

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report No. 50-220/82-13

Docket No. 50-220

License No. DPR-63 Priority -- Category C

Licensee: Niagara Mohawk Power Corporation

600 Erie Boulevard West

Syracuse, New York 13202

Facility Name: Nine Mile Point Unit 1

Inspection At: Scriba, New York

Inspection Conducted: June 23-24, and July 20-22, 1982

Inspectors: R. G. McBrearty August 18, 1982  
R. McBrearty, Reactor Inspector date

for R. G. McBrearty August 18, 1982  
E. H. Gray, Reactor Inspector date

Approved by: J. P. Durr 8/19/82  
J. P. Durr, Chief Materials and Processes Section, DETP date

Inspection Summary:

Inspection on June 23-24, 1982 and July 20-22, 1982. Inspection Report No. 50-220/82-13

Reactive inspection by a region based NDE Specialist on June 23-24, 1982 to inspect the first machine cut of a safe end from the reactor nozzle on the safe end replacement program that resulted in removal of a portion of the nozzle end clad. The inspections involved 10 inspector-hours on site.

Routine inspection by a regional based inspector on July 20-22, 1982 to inspect the areas of Welder Training/Qualification, weld procedures, weld wire control, weld shrinkage, piping system stress conditions, preservice inspection and plans for inspection of welding by the licensee and contractors on the safe end replacement program. The inspection involved 24 inspector-hours on site.

Results: No violations were identified.

## DETAILS

### 1. Persons Contacted

- T. Briegle, Lead QA Engineer - NMPC
- R. Catero - GAPCO Superintendent
- \*\*T. Gillman - NNI Project Engineer
- \*G. Gresock, Project Manager - Safe-end Replacement - NMPC
- \*T. Perkins - General Superintendent, Nuclear Generation
- \*\*J. McGoun - NNI Engineer
- \*\*\*J. Pastorok - NNI Welding Engineer
- \*T. E. Lempges, Vice President, Nuclear Generation
- \*T. Roman, Station Superintendent
- T. J. Vigne - NIC Inspector (Q.C.)
- T. Watson - NNI QA Manager

### NRC

- J. Halapatz, Materials Engineering Branch, Office of Nuclear Regulatory Research
- W. Hazelton, Materials Engineering Branch, Office of Nuclear Regulatory Research
- \*S. Hudson, Senior Resident Inspector
- H. Kister, Chief, Reactor Projects Section 1C

The inspector also held discussions with other members of the Station and corporate technical and administrative staff.

- \*denotes those present at the exit interview, discussed in Section 3 below.
- \*\*denotes those participating in follow up phone discussions.

### 2. Background

Niagara Mohawk Power Corporation (NMPC) is in the starting phase of replacing the reactor vessel safe ends for recirculation suction and discharge nozzles and making preparation to replace the recirculation pipe lines as a result of stainless steel stress corrosion, heat affected zone, cracking. Replacement of these components of the recirculation lines includes welding by machine gas tungstem arc welding (MGTAW) using inconel filler wire for safe end to nozzle buildup and stainless steel filler for the stainless steel pipe joints. The MGTAW process while offering advantages over other possible weld methods does present possible application problems specific to the MGTAW process requiring special considerations for welder qualification, nondestructive examination (NDE), and preservice inspection (PSI). A primary objective of this inspection was to identify areas of preplanning, QA/QC process coverage, welder training and welding control.

The secondary objective of this inspection was to determine that appropriate portions of the ASME code are being met for welder qualification and weld procedure qualification. The project contractor and subcontractors are outlined below:

NNI - Newport New Industrial Corp. - Contractor  
NIC - National Inspection & Consultants - Subcontractor - Q.C.  
Inspection  
NES - Nuclear Energy Services, Inc. - Subcontractor - NDE and ISI  
GAPCO - Great Atlantic and Pacific Welding Co. - Subcontractor - MGTAW

3. References

- a) 10 CFR Part 50 Appendix B
- b) ASME Code Section III, Summer 1977
- c) ASME Code Section XI, Summer 1977
- d) ANSI B31.1, 1955
- e) ASME Code Section IX Latest Edition and Appendix A.

