the time of qualification

Repair - ASME B&PV Code
Section XI - 1980 Edition

a. Review of Quality Program

The inspector reviewed the below listed documents to ascertain whether these documents had been approved by the licensee and whether adequate plans and procedures had been established to assure that the specified activities would be controlled and accomplished consistent with commitments and regulatory requirements.

| <u>No.</u> | <u>Title</u> |
|------------------------|--|
| - | "Nuclear Quality Assurance Plan" |
| - | "Crystal River Unit 3 Final Safety Analysis Report" |
| FPC-MOP-411, Rev. 1 | "Control of Welding" |
| FPC-MOP-412, Rev. 0 | "Control of Welding Consumables" |
| FPC-MP-525, Rev. 0 | "Control of Welding" |
| FPC-MP-524, Rev. 0 | "Control of Issue of Welding Material" |
| FPC-MTAP-W-010, Rev. 2 | "Welding Procedure Specification Supplement" |
| FPC-MTAP-W-020, Rev. 2 | "Qualification of Welding Procedures" |
| FPC-MTAP-W-030, Rev. 3 | "Qualification of Welders" |
| FPC-MTAP-W-040, Rev. 2 | "Storage Handling and Control of Welding Consumables" |
| FPC-MTAP-W-041, Rev. 2 | "Purchase of Welding Consumables" |
| FPC-MTAP-W-050, Rev. 2 | "Control of Preheat, Interpass and Post Weld Heat Treatment" |

With regard to the inspection above, the inspector noted that MOP-411, Section III, D6C, and Section III, Table 1, require the user of the procedure to know the direction of "primary tensile stress, shear, compression" stresses to evaluate undercut. The inspector discussed this matter with the licensee and indicated that this type of determination is beyond the abilities of the expected users of the procedure. The licensee indicated they will reevaluate this matter and provide undercut acceptance criteria definitive and determinable at the user level. This matter will be identified as inspector followup item 302/85-23-01: "Weld Undercut Acceptance Criteria."

b. Base Material and Filler Material Compatibility for Welding

- (1) The inspector reviewed the base and filler material combinations employed to evaluate the suitability of application.
- (2) The inspector reviewed the licensee's program for control of welding materials to determine whether materials are being purchased, accepted, stored, and handled in accordance with QA procedures and applicable code requirements. The following specific areas were examined:
 - Purchasing, receiving, storing, distributing and handling procedures, material identification, and inspection of welding material issuing stations
 - Welding material purchasing and receiving records for the following materials were reviewed for conformance with applicable procedures and code requirements.

| <u>Type</u> | <u>Size</u> | <u>Heat/Batch No.</u> |
|-------------|-------------|-----------------------|
| E-316 | Insert | 14548 |
| ER-316 | 3/22" | 40560 |
| ER-316 | 1/8 | 51156 |
| ER-308 | 1/8 | 98520 |
| E-70S2 | Insert | 421N3602 |
| ER-70S2 | 3/32 | 065433 |
| E-7018 | 3/32 | 33043 |

c. Welding Procedure Specification

The following Welding Procedure Specifications (WPS) were selected for review and comparison with the ASME Code:

| <u>WPS</u> | <u>PROCESS*</u> | <u>PQR</u> |
|------------|-----------------|--------------------------------|
| 8/8-TT-022 | GTAW | 76-003 |
| 8/8-TT-019 | GTAW | 76-002 |
| 1/1-TS-Q | GTAW/SMAW | 71-001, 71-002, 71-003, 76-005 |
| 1/1-SS-022 | SMAW | 76-008, 76-006 |

*GTAW-Gas Tungsten Arc Welding
SMAW-Shielded Metal Arc Welding

The above WPSs and their supporting Procedure Qualification Records (PQRs) were reviewed to ascertain whether essential supplementary and/or nonessential variables including thermal treatment were consistent with code requirements; whether the WPSs were properly qualified and their supporting PQRs were accurate and retrievable;

whether all required mechanical tests had been performed and the results met the minimum requirements; whether the PQRs had been reviewed and certified by appropriate personnel and; whether any revisions and/or changes to nonessential variables were noted. WPSs are qualified in accordance with ASME Section IX, the latest edition and addenda at the time of qualification.

