NINE MILE POINT NUCLEAR STATION UNIT 2

CHEMISTRY MAINTENANCE PROCEDURE

PROCEDURE NO. N2-CSP-17

HYDRAULIC AND LUBRICATION OIL CHEMICAL MAINTENANCE AT NMP UNIT 2

APPROVALS	SIGNATURES	DATE AND INITIALS REVISION 0	REVISION 1	REVISION 2
Chemistry and Radiation Management Superintendent E. W. Leach	E. W. Leach	10/1/86 EWL		
Station Superintendent NMPNS Unit 2 R. B. Abbott	R B Abbott	10/2/86 RBA		

Summary of Pages

Revision 0 (Effective 10/2/86)

PAGES	DATE
1-20	September 1986

NIAGARA MOHAWK POWER CORPORATION

THIS PROCEDURE NOT TO BE USED AFTER OCTOBER 1990 SUBJECT TO PERIODIC REVIEW.

N2-CSP-17

HYDRAULIC AND LUBRICATION OIL CHEMICAL MAINTENANCE AT NMP UNIT 2

1.0 PURPOSE

To provide directions necessary to assure the quality of lubrication and hydraulic oils at Unit 2.

2.0 REFERENCES

2.1 Nine Mile Point - Unit 2 FSAR Section 9.5.7, Diesel Generator Lubrication System

2.2 General Electric Documents:

GEK-46357A, EHC Fluid
GEK-46506B, Turbine Lube Oil

2.3 Flow Diagrams:

FSK-7-3.0, Feedwater Pump and Drive Lube Oil

2.4 Niagara Mohawk Procedures, NMPNS

S-CAP-4 "Standardization of Bases"

S-CAP-71 "Particulate Contamination"

2.5 Cooper Bessemer Operation and Maintenance Manuals, Section 1, Page 15-1.

2.6 Dow Corning Sales Specification for 510 Fluid, 100 CST, November 23, 1981.

N2-CSP-8 "Diesel Fuel Oil Chemistry Surveillance at NMP Unit 2"

3.0 PRECAUTION AND PREREQUISITES

3.1 EHC fluid is usually hot (140°F) while in the system. Also, the fluid is corrosive, especially to paints. Dispose of fluid into the 55 gal. drums from which it came.

NOTE: Only drums which have never been opened should be used to fill system.

3.2 Use extreme caution when handling hexanes. Use open container in fume hood only (blower on). Store containers in fire cabinets. Avoid skin contact and inhalation.

3.3 When sampling reactor feedwater pump lube oil use the drain valve on 2FWL-PI19. Other pressure indicators or switches may trip the pump. Also, excessive flow on PI19 may trip pump as well.

4.0 LIMITATIONS, ACTIONS AND ACCEPTANCE CRITERIA

4.1 Notify appropriate Unit Supervisor Chemistry if any limit is exceeded.

4.2 EHC FLUID (Fryquel EHC fluid) LIMITS: Turbine and Recirc Loop Control Valve Control Systems.

Specific gravity, 60°F;	min-	1.13
Water content;	max-	0.20% vol.
Neutralization Number;	max-	0.20mg KOH/g
Conductivity;	max-	1E-3 μmho/cm
Contamination, microns	max-	per 100ml
5 - 10		24,000
10 - 25		5,360
25 - 50		780
50 - 100		110
>100		11
Chlorine Content	max-	100 ppm

4.3 Turbine Lube Oil Limits: Main Turbine

Contamination, microns	max-	per 100ml
5 - 10		32,000
10 - 25		10,700
25 - 50		1510
50 - 100		225
100 - 250		21
>250		0
Viscosity at 100°F;	max-	36.3 cSt
	min-	29.6 cSt

4.4 Dow 510 - New Fluid Limits: MSIV Actuators

Viscosity at 25°C	95-105cST
Specific Gravity at 25°C	0.985-1.000
Neutralization Number	0.02 Max mgKOH/gm

4.5 Diesel Lube Oil Limits: EG1, 2, and 3

API Gravity	23-28
Viscosity @ 25°C	136-148cSt
Water and Sediment	max 0.2% vol.

5.0 PROCEDURE

5.1 MONTHLY ACTIONS

5.1.1 Complete Figure 1-M.

NOTE: The frequency of this task may be modified by supervision.

a. Sample the EHC fluid Systems in accordance with Appendix A.

NOTE: Obtain SSS permission and notify CSO before actual sample is collected.

5.1.1 (cont'd)

b. Analyze the EHC samples for water content according to Appendix B.

NOTE: At supervisory discretion, analyze for:

Contamination	S-CAP-71
Neutralization Number	Appendix C
Specific Gravity and Mineral Oil Content	Appendix D
Conductivity	Appendix E

c. Record results and review with respect to limitations and actions as well as past trends. Submit form to Unit Supervisor Chemistry for review and signature and store original in log book.

5.1.2 Complete Figure 2-M.

NOTE: Obtain SSS permission and notify CSO before actual sample is collected.

a. Sample each emergency diesel generators lube oil system while it is being operated.

b. Send a 100ml sample of the lube oil to Mobil for analysis. (Review and attach Mobil results after they are received. Attach to Figure 2-M for storage.)

MOBIL #	EPN
D 6036	EG3
D 6038	EG2
D 6039	EG1

c. Additionally, analyze the lube oil samples for viscosity and water and sediment according to Appendix G and H. Measure the API gravity using a API hydrometer or equivalent. See N2-CSP-8 Appendix A for directions.

Also, filter a portion of the sample. Examine it under a microscope. Comment on the presence of metallic chips or slivers.

d. Record results and review with respect to past trends. Submit to Unit Supervisor Chemistry for review and signature and store original in log book.

5.2 QUARTERLY ACTIONS

5.2.1 Sample the EHC fluid systems in accordance with Appendix A. Use the sample bottles supplied by Stauffer.

a. Ship the samples to Stauffer. Place supervision's name on return card.

5.2.1 (cont'd)

b. When analysis results are received from Stauffer, Unit Supervisor Chemistry should review and sign. Results should then be stored in log book.

5.2.2 Complete Figure 3-Q.

a. During steady state operation of the turbine, sample the turbine and feedwater pump lube oil systems in accordance with Appendix F. Use Mobil bottles for each. Collect additional 100ml bottles of the turbine oil for Mobil analysis.

b. Ship the Mobil samples using supervisions name on the return card.

c. Analyze the turbine lube oil for particulate contamination in accordance with S-CAP-71 and viscosity by Appendix G. Submit results to Unit Supervisor Chemistry for review.

d. When analysis results are received from Mobil, review results and attach to Figure 3-Q. Submit forms to Unit Supervisor Chemistry for review and signature and store original in log book.

5.3 AS REQUESTED, COMPLETE FIGURE 4

5.3.1 Analyze Dow 510 fluid in accordance with Appendix C, D, & G document results and submit to Unit Supervisor Chemistry.

5.3.2 If requested, ship a sample to Dow for additional and comparison analysis.

5.3.3 Review results of Dow analysis, if any and attach.

FIGURE 1-M

NINE MILE POINT NUCLEAR STATION - UNIT 2

EHC FLUID ANALYSIS

SSS Permission _____

CSO Notification _____

DATE: _____

TURBINE

Time _____

Water Content		_____	%vol (max 0.20%)
Specific Gravity		_____	(min 1.13)
Mineral Oil		_____	%(max 4.0)
Neutralization #		_____	mg KOH/gm (max 0.20)
Conductivity		_____	umho/cm (max 1E-3)
Contamination	5-10	_____	(max 24,000)
	10-25	_____	(max 5,360)
	25-50	_____	(max 780)
	50-100	_____	(max 110)
	>100	_____	(max 11)

2RCS-ACT2A (North)

Time _____

Sample Valve		_____	
Water Content		_____	%vol (max 0.20%)
Specific Gravity		_____	(min 1.13)
Mineral Oil		_____	%(max 4.0%)
Neutralization #		_____	mgKOH/gm (max 0.20)
Conductivity		_____	umho/cm (max 1E-3)
Contamination	5-10	_____	(max 24,000)
	10-25	_____	(max 5,360)
	25-50	_____	(max 780)
	50-100	_____	(max 110)
	>100	_____	(max 11)

2RCS-ACT2B (South)

Time _____

Sample Valve		_____	
Water Content		_____	% vol (max 0.20%)
Specific Gravity		_____	(min 1.13)
Mineral Oil		_____	% (max 4.0%)
Neutralization #		_____	mgKOH/gm (max 0.20)
Conductivity		_____	umho/cm (max 1E-3)
Contamination	5-10	_____	(max 24,000)
	10-25	_____	(max 5,360)
	25-50	_____	(max 780)
	50-100	_____	(max 110)
	>100	_____	(max 11)

COMMENTS: DATE Quarterly Samples were shipped to Stauffer: _____

Technician _____ Supervisor _____

Stauffer Results Reviewed: _____

FIGURE 2-M

NINE MILE POINT NUCLEAR STATION - UNIT 2

DIESEL LUBE OIL ANALYSIS

2EGS*EG1
(West)

DATE: _____

SSS Permission _____
CSO Notification _____

API Gravity: _____
Viscosity: _____ cSt @ 40°C
Water & Sediment: _____ % Vol

2EGS*EG2
(HPCS)

DATE: _____

SSS Permission _____
CSO Notification _____

API Gravity: _____
Viscosity: _____ cSt @ 40°C
Water & Sediment: _____ % Vol

2EGS*EG3
(Center)

DATE: _____

SSS Permission _____
CSO Notification _____

API Gravity: _____
Viscosity: _____ cSt @ 40°C
Water & Sediment: _____ % Vol

COMMENTS:

Date Mobil Samples Shipped: _____

/ / Diesel fuel smell was not present in lube oil.

Technician: _____ Supervisor: _____

Mobil Results Attached.

Supervisor Review of Mobil Results: _____

FIGURE 3-Q (Pg 1 of 1)

NINE MILE POINT NUCLEAR STATION - UNIT 2

LUBE OIL ANALYSIS

TURBINE OPERATING OIL

SAMPLE DATE: _____

Contamination

SSS Permission _____

CSO Notification _____

Size um	#/100ml	Limit
5-10	_____	32,000
10-25	_____	10,700
25-50	_____	1,510
50-100	_____	225
100-250	_____	21
>250	_____	0

Viscosity at 100°F : _____ cSt(29.6-36.3)

Mobil Sample Shipped? : _____

REACTOR FEEDWATER PUMP OIL

SSS Permission _____

CSO Notification _____

	SAMPLE DATE	MOBIL SAMPLE SHIPPED ?
2FWS-P1A	_____	_____
2FWS-P1B	_____	_____
2FWS-P1C	_____	_____

COMMENTS:

TECHNICIAN: _____ SUPERVISOR: _____

FIGURE 4

NINE MILE POINT NUCLEAR STATION - UNIT 2
DOW 510 FLUID ANALYSIS

Sample Point:_____ Date: _____

		New Fluid Limit
Neutralization Number: _____	mg KOH/ml	0.02 max
Specific Gravity: _____	@25°C	0.985-1.000
Viscosity: _____	cST @25°C	95-100

Comments:

Technician: _____ Supervisor: _____

Dow Analysis Results Review

Date Sample Shipped:_____

Results Review Comment:

Supervisor_____

APPENDIX A

HYDRAULIC OIL SAMPLING

A.1.0 PURPOSE

To provide directions for sampling EHC fluid from the Turbine and Reactor Recirculation Control System A and B loops.

A.2.0 EQUIPMENT AND REAGENTS

A.2.1 Sample bottle. Made of glass, polyethylene or polypropylene. Clean bottles by washing with free rinsing detergent followed by triple rinsing with filtered isoproplyl alcohol then hexane. Allow to drip dry, then cap.

A.2.2 Surge gloves or equivalent.

A.2.3 Saran Wrap.

A.2.4 Poly bucket (for collecting purge).

A.2.5 Kimwipes or equivalent.

A.3.0 PROCEDURE

A.3.1 Notify the SSS that you are about to sample the EHC systems.

A.3.2 Wipe the sample valve clean with lint free paper.

A.3.3 Open the sample valve and purge about 1,000ml into a bucket.

NOTE: On the 2RCS units, use sample valve from operating sub loop (pump running). Record sample valve chosen (right or left).

A.3.4 Fill the sample bottle from the flowing stream.

NOTE: Do not let the bottle touch the valve.

A.3.5 Remove bottle from stream, close sample valve, place a double layer of clean saran wrap over bottles mouth and cap.

A.3.6 Label bottle appropriately.

APPENDIX B

WATER CONTENT OF OILS

B.1.0 PURPOSE

To provide directions for the analysis of oils to determine water content in the range of 0.01 to 0.50% by volume.

B.2.0 EQUIPMENT AND REAGENTS

B.2.1 Karl Fischer titrimeter such as the Ericsen model AQ-100 or equivalent.

B.2.2 Glassware; all glassware shall be dry. Wash glassware in hot water, rinse throughly with isopropyl alcohol and air dry.

B.2.3 Syringe, 50ml volume, glass.

B.2.4 Graduated Cylinder, 100ml.

B.2.5 Titration Burette, 50ml.

B.2.6 Karl Fischer Titrant, (5mg/L) obtained from Ericsen Instruments. Catalog number 14-05 or equivalent. One year expiration.

B.2.7 Karl Fischer Solvent, obtained from Ericsen Instruments. Catalog number 15-90 or equivalent. One year expiration.

B.2.8 Isopropyl Alcohol.

B.2.9 Thermometer, ASTM 5 or equivalent.

B.3.0 PROCEDURE

B.3.1 Set up the Karl Fischer Titrimeter.

B.3.2 Rinse the buret with KF Titrant.

B.3.3 Clean the reaction vessel according to B.2.2.

B.3.4 Measure 50ml KF Solvent into reaction vessel.

B.3.5 Place stirring bar in reaction vessel.

B.3.6 Attach reaction vessel to Titrimeter.

B.3.7 Prepare Titrimeter electrode, delivery tubes, stirrer and polarizing current (5 ma).

NOTE: Clean the electrodes when necessary, as indicated by instability or loss of sensitivity, as follows: Immerse the electrodes in a sulfuric acid-dichromate cleaning solution; rinse thoroughly with tap water. Rinse thoroughly in demin. water and then in alcohol. When not in use, keep the electrodes immersed in (clean) solvent.

B.3.8 Titrate with KF Titrant until a constant end point is reached. (This pre-dries reaction vessel and solvent.)

B.3.9 Weigh 50gm of sample.

B.3.9.1 Shake sample container thoroughly.

B.3.9.2 Weigh sample container on a balance.

B.3.9.3 Adjust weights to a value 50 grams lighter.

B.3.9.4 Using the 50cc syringe (cleaned according to Section B.2.2) remove 50 grams of sample from container.

B.3.10 Place 50gm of sample in reaction vessel.

B.3.11 Titrate sample with KF Titrant (5 mg/L).

B.3.12 Divide volume (ml) of Titrant used by 100 to obtain percent water of sample.

NOTE: This assumes 5mg/L Titrant and 50gm of sample.

B.3.13 Record percent water content.

APPENDIX C

NEUTRALIZATION NUMBER

C.1.0 PURPOSE

To provide directions for the determination of the neutralization number of oils.

