UNITED STATES NUCLEAR REGULATORY COMMISSION

NORTHERN STATES POWER COMPANY
PRAIRIE ISLAND NUCLEAR GENERATING PLANT DOCKET Nos. 50-282
50-306

REQUEST FOR AMENDMENT TO
OPERATING LICENSES DPR-42 & DPR-60

LICENSE AMENDMENT REQUEST DATED January 29, 1997
Amendment of Cooling Water System Emergency Intake Design Bases

Northern States Power Company, a Minnesota corporation, by this letter dated March 20, 1997, provides supplemental information in support of the subject license amendment request dated January 29, 1997. Attachment 1 provides the reviewed and approved Prairie Island earthquake procedure.

This letter and its attachments contain no restricted or other defense information.

NORTHERN STATES POWER COMPANY

By Joel P. Sorensen
Joel P. Sorensen
Plant Manager,
Prairie Island Nuclear Generating Plant

On this 20th day of March 1997 before me a notary public in and for said County, personally appeared, Joel P. Sorensen, Plant Manager, Prairie Island Nuclear Generating Plant, and being first duly sworn acknowledged that he is authorized to execute this document on behalf of Northern States Power Company, that he knows the contents thereof, and that to the best of his knowledge, information, and belief the statements made in it are true and that it is not interposed for delay.

Marcia K. LaCore

MARCIA K. LaCORE
NOTARY PUBLIC-MINNESOTA
HENNEPIN COUNTY
My Commission Expires Jan. 31, 2000

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O.C. REVIEW DATE: 3-20-97	REVIEWED BY: [signature]	DATE: 3/20/97
	APPROVED BY: TE Silverberg	DATE: 3-20-97

1.0 PURPOSE

This procedure describes the actions necessary to place the units in a safe condition following a seismic event detected at the Prairie Island site. These actions depend upon the severity of the event and the level of deterioration of plant systems, structures, components and offsite power sources.

2.0 PROCEDURES

2.1 Symptoms

2.1.1 Receipt of Annunciator 47023-0603, SEISMIC EVENT.

2.1.2 Detection of earth tremor by personnel.

2.2 Automatic Actions

IF earth tremor is detected by the seismic recording system, THEN activation of magnetic tape recorders will occur.

2.3 Immediate Actions

NOTE:	**Indication of a decreasing safeguards bay level will necessitate expeditious reduction of cooling water load to ensure maintenance of adequate heat sink. It is expected that flow reduction can be achieved in 15 minutes.**

NOTE:	**Bay level indicators are not seismically qualified but will fail in the conservative direction so action based on observed indication is appropriate.**

2.3.1 **Monitor** safeguard bay level indication for evidence of blockage in the intake canal (**LI-41011**, **LI-41017** & **LI-41503**). IF indicated safeguards bay level is decreasing, THEN:

A. **Trip** both reactors.

B. **Perform** E-0, Reactor Trip or Safety Injection, while continuing with the SUBSEQUENT ACTION cooling water reduction steps of this procedure.

2.3.2 IF safeguards bay level is NOT decreasing, THEN **continue** monitoring level while evaluating earthquake severity per Attachment A.

2.4 Subsequent Manual Actions

2.4.1 IF safeguards bay level is decreasing rapidly such that loss of suction to safeguards cooling water pumps is imminent, THEN **trip** all four Circulating Water Pumps.

NOTE:	**Cooling Water flow must be reduced to <11,600 GPM to be within the capacity of the Emergency Intake Line. Total Clg Wtr flow is indicated by the sum of FI-4101201 and FI-4101301 OR FI-4150401 and FI-4150501. (Seismically qualified instruments)**

2.4.2 **Reduce** cooling water system flow to less than 11,600 GPM by isolating flow to loads in the following preferential order:

A. Turbine Building loads.

1. **CLOSE MV-32031**, 1 TURB BLDG CLG WTR HDR MV. IF unable to CLOSE **MV-32031** from the Control Room, THEN **direct** the dedicated seismic event operator to locally CLOSE **MV-32031** using its handwheel.