- (1) With regard to the examination above, a representative of the licensee informed the inspector that some WPSs (specific WPS Nos. not specified) were qualified by Catalytic, Inc. (CI) while they had the contract for welding work at the Crystal River site. Those procedures were not qualified by FPC. ASME B&PV Code, Section XI, paragraph IWA-4300, requires that all welding be performed in accordance with WPS, which have been qualified by the owner (FPC) or the repair organization. It has not been determined whether FPC or CI was the repair organization as defined in IWA-4300(c)(1)-(3). As FPC is the repair organization for the current outage, it remains undetermined whether those unidentified WPSs are consistent with IWA-4300 and therefore valid for this outage. If FPC is determined to be the repair organization during the contract period with CI, then the procedures were qualified consistent with IWA-4300 and are valid for this outage. Conversely, if CI is determined to be the repair organization then the procedures would not have been qualified by the owner (FPC) or the current repair organization (FPC) and therefore not valid for this outage. Once the issue of repair organization during the CI contract period is resolved, the validity of the CI qualified WPSs will be determined by the NRC staff. This matter will be identified as unresolved item 302/85-23-02: "WPS Validity".
- (2) With regard to the examination above, the inspector noted that the supporting PQRs listed on the below listed WPSs do not support the full thickness range listed on these WPSs.

| WPS | | | | ASME Section IX Qualified Maximum Thickness |
|------------|--------------------|--------------------|------------------|---|
| WPS No. | Thickness Range | PQR No. | PQR Thickness | |
| 1/1-SS-022 | 0.062"-1.500" | 76-008 & 76-006 | 0.562" 0.280" | 1.124" 0.560" |
| 8/8-TT-022 | 1/16"-0.562" | 76-003 | 0.280" | 0.560" |
| 8/8-TT-019 | 0.062-0.562" | 76-002 | 0.280" | 0.560" |

The licensee indicated that they had other PQRs to support 1/1-SS-022, and they would amend all three WPSs to reflect thickness ranges consistent with ASME B&PV Code Section III. This matter will be identified as inspector followup item 302/85-23-03: "WPS Thickness Range."

d. Welder Performance Qualification

- (1) The inspector reviewed the licensee's program for qualification of welders and welding operators for compliance with QA procedures and applicable code requirements.
- (2) The following welder qualification status records and "Records of Performance Qualification Test" were reviewed:

Welder Symbol

PF-4
 PF-13
 PF-46
 PF-362

e. Production Welding

The inspector surveyed ongoing welding activities and selected typical in-process operations representing different welding processes, procedures and joint configurations for detailed review. The weld joints selected are listed below. The review was conducted to determine the following: work conducted in accordance with a "traveler"; welding procedures and drawings available; WPS assigned in accordance with applicable code; technique and sequence are specified; materials as specified; geometry as specified; fitup and alignment as specified; temporary attachments consistent with applicable code; gas shielding and purging as specified; preheat is as specified; technique is as specified; welding electrodes are as specified and consistent with the code; gas flow is controlled as specified; welding equipment is as specified; interpass temperature is controlled and consistent with the applicable codes; interpass cleaning and backgouging are performed as specified; process control system has provision for repairs consistent with applicable codes; weld repairs are conducted in accordance with specified procedures; base metal repairs are properly documented; welder identification; peening not done on root or final weld surface layer; and contractor/licensee has periodic welding equipment preventative maintenance program.

Welds Examined

| <u>Weld Numbers</u> | <u>System</u> |
|---------------------|---------------------|
| MU-85-128 | Makeup |
| MU-85-129 | Makeup |
| MU-85-42 | Makeup |
| EF-85-110 | Emergency Feedwater |

With regard to the inspection above, the inspector noted the following on May 15, 1985, while observing inprocess welding on Field Weld No. MU-85-128 being welded with WPS 8/8-TT-022.

- The torch shielding gas was 12 cfh and the maximum bead width was 7/16-inch; this is contrary to WPS 8/8-TT-022 which requires torch shielding gas flow of 15 to 25 CFH and bead width for the filler material size used of 3/8-inch maximum.

The inspector discussed the above with the welder concerned and his supervisor. This discussion concerned the importance of verbatim compliance to procedures controlling activities affecting quality. On May 16, 1985, the inspector observed the same welder, welding field weld MU-35-129 welding with WPS 8/8-TT-022. The inspector made the following observations:

- The bead width was consistent with the procedure requirements; however, torch shielding gas flow was now less than ten CFH.

The above are clear examples of failure to follow procedure for activities affecting quality, which is in direct violation of Title 10 Code of Federal Regulations, Appendix B, Criterion V. This violation will be identified as 302/85-23-04: "Failure to Follow WPS Requirements."

f. Preheat and Post Weld Heat Treatment

(1) Preheat

- (a) The inspector reviewed the licensee's programs for weld preheating to determine whether procedures were available when specified; procedures specify acceptable methods and provide requirements for monitoring and recording preheat before, during, and if specified after welding, until post weld stress relief.
- (b) The inspector observed preheat controls in process to determine whether procedures were being followed, and temperatures were within specified limits. The welds listed in paragraph 6e were examined.

(2) Post Weld Heat Treatment (PWHT)

- (a) The inspector reviewed the licensee's program for PWHT to determine whether procedures were available; had a system capable of meeting of the heating and cooling rates, metal temperature, temperature uniformity and control limits were specified and consistent with the applicable codes; procedure covered both local and furnace heating if used; and furnace atmosphere controlled if used.