C.2.0 EQUIPMENT AND REAGENTS

C.2.1 Titrating Solution, 0.1N Potassium Hydroxide (KOH) aqueous solution. Prepare according to S-CAP-4 or obtain from a chemical supply warehouse. Record the normality.

C.2.2 Titration Solvent, 1 liter mixture of 5ml water, 500ml Toluene and the remaining as Isopropyl alcohol.

C.2.3 Indicator Solution, 1 gram of P-Naptholbenzine dissolved in 100ml of titration solvent. (This solution may be bought pre-prepared.)

C.2.4 Erlenmeyer Flask, 250ml.

C.2.5 Titration Buret, 50ml.

C.2.6 Graduated Cylinder, 100ml.

C.3.0 PROCEDURE

C.3.1 Place 100ml of titration solvent in 250ml flask.

C.3.2 Add 4 to 6 drops of indicator solution. (It will change to an amber color.)

C.3.3 Titrate slowly (drop by drop) and swirl with each addition of 0.1N KOH.

C.3.4 Record the volume required as the blank. (It should be less than 0.3ml.)

C.3.5 Weigh 20gm of sample into a clean 250ml flask. Record.

C.3.6 Add 100ml of titration solvent and 4 to 6 drops of indicator solution.

C.3.7 Swirl the flask to mix.

C.3.8 Titrate immediately.

C.3.9 Record the volume (ml) of KOH required to reach the first color change (olive green).

C.3.10 Continue titrating to a deep green or blue end point which will usually appear within 0.2ml. Record.

C.3.11 If the volume recorded in step C.3.10 is more than 0.3ml greater than the volume of step C.3.9 then use the volume of step C.3.9 for calculations, otherwise use the volume recorded in step C.3.10.

C.3.12 Calculate neutralization number; i.e., mgm KOH per gram of fluid sample, from

$$\frac{56N\ (\text{ml KOH sample} - \text{ml KOH blank})}{\text{gram weight of fluid sample}}$$

where N = normality of KOH

APPENDIX D

SPECIFIC GRAVITY

D.1.0 PURPOSE

To provide directions for the determination of the specific gravity and mineral oil content of Fryquel EHC fluid. Specific gravity only for other fluids.

D.2.0 EQUIPMENT AND REAGENTS

D.2.1 Hydrometer, specific gravity 1.120 to 1.190. 325mm long for fryquel. 0.940 to 1.010 for Dow 510.

D.2.2 Ungraduated Cylinder, 300ml, 38 x 325mm.

D.2.3 Thermometer, ASTM 5 or equivalent.

D.3.0 PROCEDURE

D.3.1 Adjust temperature of sample using water bath or equivalent to 60°F. Dow says 77F(25C)

D.3.2 Fill cylinder with sample.

D.3.3 Place hydrometer in cylinder.

NOTE: Take care to not allow hydrometer to drop to a level lower than that supported by the buoyant force.

D.3.4 Read the specific gravity scale and record.

NOTE: Level is that indicated by the bulk of the fluid. Disregard any local level disturbances caused by meniscus effects.

D.3.5 Calculate percent mineral oil of fryquel using the following formula:

$$\% \text{ Mineral Oil} \leq 417\ (1.14 - \text{Specific Gravity})$$

NOTE: Formula was derived assuming Fryquel EHC specific gravity of 1.14 and mineral oil specific gravity of 0.90 as a worse case.

APPENDIX E

CONDUCTIVITY OF OIL

E.1.0 PURPOSE

To provide direction for the determination of the conductivity of oil.

E.2.0 EQUIPMENT AND REAGENTS

E.2.1 Conductivity Cell with a constant of $0.001 cm^{-1}$ without a temperature compensator. Glass, metal and teflon material of construction only.

NOTE: Some plastics are degraded by EHC Fluid most notably PVC.

E.2.2 Acetone.

E.3.0 PROCEDURE

E.3.1 Rinse the cell with acetone, allow to dry.

E.3.2 Immerse the cell into a container of the sample fluid.

E.3.3 Agitate the cell to dislodge any air bubbles trapped within the cell plates.

E.3.4 Obtain a conductivity reading using the meter and record.

NOTE: Do not use any temperature compensation and ascertain that the conductivity reading is unaffected by further agitation of the cell.

APPENDIX F

MAIN TURBINE & FEEDWATER PUMP LUBE OIL SAMPLING

F.1.0 PURPOSE

To provide directions for the sampling the Main Turbine and Reactor Feedwater Pump lube oil at Unit 2.

F.2.0 PRECAUTIONS

F.2.1 Notify Control Room operators prior to sampling.

F.2.2 Obtain appropriate RWP.

F.3.0 MAIN TURBINE LUBE OIL

Sample point is on front standard, TB 306.

F.3.1 Close "operating oil" valve.

F.3.2 Remove corresponding Allen wrench type drain.

F.3.3 Attach nipple and sampling spout to plug.

F.3.4 Open valve slightly.

F.3.5 Allow sufficient purge.

F.3.6 Collect sample.

F.3.7 Close valve and replace plug.

F.3.8 Open valve.

F.4.0 FEEDWATER PUMP LUBE OIL

Sample point is north side of respective feedwater pumps, TB 250.

F.4.1 Close the drain valve on 2FWL-PI19.

NOTE: Valve should already be closed.

F.4.2 Remove end cap.

NOTE: Observe Precaution 3.3

F.4.3 Open valve slightly.

F.4.4 Allow sufficient purge.

F.4.5 Collect sample.

F.4.6 Close valve and replace plug.

APPENDIX G

VISCOSITY

G.1.0 PURPOSE

To provide directions for the determination of the viscosity of hydraulic fluid or oil. Procedure is similar to that used for fuel oil with the exception that the tolerance limits for the test equipment is less stringent.

G.2.0 DEFINITION

Kinematic Viscosity - a measure of the resistive flow of a fluid under gravity, the pressure head being proportional to the density, ρ of the fluid; for gravity flow under a given hydrostatic head, the pressure head of a liquid is proportional to its density, ρ. For any particular viscometer, the time of flow of a fixed volume of fluid is directly proportional to its kinematic viscosity, $v = n/\rho$, where n is the dynamic viscosity coefficient. The kinematic viscosity coefficient has the dimension L^2/T, where L is a length, and T is a time. The cgs unit of kinematic viscosity is one centimetre squared per second and is called one stokes (symbol St). Frequently, the centistokes (symbol cSt) is used (1 cSt = 10^{-2} St).

G.3.0 EQUIPMENT

G.3.1 Viscometer, Cannon-Fenske routine, or equivalent.

NOTE: Use only calibrated viscometers with constants measured and provided to the nearest 0.1% of their value. Check calibration yearly using Cannon viscosity standards. Result should agree to within 1.0%.

G.3.2 Viscometer Holder.

G.3.3 Viscosity Thermometer, ASTM 120 or equivalent.

It is essential that the ice point be determined monthly and that the corrections be adjusted to conform to the change in ice point. If the thermometer is used less frequently, check before use. Record deviation (ie. the amount that must be subtracted from reading to obtain proper value).

G.3.4 Constant Temperature Bath, Cannon M1-12M or equivalent.

G.3.5 Stopwatch with at least 0.1 sec increment and accurate to within 0.5 sec over 15 min. This should be checked yearly against a standard time signal.

G.4.0 PROCEDURE

G.4.1 Ascertain that the ice point of the thermometer has been determined within the last month, and the corrections if any applied. Double check thermometer against a NBS traceable thermometer.

G.4.2 Maintain the bath at 40°C and within 0.1°C over the length of the viscometers. Check that the lid of the bath is level, using a level.

G.4.3 Select a clean dry, calibrated viscometer.

G.4.4 Charge the viscometer in accordance with vendors directions.

G.4.5 Allow the charged viscometer to come to thermal equilibrium (30 min.).

G.4.6 Use suction or pressure to adjust the head level to a position about 5 mm ahead of the first timing mark.

G.4.7 With the sample freely flowing, measure, to within 0.2 sec, the time required for the meniscus to pass from the first timing mark to the second.

NOTE: Never add or withdraw a viscometer while any other viscometer is in use for measuring a flow time.

G.4.8 Repeat step G.4.6 and G.4.7.

G.4.9 If two measurements agree to within 2%, use the average for calculating the viscosity. If agreement is not obtained, reject the results.

G.4.10 Calculate the kinematic viscosity, v, from the measured flow time, t, and the instrument constant, C, by means of the following equation:

$$v = Ct$$

where:

v = kinematic viscosity, cSt,
C = calibration constant of the viscometer, cSt/s, and
t = flow time, s.

G.4.11 Report the results rounded to the nearest 0.01 cSt.

APPENDIX H

WATER AND SEDIMENT

H.1.0 PURPOSE

To provide directions for the determination of the water and sediment content of lubricating oils.

H.2.0 EQUIPMENT AND REAGENTS

H.2.1 Centrifuge

H.2.2 Cone-shaped centrifuge tubes (4), Kimble 45240 or equivalent.

H.2.3 Water bath maintained at 49° ± 1°C (120° ± 2°F).

H.2.4 Toluene, water saturated, Certified ACS

NOTE: Upon opening a new 1 liter bottle of Toluene, add 2 ml distilled water and shake well. Allow 24 hours for settling. Pour solution into 1 liter separatory funnel and extract the water phase to waste. Refill the reagent bottle with the water saturated toluene and label bottle "water saturated".

H.3.0 PROCEDURE

H.3.1 Fill each of two centrifuge tubes to the 50-ml mark with solvent; then immediately pour the well-shaken sample directly from the sample container into the centrifuge tubes until the total volume in each tube is 100 ml. Read the top of the meniscus at both the 50 and 100-ml marks. Stopper the tubes tightly and shake vigorously until the contents are thoroughly mixed. Loosen the stoppers and immerse the tubes to the 100-ml mark for 10 min in the bath maintained at 120 ± 2°F (49 ± 1°C).

H.3.2 Invert the tubes to assure that the oil and the solvent are uniformly mixed and shake cautiously.

H.3.3 Place the tubes in trunnion cups on opposite sides of the centrifuge to establish a balanced condition, and whirl 10 min at 1470 rpm (70 on centrifuge dial).

H.3.4 Remove the tubes from the centrifuge. Read and record the combined volume of water and sediment at the bottom of each tube. Estimate to the nearest 0.025 ml. Return the tubes without agitation to the centrifuge and whirl for 10 min at the same rate. Repeat this operation until the combined volume of water and sediment remains constant for two consecutive readings. In general, not more than two whirlings are required.

H.3.5 Record the final volume of water and sediment in each tube and report the sum of these two readings as the percentage of water and sediment.

H.3.6 Clean centrifuge tubes with a naphtha solvent or equivalent.

ATTACHMENT 2

MSIV Oil Chemistry Results

from Analysis of December 12, 1986

ATTACHMENT 3

Identified problems with Hydraulic Oil Quality

at Nine Mile Point Unit 2:

1) Recent allegation

2) Problem Report 3345

3) Other Identified Items

Leroy Fenton

INTERNAL CORRESPONDENCE
FORM 112 2 R 02 80 55-01-013

NIAGARA MOHAWK

FROM A. S. Kovac

TO QIP File

DISTRICT Nine Mile Point

Letter No. QIP-86-215

DATE December 22, 1986

FILE CODE QUA-2

SUBJECT QIP Summary Report of Former SWEC Employee's Concern to NRC

Per discussion with J. A. Perry, William Cook, NRC Senior Resident Inspector, has been provided an informational copy of the attached, "Summary of Former SWEC Employee's Concern to NRC Received Via NYS PSC", (reference QIP Concerns 86-00127A, B, & C).

A. S. Kovac
Quality First Program Manager

ASK/mjb
Attachment
xc: J. P. Beratta
W. J. Donlon
T. E. Lempges
C. V. Mangan
T. J. Perkins
J. A. Perry
A. F. Zallnick

December 18, 1986

SUMMARY OF FORMER SWEC EMPLOYEE'S CONCERN TO
NRC RECEIVED VIA NYS PSC

Description of Concern

A copy of the letter to the NRC stating a former employee's concern was received December 08, 1986 from the Nine Mile Point Site Representative of the NYS Public Service Commission. The concern addressed the following areas:

1. Mainsteam Isolation Valves (MSIVs)
2. Paperwork
3. Tubes in the condenser

NMPC Quality First Investigation Results

Representatives of QIP contacted the Concernee by telephone on December 09, 1986 for additional information regarding the concern.

The investigation of the concern has been completed by QIP and a summary of the investigative results is as follows:

1. MSIVs

During the telephone contact with the Concernee, he stated that his main concern was the acceptability of the MSIVs.

QIP's investigation revealed the following:

- All eight (8) valves have successfully passed the Preliminary "Type C" Leak Rate Testing.
- NMPC has committed to perform Confirmatory Type C Leak Testing after completion of the 100 hour warranty run.
- The Hydraulic Fluid (510-100) was controlled by Administrative Procedure AP-7.1 "Procedure for Control of the Use of Transfer of Organic Material".
- NMPC QA identified on Nonconformance Report No. 2-86-0067 a problem with the Hydraulic Fluid being utilized beyond its Shelf Life limitation. This nonconformance was dispositioned "use-as-is" as a result of a chemical analysis performed on 09/11/86.
- The Oil Filtration requirements were addressed on E&DCR M10038 and determined that the installed 40 micron filter was adequate for the usage.
- Samples of the Hydraulic Fluid in each of the eight (8) Actuators was taken on 12/12/86 and a chemical analysis determined that the fluid was proper and acceptable per the Manufacturer's (Dow-Corning) specification.

. The Actuators, although classified CAT II were subjected to inspection by QC and overview surveillance by QA.

2. Paperwork

The concern with the accuracy of paperwork was discussed with the Concernee; who, since he had previously identified to QIP a torque specification error of vendor manual origin, felt that there may be additional errors in plant documentation. The plant program of document review, both prior to and after completion of work activities, was explained to the Concernee and he requested no further investigation on this item.

3. Tubes in the Condenser

The concern with the acceptability of condenser tubes had been previously received and investigated by NMPC in the summer of 1985. A visual inspection of the installed tubes, referred to in the report of that investigation, found the tubes acceptable. The condenser had also passed hydrostatic leak tests (reference Inspection Report No. M4022812). The investigation found no problems with the condenser.

Conclusion

NMPC has committed to and is implementing a program that assures the prevention of those areas of concern regarding the MSIVs. No evidence has been found to validate the concern areas of the MSIVs, paperwork or condenser tubes.

NMPC QIP representatives contacted the Concernee by telephone on December 18, 1986, and provided him with a verbal summary of the investigation and the conclusion. The Concernee indicated he was now satisfied.