2. **CLOSE MV-32033**, 2 TURB BLDG CLG WTR HDR MV. IF unable to CLOSE **MV-32033** from the Control Room, THEN **direct** the dedicated seismic event operator to locally CLOSE **MV-32033** using its handwheel.

B. Containment FCUs.

1. **CLOSE MV-32132**, 11 FC CLG WTR RTRN ISOL MV A.
2. **CLOSE MV-32135**, 12 FC CLG WTR RTRN ISOL MV A.
3. **CLOSE MV-32147**, 21 FC CLG WTR RTRN ISOL MV A.
4. **CLOSE MV-32150**, 22 FC CLG WTR RTRN ISOL MV A.
5. **CLOSE MV-32138**, 13 FC CLG WTR RTRN ISOL MV A.
6. **CLOSE MV-32141**, 14 FC CLG WTR RTRN ISOL MV A.
7. **CLOSE MV-32153**, 23 FC CLG WTR RTRN ISOL MV A.
8. **CLOSE MV-32156**, 24 FC CLG WTR RTRN ISOL MV A.

C. Component Cooling.

1. **Verify** at least one Component Cooling Pump running for each unit.

2. IF both CC Pumps are running for a unit, THEN **stop** one CC Pump for each applicable unit.

3. **CLOSE** the Clg Wtr Inlet MV for the idle CCHX for each unit.

NOTE:	**This procedure assumes that both DDCLPs have started and 121 MDCLP is idle.**

NOTE:	**It will be necessary to place the pump control switches in "PULLOUT" to prevent automatic restart.**

2.4.3 WHEN the cooling water system total flow demand is less than 13,000 GPM, the total number of running cooling water pumps taking suction from the safeguards bay should be reduced to one.

A. **Place** the idle safeguards bay clg wtr pmp control switch in "PULLOUT".

B. **Turn** one of the running safeguards bay cooling water pump control switches to "STOP" AND **place** in "PULLOUT.

2.4.4 Cooling water flow to the in-service Component Cooling Heat Exchanger will be limited by the setting of the travel stop on the outlet flow control valve. IF further reduction of flow is necessary, THEN **throttle** CLOSED the CCHX Cooling Water Outlet Manual Valve. (Chain Operated)

2.4.5 IF CST inventory cannot be maintained, THEN **refer** to C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUXILIARY FEEDWATER PUMP SUCTION.

2.4.6 IF instrument air is lost, THEN **refer** to C34 AOP1, LOSS OF INSTRUMENT AIR, Attachment A, step 9, for operation of one Control Room Chiller.

2.4.7 **Evaluate** earthquake severity per Attachment A.

2.5 Recovery Actions

2.5.1 **Restore** any cooling water loads that can be supported by the running Cooling Water Pump. **Maintain** total cooling water flow <11,600 GPM OR **determine** allowable increased flow based on visual observation of river level at intake screenhouse. (**See** Table 2)

A. In-service component cooling heat exchanger:

IF Clg Wtr Outlet Manual Valve was throttled, THEN **OPEN** as necessary to establish desired flow.

B. IF desired to gain additional flow to the FCUs, THEN **CLOSE** one or both Clg Wtr B-P MVs to turbine oil coolers.

MV-32371, 11/12 TURB OIL COOLERS CLG WTR BYPASS MV

MV-32372, 21/22 TURB OIL COOLERS CLG WTR BYPASS MV

C. Fan Coil Unit operation:

1. **CLOSE** FCU Clg Wtr Outlet MV B.

2. **OPEN** FCU Clg Wtr Outlet MV A.

3. **Throttle** OPEN FCU Clg Wtr Outlet MV B to obtain desired flow (≈450 GPM).

