

NINE MILE POINT NUCLEAR STATIONTECHNICAL DEPARTMENT PROCEDUREPROCEDURE NO. TDP-8POST MAINTENANCE TESTING CRITERIA

<u>APPROVALS</u>	<u>SIGNATURES</u>	<u>DATE AND INITIALS</u>		
		<u>REVISION 0</u>	<u>REVISION 1</u>	<u>REVISION 2</u>
Technical Superintendent W. C. Drews	_____	2/21/86 PDR JUCD	_____	_____
Technical Services Superintendent J. R. Spadafora	_____	2/21/86 PDR JRS	_____	_____
Supervisor Technical Support R. G. Randall	_____	PDR 2-28-86	_____	_____

Summary of PagesRevision 0 (Effective 2/28/86 )Pages

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Date

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NIAGARA MOHAWK POWER CORPORATION

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

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Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains. The concentration of the *Agrobacterium* suspension was 10<sup>6</sup> cells/ml (A), 10<sup>7</sup> cells/ml (B), 10<sup>8</sup> cells/ml (C), and 10<sup>9</sup> cells/ml (D). The concentration of the *Agrobacterium* suspension was 10<sup>6</sup> cells/ml (A), 10<sup>7</sup> cells/ml (B), 10<sup>8</sup> cells/ml (C), and 10<sup>9</sup> cells/ml (D). The concentration of the *Agrobacterium* suspension was 10<sup>6</sup> cells/ml (A), 10<sup>7</sup> cells/ml (B), 10<sup>8</sup> cells/ml (C), and 10<sup>9</sup> cells/ml (D). The concentration of the *Agrobacterium* suspension was 10<sup>6</sup> cells/ml (A), 10<sup>7</sup> cells/ml (B), 10<sup>8</sup> cells/ml (C), and 10<sup>9</sup> cells/ml (D).

TDP-8

POST MAINTENANCE TESTING CRITERIA

1.0 PURPOSE

The purpose of this procedure is to provide the criteria which establishes the extent of testing required following a maintenance activity.

2.0 DEFINITION

Post Maintenance Testing (PMT) as used in this procedure means component or system operability testing to assure that the maintenance activity, be it preventative, predictive, or corrective maintenance, did not adversely affect performance of the component or system, regardless of who performed the work.

3.0 REFERENCES

- 3.1 Generic Letter 83-28
- 3.2 Information Notice 85-71
- 3.3 ASME B&PV Code, section 11
- 3.4 AP-5, "Procedure for Repair"

4.0 PROCEDURE

- 4.1 The attachment to this procedure lists, by component, the maintenance activities that might be performed and the testing required following that activity. The supervisor who approved the WR is normally the PMT specifier.
- 4.2 It is the responsibility of the PMT specifier to define the testing requirements for cases not contained in the attachment, and to notify the Supervisor, Technical Support for required revision to this document.
- 4.3 The PMT specifier shall assure that the PMT include a test specific to the corrective maintenance performed, as well as tests to assure the proper functioning of the component and/or system.



- 4.4 When maintenance is performed on a component that is part of an auxilliary system of a large component, the larger component does not necessarily need to be tested. For example, maintenance on the prelubrication pump of a diesel generator does not require a load test for any diesel maintenance. What is required in this case is a pressure/flow test of the prelubrication pump.
- 4.5 When more than one PMT is specified, the test must be done in a logical order, such that adjustments made during the test (tightening of valve packing, for example) do not invalidate a previously performed test (stroke timing).



POST MAINTENANCE TESTING COMPONENT LIST

<u>MECHANICAL COMPONENT</u>	<u>MAINTENANCE ACTIVITY</u>	<u>POST MAINTENANCE TEST REQUIREMENTS</u>
air locks	any affecting seal	Primary Containment: LLRT Secondary Containment: Local leak Test
	opening Primary Containment airlock	LLRT
compressors	any	inservice test
containment:		
primary	any	CIIRT or LLRT
secondary	any	Reactor Building leakage test or local leakage test
control room boundary	any	local leakage test or control room pressure/flow test
coolers		see heat exchangers or freon units
cranes	any	load test
dampers	actuator repair or replacement	stroke test
	damage repair or replacement	stroke test; for Reactor Building or Control Room isolation dampers, a system pressure/flow test
diesels	any	load test
doors	seal work, replacement	leakage test for fire rated or pressure boundary doors
fans	any	head/capacity (pressure/flow) test.