ORIGINAL

MF, SSP 4C

NIAGARA MOHAWK POWER CORPORATION
NINE MILE POINT UNIT #2
PROBLEM REPORT

03345
NPS NO BY4206
BY4207

EQUIPMENT NAME	EQUIPMENT NUMBER	SYSTEM NUMBER	DATE
MN STM ISOL VALVES	2MSSXHYU6A-D/7A-D	1.001	3-4-86

ORIGINATOR	REFERENCES	DISCIPLINE
K. H. McDERMOTT 4230	P-303D	M

ATTACHMENTS	ASME CLASS	QA CLASS	PRIORITY	STATUS
ANALYSIS DATA SHEET DOW CERT OF ANALYSIS	NA	I	5	OPEN CLOSED

DESCRIPTION: SUFFICIENT INFORMATION IS NOT AVAILABLE TO DETERMINE IF THE HYDRAULIC FLUID FOR THE MSIV'S (DOW CORNING 510) CURRENTLY IN THEIR RESERVOIRS IS OF A ACCEPTABLE QUALITY FOR OPERATION. NOTE ATTACHMENT # 1

NPS DESCRIPTION
HYDRAULIC FLUID ACCEPTANCE CRITERIA

RECOMMENDED SOLUTION
SUPPLY ACCEPTANCE CRITERIA FOR ~~OPERATING~~ OPERATING KHM 3-4-86 FLUID AND VENDOR PROCEDURES FOR ANALYSIS, ~~AND~~ PLUS FREQUENCY OF SAMPLING AND CHANGE OUT. KHM 3-4-86

SUBT FEELS THAT THE FLUID CURRENTLY IN THE ACTUATORS IS ACCEPTABLE DUE TO THE HYDRAULIC SYSTEM FILTER WHICH PREVENTS DAMAGE TO THE HYDRAULIC ~~EH~~ CYLINDER. ENGR & VENDOR CONCURRENCE IS NEEDED. EJM 3-4-86

SET to evaluate and provide appropriate solution - EMD 3/5/86

PROCEDURE CHANGE REQ'D	DRAWING CHANGES REQ'D	SYSTEM STATUS
YES NO	YES NO	PRE-RELEASE RELEASED TURNOVER

PROJECT ENGINEER/DATE	CONCUR	START-UP MANAGER/DATE	CONCUR
[signature]	YES NO	[signature] 3/4/86	YES NO

ENGINEER DISPOSITION/COMMENTS

E&DCR E25256 (PRELIM. COPY ATTACHED) ADDRESSES VENDORS RECOMMENDATIONS FOR ACCEPTANCE, ANALYSIS, & SAMPLING OF FWID.

M. J. Dvorak 3/10/86
J. G. Panchyson mtg

NPS NO IF APPLICABLE		
NA	APPROVED DISAPPROVED COPY OF COMMENTS	3-17-86

LEAD ENGINEER/DATE	NPS ENGINEER MANAGER/DATE
MJSchmidt 3/14/86	[signature] 3/17/86

DR NUMBER	PROCEDURES CHANGED/DATE	10 CFR POTENTIAL REPORTABLE PER
NA	NA	

SOLUTION SATISFACTORY	TEST ENGINEER/DATE	START-UP MANAGER/DATE
YES NO	[signature] 3 24 86	[signature] 3/24/86

PR 3343 Attachment

FIGURE 1-N (Pg. 1 of 1)

NINE MILE POINT NUCLEAR STATION - UNIT 2

DOW 510 ~~Lub~~ FLUID SURVEILLANCE

DATE: _____

LOT AE 055117 DRUM 5438 (NEW FLUID)

✓ Water Content	0.002	%vol (max 0.20%)	GS
✓ Specific Gravity	0.995	~~(min 1.13)~~ .985 - 1.000 @ 60°F	TC
~~✓✓ Mineral Oil~~		~~%~~	
✓✓ Neutralization #	<0.05	mg KOH/gm (max 0.20)	JS
✓ Conductivity	7.7×10^{-13}	umho/cm (max 1E-3)	
✓✓ Contamination 5-10	1370	(max ~~24,000~~) 128 000	TC
10-25	640	(~~max 5,300~~) 42 000	
25-50	220	(~~max 780~~) 6500	
50-100	58	(~~max 110~~) 1000	
>100	6	(~~max 11~~) 92	

2 MSS * HYV 7B

Sample Valve	@ reservoir		
✓ Water Content	0.005	%	GS
✓ Specific Gravity	0.995 @ 60°F		MT
~~✓ Mineral Oil~~		~~%~~	
✓✓ Neutralization #	<0.05	mgKOH/gm	JB
✓ Conductivity	8.3×10^{-14}	umho/cm	TC
✓ Contamination 5-10	35,224	128,000	JStone
10-25	12852	42,000	
25-50	2300	6500	
50-100	424	1000	
>100	69	92	

Sample Valve		
Water Content		%
Specific Gravity		
Mineral Oil		%
Neutralization #		mgKOH/gm
Conductivity		umho/cm
Contamination 5-10		
10-25		
25-50		
50-100		
>100		

COMMENTS: Viscosity at 40°C:

new fluid 182.13 x 295.96 sec = 53903 Cst

HYV-7B 182.07 x 297.55 sec = 54175 Cst . PS

Technician Jim Stone Date 2-11-86

Supervision [signature] Date 2-11-86

PR 3345 ATTACHMENT 2

*SHELF LIFE = 9-16-86

*EXPIRATION DATE = 9-16-86

Laura K. Singer

85-1780 7

STONE AND WEBSTER ENGINEERING CORPORATION

ENGINEERING & DESIGN COORDINATION REPORT

PAGE 1 OF 6

E & DCR NO. 25256

PROJECT/CLIENT: NINE MILE POINT NUCLEAR STATION — UNIT 2 NIAGARA MOHAWK POWER CORPORATION

JOB ORDER NO. 12/87

P.O. NO. (S & W): P303D

REASON CODE (S): G.

EQUIP. I.D. NO. (S)/SYS. CODE (S): 2MSS*AOV*28D, 28E/1.001/MS

REFERENCE DOCUMENTS: P303D

SUPPLIER/OR SUBSUPPLIER: CROSBY VALVE.

DESCRIPTION SUMMARY: ACCEPTABILITY OF HYDRAULIC FLUID

REMARKS: PR 03345.

PROBLEM DESCRIPTION: AREA 2 - TURB BLDG - 237-6.

PER PR 03345, CRITERIA ARE REQ'D TO DETERMINE UNACCEPTABILITY OF FLUID SPECIFIED FOR USE IN HYDRAULIC ACTUATORS OF SUBJECT MSIV'S.

SPEC P303D DOES NOT ADDRESS ANALYSIS OF THIS FLUID.

INITIATOR	AREA/DEPT DIV	TEL EXT.	DATE	DATE NEEDED BY	APPROVED	ENGR. RESP
S. LEONARD	334	4867	3/8/86			

PROBLEM SOLUTION

SEE PG 2 FOR PROBLEM SOLUTION.

THIS COPY ISSUED FOR INFORMATION ONLY. NOT TO BE USED FOR PHYSICAL CONSTRUCTION

ENVIR QUAL	YES ☐	NO ☒	INTERDISCIPLINE CONCURRENCE	ENGR	DATE	ASME ☒	NON ASME ☐
SEISMIC QUAL	YES ☐	NO ☒	DISCIPLINE			CEF REQ'D	YES ☐ NO ☒

AFFECTED DOCUMENT NUMBERS	TYPE	STATUS
P303D	S	N

STATUS
C - WILL BE INCORPORATED
N - WILL NOT BE INCORPORATED
I - NO CHANGE

RELATED ACTIVITIES	QA CAT
N/A	I

ANSWERED BY	DATE
M. J. Diamond.	3/10/86
RESP. LEAD ENGR.	DATE
MATERIALS ENGR.	DATE
EQUIP. SPEC.	DATE
QSD OR EA	DATE
PROJ. ENGR.	DATE

CLIENT APP REQ'D ☐ NR — REF — DATE

SUB ITEM	WORK RESP	SUB ITEM	WORK RESP
01	NW	02	

EQ RELEASE NO.		EQ RELEASE NO.	
WBS NO.		WBS NO.	
WORK COMPLETION	NWR ☐		DATE
INSP REPORT NO/SIG			DATE
FINAL WORK TRACKING CLOSURE			DATE

DESCRIPTION (01)	REMARKS (01)
DESCRIPTION (02)	REMARKS (02)

PROBLEM SOLUTION.

PER TELCON ATTACHED (PGS 3 & 4) THE FOLLOWING RECOMMENDATIONS / OBSERVATIONS ARE MADE:

(1) BASED ON ANALYSIS SHOWN ON PG 5, THE FLUID PRESENTLY IN ACTUATOR RESERVOIRS IS ACCEPTABLE.

(2) THE VENDORS' PRINCIPAL CONCERN IS VISCOSITY.

(3) PARTICULATES IN THE FLUID WILL BE REMOVED BY THE UNIT FILTER.

(4) THE FLUID VISCOSITY, WHEN SAMPLED, SHOULD FALL WITHIN THE SPEC LIMITS SHOWN ON PG 6 UNDER "SPECIFICATION".

(5) THE VENDOR RECOMMENDS SAMPLING SHOULD TAKE PLACE:-

a) ONCE EVERY 3 MTHS WHEN UNITS NOT IN OPERATION

b) ONCE EVERY 6 MTHS, IF PRACTICAL, WHEN UNITS IN OPERATION.

ITEM (5) WILL SERVE TO PROVIDE A HISTORY OF FLUID PERFORMANCE & SAMPLE FREQUENCY CAN BE EXTENDED OR SHORTENED DEPENDING ON FINDINGS. FLUID WILL BE SUBJECT TO SEDIMENTATION & EVAPORATION IF STORED FOR LONG PERIODS (YEARS IN ACTUATOR RESERVOIRS.

STONE & WEBSTER ENGINEERING CORPORATION

NINE MILE POINT NUCLEAR STATION - UNIT 2

NOTES OF TELEPHONE CONVERSATION

C2525
Pg 30

CALL DATE 3/7/86. TIME 11.00 am.

PROJECT Nine Mile Point - Unit 2 J.O. 12187

FROM:		TO:
S. LEONARD	NAME	B. COSTA.
SSG	TITLE	VENDOR.
SSG.	ADDRESS	CROSBY VALVES. (617)-384-3121

SUBJECT M.S.I.V. HYDRAULIC ACTUATORS FLUID. (WARRANTY)

SUMMARY B.C. WAS GIVEN THE COMPARATIVE ANALYSIS BETWEEN NEW FLUID & THE FLUID IN 2MSS*HYV78 RESERVOIR AND ASKED TO COMMENT. IT WAS HIS OPINION THAT THE PARTICULATE CONTENT WOULD BE ADEQUATELY REMOVED BY THE UNIT. FILTER & THAT THE OTHER READINGS GIVEN WERE WITHIN ACCEPTABLE LIMITS, INCLUDING THE VISCOSITY. IN CONCLUSION HE FELT THAT THE FLUID PRESENTLY IN USE IS ACCEPTABLE.

B.C. WAS ASKED TO INDICATE WHAT AN UNACCEPTABLE ANALYSIS WOULD BE & HE STATED THAT THE VENDORS MAIN CONCERN IS LOW VISCOSITY, IT & ALSO OTHER COMMODITIES SHOULD BE WITHIN "DOW 510" SPEC. LIMITS.

(CONT'D)

COPY TO: _____

STAMP OR SIGNATURE

NOTED MAR 07 1986 M. S. LEONARD

STONE & WEBSTER ENGINEERING CORPORATION

C25256
Pg 4 of 6

NINE MILE POINT NUCLEAR STATION - UNIT 2

NOTES OF TELEPHONE CONVERSATION

CALL DATE 3/7/86 TIME 11.00 am

PROJECT Nine Mile Point - Unit 2 J.O. 12187

FROM:		TO:
	NAME	
	TITLE	
	ADDRESS	

SUBJECT

SUMMARY B.C. WAS ASKED TO INDICATE A SUITABLE TIME PERIOD BETWEEN SAMPLING OF FLUID & ITS STATUS THAT IF DONE DURING NON-OPERATIONAL PERIODS OVER 3 MONTHS & DURING OPERATIONAL PERIODS OVER 6 MONTHS (IF PRACTICAL) THIS SHOULD GIVE A REASONABLE ~~BASE~~ HISTORY OF FLUID PERFORMANCE.

COPY TO:

STAMP OR SIGNATURE

NOTED MAR 07 1986 M. S. LEONARD

C25256
R5 OF 6

(Pg. 1 of 1)

FIGURE 1-H

NINE MILE POINT NUCLEAR STATION - UNIT 2

DOW 510 ~~346~~ FLUID SURVEILLANCE

DATE: _____

LOT AE 055117 DRUM 5438 (NEW FLUID)

✓Water Content	0.002	%vol (max 0.20%)	GS
✓Specific Gravity	0.995	~~(min 1.13)~~ .985 - 1.000 @ 60°F	TC
~~✓✓Mineral Oil~~		%	
✓✓Neutralization #	40.05	mg KOH/gm (max 0.20)	JS
✓Conductivity	7.7X10-13	umho/cm (max 1E-3)	
✓✓Contamination 5-10	1370	(max ~~24,000~~) 128 000	TC
10-25	640	(~~max 5,300~~) 42 000	
25-50	220	(~~max 780~~) 6500	
50-100	58	(~~max 110~~) 1000	
>100	6	(~~max 11~~) 92	

2 MSS * HYV 7B

Sample Valve	@ reservoir		
✓Water Content	0.005	%	GS
✓Specific Gravity	0.995 @ 60°F		MT
~~✓Mineral Oil~~		%	
✓✓Neutralization #	40.05	mgKOH/gm	JS
✓Conductivity	8.3 X 10-14	umho/cm	TC
✓Contamination 5-10	35,224	128,000	JStone
10-25	12852	42,000	
25-50	2300	6500	
50-100	424	1000	
>100	168	92	

Sample Valve		
Water Content		%
Specific Gravity		
Mineral Oil		%
Neutralization #		mgKOH/gm
Conductivity		umho/cm
Contamination 5-10		
10-25		
25-50		
50-100		
>100		

COMMENTS: Viscosity at 40°C :

new fluid 182.13 x 295.96 sec = 53903 Cst

HYV-7B 182.07 x 297.55 sec = 54175 Cst PS

Technician Jim Stone JS Date 2-11-86

Supervision [signature] Date 2-11-86

...CORNING CORPORATION ...LAND MICHIGAN 48640 TELEPHONE 517-496-4000

CERTIFICATE OF ANALYSIS PR3345 ATTACHMENT 2

PRODUCT DOW CORNING(R) 510 FLUID, @ 25

LOT NUMBER: AE053117 QUANTITY: 20 / 440 DATE OF SHIPMENT: Dec 30

C25256
PG 6 OF 6.

	ANALYSIS	SPECIFICATION
VISCOSITY	97.7	95. - 105

*SHELF LIFE = 9-16-86

*EXPIRATION DATE = 9-16-86

Laura K. Singer

85-1780 7

1. D.R. 12707

2. MES NO

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT UNIT #2

DEFICIENCY REPORT

B.V.5453, 24, 25.

