U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos. 50-220/90-20
50-410/90-19

Docket Nos. 50-220
50-410

License Nos. DPR-63
NPF-69

Licensee: Niagara Mohawk Power Corporation
301 Plainfield Road
Syracuse, New York 13212

Facility Name: Nine Mile Point Units 1 & 2

Inspection At: Scriba, New York

Inspection Conducted: July 23-27, 1990

Inspectors: Nancy T. McNamara 8-16-90
N. T. McNamara, Physical Science Technician date
Effluents Radiation Protection Section (ERPS),
Facilities Radiological Safety and Safeguards
Branch (FRSSB), Division of Radiation Safety
and Safeguards (DRSS)

for Nancy T. McNamara 8-16-90
J. J. Kottan, Laboratory Specialist, ERPS, date
FRSSB, DRSS

Approved by: Alexander Adam, Jr. for 8-16-90
R. J. Bores, Chief, ERPS, FRSSB, DRSS date

Inspection Summary: Inspection on July 23-27, 1990 (Combined Inspection Report Nos. 50-220/90-20 and 50-410/90-19)

Areas Inspected: Routine, unannounced inspection of the radiological and non-radiological chemistry programs. Areas reviewed included: confirmatory measurements-radiological, standards analysis-chemistry, and laboratory QA/QC.

Results: Of the areas reviewed, no violations were identified.

DETAILS

1.0 Individuals Contacted

1.1 Principal Licensee Employees

*W. Allen, MATS
*J. Blasiac, Chemistry and Radiochemistry Supervisor
*G. Corell, Unit 1 Chemistry Supervisor
*K. Dahlberg, Unit 1 Station Superintendent
*J. Firlit, Vice President Nuclear Generation
*T. Kurtz, Unit 2 Chemistry Supervisor
P. Volza, Superintendent of Chemistry and Radiation Protection
*G. Brownell, Regulatory Compliance
C. Senska, Unit 1 Assistant Chemistry Supervisor
B. Holloway, General Engineer - Unit 1 Chemistry
J. Woods, Unit 1 Chemistry, Chief Technician
M. West, Unit 1 Chemistry Technician
P. Shene, Unit 1 Chemistry Technician
S. Sipowicz, Unit 1 Chemistry Technician
C. Nessel, Unit 1 Chemistry Technician
C. Merritt, Unit 2 Assistant Chemistry Supervisor
D. Leuengerber, Unit 2 Chemistry, Chief Technician
L. Albrecht, Unit 2 Chemistry Technician
R. Samson, Unit 2 Chemistry Technician
P. Thingvoll, Unit 2 Chemistry Technician
P. Tardane, Unit 2 Chemistry Technician

1.2 Other Personnel

W. Cook, NRC Senior Resident Inspector
R. Laura, NRC Resident Inspector
R. Temps, NRC Resident Inspector

*Denotes those personnel who attended the exit meeting on July 27, 1990.

The inspectors also interviewed other licensee personnel including other members of the chemistry staffs.

2. Purpose

The purpose of this routine inspection was to review the following areas.

1. The licensee's ability to measure radioactivity in plant systems and effluent samples, and ability to measure chemistry parameters in various plant systems.

2. The licensee's ability to demonstrate the acceptability of analytical results through implementation of a laboratory QA/QC program.

3. Laboratory Organization and Operation

Nine Mile Point Units 1 and 2 each had a dedicated chemistry laboratory and a dedicated counting room. The chemistry laboratories and counting rooms were similarly equipped with the exception of an atomic absorption spectrometer (AA) which was located in the Unit 1 laboratory. All site metals analyses were performed using this AA. The chemistry laboratory and counting room of each unit operated under the direction of a Unit Supervisor, each Unit Supervisor reported to the site Chemistry and Radiochemistry Supervisor who in turn reported to the site Superintendent of Chemistry and Radiation Protection.

The data listed in Tables I and II identify which counting room (and detector) or which laboratory was used for the sample analyses.

4. Radiological and Chemical Measurements

4.1 Confirmatory Measurements Radiological

During this part of the inspection, liquid, airborne particulate (filter) and iodine (charcoal cartridge), and gas samples were analyzed by the licensee and the NRC for the purpose of intercomparison. The same samples were analyzed by the licensee and the NRC with the exception of the reactor water samples and the Unit 1 waste collector tank sample, which were actual split samples. Where possible, the samples are actual effluent samples or inplant samples which duplicated the counting geometries used by the licensee for effluent sample analyses. These samples were analyzed by the licensee using routine methods and equipment and by the NRC:I Mobile Radiological Measurements Laboratory. Joint analyses of actual effluent samples are used to verify the licensee's capability to measure radioactivity in effluent and other samples with respect to the Technical Specifications and other regulatory requirements.

