U.S. NUCLEAR REGULATORY COMMISSION

Region I

Report No. 50-410/84-14

Docket No. 50-410

License No. CPPR-112 Priority -- Category A

Licensee: Niagara Mohawk Power Corporation

300 Erie Boulevard West

Syracuse, New York 13202

Facility Name: Nine Mile Point, Unit 2

Inspection At: Scriba, New York

Inspection Conducted: August 20-24, 1984

Inspector: S. D. Reynolds, Jr., Lead Reactor Engineer — 9/27/84 date

Approved By: J. Durr, Chief, Materials and Processes Section, EPB, DETP — 10/15/84 date

Inspection Summary: Inspection on August 20-24, 1984 (Report No. 50-410/84-14) Areas Inspected: Routine inspection by a regionally based inspector of work activities, procedures, performance qualifications, and records relative to safety related welding operations. The inspection involved 34 hours at the site and 4 hours at regional headquarters.

Results: No violations were identified.

DETAILS

1. Persons Contacted

Niagara Mohawk Power Corporation (NMPC)

* W. Baker, Construction Engineer
* J. White, Construction Engineer
* G. Griffith, Licensing
* C. Becknam, Manager, QA
* J. G. Rocker, QA Surveillance
* K. O. Rafferty, QA Surveillance
* B. R. Morrison, Manager, Quality Engineering
* M. K. Burchell, Quality Engineer (Welding)
  R. K. Deuvall, Project Engineer

Stone and Webster Engineering Corporation (SWEC)

* T. Arrington, Superintendent of F.Q.C.
  S. Crowe, Assistant Superintendent F.Q.C.
  J. Ballagher, Licensing Engineer
  E. Magilley, Assistant Superintendent F.Q.C.
* A. Rovetti, Supervising Engineer, Construction
* R. Hyslop, Licensing
* G. Philippi, Principle Mechanical Engineer
* R. Deuvall, Project Engineer
* J. Burgess, QA Supervisor
* T. Baumgartner, QA Supervisor
  G. Rogers, Principle Materials Engineer
  J. Reidy, Welder Qualification Test Booth (WQTB) Supervisor
  J. Wadsworth, QC Inspector WQTB
  W. Kidd, Welder (Assigned to WQTB)
  M. Holland, Welder (In Qualification Status)
  F. Berchok, Welder (In Qualification Status)
  T. Larocco, Mechanical Engineering

Johnson Controls, Incorporated (JCI)

  R. Askew, QC Supervisor
  C. Russell, QA Engineer Level II

ITT Grinnell Industrial Piping, Incorporated (ITT)

  A. D'Antonio, Project Engineer for Welding
  D. Watson, Piping Superintendent
  M. Washburn, Welder Qualification Test Booth, Supervisor
  J. May, QA Manager
  F. Zinkevich, Director, QA/QC

Reactor Controls, Incorporated (RCI)

D. Friedrich, Installation Supervisor
W. Wilson, Rod Attendant
M. Richardson, Pipefitter Welder
P. Blucher, Installation Supervisor
D. Donath, Field Engineer
C. Kranze, Mill Wright Engineer
A. Hernandez, Welder
R. Miller, ANI (Hartford Steam Boiler)

USNRC

* R. Gramm, Resident Inspector

* Indicates those persons present at the exit interview.

2. Licensee Action on Previous Inspection Findings

(Closed) Unresolved Item (410/83-10-02). This item concerned the adequacy of performance qualification of JCI gas tungsten arc (GTA) welders for welding with austenitic stainless steel filler metal by qualification with carbon steel filler metals. The inspector cited Code Interpretation IX-80-52 of August 28, 1980 as indicating the SCIX position on this question. The licensee has taken a technical position that GTAW performance qualification with any F6 filler metal qualifies for all F6 filler metals, per ASME SCIX, however, they have supported the welding engineering position that reliability is increased by utilizing F6-A8 filler metal for qualification for depositing stainless filler metals and F6-A1 for carbon steel. This site wide commitment is made in J. L. Dillon letter, #NMQA152 to M. G. Pace. The inspector reviewed the licensee's numerous action folder documents on the question which included reclassification of 100 transition adapter (316 to carbon steel) welds from JCI planner package TIS-600A from Category I to Category II. These welds were made with ER 309 with welders qualified with F6-A1. Recently, SCIX re-evaluated their interpretations on performance qualification with F6 filler metal and their interpretation supports the position made by the licensee that this is not a violation of SCIX. The inspector has no further questions on this item and considers the item closed.