4. Inspection Areas and Findings

a) Welder Qualification and Training

Inspection was accomplished by observations at the offsite qualification and training center, review of instruction Number 1399-K-W002, for welder qualification and training, review of radiographic film for qualification of machine GTAW operators and review of samples of welder qualification documentation.

MGTAW Welder Qualification is being done using only stainless steel filler materials and stainless steel base materials which, per ASME Section IX, qualifies a machine operator to also weld with inconel filler material. The inspector questioned what provision had been made to train welders with inconel filler wire. The NNI reply was that the 1399-K-W002 instruction will be revised to require specific welder machine operator training with inconel filler wire to supplement the stainless steel training and qualification presently required.

Welder training and qualification are being performed with the welder directly observing the weld and making machine adjustments on the actual weld head or on the nearby control. During component welding some and possibly all welds will be observed at a remote location via a fiber optic borescope/video image system and controlled at this remote location. The NRC inspector questioned how this factor was accounted for in welder training and qualification. The reply being that only GAPCO welders who had previous experience using the video remote system would control component welding with the system. Upon further questioning and discussion, NNI stated that video weld observation and remote weld control would be considered as an essential variable for welder training and qualification purposes and this subject will be treated in greater detail in the 1399-K-W002 instruction. The list of qualified welders will be revised to specify those welders adequately trained and qualified to control the process via the video-remote system.

Other than the standard ASME Code paragraph on the renewal of welder qualification, no provision was made in the training-qualification instruction to bring the machine operator to peak skill level just prior to starting component welding with the MGTAW process. NNI stated that the 1399-K-W002 instruction would be revised to provide for adequate machine operator retraining after his qualification but just prior to component welding. (220/82-13-02)

b) Welding Procedures

Portions of the welding procedure number 1399-K-W001 covering manual shielded metal and (SMA) and manual gas tungsten were reviewed. This procedure is being revised to include the MGTAW procedure qualifications for both inconel and stainless steel filler metals. The preliminary MGTAW procedures were reviewed. The NRC inspector questioned how the welding procedure would be used in providing direction to the welder or welding operator. NNI replied that the weld procedure would be available to the welder near the welding station.

c) Weld Wire Control

The NNI weld consumable handling and control procedure (1399-K-W001, Paragraph 7.1) provides for control of weld consumables to have the welder get the required material. The NRC inspector questioned what QA/QC controls or checks exist to confirm that the welder actually does get the required weld consumable. NNI will review this question and possibly provide a QC weld wire check and signoff in the CWI just prior to MGTAW welding for weld material control. (220/82-13-03)

d) Weld Shrinkage - Piping System Stresses

The NNI Controlled Work Instruction (CWI) (1399-K-2-15) and weld shrinkage instruction (1399-K-5019) were reviewed to determine if weld shrinkage control was covered adequately in the work planning and instructions. The CWI requires the use of a template fixture to measure the safe end to recirculation pipe end dimension to prepare the exact length replacement elbow. As understood by the NRC inspector, the elbow replacement length is to be exactly equal to the space between the safe end and pipe end with no allowance for weld shrinkage. NNI Engineering stated that the shrinkage requirements and CWI would be reviewed to determine completeness and conformity to the NMPC requirement. The stress (pipe cold spring) conditions of the system prior to repair will exist after repair and replacement is complete.

The NRC inspector questioned the Engineering basis of replacing the pipe components with the "as was" stress conditions. NMPC replied that a system stress analysis by Teledyne is in progress. (220/82-13-04)

e) Preservice Inspection (PSI), Inservice Inspection (ISI) Preparation

The MGTAW welder qualification test coupons were being tested by radiograph (RT) only as required by ASME Section IX. The NRC inspector questioned what ultrasonic testing (UT) was in progress to assure that PSI of production welds would be meaningful. In particular, would sufficient UT of welder qualification MGTAW welds be done to identify process specific defects (mainly sidewall lack of fusion) that would interfere with PSI/ISI. Evaluation of this problem started when NMPC instructed NES to UT two stainless steel MGTAW qualification welds. More work is to follow in this area including UT of unacceptable MGTAW welds and UT evaluation of MGTAW inconel welds. The NMPC plan is to have NES UT inspect for PSI purposes each new component weld just after ASME Sect. III acceptance (Visual, PT, RT) is complete.

