U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 50-410/81-09

Docket No. 50-410

License No. CPPR-112 Priority -- Category A2

Licensee: Niagara Mohawk Power Corporation
300 Erie Boulevard, West
Syracuse New York 13202

Facility Name: Nine Mile Point Nuclear Power Station, Unit 2

Inspection at: Scriba, New York

Inspection conducted: August 18-21, 1981

Inspectors: W. F. Sanders — Oct 8, 1981
W. F. Sanders, Reactor Inspecctor — date signed

for R. A. McBrearty — 9/30/81
R. A. McBrearty, Reactor Inspector — date signed

S. D. Reynolds — 10/1/81
S. D. Reynolds, Reactor Inspector — date signed

Approved by: L. E. Tripp — 9/30/81
L. E. Tripp, Chief, Materials & Processes Section, EIB, DE&TI — date signed

Inspection Summary:
Inspection on August 18-21, 1981 (Report No. 50-410/81-09)
Areas Inspected: Routine, unannounced inspection of licensee action on previous inspection findings; primary containment record review; biological shield wall welding activities; and records associated with the reactor pressure vessel. The inspection involved 72 inspector-hours onsite by three regional based NRC inspectors.
Results: No items of noncompliance or deviations were identified.

Region I Form 12
(Rev. April 77)

DETAILS

1. Persons Contacted

* S. E. Czuba, QA Engineer
* R. Dahlin, Construction Engineer
* J. L. Dillon, Site Lead QA Engineer
* G. J. Doyle, QA Technician
  E. Manning, QA Technician
* R. L. Patch, QA Technician

Stone and Webster Engineering Corporation

* G. J. Crytzer, Sr. FQC Engineer
** C. Erikksson, Material Engineer (Welding) - Boston Office
** V. Langley, UT Technician Level III
  E. A. Magilley, Sr. QC Engineer
* G. P. Philype, Structural Mechanical Engineer
* H. J. Pierre, Chief Office Engineer
* L. E. Shea, Superintendent of Engineering
** V. Silverstein, Material Engineer (Fracture Mech.) - Boston Office
  C. Sperling, Sr. Material Controller
** I. Spring, Material Engineer (Fracture Mech.) - Boston Office

Chicago Bridge and Iron Company

C. J. Benson, QA Engineer

* denotes those present at the exit interview.

** telephone contact.

2. Licensee Action on Previous Inspection Findings

(Open) Unresolved Item (79-00-01): Disposition of deficiencies and corrective actions for eight types of welds related to inadequate nondestructive examinations of certain components of the primary containment structure.

After reviewing the actions described in the licensee correspondence of September 6, 1979 and April 27, 1981, it was determined that seven of the eight items could be resolved. The eighth item "Instrument Penetration - Adapter to Sleeve Welds" could not be resolved during this inspection, due to the unavailability of records considered necessary to document and describe the inspections and results referenced in Stone and Webster Nonconformance Report No. 1626. This information was not available prior to the conclusion of the inspection. The eight items referenced are listed below:

. Base Ring "T" Weld	(Closed)
. Lower Knuckle Seam Welds	(Closed)
. Penetrations - Flued Head to Sleeve Welds	(Closed)
. Beam Seats	(Closed)
. Penetration - Collar to Pipe (T Weld)	(Closed)
. Bottom Floor Plates	(Closed)
. Instrument Penetration - Adapter to Sleeve Weld	(Open)

(Open) Unresolved Item (80-04-01): Disposition of ultrasonic indications in biological shield wall welds. Data requested by the inspectors were not available at the time of this inspection. Stone and Webster personnel have been requested by the licensee to provide the necessary data.

(Open) Unresolved Item (80-04-02): Disposition of biological shield wall inaccessible welds. Resolution of this item is partially dependent on data associated with item (80-04-01) and is pending availability and NRC review of the data.

3. Primary Containment Record Review

The inspector reviewed the quality control records of selected components which were fabricated and installed in the primary containment structure. The review was performed to determine compliance with established procedures and requirements of the applicable engineering specification P283B. The following records were reviewed:

- Installation records for the penetration assembly No. P494 which documents the fitup inspections, weld inspections, magnetic particle examinations of the inside and outside, vacuum box tests, radiography per RT3N, Revision 0, and identification of weldors. A review was made of the material identifications and coating records for inorganic Zinc, Carbo Zinc II. A review was made of the records for penetration Z229 relative to the radiography of Joint RW 142, magnetic particle examination per MT12X Revision 1, X-ray Report No. 5 per RT9X Revision 2, and the ultrasonic test report for the penetration weld to insert plate. This included a review of subsequent repairs, required N.D.E. of the repairs and identity of the welder.