2.5.2 To reduce any possible influx of debris laden water from the circulating water pump intake bays into the suction of the safeguards bay, **CLOSE** both safeguards bay gates.

2.5.3 Manually **backwash** each safeguards traveling screen, one at a time, for 10 minutes every 30 minutes.

2.5.4 **Consult** Technical Support Center for guidance on redistribution of cooling water flow.

3.0 ATTACHMENTS

3.1 Attachment A, Severity Evaluation

3.2 Attachment B, Procedure to Interpret Seismic Event Data

3.3 Attachment C, Visual Inspection of Equipment and Structures After Earthquake

3.4 Table 1, Seismic Monitors

3.5 Table 2, Maximum CL Flow Rate Through Emergency Intake Line vs. River Elevation

4.0 REFERENCES

4.1 Developmental References

4.1.1 FSAR Section 1, Page 1.3-2

4.1.2 PINGP Technical Manual, XH-597-54

4.1.3 EPRI NP-6695, "Guidelines for Nuclear Plant Response to an Earthquake", dated December 1989

4.2 Implementing References

4.2.1 E-0, Reactor Trip or Safety Injection

4.2.2 C28.1 AOP2, LOSS OF CONDENSATE SUPPLY TO AUXILIARY FEEDWATER PUMP SUCTION

4.2.3 C34 AOP1, LOSS OF INSTRUMENT AIR

4.2.4 C37.11 AOP1, LOSS OF SAFEGUARDS CHILLED WATER

ATTACHMENT A - SEVERITY EVALUATION

PURPOSE

This attachment directs activities to evaluate the severity of the earthquake to determine the necessary actions to be performed to ensure continued safe operation of the plant.

It is anticipated that the plant site will not experience any significant earthquake motion during its lifetime. However, the plant is designed to respond elastically to earthquake ground motion as high as 6 percent gravity in the horizontal direction and 4 percent in the vertical direction. Provisions have also been made for safe shutdown of the reactors if ground motion reaches as high as 12 percent gravity in the horizontal direction and 8 percent gravity in the vertical direction. This procedure will dictate the actions to be taken following the seismic recording system actuation by the "Seismic Event" (3 percent vertical or horizontal), "operational basis Earthquake" (4 percent vertical or 6 percent horizontal), or a "Design Basis Earthquake" (8 percent vertical or 12 percent horizontal) trigger sensor.

NOTE:	**Information concerning epicenter and time of current seismic events worldwide can be obtained from the National Earthquake Information Center, Boulder, Colorado (1-303-273-8500) OR (1-800-525-7848).**

It should be noted that the actual "g" level accelerations used in this procedure are considered more accurate and useful information for the site than the Richter Scale magnitude conveyed to the general public by the media.

SEISMIC MONITORS

1.0 Table 1, Seismic Monitors, lists the areas that are automatically monitored after an activation signal.

2.0 Upon activation, the seismic recording system will record, on magnetic tape, all twelve channels of four triaxial accelerometers. The preselected accelerometer will display visually on the graphic recorder the three axes of its vibration.

3.0 Each of the eleven accelerographs will record, on magnetic tape, peak amplitude vibrations.

ATTACHMENT A - SEVERITY EVALUATION [Cont'd]

REQUIRED ACTIONS

1.0 **Suspend** all fuel handling and crane operations.

2.0 IF the "OPERATIONAL BASIS EARTHQUAKE" or the "DESIGN BASIS EARTHQUAKE" annunciator is received, and the graphic recorded concurs, THEN **perform** an orderly shutdown of both units to Cold Shutdown AND **perform** plant inspections using Attachment C as guidance.

3.0 **Activate** the Emergency Plan using the following criteria for classification:

A. "SEISMIC EVENT", Notification of Unusual Event.

B. "OPERATIONAL BASIS EARTHQUAKE", Alert.

C. "DESIGN BASIS EARTHQUAKE", Site Area Emergency.

4.0 **Notify** I&C Specialist to perform an evaluation of the seismic recorder data to determine the severity of the event as follows:

A. Display on the graphic recorder, all 12 channels of the 4 triaxial accelerometers. Refer to Attachment B to determine the percent of gravity on a time basis.