3.0 ASME Code vs. AWS D1.1 Welding Requirements

The inspector discussed the apparent generic conflicts between the subject "Codes and Standards" as they apply to structural welding of supports and other safety related weldments with engineering and quality representatives of the licensee and SWEC. The lack of verbatim compliance to all requirements of AWS Code D1.1 for weldments that are clearly neither bridges nor buildings is acknowledged in AWS D1.1 in the third paragraph of 1.1 of the

commentary. There are a number of specific areas in which there is conflict between apparent general commitment to D1.1 through use of AISC design assumptions, calculations and actual engineering applications. Some of these areas are as follows:

a. Use of a distinguishing mark on all joints inspected per paragraph 6.5.6 vs. quality recordkeeping to achieve the intent of the standard.

b. Use of D1.1 to weld materials not specifically listed in Table 4.1.1 including pressure vessel carbon and low alloy steels and austenitic stainless steel.

c. The use of engineering design assumptions for the effective throat of certain joints such as flare groove weld joints differing from D1.1 rules (e.g. Table 2.3.1.4).

d. The use of welding processes other than those specifically approved in 1.3.1 (e.g. GTAW).

e. The broad interpretation of paragraph 5.2 that qualification of procedures and performance to ASME SCIX is satisfactory for D1.1 welding.

f. The use of welding symbols that do not fully meet the requirements of AWS 2.4 as stated in paragraph 1.5 (e.g. the failure to use a number to designate the joint penetration depth and effective throat in a partial penetration weld).

g. The use of undercut rules which vary from "the 10 mils when the weld is transverse to the primary stress" requirement.

The inspector asked the licensee what documents existed that explicitly designated the "Engineer" or who was designated to act for the "Engineer" and what system established the engineering acceptance for those items where verbatim adherence to D1.1 was not desired or considered a requirement. Included in this question was what system established the approval by the "owner" (licensee) of the engineering modifications made by the "contractor". This question is considered an unresolved item (410/84-14-01).

No violations were identified.

4. Welder Performance Qualification

The inspector conducted an indepth review of performance qualification activities for SWEC, ITT, JCI and RCI. The review included specific steps taken by the various organizations to preclude falsification of qualifications, observation of welders in the process of qualification, interviews with welders being qualified, verification of recordkeeping, test piece

identification methods, and review of technical indoctrination programs conducted prior to welding. The NRC inspector examined welder test coupons prior to and following bending operations; bending operations were also observed.

Each contractor organization conducts their qualification program following different procedures. In all organizations, it was the normal practice to qualify welders who were classified by the unions as journeymen, but welders who were classified by the unions as apprentices who were capable of passing the hire-in qualification tests as journeyman were also fully acceptable for site welding. Those organizations who employed only one type of trade union welder had less complicated qualification programs than those which required employment of welders from a variety of trades. Not all of the qualification systems have "independence" with a different function reviewing, interpreting and signing off test results than the function administrating the qualification operation. The ANI activities as a third party quality function vary in the four organizations.

In the case of RCI, there is no formalized document to determine what test assemblies are required for various field welding activities, nor is there a matrix in the QA system which clearly identifies the scope or range relationship of welder qualification to WPS qualification ranges. A review of RCI WPS W-1/1-4 indicated that welds could be made utilizing an "open root" or with "backing" root configuration. Qualification of welders to weld to WPS W-1/1-4 utilized test assemblies that qualified the welder to use backing. There is no explicit document in the RCI QA system that specifies welder qualification test assembly details. This is considered an unresolved item pending clarification of the system that relates these areas of welder qualification (410/84-14-02).

No violations were identified.