- Penetration No. Z-69. Record review of flued head radiography, weld procedure specification WPS E8018-61, weldor identification, fitup, magnetic particle examination of the inside and outside and Material Certifications for Heat No. AO-3361, Certification No. 00525.

- Penetration No. Z-29. Review of radiography, weldor identification and documentation for two repair cycles, fitup and magnetic particle examination of inside and outside.

- Insert Plate No. P-494-1. Records for material certification and heat treatment for HT No. 87383-67.

- Pipe Sleeve records P494-2 of material certifications and heat treatment for HT No. A03480.

- Records for the following lots of electrodes:

  402T9551
  09P498
  02R9284
  421X8301
  402Q1591
  07L939
  31392

No items of noncompliance were identified.

4. Reactor Pressure Vessel (RPV) Record Review

The inspector reviewed procedures and records relative to RPV storage, protection, handling, installation and post-installation activities.

The review was done to ascertain that the records conform with established procedures and that the work activities were accomplished consistent with applicable requirements.

The following were included in the inspectors review:

- General Electric Company (GE) Instruction No. 22A7145, "General Instruction for Reactor Assembly"

- GE Procedure No. 22A4645, "Site Receiving and Storage of Reactor Pressure Vessel with Shop Installed Internals"

- RPV Material Receiving Report dated 11/6/79.
- RPV Product Quality Certification dated 9/28/79.
- Outside storage inspection records for the period from February 1980 to July 1980.
- In-place storage inspection records for the period from August 1980 to August 1981.
- RPV installation records.
- Licensee Surveillance Report No. 0056-80, dated 3/10/80.
- Licensee Surveillance Report No. 0291-80, dated 8/4-7/80.
- RPV Access Log for the period from 8/1/80 to 8/8/80.
- Stone and Webster (S&W) QA Inspection Plan No. F0001, dated 7/3/80.
- S&W Inspection Report No. M0000029, dated 7/22/80.
- S&W QA Inspection Plan No. F0003, dated 8/5/80.
- S&W Inspection Report No. M0000039, dated 8/7/80.

Activities covered by the reviewed records included:

- RPV bearing plate installation and grouting.
- Setting of the RPV in the containment including the required cleaning, lifting, alignment, shimming and bolt torquing.

. Periodic inspection of RPV protective covers.

. Periodic inspection of the system used to assure maintenance of an adequate nitrogen atmosphere within the RPV before and after installation.

No items of noncompliance were identified.

5. Observation of Welding Activities

The NRC inspectors visually observed welding being conducted in the ITT Grinnell Fab Shop on Weld EB-72K-3, 1-FW2 plus Class 3 Category 1 field weld joints ISO 21-48 (SWP)FW002 and ISO 21-45(SWP)FW009. The documentation for these welds was reviewed and the information verified by review of applicable specifications, filler metal certifications, WPS, PQR and WPQ documents.

No items of noncompliance were identified.

6. Filler Metal Control System

The NRC inspectors reviewed the welding filler metal control system which applied to the S&W procurement and storage and ITT Grinnell issuance. The review indicated adequate procedures for purchasing consistent with ASME Code requiremnts. The procedures for receiving, storing and distributing were reviewed and found to be adequate. Filler metal certifications were reviewed and found to meet ASME Code requirements. The materials were adequately marked. The storage requirements for moisture control were adequate and the issuance in heated "hot boxes" was verified. The control of issuance of electrodes was checked. The NRC inspector noted that heat and lot identification was maintained on a per joint basis; however, in some cases it was noted that the issue slips did not contain

the complete AWS Classification, e.g., E8018 indicated whereas electrodes were E8018B2 or E8018B2L. As the documents also contained the heat and lot, the identification could easily be traced and checked. The licensee was informed of incomplete identification, but informed that the NRC inspector did not consider this a reportable trackable item as traceability was maintained.

No items of noncompliance were identified.

7. Observation of B31.1 PWHT Procedure

The NRC inspector observed and reviewed the records of a PWHT operation on two P4 to P4 welds in the 6th Point turbine extraction line ISO 40-2, FW001 and FW002. The PWHT operation observed meets the minimal requirements of B31.1, but the procedure lacks many normal field PWHT detail parameter and technique controls such as maximum permissible ΔT during the thermal cycle, TC placement requirements, etc.

No items of noncompliance were identified.