With regard to the examination above, the inspector noted the following inconsistencies:

- W-050 specifies heating and cooling rate maximums for temperatures above 800°F; AWS D1.1 specifies maximum heating and cooling rates for temperatures over 600°F.
- The preheat temperatures listed in W-050 are not consistent with the preheat temperatures listed in USAS B31.1.0.
- The post weld treatment temperature ranges specified in W-050 are not consistent with the preheat temperatures listed in USAS B31.1.0.

The inspector discussed the above with the licensee, who indicated that they would reevaluate W-050 and provide engineering justification for all deviations from committed code requirements or ammend W-050 to comply with the committed codes. This matter will be identified as inspector followup item 302/85-23-05: "Post Weld Heat Treatment Program Inconsistencies."

g. Examination of Welds

The inspector visually examined completed and accepted welds as described below to determine whether applicable code and procedure requirements were being met.

- (1) The below listed welds were examined relative to the following: location, length, size and shape; weld surface finish and appearance (including inside diameter of pipe welds when accessible); transitions between different wall thickness; weld reinforcement -- height and appearance; joint configuration of permanent attachments and structural supports; removal of temporary attachments; arc strikes and weld spatter; finish-grinding or machining of weld surface -- surface finish and absence of wall thinning; surface defects -- cracks, laps, and lack of penetration, lack of fusion, porosity, slag, oxide film and undercut exceeding prescribed limits.

| <u>Weld No.</u> | <u>System</u> |
|-----------------|---------------|
| MU-85-115 | Makeup |
| MU-85-116 | Makeup |
| MU-85-30 | Makeup |
| MU-85-37 | Makeup |
| MU-85-38 | Makeup |
| MU-85-49 | Makeup |
| MU-85-56 | Makeup |
| MU-85-57 | Makeup |
| MU-85-58 | Makeup |

Within the areas examined no deviations or violations were identified except as noted in paragraph 6e.

7. Nondestructive Examinations

The inspector reviewed procedures, observed in-process examinations and reviewed quality records as described below to determine whether applicable code, procedure and regulatory requirements were being met. The applicable code for nondestructive examination (NDE) is ASME B&PV Code, Section V, 1974 Edition with Addenda through Summer 1975.

a. Review of Quality Program

The inspector reviewed the below listed documents to ascertain whether the NDE program has been approved by the licensee and whether adequate plans and procedures had been established to assure that the modification project would be controlled and accomplished consistent with commitments and regulatory requirements.

| <u>Procedure No.</u> | <u>Title</u> |
|----------------------|---|
| FPC-SPS-PT-002, R4 | "Visible Dye Liquid Penetrant Examination Specification |
| FPC-SPS-PA-002, R1 | "Liquid Penetrant Acceptance Standard (AWS)" |
| FPC-SPS-PA-001, R4 | "Liquid Penetrant Acceptance Standard (ASME & ANSI) |

b. Liquid Penetrant (57060B)

(1) Procedure Review

The inspector reviewed Procedure Nos. FPC-SPS-PT-002, FPC-SPS-PA-001 and FPC-SPS-PA-002 to ascertain whether it has been reviewed and approved in accordance with the licensee's established QA procedures. The above procedures were reviewed for technical adequacy and conformance with ASME, Section V, Article 6, and other licensee commitments/requirements in the below listed areas: specified method; penetrant materials identified; penetrant materials analyzed for sulfur; penetrant materials analyzed for total halogens; acceptable pre-examination surface; drying time; method of penetrant application; surface temperature; solvent removal/water washable; dry surface prior to developing; type of developing; examination technique; and evaluation technique.

(2) Work Observation

The inspector observed the liquid penetrant examination of weld joints indicated below: to determine whether procedure clearly specified the applicable test; procedure was available; sequencing and timing of examination in accordance with applicable code/and

contract; materials available and properly identified; examiner identification; location and extent of examination clearly defined; and procedure compliance in the following areas; surface preparation; penetrant type; application method; penetration time; surface temperature; penetrant removal; drying; developed type and application; developing time; evaluation in accordance with procedure and with correct acceptance criteria; and surfaces cleaned at conclusion of examination.

Weld No.
 MU-85-115
 MU-85-116

(3) Records Review

- (a) The inspector reviewed the qualification documentation for the below listed examiners in the following areas: employer's name; person certified; activity qualified to perform; effective period of certification; signature of employer's designated representative; basis used for certification; annual visual acuity; and color vision examination.

RUV PT-LII
 AJU PT-LII
 JA PT-LII

- (b) The inspector reviewed the below listed liquid penetrant examination reports for compliance with procedure record requirements.

Weld No.
 MU-85-38
 MU-85-49
 MU-85-56
 MU-85-57
 MU-85-58

- (c) The inspector reviewed the "certification of contaminant content" for the below listed liquid penetrant materials to determine whether the analysis for halogen and sulfur is consistent with applicable requirements.

| <u>Type</u> | <u>Batch No.</u> |
|-------------|------------------|
| Penetrant | 85C025 |
| Cleaner | 84K065 |
| Developer | 84M040 |

Within the areas examined no violations or deviations were identified.