3. EQUIP NAME	4. EQUIP NO	5. SYS	6. ORIGINATOR	7. DATE
MAIN STM ISOL VALVES	BUCK 15	1.CC1	K. MCGERMOTT	1-30-86

8. QUAL CLASS	9. REF/RELATED DOCUMENTS	10. PR NO	11. DISC.	12. ATTACHMENTS	13. ASME CLASS	14. PRIORITY
I	NF 85-0150	N/A	QA	ANALYSIS DATA SHEETS	AIA	2

15. DESCRIPTION OF DEFICIENCY/EXPOSED DISPOSITION/ETC /ATTACH ADDITIONAL SHEETS IF NECESSARY

BUCK 15 - 20" [illegible] - B & D, MASSACHUSETTS BLVD

THE MOST UNDESIRABLE UNIT; REQUIRES FLUSHING AND FLUID CHANGE OUT

BASED ON ATTACHED COPIES OF ANALYSIS DATA SHEETS

16. MES DESCRIPTION

FLUSH HYDRAULIC UNIT (Now 1-3 BC)

17. EST COMP DATE	18. ORG RESP FOR COMP	19. MES ENTRY REQ'D	20. CLEANLINESS CLASS
2-1-86	MCS	☒ YES ☐ NO	☒ A ☐ B ☐ C ☐ D ☐ NONE

21. STATUS A EQUIP	B PRELIM TEST	C PREOP TEST	D RETEST REQ'D
☐ PRE-RELEASE ☐ RELEASE ☐ TURNOVER	☐ IN PROGRESS ☐ COMPLETE	☐ IN PROGRESS ☐ COMPLETE	☐ YES ☒ NO

22. REMARKS FLUSH PER GUIDELINES OF MF. ENG. CC1 AND SPEC. AC4D

23. REVIEWED BY TEST ENGR [signature] DATE 1-30-86

24. APPROVED BY MANAGER [signature] DATE 1-31-86

25. INSPECTION REQUIREMENTS

26. REVIEWED BY QUALITY ASSURANCE _____ DATE _____

27. DEFICIENCY CORRECTED ACTION TAKEN. WCR/VR # _____

28. QC INSPECTIONS

DATE

31. APPROVED BY (TEST GROUP MANAGER) DATE

30. POTENTIALLY REPORTABLE 10CFR50.55(E) ☐ YES ☐ NO

32. MES CLOSE DATE | 33. TRACK NO. | CAUSE | DEFICIENCY

10CFR21 ☐ YES ☐ NO

34. QA DOCUMENT REVIEW BY DATE

ANALYSIS DATA SHEET

Sample Identification: EHC 6A Resivoir Sample 5/20/85

Particle Range (um)	Count	OPERATING / New Fl. Limit Per 100 ml.
5-10	2,063,460	~~32,000~~ 24,000 / 12
10-25	355,200	~~10,700~~ 5,300 / -
25-50	4,030	~~1,500~~ ~~300~~ / -
50-100	290	~~300~~ 110 / -
100-200	50	~~40~~ 1 / -
>200	12	~~4~~ - / -

Spec. Gr. of Sample 0.996 at 60°F this implies that Sample is not EHC fluid

Moisture Content was 0.011% Water

Resistivity 8.5 x10^12 ohm-cm

Comments: Why count something that is contaminate does this ?????

ANALYST: Skip

DATE: 5/21/85

SUPERVISOR: [signature]

DATE: 5/22/85

ANALYSIS DATA SHEET

Sample Identification: 2-MSS * HYV 7B for K. McDermott

Particle Size (µm)	Counts	Mass (g)

ANALYST: Tom Coates

DATE: 4/21/93

Sample weight:

*TNTC Too numerous to count, filter stained black with small particulates.

September 1984

entered 4/30/86

NIAGARA MOHAWK — INFORMATION ONLY — PAGE 1 OF 4

QA SECTION/GROUP: — SR-86-10132

RESPONSIBLE ORGANIZATION: UNIT II CHEMISTRY/STARTUP AND TEST DATE: 2-5-86

SUBJECT: MAIN STEAM ISOLATION VALVES (MSIV's) HYDRAULIC OIL ANALYSIS

CHECKLIST NO., REV. & TITLE OR GOVERNING DOCUMENTS: AP-2.0, REV. 3, "PRODUCTION AND CONTROL OF PROCEDURES" MF.GENE.001, REV. 5, "GENERIC FLUSHING/CLEANING PROCEDURE"

SCHEDULED: YES ☐ NO ☒ NUCLEAR SAFETY RELATED: YES ☐ NO ☒ 10CFR50 APP. B CRITERIA: II

OBSERVATIONS: SU&T INITIATED DEFICIENCY REPORT (DR) #12707 TO FLUSH AND CHANGE OUT THE HYDRAULIC FLUID IN THE ACTUATORS OF THE MAIN STEAM ISOLATION VALVES (EQUIPMENT MARK #'s 1MSS*HYV 6A, 6B, 6C, 6D, 7A, 7B, 7C AND 7D). THE FLUSHING WAS DEEMED NECESSARY BASED ON ANALYSIS DATA SHEETS ATTACHED TO THE DR. SU&T LATER OBTAINED A SAMPLE OF NEW HYDRAULIC ACTUATOR OIL AND HAD IT ANALYZED. BASED ON A COMPARISON OF THE ANALYSIS DATA SHEET FOR THE NEW FLUID WITH THE DATA SHEET FOR THE EXISTING FLUID IN VALVE 7B, SU&T DEEMED THAT THE FLUID IN ALL 8 MSIV's (CONTINUED PG. 3)

OPEN ITEMS:

#1 REQUIREMENT: REGULATORY GUIDE 1.68, REV. 2, "INITIAL TEST PROGRAMS FOR WATER-COOLED NUCLEAR POWER PLANTS," APPENDIX C, PARA. 1e, "ACCEPTANCE CRITERIA," STATES: "THE CRITERIA AGAINST WHICH THE SUCCESS OR FAILURE OF THE TEST WILL BE JUDGED SHOULD BE CLEARLY IDENTIFIED..."

#1 VIOLATION: CONTRARY TO THE ABOVE REQUIREMENT, SU&T DECIDED TO PERFORM A FLUSH PROCEDURE (TEST) AND WITHOUT CLEARLY IDENTIFIED ACCEPTANCE CRITERIA LATER DECIDED TO ONLY CHANGE THE FLUID.

#1 RESOLUTION AND CLOSURE: SEE PROPOSED CORRECTIVE ACTION AND CORRECTIVE ACTION VERIFICATION SECTIONS ON PAGE 2 OF THIS REPORT.

FOR OPEN ITEM #2 SEE PG. 4.

NIAGARA MOHAWK QUALITY ASSURANCE DEPT.

SURVEILLANCE REPORT CONTINUATION SHEET

REPORT NO. SR-86-10132

PERSONNEL CONTACTED: A. M. Ross, Unit Supervisor Chemistry

K. McDermott, SU&T Engineer

FOLLOW-UP REQUIRED	PREPARED BY:	DATE	APPROVED BY:	DATE
YES ☒ NO ☐	Terence D. O'Connell	3-4-86	J R Orlando	3/4/86

PROPOSED CORRECTIVE ACTION AND COMMITTED COMPLETION DATE:

OPEN ITEM #1: WRITE A PROBLEM REPORT (PR) TO ESTABLISH ACCEPTANCE CRITERIA FOR 510 FLUID. ALSO RECOMMEND CLEAR DEFINITION OF "SHELF LIFE" AND "USEFUL (SERVICE) LIFE" OF 510 FLUID.

OPEN ITEM #2: INCORPORATE ACCEPTANCE CRITERIA (WHEN AVAILABLE) INTO SURVEILLANCE PROCEDURE N2-CSP-17 AND ISSUE APPROVED PROCEDURE.

CORRECTIVE ACTION VERIFICATION OR ESCALATION:

VERIFICATION OPEN ITEM #1: SU&T ISSUED PR #03345 ON 3-4-86 REQUESTING ACCEPTANCE CRITERIA FOR THE HYDRAULIC FLUID. SWEC SUPPLIED ACCEPTANCE CRITERIA TO NMPC ON E&DCR #C25256 ALSO STATING THAT THE FLUID PRESENTLY IN THE ACTUATOR RESERVOIRS IS ACCEPTABLE. NMPC ENGINEERING APPROVED THE E&DCR RESPONSE (BLOCK #27 ON PR #03345) ON 3-17-86 AND SU&T DEEMED THE SOLUTION SATISFACTORY (BLOCK #31 ON PR) ON 3-24-86. BASED ON THE ABOVE, OPEN ITEM #1 IS SATISFACTORILY RESOLVED. OPEN ITEM #1 IS CLOSED. Terence D. O'Connell 3-27-86

VERIFICATION OF OPEN ITEM #2: SEE PAGE 4 (MIDDLE).

CAR/NCR INITIATED:	TREND CODE:
NONE	2-F-P-11 W97

PREPARED BY:	DATE:	APPROVED BY:	DATE:
Terence D. O'Connell	4-9-86	J R Orlando	4-28-86

COMMENTS: Extension Granted to 3/25/86 RJ Gaschnel

Extension Granted to 4/1/86 RJ Gaschnel

Extension Granted to 5/1/86 RJ Gaschnel

NOTE: E&DCR #C25256 DOES NOT LIMIT THE SHELF LIFE OF 510 FLUID TO ONE YEAR. REGULAR SAMPLING AND ANALYSIS WILL DETERMINE THE USEFUL LIFE OF THE FLUID E&DCR #C25256

OBSERVATIONS (CONTINUED):

SHOULD ONLY BE CHANGED. SUCT VOIDED DR #12707 AND SUPERSEDED IT WITH DR #13850 TO ONLY CHANGE THE FLUID (MTS #BY0780). INITIALLY, DR #12707 REQUIRED FLUSHING PER MF.GENE.001, "GENERIC FLUSHING/CLEANING PROCEDURE." MF.GENE.001 DOES NOT CONTAIN ANY ACCEPTANCE CRITERIA FOR CONTAMINATION OR DEGRADATION OF THE SUBJECT HYDRAULIC FLUID. DR #12707 WAS VOIDED AND REPLACED BY DR #13850 WITHOUT INCORPORATING ANY ACCEPTANCE CRITERIA FOR THE FLUID. REGULATORY GUIDE 1.68 REQUIRES CLEARLY IDENTIFIED ACCEPTANCE CRITERIA. OPEN ITEM #1.

NMA SUBSEQUENTLY CONTACTED SITE CHEMISTRY TO INQUIRE HOW THE FLUID SAMPLES WERE ANALYZED. NMA WAS INFORMED THAT THE FLUID WAS ANALYZED ACCORDING TO THE GENERAL REQUIREMENTS OF A DRAFT VERSION OF CHEMICAL SURVEILLANCE PROCEDURE, N2-CSP-17, "HYDRAULIC AND LUBRICATING FLUIDS FOR NMP2". THE PROCEDURE WAS UNAPPROVED AND CONTAINED NO ACCEPTANCE CRITERIA FOR MSIV HYDRAULIC ACTUATOR FLUID (DOW CORNING 510 FLUID). SEE ATTACHMENT #1 FOR A DETAILED DESCRIPTION OF 510 FLUID. ANALYSES WERE PERFORMED ASSUMING THAT 510 FLUID IS THE SAME AS (OR NEARLY IDENTICAL TO) TURBINE ELECTRO-HYDRAULIC CONTROL (EHC) FLUID. ADMINISTRATIVE PROCEDURE AP-2 REQUIRES FORMAL PROCEDURES FOR THE SAFE AND CONSISTENT OPERATION AND TESTING OF THE STATION. OPEN ITEM #2.

NIAGARA MOHAWK QUALITY ASSURANCE DEPT.

SURVEILLANCE REPORT CONTINUATION SHEET

REPORT NO. SR-86-10132

OPEN ITEMS (CONTINUED):

#2 REQUIREMENT: ADMINISTRATIVE PROCEDURE AP-2.0, REV. 3, "PRODUCTION AND CONTROL OF PROCEDURES," PARA. 2.0 STATES IN PART: "FORMAL PROCEDURES ESTABLISH STANDARDS OF PRACTICE WHERE SUCH STANDARDS ARE ESSENTIAL TO THE ORDERLY, SAFE AND CONSISTENT ADMINISTRATION, OPERATION, TESTING, AND MAINTENANCE OF THE STATION." CHEMICAL SURVEILLANCE PROCEDURES ARE INCLUDED UNDER THE REQUIREMENTS OF AP-2 ACCORDING TO PARAGRAPH 4.6(4).

#2 VIOLATION: CHEMISTRY PERFORMED SEVERAL ANALYSES OF DOW CORNING 510 FLUID WITHOUT APPROVED PROCEDURES.

#2 RESOLUTION AND CLOSURE: SEE PROPOSED CORRECTIVE ACTION AND CORRECTIVE ACTION VERIFICATION SECTIONS ON PAGE 2 OF THIS SURVEILLANCE REPORT.

VERIFICATION OPEN ITEM #2: NQA SUPPLIED A COPY OF PR # 03345 AND E&DCR # C15256 TO ANDY ROSS OF CHEMISTRY ON 3-26-86 FOR INCORPORATION INTO ANALYSIS PROCEDURE N2-CSP-17. THIS SURVEILLANCE WAS THEN EXTENDED UNTIL 5/4 (T.O. 4-9-86) -1-86 TO ALLOW CHEMISTRY SUFFICIENT TIME TO INCORPORATE THE ACCEPTANCE CRITERIA. ON 4-2-86 ANDY ROSS TRANSMITTED ACCEPTANCE CRITERIA FOR MSIV ACTUATOR OIL, A SUMMARY OF ANALYSES TO BE PERFORMED BY CHEMISTRY, SAMPLING FREQUENCY AND A TIMETABLE FOR PROCEDURE APPROVAL FOR N2CSP-17 TO J. ORLANDO VIA INTERNAL CORRESPONDENCE. SEE ATTACHMENT #1. BASED ON THE ABOVE, OPEN ITEM #2 IS SATISFACTORILY RESOLVED AND CLOSED. Terence D. O'Connell 4-9-86

DOW CORNING CORPORATION · MIDLAND MICHIGAN 48640 TELEPHONE 517-496-4000

CERTIFICATE OF ANALYSIS

ATTACHMENT # 1

PAGE 1 OF 1

REPORT # SR-86-10132

PRODUCT: DOW CORNING(R) 510 FLUID 100 CS

LOT NUMBER: AE055117 QUANTITY: 20 X 440 LB. DATE OF SHIPMENT: 09/16/85

BRUENING BEARINGS, INC.
ATTN: ROGER PFOHMAN
525 ERIE BLVD. WEST
SYRACUSE, NY 13201

CUSTOMER PURCHASE ORDER NUMBER
SN255218DX/AUTH # H5-023723

DOW CORNING INVOICE NUMBER
FB34022901

CUSTOMER SPECIFICATION NUMBER REVISION DATE
NONE

TEST	DESCRIPTION	ANALYSIS	UNITS	SPECIFICATION
0001A	SPECIFIC GRAVITYHYDROMETER 25C/15.6C	.992		0.9850 - 1.0000
0002	REFRACTIVE INDEX, 25C	1.4258		1.4200 - 1.4300
0004	VISCOSITY 25C	97.7		95. - 105.
0005	COLOR, APHA	30.		50. MAXIMUM
0031	ACID NUMBER BCP	.0028		.02 MAXIMUM

*SHELF LIFE = 9-16-86

*EXPIRATION DATE = 9-16-86

THIS IS TO CERTIFY THAT THE ABOVE DESIGNATED MATERIAL HAS BEEN TESTED AND DID COMPLY WITH LISTED SPECIFICATIONS (WITH THE LISTED EXCEPTIONS) WHEN SUPPLIED IN THE ORIGINAL CONTAINER. THE MATERIAL IS SUBJECT TO THE CONDITIONS LISTED ON THE DOW CORNING INVOICE. THE ABOVE IS A COPY OF INFORMATION ON FILE. THE LOT ACCEPTANCE DATA ARE AVAILABLE FOR EXAMINATION.