POST MAINTENANCE TESTING COMPONENT LIST (Cont'd)

<u>MECHANICAL COMPONENT</u>	<u>MAINTENANCE ACTIVITY</u>	<u>POST MAINTENANCE TEST REQUIREMENTS</u>
filters (air)	housing maintenance	leakage test; for SGTS or Control Room Emergency Ventilation, chemical absorption test(s)
	media replacement	flow, delta pressure, and chemical absorption test(s)
	intake area smoke chemical release, or painting	chemical absorption test(s)
filters (fluid)	housing maintenance	ISI, hydro
	media replacement	flow, delta pressure
flanges	gasket replacement	leakage check, system flow test
freon units (chillers)	any	inservice test
gates	any	exercise test (raise/lower)
gears	any	inservice test (ST for driven device)
hatches	any	leakage test (LLRT for Containment)
	opening of containment hatches	LLRT
heat exchangers	tube plugging	tube leakage test; LLRT for Unit 1 Containment Spray HX's; verification of heat exchange capability, either by test or analysis
hydraulic units	any	inservice test (ST for driven device)
pipng	weld repair	ISI; hydro



POST MAINTENANCE TESTING COMPONENT LIST (Cont'd)

<u>MECHANICAL COMPONENT</u>	<u>MAINTENANCE ACTIVITY</u>	<u>POST MAINTENANCE TEST REQUIREMENTS</u>
penetrations:		
non-containment	repair, replacement	leakage test for fire rated or pressure boundry
containment	any opening	LLRT
pumps	packing/mechanical seal adjustment or replacement	check for gross leakage; adequate seal cooling
	overhaul	head/capacity test; vibration; bearing temperatures
	casing repair	ISI; hydro
racks	any	inservice test
rod drives/HCU's	any	exercise test; scram time test
	any affecting coupling integrity	coupling integrity test
snubbers	any	operability test
strainers	pressure boundary repair	ISI; hydro
	any other	inservice flow test
tanks	pressure boundary repair	ISI; hydro
traveling screens	any	inservice test
turbines	any	ST for driven component
valves:		



POST MAINTENANCE TESTING COMPONENT LIST (Cont'd)

MECHANICAL COMPONENT

MAINTENANCE ACTIVITY

POST MAINTENANCE TEST REQUIREMENTS

Non-CIV packing replacement  
or adjustment

stroke timing

CIV packing  
replacement or adjustment

pre-maintenance LLRT; post maintenance  
LLRT; stroke timing

limit switch replacement  
or adjustment (stem mounted  
or internal)

stroke; verify limit switch actuation of  
controlled device including any inter-  
locks

torque switch replacement  
or adjustment

MOVATS

motor operator  
replacement

stroke timing; MOVATS; verify limit  
switch actuation of controlled device  
including any interlocks

air operator replacement

stroke timing; verify limit switch  
actuation of controlled device,  
including any interlocks; snoop air  
connections

controller replacement

inservice test

pressure boundary repair

ISI; hydro

valve internals repair:  
Pressure Isolation  
valves

seat leakage test (Unit 1 T.S. 3.2.7.1,  
Unit 2 T.S. 3.4.3.2.d)

CIV's

LLRT

Vacuum Breakers:  
Torus to Drywell

Pressure decay rate test (Unit 1 only),  
Force test per T.S. 4.3.6.b.1 (Unit 1)



POST MAINTENANCE TESTING COMPONENT LIST (Cont'd)

MECHANICAL COMPONENT

MAINTENANCE ACTIVITY

POST MAINTENANCE TEST REQUIREMENTS

Rx Bldg. to Torus

Force test per T.S. 4.3.6.b.1 (Unit 1)

Accumulator Check valves

leakage check per T.S. 4.1.3.5.b.2

replacement:  
safety valve

pressure lift test prior to  
installation inservice flange leakage  
test

SRV

Unit 1: flow test per T.S. 4.1.5.a

Pressure Isolation valves

seat leakage test (Unit 1 T.S. 3.2.7.1,  
Unit 2 T.S. 3.4.3.2.d)

CIV's

LLRT

Vacuum Breakers:  
Torus to Drywell

Pressure decay rate test (Unit 1 only),  
Force test per T.S. 4.3.6.b.1 (Unit 1)

Rx Bld. to Torus

Force test per T.S. 4.3.6.b.1 (Unit 1)

Accumulator Check valves

leakage check per T.S. 4.1.3.5.b.2





POST MAINTENANCE TESTING COMPONENT LIST

<u>ELECTRICAL COMPONENT</u>	<u>MAINTENANCE ACTIVITY</u>	<u>POST MAINTENANCE TEST REQUIREMENTS</u>
annunciators	any	inservice test
batteries	cell replacement	cell voltage; cell specific gravity; bank voltage
	bank replacement	battery discharge test
breakers (switchgear)	any	trip and closure tests; ST for effected component
generators (emergency)	any	load test
heaters	any	rated power test
heat trace	any	inservice test
hoists	any	load test
lighting (emergency)	any	inservice test
limit switches	adjustment or replacement	verify actuation of controlled device including any interlocks
limitorques	any	see valves; MOVATS
M-G sets:		
recirculation	any	inservice test
UPS	any	load test
meters	any	inservice test
motors	any	inservice test; bearing temperatures; ST for driven device



POST MAINTENANCE TESTING COMPONENT LIST (Cont'd)