8. Bioshield Cladding for Support Weldments

The licensee is aware of the potential lammellar tearing propensity associated with highly restrained joints in A537 constructional steels as reported in the literature and documented at various nuclear sites. There have been lammellar tearing problems at this site. Review of the literature indicated the beneficial welding metallurgical effects resulting from the deposition of a "barrier" layer of low residual stressed weld metal. An E&DCR indicated an engineering evaluation that proposed a cladding technique to minimize lammellar tearing of restrained attachment welds. CB&I has been awarded a contract to deposit 1/8" minimum thickness "cladding" by the automatic oscillated (machine welding) gas shielded

FCAW process on the bioshield where attachments will later be welded. The attachments will most probably be welded by the manual SMAW process by another contractor. These weldments will be in accordance with AWS D1.1 and are planned to be made using the "pre-qualified" D1.1 procedure provisions. The automatic oscillated FCAW procedure employed by CB&I is GWPS - FCAW1N (general welding specification Revision 0 dated 4/30/81) and WPS E 70T-1 (B-U3-GF/13640 Revision 1 dated 5/20/81). These documents have been approved by S&W. The governing document is S&W S204H (Addendum 1, 4/17/81). The welding operators for the cladding operation were qualified for the cladding operation by depositing the cover pass on a vertical FCAW semi-automatic welder test assembly which is subsequently radiographed. The documentation for these performance tests indicates that ASME Section IX performance qualification rules are being followed (which is acceptable under AWS D1.1).

The filler metal utilized for the FCAW "overlay" was evaluated for filler metal material certification purposes by welding with a different shielding gas than is called for in the WPS, i.e., 100% Argon for the certifications and 75 Argon - 25 CO_2 for the WPS.

Welding commenced on the bioshield walls prior to promulgation of procedures that permitted the use of automatic oscillated FCAW techniques. This was quickly noted by the Licensee's QA Department and documented in SR NMP2 0211-81 dated 5/29/81 (5/20/81 observation date). Responses to this question of adequate procedural qualification included a statement that "if D1.1 is silent concerning qualification of a weld overlay, a pre-qualified procedure could be utilized."

Further discussion of the qualification requirements for the overlay welding are contained in the Licensee's QA Action Sheet 81.017 (File 3N2.2-M58.42) dated 5/27/81. S&W indicated that "based on sound engineering judgement that D1.1 prequalified groove welding procedure (B-U3-GF)

constitutes an acceptable basis for a weld overlay because the parameters utilized for the final pass and weld reinforcement (semi-automatic technique) utilize the same parameters as the automatic oscillated FCAW overlay procedure. S&W contacted Dr. Moss Davis (AWS Staff, Miami, Florida), AWS Secretary to the D1.1 Committee, and he indicated "A pre-qualified groove welding procedure may be used to 'butter' the surface of the plate for which a pre-qualified procedure is written."

The bioshield "cladding" operation conducted to meet the requirements of NMP2-S204H Addendum 1 is considered to be an unresolved item due to inadequacy and incompleteness of the documentation and lack of a composite joint qualified procedure. The cladding will form a portion of a Seismic 1 support weld joint and as such will constitute a portion of a composite weld joint and probably also will be a multi-process (FCAW-SMAW) joint. The documentation does not indicate the metallurgical or mechanical properties of either the composite weld joint or the cladding per se.

a. The filler metal certification for the all weld metal mechanical properties was not performed with the automatic oscillated process or the shielding gas required by the WPS.

b. The WPS has certain inaccurate information, does not indicate that the process is an automatic oscillated process or indicate oscillation parameters or include travel rate. It does not give sufficient "directions" to the welding operator.

c. The welding operator performance records are misleading and incomplete in the information presented.

d. The response provided by Dr. Moss Davis applies to the "buttering" of a pre-qualified joint surface to meet the dimensional tolerance requirements as stated in the pre-qualified joint rules. In this

case, the same welding procedure (same welding parameters, welding process and general welding technique is employed). CB&I is not following the intent indicated in Dr. Davis's quote. They are using a different welding process, a machine welding technique vs a manual SMAW technique and different welding parameters.

The intent of the D1.1 pre-qualified procedure method is to waive repeated procedure qualification testing on proven standardized welding joints where experience has shown that engineering requirements can be repeatedly demonstrated by adherence to standardized techniques. The automatic (machine) oscillated FCAW/manual SMAW composite joint is not a standardized industry wide procedure and therefore should not qualify as a pre-qualified joint.

This item shall be considered unresolved until the licensee can demonstrate that the complete composite attachment joint is adequate on an engineering basis and the complete attachment weld procedure is qualified by test or further engineering evaluation as meeting the applicable specification. (81-09-01)

9. Unresolved Items

Unresolved items are matters about which more information is required to ascertain whether they are acceptable items, items of noncompliance, or deviations. An unresolved item disclosed during this inspection is discussed in Section 8.

10. Exit Interview

The inspectors met with the licensee representatives (denoted in paragraph 1) at the conclusion of the inspection on August 21, 1981. The inspectors summarized the purpose and the scope of the inspection and the findings.