REVIEWED BY: LAURA K. SINGER DATE: 09/17/85 PAGE 1

Laura K. Singer

85-13807

INTERNAL CORRESPONDENCE
FORM 112-2 R 02-80 55-01-013

NIAGARA MOHAWK

FROM Andrew Ross
John Orlando

DISTRICT Nine Mile Point

DATE April 2, 1986 FILE CODE NMP - 15744

SUBJECT Unit 2 MSIV - Dow Corning 510 Fluid

T.O. 4-9-86

ATTACHMENT # 1

PAGE 1 OF 1

REPORT # SR-86-10132

As I discussed with Terry O'Connell, I will revise Chemistry Surveillance Procedure N2-CSP-17 (Hydraulic and Lubrication Oil Chemical Surveillance at NMP Unit 2) to include the hydraulic fluid in the MSIV's. Specifically, directions will be given for measuring the viscosity, specific gravity, neutralization number and water content. Acceptance criteria will be:

Viscosity cSt at 40°c=95-105

Specific Gravity at 25°c=0.985-1.000

Neutralization Number (BCP)=<0.02

Water Content (%vol)=<0.2

which is in accordance with Dow Corning manufacturing specifications. We will sample and analyze the fluid as requested by maintenance during outages. Sampling will not occur during operation due to the high temperatures and radiation levels around the MSIV's. Formal approval of this procedure is not likely until after fuel load.

AR:aal

cc: J.N. Duell
E.W. Leach
File

NIAGARA MOHAWK QUALITY ASSURANCE DEPT.

SURVEILLANCE REPORT

FACILITY: NMP2

QA SECTION/GROUP: OPERATIONS

REPORT NO. SR-86-10746

RESPONSIBLE ORGANIZATION: CHEMISTRY

DATE: 9-19-86

SUBJECT: USE OF UNAPPROVED PROCEDURE BY CHEMISTRY ON MSIV FLUID ANALYSIS

CHECKLIST NO., REV. & TITLE OR GOVERNING DOCUMENTS: AP-2.0, REV. 6, "PRODUCTION AND CONTROL OF PROCEDURES"

SCHEDULED: YES ☐ NO ☒ NUCLEAR SAFETY RELATED: YES ☐ NO ☒ 10CFR50 APP. B CRITERIA: 5

OBSERVATIONS: THIS SURVEILLANCE IS A FOLLOW-UP TO SURVEILLANCE SR-86-10132 ON DOW CORNING 510 HYDRAULIC FLUID USED IN THE ACTUATORS OF THE MAIN STEAM ISOLATION VALVES (MSIV's). THE REPLACEMENT FLUID CURRENTLY ON SITE WAS RECEIVED ON MATERIAL RECEIVING REPORT (MRR) #85-12807 AND ITS SHELF LIFE EXPIRED ON 9-16-86.

NQA PERFORMED THIS SURVEILLANCE TO VERIFY THAT THE CHEMISTRY PROCEDURE N2-CSP-17 FOR HYDRAULIC FLUID ANALYSIS HAS BEEN APPROVED FOR SITE USE. DURING THE EVALUATION FOR SHELF LIFE EXTENSION OF THE MSIV HYDRAULIC FLUID, (CONTINUED PG. 3)

OPEN ITEMS:

#1 REQUIREMENT: ADMINISTRATIVE PROCEDURE NUMBER AP-2.0, REV. 6, "PRODUCTION AND CONTROL OF PROCEDURES," UNDER SECTION 2.0 STATES IN PART: "IT IS INTENDED THAT FORMAL PROCEDURES ESTABLISH STANDARDS OF PRACTICE WHERE SUCH STANDARDS ARE ESSENTIAL TO THE ORDERLY, SAFE, AND CONSISTENT ADMINISTRATION, OPERATION, TESTING, AND MAINTENANCE OF THE STATION."

#1 VIOLATION: CONTRARY TO THE ABOVE REQUIREMENT, CHEMISTRY PERFORMED ANALYSES OF DOW 510 FLUID USED IN THE MSIV ACTUATORS WITHOUT AN APPROVED PROCEDURE (SEE ATTACHMENT #2 FOR DETAILS OF ANALYSES PERFORMED).

#1 RESOLUTION AND CLOSURE: SEE PROPOSED CORRECTIVE ACTION AND CORRECTIVE ACTION VERIFICATION SECTIONS OF THIS REPORT.

NIAGARA MOHAWK

SURVEILLANCE REPORT CONTINUATION SHEET

REPORT NO. SR-86-10746

PERSONNEL CONTACTED:

FOLLOW-UP REQUIRED YES ☒ NO ☐

PREPARED BY: Terrence S. O'Connell DATE 9-22-86

APPROVED BY: [signature] DATE 9-23-86

PROPOSED CORRECTIVE ACTION AND COMMITTED COMPLETION DATE:

DRAFT VERSION OF CHEMISTRY SURVEILLANCE PROCEDURE N2-CSP-17 CONTAINING ACCEPTANCE CRITERIA FOR DOW 510 FLUID HAS BEEN AVAILABLE FOR ALMOST 6 MONTHS. PROPOSED CORRECTIVE ACTION IS TO APPROVE N2-CSP-17 AND ISSUE IT FOR SITE USE.

CORRECTIVE ACTION VERIFICATION OR ESCALATION:

CAR/NCR INITIATED:		TREND CODE:	
PREPARED BY:	DATE:	APPROVED BY:	DATE:

COMMENTS:

NIAGARA MOHAWK QUALITY ASSURANCE DEPT.

SURVEILLANCE REPORT CONTINUATION SHEET

REPORT NO. SR-86-10746

OBSERVATIONS: (CONTINUED FROM PG. 1)

CHEMISTRY WAS REQUESTED TO ANALYZE THE FLUID AS NOTED IN ATTACHMENT #1 (EXPENDED SHELF LIFE REORDER FORM). CHEMISTRY PERFORMED THE ANALYSES AND REPORTED THEM ON ATTACHMENT #2 (SAMPLE AND ANALYSIS REPORT). CONTRARY TO AP-2.0, THE ANALYSES WERE PERFORMED WITHOUT AN APPROVED PROCEDURE. OPEN ITEM #1.

ITEMS EXAMINED: 14 BARRELS OF DOW CORNING 510 SILICONE HYDRAULIC FLUID IN THE NMPC SPARES WAREHOUSE (WEST END OF MAIN WAREHOUSE).

RECORDS EXAMINED: EXPENDED SHELF LIFE REORDER FORM (ATTACHMENT #1) AND THE CHEMISTRY DEPARTMENT'S SAMPLE & ANALYSIS REPORT (ATTACHMENT #2).

P303D-10

EXPENDED SHELF LIFE REORDER FORM

Date: 9-16-86

Spare Parts Description: Dow 510 Silicone Fluid Parts Number: 510

Spec. No.: P303D / MSIV Q.A. Cat.: _____

MRR: 85-12807 Purchase Order: _____

Shelf Life Expiration Date: 9-16-86

Documentation Requirements: AB, AF, D, QA, SL

Originator: S. Mattucci Date: 8-9-85

Disposition of Material: Requalify

Requalify: New S/L Expiration Date: 3087

Return to Vendor: N/A

Scrap: N/A

Reorder FPR No.: N/A

FPO No.: N/A Expected Delivery Date: N/A

Evaluator: Amy E. Gardner Date: 9-16-86

Remarks: Per the attached Sample & Analysis Report, Analysis performed by the Chemistry Lab on site. All tests fall within acceptable range. Extend shelf life by 1 year.

NOTED SEP 16 1986 A. CARDONE

ATTACHMENT # 1

PAGE 1 OF 1

REPORT # SR-86-1074

FIO

NINE MILE POINT NUCLEAR STATION - UNIT 2

SAMPLE & ANALYSIS REPORT

SAMPLED SYSTEM: Dow 510 MSIV Oil SAMPLED POINT: Barrel #23

SAMPLE DATE: 9/11/86 TIME: 1400

SAMPLED BY: Marlene Trotta

SAMPLE FOR WHOM: Rick Spurling TEL. EXT: 4943

PARAMETERS ANALYZED	VALUE	ACCEPTANCE LIMIT	PROCEDURE USED	ANALYSIS DATE / TECHNICIAN
Viscocity	97.86cst@25C	95-105cst@25°C	Dow Corning Corp Corporate Test Methods	TS/9/11/8
Neutralization #	0.0056 mg KOH/g	.02 Maximum	NB-CSP-17	JB/9/12/8
Specific Gravity	0.996 @60°F	0.9850-1.0000	NB-CSP-17 adopted	JB/9/

REVIEWED BY: [signature]

DATE: 9-13-86

COMMENT: Passes Dow Limits for New Fluid

ATTACHMENT # I

PAGE 1 OF 1

REPORT # SR-86-10746

9/9

MF/JJP/SL

ORIGINAL

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT UNIT #2

PROBLEM REPORT

PR 05642

WR # CB 6683

6685-6691

VALVE 2MSS*HYV6A-D

AUG 27 1986

3. EQUIPMENT NAME	4. EQUIPMENT NUMBER	5. SYSTEM NUMBER	6. DATE
MN STM ISOL VALVES	VALVE 2MSS*HYV7A-D	1.001	8-27-86

7. ORIGINATOR	8. REFERENCES	9. DISCIPLINE
K. MCDERMOTT SLOT 4230	P-303D	MM

TO ASSIGNMENT/FROM	11. ASME CLASS	12. QA CLASS	13. PRIORITY	14. STATUS
~~MA~~ COPY OFF MRR 8-27-86 ~~8-27-86~~ 6-27-86	NA	II	HU-Q3	☒ RUSH ☐ NORMAL

15. DESCRIPTION THE HYDRAULIC FLUID USED FOR THE MSIV'S HAS A SHELF-LIFE WHICH EXPIRED 9-1986. (REF MRR 85-12807 COPY ATTACHED.) FLUID IS DOW CORNING 510-100.

16. NTS DESCRIPTION

H V D R A U L I C F L U I D S H E L F L I F E

17. RECOMMENDED SOLUTION EXTEND THAT SHELF LIFE

SEE to evalnate and provide resolution - EMD 8/28/86

18. PROCEDURE CHANGE REQ'D	19. DRAWING CHANGES REQ'D	20. SYSTEM STATUS
SPECIFY ☐ YES ☒ NO	☐ YES ☒ NO	☐ PRE-RELEASE ☐ RELEASED ☒ TURNOVER

21. RESEARCH ENGINEER/DATE	CONCUR	22. SECTION MANAGER/DATE	CONCUR
V Bhagat	☒ YES ☐ NO	[illegible] 8/28/86	☒ YES ☐ NO

23. ENGINEER DISPOSITION/COMMENTS

The hydraulic fluid has been tested (See attached) and passes Dow's Limits for a new fluid. Shelf Life has been extended to 9/30/87 (this addresses all drums in warehouse listed on MRR-85-12807.

Peter J. Anastas 9/19/86

24. CPR NO (IF APPLICABLE)	25.	
	☒ APPROVED ☐ DISAPPROVED ☐ APP'D W/ COMMENTS	9/86

26. LEAD ENGINEER/DATE	27. [illegible] MANAGER/DATE
Manufacturer 9/26/86	9-23-86

28. OR NUMBER	29. PROCEDURES CHANGED/DATE	30. POTENTIAL REPORTABLE PER 10CFR50.73(C)	10CFR21
NA	NA	☐ YES ☒ NO	☐ YES ☒ NO

31. SOLUTION SATISFACTORY	TEST ENGINEER/DATE	32. STARTUP MANAGER/DATE
☒ YES ☐ NO	9-24-86	[illegible]

1605

RECEIVING REPORT

ELECTRICAL ☐ REBAR ☐ INSTRUMENT CONTROL ☐
MECHANICAL ☐ PIPING ☐
STRUCTURAL ☐ MISCELLANEOUS ☐

1970 2A-NM ☑ PERM ☐ TEMP

Stone & Webster

J.O. NO 12787 P.O. NO F-249

Shipper: Corning Glass Works
Corning Corp.

REC'D NC 1995 DATE SHIPPED 9-13-85

Shipping Point: Midland, Mi.

Shipper's Number: 340329-C1

Delivered By: St. Johnsbury Trucking Co.

Number & Type of Units Received: 30 Drums

Date Received: 9-19-85

Car Number: —

PRO CR W/B Number: 71-0007175

Prepaid $ ☐ Collect $ 760.80

Shipment: ☐ Partial ☑ Complete

Weight: 9760

Condition of Shipment: ☑ Good ☐ Poor

Shipping Damage (M01): ☐ Apparent Damage ☐ Old Apparent Damage

Damage to be Corrected By: ☐ Field Forces ☐ SCRAP ☐ Reorder ☐ Return to Vendor

QS & D NO (D08)

IDENTIFICATION (B01)	CORRECT MAT'L/ITEM (M80)	CLEANLINESS (W01)	STORAGE LEVEL (W25)	QA CATEGORY
☐S ☐U ☐N/A	☐S ☐U ☐N/A	☑S ☐U ☐N/A	B	☐1 ☐2A ☑2B ☐3

PQA DOCUMENT (D01)	VENDOR'S DOCUMENT (D04)	SPECIAL SHIP'G INSTRUCT'S (D04)	DIMENSIONS (W08)	VENDOR CODE
☐S ☐U ☐N/A	☑S ☐U ☐N/A	☐S ☐U ☑N/A	☑S ☐U ☐N/A	14630

COVERS/SEALS (M23)	PURGE/DESICCANT (M03)	COATING/PRESERVATIVE (M13)	LUBRICANT/OIL (M04)	CABLE SIZE/PROTECTION
☐S ☐U ☑N/A	☐S ☐U ☑N/A	☐S ☐U ☑N/A	☐S ☐U ☑N/A	☐S ☐U ☑N

WELD PREP (W19)	FINISH/PAINT (W17)	PREP FOR SHIPMENT (W28)	RECEIPT MEGGAR (T10)
☐S ☐U ☐N/A	☐S ☐U ☑N/A	☑S ☐U ☐N/A	☐S ☐U ☑N/A ☐S ☐U ☐

P.O. ITEM	QUANTITY	UNIT	DESCRIPTION	STORAGE LOCATION
			Permanent Plant Replacement Parts:	
			See Spec. P303D, Rev. 1, Addn.	
1	30	Drums	@ 440 Lbs. Each Fluid, Silicone, Stat	
			Dow Corning #510 P/N: 510-100,	Floa
			(1100 Gallons, 8000 Lbs), Non	
			Returnable Drums.	
			S/N Drum # 5435 Thru 5444	
			93-56-407	
			2 Pages Vendors Certification.	Wh
				F.
			Shelf Life Expires 9-1986"	
			WORK COMPLETE	

REMARKS: APPROVED BY CONSTRUCTION

NAME PLATE DATA ☑ NONE ☐ SEE ATTACHED NAME PLATE DATA SHEET(S)

MRR NO. (D08): 85-17807

Date: 9-24-85

Signature: L. Hartman
Material Department

FIO

NINE MILE POINT NUCLEAR STATION - UNIT 2

SAMPLE & ANALYSIS REPORT

SAMPLED SYSTEM: Dow 510 MSIV Oil SAMPLED POINT: Barrel #23

SAMPLE DATE: 9/11/86 TIME: 1400

SAMPLED BY: Marlene Trotta

SAMPLE FOR WHOM: Rick Spurling TEL. EXT: 4973

PARAMETERS ANALYZED	VALUE	ACCEPTANCE LIMIT	PROCEDURE USED	ANALYSIS DATE/ TECHNICIAN
Viscosity	97.86cSt@25C	95-105cSt@25C	Dow Corning Corp. Corporate Test Methods	TS/9/1
Neutralization #	0.056mgKOH/g	.05 Maximum	DOW CSP-17	JB/9/
Specific Gravity	0.996 @ 66°F	0.9950-1.0000	DOW CSP-17 adapted	JB/9

REVIEWED BY: [signature]

DATE: 9-13-86

COMMENT: Passed Dow Limits for New Fluid

INTERNAL CORRESPONDENCE
FORM 112-2 R 02-80

NIAGARA MOHAWK

FROM W. R. Yaeger

J. C. Shepherd

DISTRICT Nine Mile Point Unit #2

DATE SEPTEMBER 24, 1986 FILE CODE

SUBJECT NCR's

Attached please find the following dispositioned NCR's:

NCR # 2-86-0067

NCR # _____

NCR # _____

NCR # _____

NCR # _____

NCR # _____

NCR # _____

K. D. Ward for
W. R. Yaeger
Mgr. Project Engineering

WRY/KDW/lmn
(1753E)

Attachment

xc: K. D. Ward (w/o attach.)
K. Kriven (w/attach.)
NMPC Project File (w/attach.)
W. A. Hansen
M. J. GRAMMES (W/ATTACH.)