<u>ELECTRICAL COMPONENT</u>	<u>MAINTENANCE ACTIVITY</u>	<u>POST MAINTENANCE TEST REQUIREMENTS</u>
MCC's (load centers)	any	ST for effected components
penetrations	electrical repair	megger test
	any other	see penetrations, mechanical
refuel platform	any	ST
relays	replacement	pre or post replacement inservice test
	adjustment	post adjustment calibration
RPIS	any	inservice test
solenoids	any	cycle; ST for actuated device
squibs	squib replacement	test fire replaced squibs; fire one from new batch
transformers	any	inservice test
volatage regulator	any	inservice test; ST for emergency generators



POST MAINTENANCE TESTING COMPONENT LIST

<u>I&amp;C COMPONENT</u>	<u>MAINTENANCE ACTIVITY</u>	<u>POST MAINTENANCE TEST REQUIREMENTS</u>
accelerometers	any	inservice test
amplifiers	any	inservice test
CAM's	any	inservice test
chart recorders	any	calibration, inservice test
communication equipment	any	inservice test
	Gaitronics speaker repair, replacement	audibility ST
controllers	any	inservice test
Detectors:		
fire	any	inservice test
radiation	any	inservice test
EPR	any	inservice test
gas analyzer	any	inservice test
indicators	any	inservice test
LVDTs	any	inservice test
MPR	any	inservice test
meteorological instruments	any	inservice test
meters	any	inservice test



POST MAINTENANCE TESTING COMPONENT LIST (Cont'd)

<u>I&amp;C COMPONENT</u>	<u>MAINTENANCE ACTIVITY</u>	<u>POST MAINTENANCE TEST REQUIREMENTS</u>
neutron instrumentation:		
SRM	any	inservice test
IRM	any	inservice test
APRM	any	inservice test
LPRM	any	inservice test
RBM	any	inservice test
PINGS	any	inservice test
positioners	any	inservice test
refueling grapple	any	inservice test
relays	any	inservice test
RPIS	any	inservice test
Rod Worth Minimizer	any	ST
Rod Sequence Control	any	ST
RTDs	any	inservice test
seismometers	any	inservice test
synchros/servos	any	inservice test
switches:		
limit	replacement or adjustment	verify limit switch actuation of controlled device





POST MAINTENANCE TESTING COMPONENT LIST (Cont'd)

<u>I&amp;C COMPONENT</u>	<u>MAINTENANCE ACTIVITY</u>	<u>POST MAINTENANCE TEST REQUIREMENTS</u>
flow	any	inservice test
level	any	inservice test
pressure/DP	any	inservice test
radiation	any	inservice test
temperature	any	inservice test
SQUIBS	SQUIB Replacement	Test Fire Replace SQUIBS; Fire One From New Batch
TIP system	any	normalization of output prior to use
thermocouples	any	inservice test
transducers	any	inservice test
transmitters		
conductivity	any	inservice test
flow	any	inservice test
humidity	any	inservice test
pressure/DP	any	inservice test
radiation	any	inservice test
temperature	any	inservice test
trip units	any	inservice test
tachometers	any	inservice test



POST MAINTENANCE TESTING COMPONENT LIST (Cont'd)

<u>I&amp;C COMPONENT</u>	<u>MAINTENANCE ACTIVITY</u>	<u>POST MAINTENANCE TEST REQUIREMENTS</u>
timers	any	inservice test
valves	replacement	pressure test of fittings; flow test for excess flow check valves
vibrometers	any	inservice test
video equipment	any	inservice test



## DEFINITIONS:

ANY: any maintenance activity that could effect the proper functioning of the component. Includes: any disassembly of the component or power supply. Does not include removal of inspection covers on non pressure retaining components. Does not include non intrusive maintenance, such as a visual inspection or surface cleaning.

CIIRT: Appendix J to 10CFR50 Containment Integrated Leak Rate test

INSERVICE TEST: observation of correct operation of the component after being placed in service. This should be accomplished by comparison with redundant equipment or with previously known performance characteristics. This may need to be accomplished with one or more of the following Technical Specifications tests:

Surveillance tests (ST)  
Channel Calibration  
Sensor Check/Channel Check  
Instrument Channel test/Channel Functional test  
Source Check

ISI: Non destructive examination as required by ASME B&PV code section XI.

LOCAL LEAKAGE TEST: a test for leakage at the point of maintenance, such as a Downy Wand test.

LLRT: Appendix J to 10CFR50 Local Leak Rate Test.

LOAD TEST: a test designed to assure that the component is capable of carrying its required load.

PRESSURE/FLOW TEST: a test designed to assure that a fan or pump is operating on its head/capacity curve, or a test designed to show that a pressure boundary is sufficiently leak tight.

STROKE TEST: movement of a valve or damper through a sufficient portion of its travel to assure freedom of movement.

STROKE TIMING TEST: timing of the movement of a valve or damper through a sufficient portion of its travel to assure that the travel time is correct. This test usually requires full travel unless partial travel times are previously documented.