B. Using the Magnetic Developer Kit, determine the amplitude of each of the 11 accelerographs.

5.0 Visually **inspect** all areas receiving 3 percent of gravity horizontal or vertical accelerations and greater. The inspection **SHALL** specifically include the Safeguards Chill Water System shown on Flow diagram NF-39603-3. IF necessary, THEN **initiate** actions for break/leak in this system per C37.11 AOP1, LOSS OF SAFEGUARDS CHILLED WATER.

6.0 Areas receiving 6 percent of gravity horizontally or 4 percent of gravity vertically will have related equipment and components hydrostatically tested. In addition, primary and secondary leakage rate tests, including all Class I ventilation systems, will be performed.

ATTACHMENT A - SEVERITY EVALUATION [Cont'd]

7.0 IF the Operational Basis Earthquake limits were reached, THEN all safeguards systems will be tested and control rod motion and control will be proven. The protection system will be calibrated and tested.

A. **Inspect** all Class I building and structures for loss of integrity.

B. A general plant site radiation survey will be performed. Restart of the plant will be under strict administrative control with special emphasis on radiation detection surveys.

ATTACHMENT B - PROCEDURE TO INTERPRET SEISMIC EVENT DATA

TRIAXIAL ACCELEROMETER DEFLECTION IN PERCENT GRAVITY (G)

Definitions:

1) Seismic Event: 3% deflection vertical or horizontal

2) Operational Basis Earthquake: 4% vertical or 6% horizontal

3) Safe Shutdown Earthquake: 8% vertical or 12% horizontal

Procedure: Use Figure B-1 as a guide.

1. Using the event "START" and "END" marker positions, **construct** a reference line on each trace corresponding to 0% deflection.

NOTE:	**Recording unit may experience an initial power up perturbation which dampens out in under 1 second and/or an occasional intermittent high frequency noise spike which will be observed on all traces the same time. These occurrences are not related to the event.**

2. Using calibrated calipers, complete Table B-1 as follows:

   C. **Find** AND **measure** the highest peak from the reference line for each trace.

   D. **Find** AND **measure** the lowest peak from the reference line for each trace.

   E. **Record** the greater of 2A and 2B in Table B-1 for each trace.

NOTE:	**Conversion factor based on 0.25g/40mm at a gain setting of 4 as derived from the reference [1].**

   F. **Multiply** each value in Table B-1 by 0.00625 g/mm AND **enter** the result in the %G column in Table B-1.

ATTACHMENT B - PROCEDURE TO INTERPRET SEISMIC EVENT DATA

TRIAXIAL ACCELEROMETER DEFLECTION IN PERCENT GRAVITY (G)

G. **Compare** the results in Table B-1 to the definitions above to determine if the Seismic Trigger is valid, or if the Operational Basis Earthquake or Design Basis Earthquake was exceeded.