NONCONFORMANCE REPORT

NCR Number 2-86-0067

Page 1 of 2

Stop Work Order Issued ☐ Yes ☒ No Number: N/A

MSIV's ARE SAFETY RELATED, HYDRAULIC OIL IS NOT.

Item Description:	Item Identification Number:	Nuclear Safety Related	ASME Class
MSIV HYDRAULIC FLUID (DOW 510 SILICONE)	DRUM #5435	☐ Yes ☒ No	N/A

Item Location:	Contractor/Supplier:	P.O./Spec. Number & Rev.:	Drawing Number & Rev.:
ELEV. 261' REACTOR BLDG. TRACK BAY	DOW CORNING CORP.	F.P.O. #F-24981 SPEC. P-303D, REV. 1	N/A

System:	Tag Number(s):	Initiator:
MAIN STEAM SYSTEM; MAIN STEAM ISOLATION VALVES (MSIV's)	H-165	Print TERENCE O'CONNELL Sign Terence D. O'Connell Date 9-18-86

Potentially Reportable:	Evaluated by:	Response Due Date:
☐ Yes ☒ No Reference Number:	Signature Paul K Weber Date 9-19-86	9-21-86

No.	(1) Requirement Violation	(2) Requirement Location	(3) Preventive Action Required (Y/N)	Trend Code:	(4) Disposition*	(5) Reinspection Required (Y/N)
1.	HYDRAULIC FLUID HAS EXCEEDED EXPIRATION DATE OF 9-16-86. DRUM #5435 OBSERVED IN TRACK BAY WITH HAND PUMP INSTALLED. MRR #85-12807. FLUIDS USE ~~COULD~~ COULD JEOPARDIZE THE EQUIPMENT QUALIFICATION STATUS OF MSIV'S PKW 9-19-86	CERTIFICATE OF ANALYSIS ATTACHMENT #1		2DH77 DMC 9/22/86	USE-AS-IS TECHNICAL JUSTIFICATION: SEE PAGE 2 OF 2 MJG 9/24/86	

Approval Signatures | * Dispositions: Use-As-Is, Repair, Rework, Scrap or Return to Supplier | Target Completion Date: _____

Engineering	Quality Assurance	Authorized Nuclear Inspector
9-24 R. D. Ward 9-24-86		

(6) Disposition Verification Results:	(7) Reinspection Results:	Closed by:
Signature _____ Date _____		Signature _____ Date _____

126-11.13.85

NIAGARA MOHAWK

NONCONFORMANCE REPORT
CONTINUATION SHEET

NCR Number
2-86-0067
Page 2 of 2

NO.	COL.	AMPLIFYING INFORMATION
1		USE-AS-IS : FLUID IN DRUM # 5435 SHELF LIFE OF HYDRAULIC FLUID RECEIVED UNDER MRR 85-12807 HAS BEEN EXTENDED TO 9/87 BASED ON RESULTS OF SAMPLE TESTING AT SITE CHEMISTRY LAB (REFER TO PR# 5642, COPY ATTACHED). AS SUCH, QUALIFICATION OF MSIV'S IS ASSURED MARC GRAMMES NMPC X4771 Marc Grammes 9.24.86

CERTIFICATE OF ANALYSIS PR3345 ATTACHMENT 2

PRODUCT: DOW CORNING(R) 510 FLUID 100 CS

LOT NUMBER: AE055117 QUANTITY: 20 X 440 LB. DATE OF SHIPMENT: 6/16/85

BRUENING BEARINGS, INC.
ATTN: ROGER FROHMAN
525 ERIE BLVD. WEST
SYRACUSE, NY 13201

ATTACHMENT #1
PAGE 1 OF 1
REPORT # NCR 2-86-0067

CUSTOMER PURCHASE ORDER NUMBER
SN25521BDX/AUTH # HS-023723

DOW CORNING INVOICE NUMBER
FB34022901

CUSTOMER SPECIFICATION NUMBER — REVISION — DATE
NONE

TEST	DESCRIPTION	ANALYSIS	UNITS	SPECIFICATION
0001A	SPECIFIC GRAVITY HYDROMETER 25C/15.4C	.972		0.9830 - 0.9880
0002	REFRACTIVE INDEX, 25C	1.4258		1.4200 - 1.4300
0004	VISCOSITY 25C	97.7		95 - 105
0005	COLOR, APHA	30		50 MAXIMUM
0031	ACID NUMBER 3CP	.0028		.02 MAXIMUM

*SHELF LIFE = 9-16-86

*EXPIRATION DATE = 9-16-86

THIS IS TO CERTIFY THAT THE ABOVE DESIGNATED MATERIAL HAS BEEN TESTED AND DID COMPLY WITH LISTED SPECIFICATIONS (WITH THE LISTED EXCEPTIONS, IF ANY) WHEN SUPPLIED IN THE ORIGINAL CONTAINER. THE MATERIAL IS SUBJECT TO THE CONDITIONS LISTED ON THE DOW CORNING INVOICE. THE ABOVE IS A COPY OF INFORMATION ON FILE. THE LOT ACCEPTANCE DATA ARE AVAILABLE FOR EXAMINATION.

REVIEWED BY: LAURA K. SINGER DATE: 09/17/85 PAGE 1

Laura K. Singer

85-1780 7

9/9

MF/JJP/SL

ORIGINAL

1. PR 05642
2. NTS NO

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT UNIT #2

PROBLEM REPORT

ATTACHMENT #2
PAGE 1 OF 3
NCR # 2-86-0067

VALVE 2MSS*HYV7A-D

3. EQUIPMENT NAME	4. EQUIPMENT NUMBER	5. SYSTEM NUMBER	6. DATE
MN STM ISOL VALVES	VALVE 2MSS*HYV7A-D	1.001	8-27-86

7. ORIGINATOR	8. REFERENCES	9. DISCIPLINE
K. MSOERMOTT SCI# 4230	P-303D	M

10. ATTACHMENTS	11. ASME CLASS	12. QA CLASS	13. PRIORITY	14. STATUS
NA COPY OF MRR from 8-27-86	NA	II	HU-03	☒ RUSH ☐ NORMAL

15. DESCRIPTION THE HYDRAULIC FLUID USED FOR THE MSIV'S HAS A SHELF-LIFE WHICH EXPIRES 9-1986. (REF MRR 85-12807 COPY ATTACHED.) FLUID IS DOW CORNING 510-100.

16. NTS DESCRIPTION
H|Y|D|R|A|U|L|I|C| |F|L|U|I|D| |S|H|E|L|F| |L|I|F|E|

17. RECOMMENDED SOLUTION EXTEND THE SHELF LIFE

SET to evaluate and provide resolution - EMD 8/28/86

18. PROCEDURE CHANGE REQ'D	19. DRAWING CHANGES REQ'D	20. SYSTEM STATUS
SPECIFY ☐ YES ☒ NO	☐ YES ☒ NO	☐ PRE-RELEASE ☐ RELEASED ☒ TURNOVER

21. SYSTEM ENGINEER/DATE	CONCUR	22. STARTUP MANAGER/DATE	CONCUR
[signature]	☒ YES ☐ NO	[signature] 8/29/86	☒ YES ☐ NO

23. ENGINEER DISPOSITION/COMMENTS

The hydraulic fluid has been tested (see attached) and passes Dow's limits for a new fluid. Shelf life has been extended to 9/30/87 (this addresses all drums in warehouse listed on MRR-85-12807.

[signature] 9/1/86

24. CPN NO (IF APPLICABLE)	25. ☒ APPROVED ☐ DISAPPROVED ☐ APPV'D W/ COMMENTS
	[signature] 9/86

26. LEAD ENGINEER/DATE	27. PROJ. ENGINEER/MANAGER/DATE
Manufacturer 9/9/86	[signature] 9-23-86

28. QR NUMBER	29. PROCEDURES CHANGED/DATE	30. POTENTIAL REPORTABLE PER 10CFR50.55(E) ☐ YES ☐ NO .10CFR2. ☐ YES ☐ NO

31. SOLUTION SATISFACTORY ☐ YES ☐ NO TEST ENGINEER/DATE	32. STARTUP MANAGER/DATE

AUG 27 1986

RECEIVING REPORT

ELECTRICAL ☐ REBAR ☐ INSTRUMENT CONTROL — ATTACHMENT 2 PG 2 OF 3 NCR # 2-86-007
MECHANICAL ☐ PIPING ☐
STRUCTURAL ☐ MISCELLANEOUS ☐

☐ 67C 2A-NM ☑ PERM ☐ TEMP — Stone & Webster — JO NO 12187 · PO NO F-249

Seller: Bruening Bearing — REC NO 19955 — OS&M Tuscola
Buyer: Dow Corning Corp. — Shipping Point: Midland, Mi. — Shipper's Number: 340229-01
Delivered By: St. Johnsbury Trucking Co. — Number & Type of Units Received: 20 Drums

Date Received	Car Number	PRO CR W/B Number	Prepaid $ / Collect $	Shipment	Weight
9-19-85	—	71-0007725	☐ / ☑ 766.80	☐ Partial ☑ Complete	9766

Condition of Shipment	Shipping Damage (M01)	Damage to be Corrected By	OS & D NO (D08)
☑ Good ☐ Poor	☐ Apparent Damage ☐ Not Apparent Damage	☐ Field Forces ☐ SCRAP ☐ Re-order ☐ Return to Vendor	—

IDENTIFICATION (B01)	CORRECT MAT'L/ITEM (M80)	CLEANLINESS (W01)	STORAGE LEVEL (W25)	QA CATEGORY
☑S ☐U ☐N/A	☑S ☐U ☐N/A	☑S ☐U ☐N/A	B	☐1 ☐2A ☑2B ☐3 ☐

PQA DOCUMENT (D01)	VENDOR'S DOCUMENT (D04)	SPECIAL SHIP'G INSTRUCT'S (D04)	DIMENSIONS (W06)	VENDOR CODE
☐S ☐U ☑N/A	☑S ☐U ☐N/A	☐S ☐U ☑N/A	☑S ☐U ☐N/A	14830

COVERS/SEALS (M23)	PURGE/DESICCANT (M03)	COATING/PRESERVATIVE (M13)	LUBRICANT/OIL (M04)	CABLE SIZE/PROTECTION
☐S ☐U ☑N/A	☐S ☐U ☑N/A	☐S ☐U ☑N/A	☐S ☐U ☑N/A	☐S ☐U ☑

WELD PREP (W19)	FINISH/PAINT (W17)	PREP FOR SHIPMENT (W28)	RECEIPT MEGGAR (T10)	
☐S ☐U ☑N/A	☐S ☐U ☑N/A	☑S ☐U ☐N/A	☐S ☐U ☑N/A	☐S ☐U ☐

P.O. ITEM	QUANTITY	UNIT	DESCRIPTION	STORAGE LOCATION
			Permanent Plant Replacement Parts: See Spec. P303D, Rev. 1, Add. 1.	
1	20	Drums	@ 440 Lbs. Each Fluid, Silicone, Dow Corning #510 P/N: 510-100, (100 Gallons, 8000 Lbs), Non Returnable Drums. S&W Drum # 5425 Thru 5444 93-56-407	Stor Floo
	2	Pages	Vendors Certification.	Whs File
			"Shelf Life Expires 9-1986"	

REMARKS: APPROVED BY CONSTRUCTION

NAME PLATE DATA ☑ NONE ☐ SEE ATTACHED NAME PLATE DATA SHEET(S)

MRR NO. (D08) 85-13817 — Date 9-24-85 — Signature L. Hartman — Material Department

FIO

NINE MILE POINT NUCLEAR STATION - UNIT 2

SAMPLE & ANALYSIS REPORT

SAMPLED SYSTEM: Dow 510 MSIV Oil SAMPLED POINT: Barrel #23

SAMPLE DATE: 9/11/86 TIME: 1400

SAMPLED BY: Marlene Trotta

SAMPLE FOR WHOM: Rick Spurling TEL. EXT: 4943

PARAMETERS ANALYZED	VALUE	ACCEPTANCE LIMIT	PROCEDURE USED	ANALYSIS DATE / TECHNICIAN
Viscocity	97.86cSt@25C	95-105cst@25C	Dow Corning Corp corporate Test methods	TS/9/16
Neutralization #	0.0056 mg KOH/g	.02 Maximum	N2-CSP-17	JB/9/16
Specific Gravity	0.996 @ 66°F	0.9850-1.0000	N2-CSP-17 adapted	JB/9.

REVIEWED BY: [signature]

DATE: 9-13-86

COMMENT: Passes Dow Limits for New Fluid

P303D-10

EXPENDED SHELF LIFE REORDER FORM

Date: 9-16-86

Spare Parts Description: Dow 510 Silicone Fluid Parts Number: 510

Spec. No.: P303D / MSIV Q.A. Cat.: _____

MRR: 85-12807 Purchase Order: F24981

Shelf Life Expiration Date: 9-16-86

Documentation Requirements: AB, AF, D, QA, SL

Originator: S. Mattucci Date: 8-9-85

Disposition of Material: Requalify

Requalify: New S/L Expiration Date: 3Q87

Return to Vendor: N/A

Scrap: N/A

Reorder FPR No.: N/A

FPO No.: N/A Expected Delivery Date: N/A

Evaluator: Amy E. Gardner Date: 9-16-86

Remarks: Per the attached Sample & Analysis Report, Analysis performed by the Chemistry Lab on site. All tests fall within acceptable range. Extend Shelf Life by 1 year.