In addition, a liquid effluent sample was sent to the NRC reference laboratory, Department of Energy, Radiological and Environmental Sciences Laboratory (RESL), for analyses requiring wet chemistry. The analyses to be performed on the sample are Sr-89, Sr-90, Fe-55, H-3, and gross alpha. The results of these analyses will be compared with the licensee's results when received at a later date and will be documented in a subsequent inspection report.

The results of an effluent sample split between the licensee and the NRC during a previous inspection on August 3-7, 1987 (Combined Inspection Report Nos. 50-220/87-15 and 50-410/87-24) were also compared during this inspection.

The results of the sample measurements comparisons indicated that all of the measurements were in agreement under the criteria for comparing results. (See Attachment 1.) The results of the radioactivity measurements comparisons are listed in Table I. The inspector had no further questions in this area. No violations were identified.

4.2 Standards Analyses (Chemical)

During this part of the inspection, standard chemical solutions were submitted to the licensee for analysis. The standard solutions were prepared by Brookhaven National Laboratory (BNL) for the NRC, and were analyzed by the licensee using routine methods and equipment. The analysis of standards is used to verify the licensee's capability to monitor chemical parameters in various plant systems with respect to Technical Specifications and other regulatory requirements. In addition, the analysis of standards is used to evaluate the licensee's procedures with respect to accuracy and precision.

The standards were submitted to the licensee for analysis in triplicate at three concentrations spread over the licensee's normal calibration range. The boron analyses were performed in duplicate at the Unit 1 laboratory and singly at the Unit 2 laboratory due to the lack of sufficient volume of the NRC supplied standard to perform the analysis in triplicate.

The results of the standards measurements comparisons indicated that all of the measurements were in agreement or qualified agreement under the criteria used for comparing results. (See Attachment 2.)

The data for the comparisons are presented in Table II. The Unit 2 laboratory chloride results presented in Table II are those obtained after a reintegration of the chromatogram chloride peak with corrections made for an interference peak which was present in the chromatogram. The Unit 1 laboratory ion chromatography (IC) system routinely resolved the chloride and interference peak. The inspector discussed this matter with the licensee, and the licensee stated that this area would be reviewed and the Unit 2 laboratory IC method parameters adjusted as necessary. The inspector stated that this area would be reviewed during a subsequent inspection. The inspector had no further questions in this area. No violations were identified.

5.0 Laboratory QA/QC

The inspector reviewed the licensee's chemistry and radiochemistry laboratory QA/QC program. This program is described in Procedure S-CSP-15V, "Quality Assurance of Chemistry/Radiochemistry Analytical Results". This procedure provides for both an interlaboratory QC program and an intralaboratory QC program. The intralaboratory QC program

consisted of instrument and procedure control charts. The interlaboratory program consisted of the analysis of unknown samples from outside laboratories. Two outside laboratories were used to supply unknown samples for the analysis of chemical parameters and one outside laboratory was used to supply unknowns for radioactivity analyses. The licensee's procedure contained acceptance criteria for comparing these results. The inspector noted that these spiked samples were used by the licensee as technician proficiency checks. Also included in the interlaboratory program was the vendor laboratory utilized by the licensee for performing radiochemical analyses of effluent samples. The inspector review selected data generated by the licensee's laboratory QC program for 1989 and 1990 to date and noted that the licensee appeared to be implementing the program as required.

In reviewing the above data the inspector noted that the interlaboratory QC program was just being implemented at the Unit 2 laboratory. Additionally, the inspector noted that the interlaboratory data discussed in the above paragraph was not plotted on any type of control chart. The inspector discussed these matters with the licensee and the licensee stated that future interlaboratory QC data would be plotted, and the interlaboratory QC program at Unit 2 would be implemented to the same extent as the program at Unit 1. The inspector stated that the above areas would be reviewed during a subsequent inspection. The inspector had no further questions in this area. No violations were identified.