TABLE B-1 - SEISMIC DEFLECTION IN PERCENT GRAVITY

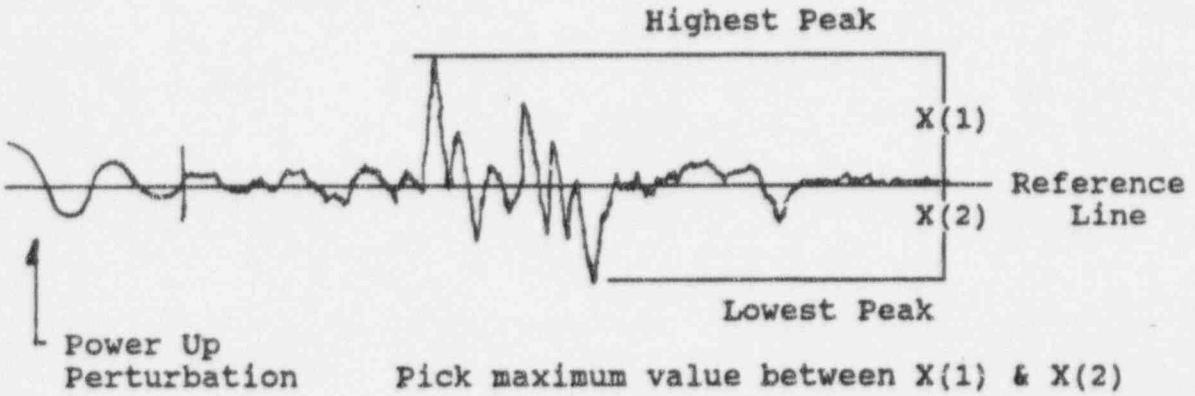
Accelerometer Tag No.	Accelerometer Gain Setting	Deflection Direction	Measured Deflection (Peak Amplitude) (mm)	Conversion * Factor From (mm) to (%G)	Deflection Peak Amplitude (%G)
28395		Longitudinal (L)	(mm)		(%G)
		Vertical (V)	(mm)	× 2.232 (%G/mm)	(%G)
		Transverse (T)	(mm)		(%G)
28396		Longitudinal (L)	(mm)		(%G)
		Vertical (V)	(mm)	× 2.212 (%G/mm)	(%G)
		Transverse (T)	(mm)		(%G)
28397		Longitudinal (L)	(mm)		(%G)
		Vertical (V)	(mm)	× 2.427 (%G/mm)	(%G)
		Transverse (T)	(mm)		(%G)
28398		Longitudinal (L)	(mm)		(%G)
		Vertical (V)	(mm)	× 2.688 (%G/mm)	(%G)
		Transverse (T)	(mm)		(%G)

* Conversion factors are based on an accelerometer gain setting of X4, if gain setting is different, I&C Engineering **SHALL** determine the new gain setting.

ATTACHMENT B - PROCEDURE TO INTERPRET SEISMIC EVENT DATA

TRIAXIAL ACCELEROMETER DEFLECTION IN PERCENT GRAVITY (G)

FIGURE B-1 - Example of Seismic Event



ATTACHMENT C - VISUAL INSPECTION OF EQUIPMENT AND STRUCTURES AFTER EARTHQUAKE

Equipment/Structure	Types of Inspections
1. Equipment - - Fans	1. Check equipment anchorage/isolation mounts for damage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of equipment. 2. Check for damage to attached conduit and ground straps. 3. Check for damage or distortion to fan housing or tearing of fabric noise eliminators due to seismic loads imposed by attached ducts. 4. Check for evidence of excessive fan vibration and/or noise. May be an indication of misalignment between the motor and fan shafts. 5. Check clearance between fan wheel and housing. 6. Check for damage due to impact or earthquake induced flooding or spraying. 7. Check for belt tightness and/or slippage; e.g., belt smoke/odor. 8. Check local alarms, breakers and protective devices for actuation/trips.
- - Air Compressors	1. Check equipment anchorage/isolation mounts for damage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of equipment. 2. Check for damage due to impact or earthquake induced flooding or spraying. 3. Check for excessive noise and/or vibration. 4. Check for air leaks if compressor is running continuously rather than cycling on and off. 5. Check for belt tightness and/or slippage; e.g., belt smoke/odor. 6. Check local alarms, breakers and protective devices for actuation/trips.
- - Battery Racks	1. Check battery rack anchorage for damage; e.g., stretching or loosening of anchor bolts or nuts; evidence of rocking or sliding of racks. 2. Check for distortion of rack structure.