NOTED SEP 16 1986 A.GARDNER

FIO

NINE MILE POINT NUCLEAR STATION - UNIT 2

SAMPLE & ANALYSIS REPORT

SAMPLED SYSTEM: Dow 510 MSIV Oil SAMPLED POINT: Barrel #23

SAMPLE DATE: 9/11/86 TIME: 1400

SAMPLED BY: Marlene Trotta

SAMPLE FOR WHOM: Rick Spurlling TEL. EXT: 4943

PARAMETERS ANALYZED	VALUE	ACCEPTANCE LIMIT	PROCEDURE USED	ANALYSIS DATE/ TECHNICIAN
Viscocity	97.86cSt@25C	95-105cst@25C	Dow Corning Corp corporate Test methods	TS/9/12/86
Neutralization #	0.0056mgKOH/g	.02 Maximum	N2-CSP-17	JB/9/12/86
Specific Gravity	0.996 @60°F	0.9850-1.0000	N2-CSP-17 adapted	JB/9/

REVIEWED BY: [signature]

DATE: 9-13-86

COMMENT: Passes Dow Limits for New Fluid

DOW CORNING CORPORATION MIDLAND MICHIGAN 48640 TELEPHONE 517-496-4000

CERTIFICATE OF ANALYSIS

PRODUCT: DOW CORNING(R) 510 FLUID 100 CS

LOT NUMBER: AE055117 QUANTITY: 20 X 440 LB. DATE OF SHIPMENT. 09/16/85

BRUENING BEARINGS, INC.
ATTN: ROGER PFOHMAN
525 ERIE BLVD. WEST
SYRACUSE, NY 13201

CUSTOMER PURCHASE ORDER NUMBER
SN255218DX/AUTH # H5-023723

DOW CORNING INVOICE NUMBER
FB34022901

CUSTOMER SPECIFICATION NUMBER
NONE

REVISION DATE

TEST	DESCRIPTION	ANALYSIS	UNITS	SPECIFICATION
0001A	SPECIFIC GRAVITYHYDROMETER 25C/15.6C	.992		0.9850 - 1.0000
0002	REFRACTIVE INDEX, 25C	1.4258		1.4200 - 1.4300
0004	VISCOSITY 25C	97.7		95. - 105.
0005	COLOR, APHA	30.		50. MAXIMUM
0051	ACID NUMBER BCP	.0028		.02 MAXIMUM

***SHELF LIFE = 9-16-86**

***EXPIRATION DATE = 9-16-86**

THIS IS TO CERTIFY THAT THE ABOVE DESIGNATED MATERIAL HAS BEEN TESTED AND DID COMPLY WITH LISTED SPECIFICATIONS (WITH THE LISTED EXCEPTIONS) WHEN SUPPLIED IN THE ORIGINAL CONTAINER. THE MATERIAL IS SUBJECT TO THE CONDITIONS LISTED ON THE DOW CORNING INVOICE. THE ABOVE IS A COPY OF INFORMATION ON FILE. THE LOT ACCEPTANCE DATA ARE AVAILABLE FOR EXAMINATION.

REVIEWED BY: LAURA K. SINGER DATE: 09/17/85 PAGE 1

Laura K. Singer

R5-12807

DOW CORNING

[redacted]

September 8, 1986

Ms. A. Gardner
Stone & Webster Engineering Corp.
9 Mile Point Unit 2
Lycoming, NY 13093

Dear Ms. Gardner:

Attached is the Sales Specification for Dow Corning® 510 Fluid 100 CST.

Also enclosed are Corporate Test Methods 0001A, 0002, 0004, 0005 and 0051.

Our recommendation for extension of shelf life is to run the tests listed on the Sales Specification and any other tests the customer may consider essential to their specific application on a freshly taken sample.

While the shelf life of this material is 12 months, as shown on the Sales Specification, it will probably be useful for a considerably longer time.

Shelf life is the length of time Dow Corning will guarantee a material will meet the requirements of the Sales Specification after it leaves our control if the customer stores is properly. We consider extension of shelf life of a material, which is not under our control, to be the customers' responsibility.

If I can be of further service, please give me a call.

Sincerely,

Jack E Weiler

Jack E. Weiler
Senior Quality Assurance Specialist
Quality Management Department
Mail Number 140
(517) 496-5461

JEW/eb
Enclosures

DOW CORNING SALES SPECIFICATION
(* INDICATES DOW CORNING REGISTERED TRADEMARK)

DOW CORNING* 510 FLUID 100 CST

NEW DATE: 11/23/81
SUPERSEDES: 7/11/72

PROPERTIES	LIMITS	DOW CORNING TEST METHODS	REFERENCE
COLOR, APHA	50 MAXIMUM	CTM 0005	ASTM D 1209
VISCOSITY, CST @ 25 C	95 - 105	CTM 0004	ASTM D 445
SPECIFIC GRAVITY @ 25 C	0.985 - 1.000	CTM 0001	ASTM D 1298
REFRACTIVE INDEX @ 25 C	1.4200 - 1.4300	CTM 0002	ASTM D 1218
ACID NUMBER, BCP	0.02 MAXIMUM	CTM 0051	ASTM D 974 ASTM D 664

SHELF LIFE: DOW CORNING CERTIFIES THAT THIS PRODUCT WILL MEET THE ABOVE SPECIFICATION REQUIREMENTS FOR 12 MONTHS FROM DATE OF SHIPMENT WHEN PROPERLY STORED IN THE ORIGINAL UNOPENED CONTAINER. STORAGE TEMPERATURE AMBIENT.

DOW CORNING CORPORATE TEST METHODS ARE BASED, WHEN APPROPRIATE, ON STANDARD METHODS IN ASTM OR OTHER COMPENDIA, BUT MAY NOT BE EXACTLY EQUIVALENT. DOW CORNING METHODS ARE AVAILABLE ON REQUEST. REFER TO THE TECHNICAL DATA SHEET FOR TYPICAL PROPERTIES AND PERFORMANCE CHARACTERISTICS OF THIS PRODUCT.

DOW CORNING

corporate test method

SPECIFIC GRAVITY - Hydrometer Spindle Reading - Uncorrected

March 1, 1973 CTM 0001A

Abstract

The specific gravity of liquids is determined using standard glass hydrometers in a manner similar to that described in ASTM D 1298.

No corrections are applied for such factors as surface tension, variation in hydrometer dimensions, and differences in standardization and measurement temperatures. The results may differ by as much as 0.01 from the true value. Conversion to density in various units is shown. The determination of percent composition of binary systems is illustrated.

Specific gravity is defined as the ratio of the mass of a given volume of a liquid at 25°C to the mass of an equal volume of pure water at 15.6°C. It is a unitless number.

Apparatus

Bath: Constant temperature to hold 25 ± 0.2°C. Any suitable source.

Hydrometers: Glass, graduated in vacuum 60/60°, to cover the specific gravity range from 0.650 to 1.500. Any suitable source.

Test tube: 1-1/4 in. x 8 in. (3.18 cm x 20.3 cm), any suitable source. (The tube must be large enough to allow the hydrometer to move freely and tall enough to allow the hydrometer to float at least 1/2 in. (1.3 cm) above the bottom when it has stabilized.)

Reagents

Normally equipped laboratory.

DOW CORNING CORPORATION, MIDLAND, MICHIGAN 48640 TELEPHONE 517 496-4000

Precautions

Safety: Normal safe laboratory practice.

Procedural: No unusual precautions.

Parameters

Units desired (if information other than a specific gravity is required.). Other temperatures may be specified; however, additional error may be introduced.

Procedure

Place the test tube, approximately 2/3 full of sample, in the constant temperature bath. Lower the hydrometer (Note 1) gently into the sample. When it has settled, depress it about two scale divisions. Allow the sample to come to constant temperature, about 15 min (Note 2). Raise the test tube from the bath and read the specific gravity at that point on the hydrometer scale where the surface of the liquid cuts the scale. Sight the point from slightly below the surface and gradually lower the test tube until the surface changes from a distorted ellipse to a straight line cutting the scale. Report the reading as a unitless number to the third decimal or use it to calculate density in the desired form.

The percentage composition of known binary systems may be determined. Prepare known standards and determine the specific gravity as outlined above. Plot specific gravity versus concentration (Note 3) to make a standard curve. Use the specific gravity (Note 4) of the sample and the curve to determine its concentration.

Standardization

Hydrometers should be standardized initially and at least once a year using known reference standards. For specific gravity less than 0.95 the standard solutions are generally low surface tension hydrocarbons while above 1.0 high surface tension aqueous solutions of H_2SO_4 are used (Note 5).

Calculations

Hydrometer spindle reading may be converted as follows:

gm/cc = specific gravity

$$\text{lb/gal (U.S).} = \text{SpGr} \times \frac{1}{453.5} \times \frac{3783.4}{1} = \text{SpGr} \times 8.345$$

$$\text{lb/gal (Imperial)} = \text{lb/gal (U.S.)} \times 1.2 = \text{SpGr} \times 10.014$$

$$\text{lb/cu ft} = \text{SpGr} \times \frac{1}{453.5} \times \frac{28317}{1} = \text{SpGr} \times 62.43$$

Precision and Accuracy

The repeatability of the value reported (the maximum difference between two independent results) should not exceed 0.005 units at the 95% confidence level. The reproducibility of this method should be within ± 0.01 (Note 5).

Notes

1. If the correct hydrometer is unknown, start with the lower end of the set and work up.

2. Volatile samples must be checked rapidly or protected from loss of solvent. They should be temperature equilibrated in a loosely closed container before being transferred to a tube.

3. Standard reference tables are available in Lange's Handbook and elsewhere for specific pairs of compounds.

4. Best fit straight line equations may be used over short ranges of percentage.

5. Appreciable error is introduced if the surface tension of the standard liquid and the material being tested differ. Hydrocarbons have surface tensions in the range of 20 to 30 dyne/cm while aqueous solutions of H_2SO_4 are in the range of 70 to 80 dyne/cm. If the material being tested is within 10 dyne/cm of the standard material, then the reproducibility of the results should be similar to the repeatability. In this method no knowledge of the surface tension of a material is assumed and NO corrections are applied.

References

ASTM D 1298

Norbert A. Lange, PH.D., Handbook of Chemistry, McGraw-Hill Book Co., Inc., New York, 1961

Figures, Graphs and Sketches

None.

Ed. Corr.
+ Indicates change
5/85
JEW
CTM4

DOW CORNING

corporate test method

REFRACTIVE INDEX -- Liquids With Abbe Refractometer

July 28, 1970 CTM 0002

Abstract

The refractive index is measured using an Abbe Refractometer. Refractive index is defined as the ratio of the velocity of light in air to its velocity in the substance under examination. It is a unitless number. This method is based on ASTM D 1218 and covers a range of 1.30 to 1.71.

Apparatus

Bath: Constant temperature to hold 25 ± 0.2°C. Any suitable source.

Circulating pump: Sargent Welch, Chicago, IL, Cat. No. S71598.

Refractometer: Abbe, 3L, Bausch & Lomb, Sargent Welch, Cat. No. S72290.

Test piece: Standard, Bausch & Lomb, Sargent Welch (part of refractometer), Cat. No. 33-45-85.

Reagents

Liquid: Standard, Bausch & Lomb, Sargent Welch (part of refractometer), Cat No. 34-45-81.

Precautions

Safety: Normal safe laboratory practice.

Procedural: No unusual precautions.

Parameters

None

Procedure

Turn on circulating pump and make sure temperature of bath is at 25 ± 0.2°C. Allow the water to circulate through the

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refractometer for a minimum of 3 min before making a determination. Clean prisms with n-butyl alcohol and tissue and air dry (Note 1). Apply sample to bottom prism with eyedropper or pipette and close top prism. If dark spots appear when looking through the eyepiece, either the sample has bubbles or there is not enough sample. Do not attempt to measure refractive indices until the sample is in position on the instrument, set the scale at the approximate value expected (Note 2).

Release the switch and bring the borderline near the crosshair and compensate the color by adjusting the position of the dial. The borderline should be faintly blue on one side and faintly red on the other. Observe the crosshairs and bring the dividing line upon their intersection by means of the coarse and fine hand controls. Depress the momentary contact switch and read the refractive index from the scale, estimating the fourth place.

Standardization

The instrument should be checked with the standard test piece and contact liquid at least once every month (more often under heavy use) to insure accurate operation.

Calculations

None

Precision and Accuracy

The reading error should be ± 0.0002.

Notes

1. The prism should never be touched with anything but the softest cleaning tissue. The prisms must not be scratched or damaged. The prisms must be thoroughly cleaned after each use with n-butyl alcohol, water, or a dilute solution of Triton X-100. The prisms are set in epoxy resin which may be attacked by some solvents - these are listed in the instruction booklet.

2. To see the scale, depress the momentary contact switch on the side of the instrument.

References

ASTM D 1218

Figures, Graphs and Sketches

None

DOW CORNING

corporate test method

VISCOSITY - Glass Capillary Viscometer

July 29, 1970 CTM 0004

Abstract

The kinematic viscosity of liquids is determined by measuring the time required for a fixed volume of samples to pass through a calibrated glass capillary using "gravity-flow". The method is based on ASTM D-445, IP 71 and the results are reported in Stokes. A calculation for determining the absolute viscosity (dynamic viscosity) in Poise is given (Note 1).

Apparatus

Bath: Constant temperature to hold 25 ± 0.2°C. Any suitable source.

Viscometer: A set of one of the following types (Note 2) to cover the desired range of viscosities.

1. Cannon Fenski: Fisher Scientific Co., Pittsburgh, PA, Cat. No. 13-616.
2. Ostwald: Fisher Scientific Co., Cat. No. 13-695.
3. Ubbelohde: Fisher Scientific Co., Cat. No. 13-614.

Reagents

Primary standard fluids: Various viscosities, Cannon Instrument Co., State College, PA.

Secondary standard fluids: Appropriate viscosity silicone oil standardized using calibrated master viscometers (ASTM D-2162).

Precautions

Safety: Normal safe laboratory practices.

Procedural: No unusual precautions.

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Parameters

Viscosities may be determined at temperatures other than 25°C. Results will be in Stokes or centiStokes unless otherwise requested.

Procedure

Select a clean, dry calibrated viscometer that will yield a flow time of greater than 80 sec with the sample. Load the viscometer in the correct manner as dictated by the design (Note 3). Place the tube in the constant temperature bath and allow it to reach equilibrium (at least 15 min. at 25°C). Use suction or pressure (Note 4) to adjust the head level of the sample to a point about 5 mm above the first timing mark. Allow the sample to flow freely. Start a timer as the meniscus passes the first timing mark. Stop the timer as the meniscus passes the second timing mark. Record the time to the nearest 0.1 sec. Repeat the test without refilling the tube. If the two results do not agree to within 0.2 sec, repeat the procedure with a new sample. Use the average in calculating the viscosity. Report viscosity and temperature.

Standardization

Viscometers should be calibrated and given an identification mark upon receipt and then calibrated at least once every year or whenever cleaned with strong acid or base or after being repaired. Either primary or secondary standards may be used.

Follow the procedure and determine the flow time. Calculate the viscometer factor:

$$F = \frac{\text{Viscosity of Standard}}{\text{flow time, sec}} = \frac{\text{Stokes*}}{\text{sec}}$$

* CentiStokes may be used if preferred where:

1 St = 100 cSt

Viscometers should be thoroughly cleaned with appropriate cleaning mixtures. Viscometers used with silicone fluids should be retained exclusively for that purpose. They may require cleaning with hydrofluoric acid.

Calculations

Kinematic viscosity:

Viscosity, St* = F x flow time, sec

* CentiStokes if preferred.

