

U. S. NUCLEAR REGULATORY COMMISSION  
REGION I

Report Nos. 50-220/92-04 & 50-410/92-04

Docket Nos. 50-220 & 50-410

License Nos. DPR-63 & NPF-69

License: Niagara Mohawk Power Corporation

Facility Name: Nine Mile Point, Unit 1 and Unit 2

Inspection At: Oswego, New York

Inspection Conducted: January 27 - January 31, 1992

Inspector: E. H. Gray, Jr. G.K. 2/19/92  
George A. Koch, Reactor Engineer  
Engineering Branch, Division of Reactor  
Safety (DRS) Date

Approved by: E. H. Gray 2/19/92  
E. Harold Gray, Section Chief  
Materials Section, Engineering Branch,  
Division of Reactor Safety (DRS) Date

Areas Inspected: A safety inspection of welding activities was conducted at Nine Mile Point Generating Station Unit Nos. 1 and 2. Areas examined were welder qualification, weld procedure qualification, filler metal control, welding performance and the system defining the welding program.

Results: No violations of NRC requirements were noted during the inspection. The licensee's activities for weld procedure qualification met the requirements of the American Society of Mechanical Engineers (ASME) Code, Sect IX and the welding procedures were appropriately distributed. Welder training was performed in a thorough and planned manner by competent trainers and documentation of the qualification effort met the requirements of ASME Sect IX. An examination of several work request packages governing weld performance showed adequate instructions and good engineering judgement. Interviews with welders revealed acceptable knowledge of sound welding practice. Weld material storage and distribution was reviewed and storage areas were well maintained. No damaged containers were found and material was adequately identified. The system used to control the welding program was judged to be adequate but exhibited several weaknesses; (1) The procedures defining welding made no mention about proper oven temperature even though the inspector



witnessed appropriate settings; (2) In the absence of further guidance in the work instructions, the weld procedure system can potentially place welders in a position to make decisions they should not make regarding preheat and the selection of filler metal for dissimilar metal stainless steel welds. No controls were in place to insure that supplemental instructions for preheat and stainless steel welding are prepared. (3) The system did not cover welder qualification for limited access joints, or how to weld at low ambient temperatures. (4) The procedures did not adequately address the controls for the joint storage of nuclear and non-nuclear electrode and storage of electrodes of different designation to prevent mixing. (5) The procedures controlling welding are not confined to one department, and no controls were in place to assure that changes to procedures affecting welding are reviewed by the persons with welding knowledge and authority.



## 1.0 MAINTENANCE WELDING ACTIVITIES (55050)

### WELDER TRAINING AND QUALIFICATION

Welder training and qualification were reviewed as part of this inspection. Nearly all maintenance welds at the Nine Mile Stations are performed by the manual welding processes and the quality of these welds is dependant upon the knowledge and skill of the welder. Training of the Nine Mile welders is performed at a Corporate Training Center located on the grounds of the Niagara Mohawk fossil fuel plant in Oswego. The inspector visited this facility to determine the quality of the welder training. Training personnel were interviewed and the training curriculum was reviewed. The facility was examined to determine the adequacy of the equipment, and condition of the training center. While there is no requirement for formal training of welders, the condition of the center and elements of the training are an indication of the licensees general commitment for obtaining a competent staff.

The training center is only responsible for welder training and does no welder qualification. It is staffed with one welding instructor who develops the curriculum and conducts the classroom and practical training. The curriculum was found to be comprehensive and is divided into three modules lasting three weeks each. The first two modules teach shielded metal arc welding (SMAW) and the third teaches gas tungsten arc welding (GTAW). Approximately twenty-five percent of each three weeks is spent in the classroom learning welding theory, equipment, and processes and the balance is spent in welding practice. Weekly examinations are given for both classroom and performance sessions which further strengthens the program.

Qualification of welders to the requirements of ASME Section IX is defined in Site Welding Procedure S-MAP-WLD-001 which is used at both Unit 1 and Unit 2. Each unit is responsible for qualifying welders and both use bend tests as defined in ASME Section IX as proof of successful qualification. In addition, qualifications are maintained in accordance with Section IX by assessing each welders performance every three months and maintaining records for each welder. This is accomplished by the welding supervisor who reviews each welders work for the past three months and schedules test coupons when production welds can not satisfy the qualification maintenance requirements. The inspector reviewed the qualification records for three Unit 1 welders and three Unit 2 welders and verified compliance to ASME Section IX. The bend test fixture was measured to verify conformance to Section IX and the inspector verified that persons assessing bend tests had a yearly eye examination. Welders visual acuity is also tested yearly and the inspector verified the medical records.