ATTACHMENT C - VISUAL INSPECTION OF EQUIPMENT AND STRUCTURES AFTER EARTHQUAKE [Cont'd]

Equipment/Structure	Types of Inspections
- - Battery Racks (Cont'd)	3. Check for evidence of rocking or sliding of batteries on the racks, buckling or distortion of the bus bars, condition of the spacers between batteries. 4. Check for damage due to impact or earthquake induced flooding or spraying. 5. Check buses/cables/ground straps for damage, distortion or chafing. 6. Check local alarms, breakers and protective devices for actuation/trips.
- - Static Inverters and Battery Chargers	1. Check equipment anchorage for damage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of equipment. 2. Check for damage to attached conduit and ground straps. 3. Check for distortion of cabinet structure. 4. Open cabinet, check to see that internally mounted components are secure and undamaged. 5. Check for damage due to impact or earthquake induced flooding or spraying. 6. Check local alarms, breakers and protective devices for actuation/trips.
- - Air Handlers	1. Check equipment anchorage/isolation mounts for damage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of equipment. 2. Check for damage to attached conduits and ground straps. 3. Check for damage to air handler due to seismic loads imposed by attached ducts or tearing of fabric noise eliminators. 4. Check for damage due to impact or earthquake induced flooding or spraying. 5. Check for belt tightness and/or slippage; e.g., belt smoke/odor. 6. Check local alarms, breakers and protective devices for actuation/trips.

ATTACHMENT C – VISUAL INSPECTION OF EQUIPMENT AND STRUCTURES AFTER EARTHQUAKE [Cont'd]

Equipment/Structure	Types of Inspections
– – Chillers	1. Check equipment anchorage/isolation mounts for damage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of equipment. 2. Check for damage to attached conduits and ground straps. 3. Check for leakage or damage to chiller components due to seismic loads imposed by attached ducts and piping. 4. Check for damage due to impact or earthquake induced flooding or spraying. 5. Check for belt tightness and/or slippage; e.g., belt smoke/odor. 6. Check local alarms, breakers and protective devices for actuation/trips. 7. Check for refrigerant leakage.
– – Transformers	1. Check equipment anchorage for damage, stretching or loosening of anchor bolts or nuts; rocking or sliding of equipment. 2. Check for damage to attached conduits and ground straps. 3. Check oil reservoir level. 4. Check the nitrogen blanketing system and fire deluge system for damage. 5. Check for damage due to impact or earthquake induced flooding or spraying.
– – Vertical Pumps	1. Check equipment base plate and anchorage for damage; e.g., stretching or loosening of anchor bolts or nuts and equipment movement. 2. Check casing below base plate for damage due to ground settlement/movement. 3. Check for evidence of excessive noise and/or vibration and seal leakage. May be an indication of misalignment between the motor and pump shaft. 4. Check for damage to pump housing from seismic loads imposed by attached piping. 5. Check for damage to shaft housing.

ATTACHMENT C - VISUAL INSPECTION OF EQUIPMENT AND STRUCTURES AFTER EARTHQUAKE [Cont'd]

Equipment/Structure	Types of Inspections
- - Vertical Pumps (Cont'd)	6. Check for damage due to impact or earthquake induced flooding or spraying. 7. Check local alarms, breakers and protective devices for actuation/trips. 8. Check pump and motor bearings for overheating/lubrication. 9. Check for damage to attached conduit and ground straps.
- - Horizontal Pumps	1. Check equipment base plate and anchorage for damage; e.g., stretching or loosening of anchor bolt or nuts and equipment movement. 2. Check for evidence of excessive noise and/or vibration and seal leakage. May be an indication of misalignment between motor and pump shaft. 3. Check for damage to pump housing due to seismic loads imposed by attached piping. 4. Check for damage due to impact or earthquake induced flooding or spraying. 5. Check local alarms, breakers and protective devices for actuation/trips. 6. Check pump and motor bearings for overheating/lubrication. 7. Check for damage to attached conduit and ground straps.
- - Motor-Generators	1. Check equipment anchorage/isolation mounts for damage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of equipment. 2. Check for noise and/or vibration caused by misalignment between motor and generator shaft, especially if they are not mounted to a common base. 3. Check for damage to attached conduits and ground straps. 4. Check for damage due to impact or earthquake induced flooding or spraying. 5. Check local alarms, breakers and protective devices for actuation/trips.