Absolute viscosity:

Viscosity P* = (kinematic viscosity, St) (density g/cm^3)

* CentiPoise if preferred.

Precision and Accuracy

The relative error should be less than ± 1% (Note 5).

Notes

1. In cgs units, viscosity is expressed in the following dimensions:

   a. Stokes - cm^2/sec

   b. Poise - g/cm/sec

2. The Ubbelohde viscometers are the preferred unit. They cover the range of 0.4 to 100,000 cSt. They are easy to fill and are free falling column viscometers.

   The Cannon Fenski viscometers have one advantage. They require a smaller sample size. However, they require an exact fill. They cover the range of 0.4 to 16,000 cSt. Any of these viscometers may be used interchangeably, if properly standardized.

   The Oswald viscometers are not preferred due to the extreme self-leveling effect of the fluid flow and consistent fill requirement. They cover the range of 0.4 to 16,000 cSt.

3. The Ubbelohde viscometers are filled by pouring the sample down the largest tube until the bulb is about 3/4 full (the vent tube must be open). The amount is not critical. The other two must be filled by drawing the sample in to fill mark or by adding a specific volume.

4. Care must be taken in handling volatile samples.

5. A "quick and dirty" viscosity measurement with a precision of ± 5% or better can be obtained using a calibrated volumetric pipet on as little as 1 ml of sample and following this basic procedure.

References

1. ASTM D-445

2. ASTM D-2162

3. ASTM D-2515

4. Institute of Petroleum 71/66

Figures, Graphs and Sketches

None

Ed. Corr.
7/81
JEW
10:T

DOW CORNING

corporate test method

COLOR--Clear Liquids by APHA Technique

July 29, 1970 CTM 0005

Abstract

The method describes a procedure for the visual measurement of the color of essentially water-white liquids. It is applicable only to materials in which the color producing bodies present have light absorption characteristics nearly identical with those of the platinum-cobalt color standards used (pale yellow).

The sample is compared with a series of numbered standards. Report the number of standard of best match, or if between standards, report the darker of the two.

Apparatus

Tubes: Nessler matched ml tall form, any suitable source.

Reagents

Cobalt chloride ($CoCl_2.6H_2O$): Reagent grade, any suitable source.

Hydrochloric acid (HCl): Reagent grade, any suitable source.

Potassium chloroplatinate (K_2PtCl_6): Reagent grade, any suitable source.

Stock solution: Sargent Welch, Chicago, Ill., Cat. No. CS14116 or prepared from above reagents. (See standardization section).

Precautions

Safety: Normal safe laboratory practice.

Procedural: No unusual precautions

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Parameters

None.

Procedure

Place 100 ml of sample in a Nessler tube (Note 1) passing it through a filter if there is any visible turbidity. Cap the tube and place the tube in the comparator between two standards. Observe the three tubes from the top (Note 2). Move the sample until it fits between two consecutively numbered standards.

Report the color as the number of the standard that best matches the sample, or if between standards, report the darker of the two i.e.:

$$\text{Color}_{\text{APHA}}: \quad 10 \text{ or } <10$$

If owing to differences in hue between the sample and the standards a definite match cannot be obtained, report the range over which an apparent match is obtained and also report if the sample is off-hue. If possible, describe the color.

Standardization

Stock solution "A". This solution has a color of 500 and should be stable for up to 2 yr.

Dissolve 1.245 g of K_2PtCl_6 and 1.000 g $CoCl_2$ in distilled water. Add 100 ml of HCl and dilute to 1 liter with distilled water.

Working standards: Dilute the required volume of "A" to 100 ml with distilled water in the Nessler tubes. Cap the tube and seal the cup with shellac or waterproof cement (Note 3). These solutions should be prepared at least once every year.

Ml Sol "A"	$\text{Color}_{\text{APHA}}$
1	5
2	10
4	20
6	30
8	40
10	50
12	60
14	70
16	80
18	90
20	100
30	150
40	200
60	300
80	400
100	500

Calculations

None.

Precision and Accuracy

The precision of this method should be within one color standard number.

Notes

1. Other clear glass containers are acceptable where the material to be tested is difficult to load into a Nessler tube. Standards should be matched containers.

2. The tubes should be reviewed against a white background with white light.

3. The standards should be inverted to clear the cap before each series of observations. If the tubes are not sealed and the caps removed from observation, the solutions should be replaced at least once every six months. Standards may be added or subtracted from this suit specific situations.

References

ASTM D 1209
"Standard Methods for the Examination of Water and Sewage" American Public Health Association Ed 9, p. 14.
W. W. Scott "Standard Methods of Chemical Analysis", D. VanNostrand Company, Inc., Ed 5, Vol. 2, p. 2045.

Figures, Graphs and Sketches

None

Retype
6/85
JEW
CTM4

DOW CORNING

corporate test method

ACIDITY/ALKALINITY--Toluene and n-Butyl Alcohol Solvent System

July 31, 1970 CTM 0051

Abstract

This method is designed to determine the concentration of acidic or alkaline constituents in organic or organosilicon compounds that are soluble in the solvent system. A variety of indicators or potentiometric measurement may be used to detect the endpoint. Results may be reported as (1) acid or base number expressed in milligrams of potassium hydroxide per gram, (2) neutral equivalent expressed as equivalent weight or (3) percentage of a specific acid or base.

This method is a modification of ASTM D 664 and D 974. This method should not be applied to amines.

Apparatus

Electrode: Single combination. Any suitable source.

Meter: pH. Any suitable source.

Reagents

Hydrochloric acid (HCl): Reagent grade. Any suitable source. Prepare alcoholic 0.1N HCl - dilute 8.5 ml of concentrated HCl to 1 liter with reagent grade isopropyl alcohol. Standardize. Other normalities may be used.

Indicators: Select one of the following reagents (Note 1).

1. Bromcresol purple (BCP): Eastman Organic Chemicals, Rochester, NY, Cat. No. 745. Prepare 0.5% solution in 2B-ethyl alcohol.

2. p-Naphtholbenzene (PNB): Eastman Organic Chemicals, Cat. No. 924. Prepare 1.0% solution in 1:1 toluene : isopropyl alcohol.

3. Phenolphthalein (PP): Eastman Organic Chemicals, Cat. No. 202. Prepare 0.1% solution in 2B-ethyl alcohol.

DOW CORNING CORPORATION, MIDLAND, MICHIGAN 48640 TELEPHONE 517 496-4000

4. Tetrabromophenolphtalein ethyl ester (TB): Eastman Organic Chemicals, Cat. No. 6810. Prepare 0.2% solution in 2B-ethyl alcohol.

Potassium hydroxide (KOH): Alcoholic reagent, 0.1N, Hartman-Leddon Co., Philadelphia, PA, Cat. No. 1274x5. Other normalities may be used.

Solvent: Prepare a 1:1 mixture of toluene and n-butyl alcohol. Add 6 ml/gal of the desired indicator. Add standard KOH or HCl, as required, to bring the solution to the neutral color of the indicator.

Precautions

Safety: Normal laboratory procedures for handling solvents, acids and bases.

Procedural: The sample should be soluble in the solvent system.

Parameters

The expected acidity/alkalinity must be used in selection of the appropriate sample size (Note 2).

The indicator to be used must be specified.

The form in which the results will be reported must be specified.

Procedure

Weigh the sample (Note 2) directly into a tared 125 ml Erlenmeyer flask. Add 30 - 40 ml of neutral solvent containing the specified indicator. Swirl to dissolve the sample. Titrate the mixture with either standard KOH or HCl (Note 3), as required, to return the solution to the neutral color (Note 4). Use a blank 125 ml flask with 30 - 40 ml of the same solvent as a color match. Record the volume, identity, and normality of the standard reagent used. Calculate the result in the specified form (Note 5).

Standardization

Hydrochloric acid: Standardize when made and at least once a month against freshly standardized KOH of similar normality to the phenolphthalein endpoint.

$$\underline{N}_{HCl} = \frac{(V_{KOH})(\underline{N}_{KOH})}{V_{HCl}}$$

Potassium hydroxide: Standardize when opened and at least once a month against NBS potassium acid phthalate (dried 1 h/110°C) to the phenolphthalein endpoint.

$$\underline{N}_{KOH} = \frac{\text{Weight of } KHC_8H_4O_4}{(204.23/1000)(V_{KOH})}$$

Calculations

$$\text{Acid No. or Base No.} = \frac{(V_{Tit*})(\underline{N}_{Tit*})(56.1/1000)(1000)}{SW_g} = \text{mg KOH/g}$$

$$\text{Acid NE or Base NE} = \frac{(SW_g)(1000)}{(V_{Tit*}))\underline{N}_{Tit*})} = \text{Equivalent Weight}$$

$$\text{\% Acid or \% Base} = \frac{(V_{Tit*})(\underline{N}_{Tit*}) \times (\text{Meq Wt}^{**})(100)}{SW_g}$$

* When KOH is used as titrant, acid numbers etc. are calculated and when HCl is used as titrant, base numbers etc. are calculated.

** Milliequivalent weight of the acid or base being calculated.

Acidity as ppm $CaCO_3$ may be calculated as a measure of hardness as:

$$CaCO_3 = \frac{(V_{KOH})(\underline{N}_{KOH})(100.09/2000)(10^6)}{SW_g}$$

Precision and Accuracy

The precision should be ± 2% relative when the endpoint is determined potentiometrically or in a clear solution. Highly colored samples and sample composition will drastically reduce the precision and accuracy.

Notes

1. A potentiometric titration should be made and the curve plotted to aid in the initial selection of the indicator. The following should also be considered:

   BCP has a pH range of 5.2 - 6.8. Silanol will titrate but not quantitatively.

PNB has a pH range of 8.2 - 10. It is good for highly colored materials.

PP has a pH range of 8.0 - 10.0. It will allow titration of weak acids. Silanols and some silanes may be titrated.

TB has color change about 4.3. It will titrate strong acids without significant interference.

Other indicators may be used. They should be reagent grade, commercially available.

2. Sample size should be selected to give a titration within the limits of one buret full. Use the following table based on 0.1N reagent and a 10 ml titration as a guide:

Expected Result		Sample Weight, g	
Acid No.*	NE*	Approx. Weight	Precision
→ < 0.02	>2800000	50.0 **	± 0.1
→ 0.25	280000	20.0 **	± 0.05
→ 10.0	5600	5.0	± 0.02
50.0	1000	1.0	± 0.005
250.0	200	0.2	± 0.001
	50	0.05	± 0.0001

* Either Acid or Base.

** When a large sample is used, the indicator dilution and subsequent depth of color may be affected and an accurate color match may be difficult.

3. It may be convenient in titrating strong base with phenolphthalein to add a slight excess of standard HCl then back titrate clear to pink with standard KOH. Calculate the net titration.

4. A potentiometric titration should be used on highly colored materials. Two approaches may be used.

   a. A standard plot of volume vs millivolt reading to determine the endpoint.

   b. Determine the millivolt reading of the standard neutral titrant, add the sample and titrate back to the original.

5. Two notations are frequently used and are defined as follows:

   a. Nil: No color change in the system when the sample was added.

   b. Trace: Slight color change in the system. A 0.02 ml titration goes well past neutral. In Note 2 with 5 g, 0.01 ml = 0.002 Acid No., trace is less than this but more than nil.

References

ASTM D 664

ASTM D 974

Figures, Graphs, and Sketches

None

Ed. Corr.
4/81
JEW
T4:t.106

→ indicates changes in current issue.

INTRODUCED IN ISOD

STONE AND WEBSTER ENGINEERING CORPORATION

ENGINEERING & DESIGN COORDINATION REPORT M10038A

PAGE 1 OF 2

E & DCR NO 2 ~~E34~~ 94NW

PROJECT/CLIENT: NINE MILE POINT NUCLEAR STATION — UNIT 2 NIAGARA MOHAWK POWER CORPORATION

JOB ORDER NO: 12187

P O NO (S&W): P303D

REASON CODE (S): B

EQUIP ID NO (S)/SYS CODE (S): 2MSS*HYVGA-7D B1P1.001

REFERENCE DOCUMENTS: P303D

SUPPLIER/OR SUBSUPPLIER/NAME: CROSBY

DESCRIPTION SUMMARY: MSIV HYD. OIL REQTS.

REMARKS: ALL SUPERSEDE CANCEL M10038 PN2YSEM1118 5/21/86.

PROBLEM DESCRIPTION: AREA I - IZB. 86MX116 LE119

REQUEST CLARIFICATION OF THE FOLLOWING ITEMS FOR MSIV HYDRAULIC OIL (IN ACTUATOR) :-

1/ WHAT IS THE SETTING REQT FOR FCV AT ACCUMULATOR OUTLET?

2/ WHAT ARE THE OIL CLEANLINESS, FILTRATION & FILING REQTS?

THESE REQTS WERE ADDRESSED ON M10038, HOWEVER FURTHER CLARIFICATION IS REQ'D.

ATOR	AREA/DEPT DIV	EXT	DATE	DATE NEEDED	APPROVED
S. LEONARD	~~SEG~~	8867	5/16/86	5/16/86	

PROBLEM SOLUTION: ~~CANCEL~~ SUPERSEDE E&DCR M10038 5/21/86

SEE PG 2 FOR PROBLEM SOLUTION.

COPY

ENVIR QUAL: YES ☐ NO ☒	INTERDISCIPLINE CONCURRENCE / DATE	ASME ☐	
SEISMIC QUAL: YES ☐ NO ☒	DISCIPLINE N/A	SEE REQD	

AFFECTED DOCUMENT NUMBERS	TYPE	STATUS
P303D	S	N

RELATED [illegible] N/A

[illegible] V. Bilanin 2/26/86 | 0 | 005

[illegible] 5/16/86 | .00

[illegible] NC | 123, 123

[illegible] NC

[illegible] NC

[illegible]

S - WILL BE INCORPORATED
N - WILL NOT BE INCORPORATED
I - NO CHANGE

DESCRIPTION: HYD OIL REQTS

REMARKS: SUPERSEDE

CALCULATION SHEET

E&DR 2-87-0 Attachment 3
PG 2 OF 2

Client | Location | Est No | JO No.

Subject | Date | By

Checked | By

Based on | Revised | By

PROBLEM SOLUTION.

1/ THE FCV IS TO BE SET AT THE MARKING FOR 1 GPM & LOCKED BY THE SET SCREW PROVIDED FOR THAT PURPOSE.

2/ DURING HYD. SYSTEM MOD'S, SYSTEM CLEANLINESS TO BE MAINTAINED. VISUAL EXAMINATION IS REQ'D.

3/ AFTER INITIAL RUNNING OF THE HYDRAULIC PUMP, A SAMPLE OF THE HYDRAULIC FLUID IS TO BE TAKEN & CLEANLINESS VERIFIED.

4/ NEW OIL ONLY TO BE USED IN FILLING THE SYSTEM. MONITORING OF THE OIL CONDITION IS ADDRESSED ON E&DR E87564.

5/ PUMP DISCHARGE FILTER IS TO BE REPLACED SUBSEQUENT TO ITEM 3 & PRIOR TO PRE-OP TESTING.

6/ THE SYSTEM VOLUME REQ'TS ARE 18.6 TO 21.4 GALS WHICH ARE NOT SIGNIFICANTLY DIFFERENT FROM THE ORIGINAL DESIGN. NO REVISION REQ'D TO RESERVOIR DIMENSIONS.