### WELD PROCEDURE QUALIFICATION

A weld procedure specification (WPS) is a document that provides the welder specific instructions for making a weld with the required strength and to some degree the required soundness. The capability of a WPS to make a weld with this strength and soundness level is proven through actual demonstration and destructive testing. Its purpose is to minimize variability in the process and increase the assurance that the weld will function as intended. The inspection focused on this area because improperly prepared or tested procedures reduce the assurance that the weld will perform adequately in service. The licensee is committed to performing WPS qualification in accordance with ASME Sect IX through NRC regulations and the Site Welding Procedure S-MAP-WLD-001, Rev. 00. Weld procedure qualification is the responsibility of the Maintenance Department of each unit at Nine Mile Point. This department is also responsible for issue, distribution, and record retention of weld procedures. The inspector reviewed weld procedure's 1-1-BA-101, 1-5-BA-102, 5-5-BA-101, and 8-8-B-101 and the record of qualification for each including the test results. The inspector concluded that the WPS's were qualified and records maintained in accordance with ASME Sect IX.

### FILLER METAL STORAGE AND ISSUE

The strength of a weld can be reduced by using improperly stored and issued filler metal. This could result in a weld that does not meet design requirements. To verify that station filler metal was being properly controlled, the inspector reviewed procedures, interviewed personnel, and visited weld material storage and issue areas.

Storage and issue of filler metal are defined in procedure's MMP(N)-701, Rev. 4 and MMP(N)- 603, Rev. 3. These procedures were reviewed and welders and other persons involved in the storage and issue were interviewed to verify compliance. The bulk storeroom and maintenance storeroom were visited to determine the condition of the material and compliance with the procedures. In both places the material was well identified, dry, and free from visible damage.

### WELDING PERFORMANCE

The inspector reviewed five welding work packages during the inspection. When welds are deposited the performance qualifications, personnel qualifications, weld material storage and issue, and planning must come together to provide the control for a consistent product. The work package contains the documentation that shows acceptable performance. The inspector verified that the welder making the weld was qualified, that the weld procedure used was appropriate for the base materials being joined, that the proper filler metal was used and adequate pre and post heat treatment was performed where appropriate.



The first weld package reviewed was WR 154809 and covered the repair of a leaking weld in a American Society of Mechanical Engineers/American National Standards Institute (ASME/ANSI) B31.1 piping system. A typical and acceptable method for the repair was used. The leak was isolated by freeze plugging on both sides of the weld and the water trapped between the plugs was drained by drilling a weep hole at the lowest point of the pipe. The crack causing the leak was ground out and repaired by adding weld metal. Procedure 8-8-BA-102 was used which was appropriate for the stainless steel base material. This procedure had been qualified by Procedure Qualification N107 and demonstrated acceptable properties. Work instructions in accordance with Niagara Mohawk Nuclear Station Maintenance Administrative Procedure S-MAP-PSH-0202, Rev. 00 were followed and evidence showed that the proper filler metal was deposited by a qualified welder. The instructions in the package were acceptable with two exceptions considered by the inspector as weaknesses. First the instructions did not define the included angle of the ground out area and second the bevel of the weep hole was not mentioned. In this case, it was not judged to be significant since relatively thin wall pipe was being welded.

The second weld repair package was WR 19401 which controlled the welding for Temporary Repair 91-0078. In this case, a leak was discovered in a piece of alloy pipe in a Non-Safety Related B31.1 piping system. Nondestructive examination showed an area of erosion on the pipe inside wall and a carbon steel patch was added to the outside of the pipe. Procedure 1-5-BA-102 was used to define the welding and is considered as appropriate. This procedure was qualified by PQR's N-160 and N-163 which met ASME Section IX requirements. Again internal procedure S-MAP-PSH-0202 was followed for the work instructions and a qualified welder deposited the filler metal.

WR164441 was the third weld package reviewed. This work was performed on the polar crane rails of Unit 2 and while it is not under ASME Section III or B31.1 it was considered as safety related. The review showed that the welds were not being used structurally but were added to fill the some gaps between the rails that exceeded the crane manufacturers recommendations. One of the polar crane wheel bearings had failed and the gaps were believed to be the cause. Weld procedure specification 16316-C was used. It was recommended and qualified by the crane manufacturer and Niagara Mohawk adopted the instructions. The inspector's analysis showed that the procedure and procedure qualifications were adequate for the intended service. However, because the high tensile strength filler metal (E10018) used in these welds is less forgiving of moisture contamination, the inspector visited the specific oven where this electrode was stored and verified that the proper temperature was being used. In addition, the oven temperature indicator was calibrated and the weekly temperature verification performed by the storeroom personnel had been performed. Records and welder interviews confirmed that the time the rod was out of the oven did not exceed the specified time. The design calculations in the modification were reviewed by NRC personnel to verify the adequacy of the engineering judgements and found to be acceptable.