6.0 Exit Interview

The inspector met with the licensee representatives denoted in Section 1 at the conclusion of the inspection on July 27, 1990. The inspector summarized the purpose, scope and findings of the inspection.

Table I

Nine Mile Point Units 1 & 2 Verification Test Results

SAMPLE	ISOTOPE	NRC VALUE	LICENSEE VALUE	COMPARISON
		Results in Microcuries Per Milliliter		
Liquid Radioactive Waste 1445 hrs 7-25-90 (Unit 1, Det. 1)	Cr-51	(2.051±0.008)E-3	(2.02±0.07)E-3	Agreement
	Mn-54	(1.222±0.011)E-4	(1.10±0.03)E-4	Agreement
	Co-58	(2.84±0.09)E-5	(2.80±0.11)E-5	Agreement
	Co-60	(1.621±0.012)E-4	(1.60±0.05)E-4	Agreement
	Zn-65	(3.68±0.03)E-4	(3.62±0.10)E-4	Agreement
	Na-24	(2.02±0.14)E-4	(2.00±0.06)E-4	Agreement
		Results in Total Microcuries		
Offgas Particulate Filter 1000 hrs 7-20-90 (Unit 1, Det. 2)	Ba-140	(3.64±0.07)E-2	(3.6±0.2)E-2	Agreement
	Cs-137	(1.90±0.12)E-3	(1.8±0.2)E-3	Agreement
	La-140	(2.51±0.03)E-1	(2.50±0.09)E-1	Agreement
Offgas Charcoal Cartridge 1000 hrs 7-20-90 (Unit 1, Det. 1)	I-131	(4.2±0.3)E-3	(3.7±0.3)E-3	Agreement
		Results in Microcuries Per Milliliter		
Reactor Water 1100 hrs 7-25-90 (Unit 1, Det. 2)	Cr-51	(3.60±0.02)E-2	(3.40±0.13)E-2	Agreement
	Zn-65	(1.80±0.05)E-3	(1.80±0.10)E-3	Agreement
	Na-24	(1.056±0.006)E-2	(1.05±0.04)E-2	Agreement
Reactor Water 1100 hrs 7-25-90 (Unit 1, Det. 1)	Cr-51	(3.60±0.02)E-2	(3.7±0.2)E-2	Agreement
	Zn-65	(1.80±0.05)E-3	(1.8±0.2)E-3	Agreement
	Na-24	(1.056±0.006)E-2	(1.07±0.04)E-2	Agreement
Offgas 1330 hrs 7-24-90 (Unit 1, Det. 1) 1 hour count	Kr-85m	(1.8±0.2)E-4	(2.0±0.2)E-4	Agreement
	Kr-87	(1.36±0.08)E-3	(1.15±0.08)E-3	Agreement
	Kr-88	(7.6±0.6)E-4	(8.0±0.6)E-4	Agreement
	Xe-135	(5.2±0.2)E-4	(5.3±0.2)E-4	Agreement

Table I (continued)

Nine Mile Point Units 1 & 2 Verification Test Results

SAMPLE	ISOTOPE	NRC VALUE	LICENSEE VALUE	COMPARISON
		Results in Microcuries Per Milliliter		
Offgas 1330 hrs 7-24-90 (Unit 1, Det. 1) 4 hour count	Kr-85m	(2.0±0.2)E-4	(2.1±0.2)E-4	Agreement
	Xe-135	(5.3±0.2)E-4	(5.8±0.3)E-4	Agreement
Liquid Radioactive Waste 0000 hrs 7-25-90 (Unit 1, Det. 2)	Co-60	(4.7±0.2)E-7	(4.7±0.3)E-7	Agreement
Liquid Radioactive Waste 1445 hrs 7-25-90 (Unit 2, Det. 4)	Cr-51	(2.051±0.008)E-3	(2.00±0.07)E-3	Agreement
	Mn-54	(1.222±0.011)E-4	(1.07±0.03)E-4	Agreement
	Co-58	(2.84±0.09)E-5	(2.64±0.11)E-5	Agreement
	Co-60	(1.621±0.012)E-4	(1.50±0.04)E-4	Agreement
	Zn-65	(3.68±0.03)E-4	(3.70±0.11)E-4	Agreement
	Na-24	(2.02±0.14)E-4	(2.00±0.06)E-4	Agreement
		Results in Total Microcuries		
Offgas Particulate Filter 1000 hrs 7-25-90 (Unit 2, Det. 5)	Ba-140	(3.64±0.07)E-2	(4.0±0.2)E-2	Agreement
	Cs-137	(1.90±0.12)E-3	(2.0±0.2)E-3	Agreement
	La-140	(2.51±0.03)E-1	(2.34±0.09)E-1	Agreement
		Results in Microcuries Per Milliliter		
Reactor Water 1100 hrs 7-25-90 (Unit 2, Det. 5)	Cr-51	(3.60±0.02)E-2	(3.01±0.13)E-2	Agreement
	Zn-65	(1.80±0.05)E-3	(1.70±0.07)E-3	Agreement
	Na-24	(1.056±0.006)E-2	(9.3±0.3)E-3	Agreement
Reactor Water 1100 hrs 7-25-90 (Unit 2, Det. 4)	Cr-51	(3.60±0.02)E-2	(4.0±0.2)E-2	Agreement
	Zn-65	(1.80±0.05)E-3	(1.9±0.2)E-3	Agreement
	Na-24	(1.056±0.006)E-2	(1.07±0.04)E-2	Agreement