5. Flare Bevel Groove Welds

The inspector reviewed the SWEC engineering approach to application of flare bevel groove welds. SWEC is the cognizant design group for JCI and RCI weldments utilizing flare bevel joints. Discussions with SWEC Mechanical Engineering personnel indicated that the SWEC flare bevel groove weld effective throat design assumption, established in the C. S. Lai to C. E. Crocker memo, dated 11/4/81, Subject: Definition of Effective Throat for Flare Bevel Groove Welds, was $E=t_{(thinner)} - 1/16"$. Discussions with SWEC personnel indicated that tubular steel has only been purchased from domestic sources to the ASTM A500 dimensional requirements. Although ASTM A500 does not specify the minimum corner radius, the domestic steel producers standard corner radius is 2t minimum. Using the AWS effective throat rule of 5/16R and assuming a worst case situation of 2" tubular with 3/16" wall the AWS effective throat would be 0.117" whereas the SWEC effective throat would be 0.125" (or less conservative). Assuming the actual radius of the tubular could be 1½t as alleged at other sites the permissible effective throat would be 0.088" per AWS and 0.125" per SWEC.

The inspector considers the flare bevel weld design assumptions and proof test actual throat dimensions per D1.1 2.3.1.4 to be an unresolved item pending verification of the actual corner radii welded, the corner radii used for proof tests, and the engineering justification of E=t-1/16" for all size flare bevel joints welded. (410/84-14-03).

No violations were identified.

6. Quality Control

The inspector reviewed the activities of quality functions in the welder qualification area. The licensee conducts surveillance type audits of the activities of SWEC, JCI, RCI and ITT. SWEC QC conducts the guided bend testing for JCI and RCI. The Authorized Nuclear Inspector (ANI) does not conduct hold point inspections of the welder qualification activities. In the case of JCI the ANI acts only as a third party inspector as there are no code stamping requirements. There is no site wide QA inspection plan applicable to all organizations conducting welding.

The RCI welder qualification does not have "independence" in the conduct of the qualification operations; as one individual is responsible for all activities (SCIX does not address quality activities in the qualification operations).

During the observation of RCI welding, a weld identified as NMP-019 Sheet 3 2" cooling line, the NRC inspector raised a question concerning sign off of hold points prior to continuing welding operations. RCI indicated that the inspector logged his inspections in his log book and signed off the clean copy of QC hold points inspection sheets "at lunch" or at the "end of the shift". On the specific weld in question, the NRC inspector verified that the clean copy of QC records did show QC sign off of the fitup for this joint. It is not apparent how RCI controls the transference of this information as an auditing inspection could show, at least temporarily, that welding past a hold point had occurred and it is also possible for the QC inspector to miss signing some of the QC paperwork. This is considered an unresolved item pending clarification of the QA control system for temporarily recording the holdpoint inspection in a log book prior official sign off on the clean copy QC record (410/84-14-04).

No violations were identified.

7. Special Welding Applications

The inspector reviewed the application of the orbiting machine gas tungsten arc welding process for pipe welding with the cognizant ITT welding specialists associated with the operation. The inspector pointed out that the terminology utilized in WPS 1-4A-2-4 was incorrect where it refers to "automatic" welding rather than "machine welding". ITT issued a letter stating that the welding was in fact machine welding. The inspector reviewed

the welding operator performance qualification records of the two welding operators currently qualified for this welding operation. ITT stated that the welding has been applied approximately 95% to safety related piping and approximately 90% of the welds have been to P1 materials. The filler metal size has been limited to 0.045" diameter. The radiographic results have indicated higher quality than normal welding. The variables utilized in performance qualification have exceeded those currently required by SCIX and essentially meet the proposed SCIX changes to QW360 for machine welding. The success of the operations appear to be related to the utilization of supervision fully knowledgeable of the Dimetrics System, it's maintenance requirements, and operational characteristics.

No violations were identified.

8. Unresolved Items

Unresolved Items are matters about which more information is required in order to ascertain if they are acceptable, violations or deviations. Unresolved items are discussed in paragraphs 3, 4, 5 and 6.

9. Exit Meeting

The inspector met with licensee and Architect-Engineer/Constructor representatives (see paragraph 1) at the end of the inspection on August 24, 1984. In addition, Mr. R. A. Gramm, the NRC Resident Inspector was present. The inspector summarized the purpose and scope of the inspection and identified the inspection findings. At no time during this inspection was written material provided to the licensee by the inspector.