- WR182231 and WR 187020 were both performed at Unit 1 and were the last two weld packages reviewed. WR 182231 covered work done on the Reactor Building Closed Loop Cooling (RBCLC) heat exchanger in which a seal fillet weld was added and several tubes were plugged. Procedure 1-1-BA-101 was used for the seal weld and 8-8-BA-102 was used to weld the tube plugs. Both procedures were qualified to the requirements of ASME Section IX (PQR's N-120 and N-107, respectively) and found to be acceptable. Qualified welders were used with the proper filler metal. As in the packages for Unit 2, instructions were performed in accordance with procedure S-MAP-PSH-0202, Rev.00. WR 187020 was a non safety related package for performing structural erection of a observation platform. Most welds were fillets joining carbon steel to carbon steel. Previously discussed procedure 1-1-BA-101 was used and the welder was qualified. The records showed that appropriate filler metal was deposited and the instructions used met the internal departmental procedure.

### SYSTEM REVIEW

The manhours used to make welds in an operating nuclear station is small compared to other activities. The relative inactivity of welding can cause knowledge levels of those persons involved with the welding program to atrophy. It is therefore important that the welding program be fully described in a single or well networked set of procedures so that consistent high quality welds can be deposited. To verify that the procedures employed at Nine Mile Point Units 1 and 2 would meet this end, they were examined. Control of the maintenance welding program is accomplished by a number of procedures found in the maintenance and purchasing departments. The Maintenance Administrative Procedure S-MAP-WLD-001, Rev. 00 "Site Welding Procedure" is a working document that defines the general "how-to" welding information. Specific welding guidance supplementing or modifying this procedure can be given in the Work Instructions which are part of Maintenance Work Requests. The level and scope of Work Instructions are controlled by Maintenance Administrative Procedure S-MAP-PSH-0202, Rev. 00, "Use of Procedures". Weld material storage and issue is controlled by purchasing department procedures. Procedure MMP(N)-701, Rev. 4 defines how welding material is withdrawn from stores, and MMP(N)-603, Rev. 3 defines the surveillance activities used to verify storage oven temperatures and calibration and material identification.

The inspector found the compliance to procedures to be excellent and working personnel to have a good understanding of the requirements. The procedure system provided adequate controls but exhibited the following weaknesses:

- \* There was no mention in any of the procedures about the proper weld material oven temperatures even though in practice they were set at an appropriate level.
- \* Similarly no controls could be found governing the use, issue, calibration, and maintenance of portable rod ovens.



- \* The procedures lacked specific instructions about how to identify electrodes in ovens, controls for segregation of electrode types and heats, and controls to prevent intermixing of "nuclear" and "nonnuclear" grades of welding material.
- \* The procedures did not alert personnel that welders need to be qualified for limited access joints nor did they define limited access which is a commitment in the FSAR for Nine Mile Point 2.
- \* The qualified welding procedures (part of S-MAP-WLD-001) show the appropriate preheat temperatures for ASME Section III and ASME/ANSI B31.1 code systems, however procedures do not require welding engineering to specify the applicable specification on the Work Instructions. Without this instruction, welders are forced to make judgements for which they may not be qualified.
- \* The weld procedures do not specify the filler metal for dissimilar stainless steel welds.
- \* The procedures covering weld control reside in two different departments. No control was present to assure that qualified personnel with welding knowledge review changes to procedures impacting welding.

The licensee acknowledged the above weaknesses and after thorough review of the items will consider appropriate revisions to procedures or practices.

### CONCLUSION

The licensee exhibited good control of basic welding activities at the performance level. No violations to NRC requirements were identified. Welder training and qualification were performed using well organized and preplanned material by capable instructors and met the requirements of ASME Sect IX. The length of the training and combination of classroom and practical work were shown to result in skilled and knowledgeable welders. Weld procedure qualifications were in agreement with the ASME Code, Section IX. The appropriate tests were performed and sufficient records maintained to verify welding procedure adequacy. The inspection showed weld metal storage to be acceptable in both the bulk and maintenance areas and a satisfactory system was in place to provide instructions to welders and to document performance. While no departures from requirements were revealed, weaknesses in the procedures defining the welding program were noted.



## 2.0 ENTRANCE AND EXIT MEETINGS

Members of the licensee's management and maintenance staff were informed of the scope and purpose of the inspection on January 27, 1992. The results of the inspection were discussed with the licensee management and staff at the conclusion of the inspection on January 31, 1992. Attachment A is a list of those in attendance at the exit meeting.



ATTACHMENT A

LIST OF PERSONS CONTACTED

Naigara Mohawk Power Corporation

- K. Dahlberg, Unit 1 Plant Manager
- M. McCormick, Unit 2 Plant Manager
- \* K. Sweet, Unit 1 Maint. Manager
- \* K. Coates, Unit 2 Maint. Manager
- \* C. McClay, Maintenance Engineer
- \* G. Riley, Gen. Specialist
- \* A. Curran, Licensing Engineer

\* Indicates attendance at exit meeting