Table I (continued)

Nine Mile Point Units 1 & 2 Verification Test Results

SAMPLE	ISOTOPE	NRC VALUE	LICENSEE VALUE	COMPARISON
		Results in Microcuries Per Milliliter		
Liquid Radio-active Waste* 1015 hrs 8-5-87	Fe-55	(2±5)E-8	<1.2E-6	No Comparison
	H-3	(2.01±0.03)E-3	(2.0±0.1)E-3	Agreement
	Sr-89	(3.1±0.2)E-7	(3.1±0.3)E-7	Agreement
	Sr-90	(1.1±3.8)E-9	<1.5E-8	Agreement
	gross alpha	(5±7)E-10	<6.1E-8	No Comparison
		Results in Total Microcuries		
Offgas Charcoal Cartridge 1000 hrs 7-20-90 (Unit 2, Det. 4)	I-131	(4.2±0.3)E-3	(3.5±0.3)E-3	Agreement
Offgas Charcoal Cartridge 1000 hrs 7-20-90 (Unit 2, Det. 5)	I-131	(4.2±0.3)E-3	(3.9±0.3)E-3	Agreement
		Results in Microcuries Per Milliliter		
Offgas 1330 hrs 7-24-90 (Unit 2, Det. 4) 1 hour count	Kr-85m	(2.12±0.15)E-4	(1.6±0.2)E-4	Agreement
	Kr-87	(1.14±0.07)E-3	(1.30±0.08)E-3	Agreement
	Xe-135	(5.1±0.2)E-4	(5.1±0.3)E-4	Agreement
Offgas 1330 hrs 7-24-90 (Unit 2, Det. 4) 4 hour count	Xe-135	(5.0±0.2)E-4	(6.0±0.3)E-4	Agreement
	Kr-85m	(1.7±0.2)E-4	(1.90±0.14)E-4	Agreement

*Sample split during previous inspection

TABLE II

Nine Mile Point Units 1 & 2

Chemistry Test Results

Chemical Parameter	Method of Analysis*	NRC Known Value	Licensee Measured Value	Ratio (LIC/NRC)	Comparison
			Results in parts per billion (ppb)		
Chloride (Unit 1)	IC	3.0±0.2	2.90±0.06	0.97±0.07	Agreement
		6.2±0.4	5.54±0.10	0.89±0.06	Qualified Agreement
		9.5±0.5	8.5±0.2	0.89±0.05	Qualified Agreement
Chloride (Unit 2)	IC	3.0±0.2	3.03±0.15	1.01±0.08	Agreement
		6.2±0.4	5.92±0.09	0.95±0.06	Agreement
		9.5±0.5	9.6±0.3	1.01±0.06	Agreement
Sulfate (Unit 1)	IC	1.9±0.3	1.92±0.03	1.01±0.16	Agreement
		3.8±0.4	3.77±0.06	0.99±0.10	Agreement
		6.0±0.4	5.98±0.04	1.00±0.07	Agreement
Sulfate (Unit 2)	IC	1.9±0.3	1.95±0.09	1.0±0.2	Agreement
		3.8±0.4	3.760±0.010	0.99±0.10	Agreement
		6.0±0.4	5.75±0.04	0.96±0.06	Agreement
Fluoride (Unit 1)	ISE	24.0±1.0	21±0	0.88±0.04	Agreement
		48±2	42.2±0.3	0.88±0.04	Agreement
		74±3	65.4±0	0.88±0.04	Agreement
Fluoride (Unit 2)	ISE	24.0±1.0	24.0±0.5	1.00±0.05	Agreement
		48±2	49.8±0.8	1.04±0.05	Agreement
		74±3	75.5±0.5	1.02±0.04	Agreement
Silica (Unit 1)	SP	24±2	26.3±0.4	1.10±0.09	Agreement
		55.0±1.0	49.4±1.3	0.90±0.03	Qualified Agreement
		80.5±1.5	69.3±0.6	0.86±0.02	Qualified Agreement
Silica (Unit 2)	SP	24±2	25.5±0.5	1.06±0.09	Agreement
		55.0±1.0	49.5±0	0.90±0.02	Qualified Agreement
		80.5±1.5	69.4±0.9	0.86±0.02	Qualified Agreement