f) QA/QC Weld Surveillance

NNI plans Q.C. inspection of in process welds in root pass and final layer only. The NRC inspector asked if any in process Q.C. inspection of weld layers, other than that done by the welder as a part of welding, would be done since signoff points for this purpose were not in the CWI. As a result of a phone conversation, E. H. Gray to J. Pastorok, on July 26, 1982, this question is under consideration by NNI.

g) Recirculation system nozzle safe end replacement

Prior to the inspection of June 23 - June 24, 1982 by a Region based inspector (NDE Specialist), the licensee reported that during the cutting operation for removal of the recirculation nozzle safe end for pump No. 15 suction the operation was discontinued due to tool breakage prior to metal removal. A spacer bar which was removed with the broken tool was not replaced with the new tool. The purpose of the spacer bar was to fix the cut location at a pre-determined distance from the carbon steel nozzle. Failure to replace the spacer bar resulted in cutting approximately 1" closer to the nozzle than was desired and exposing an undetermined amount of base metal. Preparations were in progress to measure the thickness of cladding remaining on the nozzle, but were not completed prior to the inspector's departure from the site on June 24, 1982. The licensee proposed making the thickness measurements using a Deltascop manufactured by Fischer Technology Incorporated. The instrument is designed to measure the thickness of non-ferrous metal coatings on ferromagnetic substrate such as iron and steel. A demonstration of the equipment, which was observed by the inspector, indicated that it was capable of performing its intended function.

The Nuclear Energy Services (NES), Service Group has been contracted to perform the ASME Section III acceptance examinations. The NDE personnel qualification and certification records were reviewed to ascertain compliance

with SNT-TC-IA and licensee commitments. Records of a radiographer indicated that he was certified directly to level II from trainee status. SNT-TC-1A permits this, but requires that the accumulative experience and classroom training required for certification to level I and level II must be met. The records did not indicate that this requirement was met. The licensee stated that the individual's status would be determined. This item is unresolved pending licensee action and subsequent NRC review. (220/82-13-01)

In addition to the above the inspector made a walk through inspection of the facilities for training personnel involved with removing piping and safe ends in the recirculation system. In progress training was observed which included set up and use of the cutting equipment.

No violations were identified.

#### 5. Inspection Summary

Areas with changes occurring or under considerations as a result of questions raised by the NRC inspector are summarized:

##### a) Welder Training & Qualification

- 1) Welder training and qualification for MGTAW using inconel welder filler metal and video/ remote process control. 2) Sufficient UT of welder qualification coupons to assure that results are suitable for PSI/ISI. 3) Welder retraining for MGTAW close to the time of component welding.

##### b) Weld Procedures

Determine how the weld procedure is to be used by the welder so the welder will understand essential portions of the procedure.

##### c) Weld Wire Control

QA/QC confirmation that welder has the required weld material.

##### d) Weld Shrinkage - Piping System Stress

NNI review of CWI to determine if the required aspects of weld shrinkage are controlled. NMPC stress analysis of the piping system to determine the optimum stress condition in the replaced piping system.

##### e) PSI-ISI

UT of machine GTAW Qualification or training welds to provide correlation of RT to UT for both stainless steel and inconel with the objective of minimizing PSI-ISI inspection problems.

f) Weld Inspection

QC inspection of weld appearance at intervals during welding.

6. Unresolved Items

Unresolved items are matters about which more information is required to determine whether they are acceptable items, violations or deviations. An unresolved item is discussed in paragraph 4.g.

7. Exit Interview

The inspectors met with the licensee representatives denoted in paragraph 1 on June 24, 1982 and at the conclusion of the inspection on July 23, 1982. The inspectors summarized the purpose and the scope of the inspection and the findings.