TABLE II (continued)

Nine Mile Point Units 1 & 2

Chemistry Test Results

Chemical Parameter	Method of Analysis*	NRC Known Value	Licensee Measured Value	Ratio (LIC/NRC)	Comparison
			Results in parts per billion (ppb)		
Boron (Unit 1)	Tit.	1030±20	1023±10[1]	0.99±0.02	Agreement
		2990±40	3010±20[1]	1.007±0.015	Agreement
		5100±100	4974±10[1]	0.98±0.02	Agreement
Boron (Unit 2)	Tit.	1030±20	1009[2]	0.98	Agreement
		2990±40	3027[2]	1.01	Agreement
		5100±100	5045[2]	0.99	Agreement

* NOTES

IC = Ion Chromatography
SP = UV-Vis Spectrophotometry
Tit. = Titration (after mannitol addition) with PHT end point
ISE = Ion Specific Electrode

[1]Duplicate Analysis
[2]Single Analysis

ATTACHMENT 1

CRITERIA FOR COMPARING ANALYTICAL MEASUREMENTS

This attachment provides criteria for comparing results of capability tests and verification measurements. The criteria are based on an empirical relationship which combines prior experience and the accuracy needs of this program.

In these criteria, the judgement limits are variable in relation to the comparison of the NRC Reference Laboratory's value to its associated uncertainty. As the ratio, referred to in this program as "Resolution", increases the acceptability of a licensee's measurement should be more selective. Conversely, poorer agreement must be considered acceptable as the resolution decreases.

Resolution[1]	Ratio for Agreement[2]
<3	No Comparison
4 - 7	0.5 - 2.0
8 - 15	0.6 - 1.66
16 - 50	0.75 - 1.33
51 - 200	0.80 - 1.25
>200	0.85 - 1.18

[1]Resolution = (NRC Reference Value/Reference Value Uncertainty)
[2]Ratio = (License Value/NRC Reference Value)

ATTACHMENT 2

Criteria for Comparing Analytical Measurements

This attachment provides criteria for comparing result of capability tests. In these criteria the judgement limits are based on data from Table 2.1 of NUREG/CR-5244, "Evaluation of Non-Radiological Water Chemistry at Power Reactors". Licensee values within the plus or minus two standard deviation range (±2Sd) of the BNL known value are considered to be in agreement. Licensee values outside the plus or minus two standard deviation range but within plus or minus three standard deviation range (±3Sd) of the BNL known values are considered to be in qualified agreement. Repeated results which are in qualified agreement will receive additional attention. Licensee values greater than the plus or minus three standard deviations range of the BNL known value are in disagreement. The standard deviations were computed using the average percent standard deviation values of each analyte in Table 2.1.

The ranges for the data in Table II are as follows:

Analyte	Agreement Range	Qualified Agreement Range
Chloride	2.8-3.2	2.7-3.3
	5.7-6.7	5.5-6.9
	8.8-10.2	8.5-10.5
Sulfate	1.7-2.1	1.6-2.2
	3.4-4.2	3.3-4.3
	5.4-6.6	5.2-6.8
Fluoride	21-27	20-28
	42-54	40-56
	65-83	61-87
Silica	22.2-26.8	21.0-28.0
	50.0-60.0	47.3-62.5
	73.0-88.0	69.0-92.0
Boron	1008-1052	997-1063
	2926-3054	2894-3086
	4991-5209	4937-5263