ATTACHMENT C – VISUAL INSPECTION OF EQUIPMENT AND STRUCTURES AFTER EARTHQUAKE [Cont'd]

Equipment/Structure	Types of Inspections
-- Motor Control Centers	1. Check equipment anchorage for damage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of equipment. 2. Check for damage to attached conduits and ground straps. 3. Check for distortion of cabinet structure. 4. Open cabinet, check to see that all internally mounted components, including relays and breakers, are secure and undamaged. 5. Check for damage due to impact or earthquake induced flooding or spraying. 6. Check controls, breakers and protective devices for actuations/trips.
-- Low Voltage Switchgear	1. Check equipment anchorage for damage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of equipment. 2. Check for damage to attached conduits and ground straps. 3. Check for distortion of cabinet structure. 4. Open cabinets, check to see that all internally mounted components, including relays and contacts, are secure and undamaged. 5. Check for damage due to impact or earthquake induced flooding or spraying. 6. Check local alarms, breakers and protective devices for actuation/trips. 7. Reset any trips. Investigate any retrips after reset.
-- Medium Voltage Switchgear	1. Check equipment anchorage for damage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of equipment. 2. Check for damage to attached conduit and ground straps. 3. Check for distortion of cabinet structure. 4. Open cabinets, check to see that all internally mounted components, including relays and contacts, are secure and undamaged. 5. Check for damage due to impact or earthquake induced flooding or spraying.

ATTACHMENT C – VISUAL INSPECTION OF EQUIPMENT AND STRUCTURES AFTER EARTHQUAKE [Cont'd]

Equipment/Structure	Types of Inspections
-- Medium Voltage Switchgear (Cont'd)	6. Check local alarms, breakers ands protective devices for actuation/trips. 7. Reset any trips. Investigate any retrips after reset.
-- Distribution Panels	1. Check equipment anchorage for damage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of equipment. 2. Check for damage to attached conduit and ground straps. 3. Check for distortion of cabinet structure. 4. Open cabinet, check to see that all internally mounted components are secure and undamaged. 5. Check for damage due to impact or earthquake induced flooding or spraying. 6. Reset any tripped breakers. Investigate any retrips after reset.
-- Fluid/Air/Motor-Operated Valves	1. Check for damage or distortion at attachment of operator to valve body. 2. Check for damage to attached conduit/tubing, ground straps. 3. Check for damage due to impact or earthquake induced flooding or spraying. 4. Check local alarms/indicators/protective devices for actuations/trips. 5. Stroke valve in both directions to check operation.
-- Engine-Generators	1. Check equipment anchorage/isolation mounts for damage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of equipment. 2. Check for damage to attached piping, ducts, conduits and ground straps. 3. Check for noise and/or vibration due to misalignment between engine and generator, especially if not mounted to a common base. 4. Check for damage due to impact or earthquake induced flooding or spraying.

ATTACHMENT C – VISUAL INSPECTION OF EQUIPMENT AND STRUCTURES AFTER EARTHQUAKE [Cont'd]

Equipment/Structure	Types of Inspections
– – Engine-Generators (Cont'd)	5. Check local alarms, breakers and protective devices for actuation/trips.
– – Instrument Racks	1. Check equipment anchorage for damage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of equipment. 2. Check for distortion of rack structure. 3. Check for damage to attached conduit and ground straps. 4. Check to see that instruments mounted to the rack are secure and undamaged. 5. Check for damage due to impact or earthquake induced flooding or spraying. 6. Check local alarms, breakers and protective devices for actuation/trips. 7. Reset any trips. Investigate any retrips after reset.
– – Sensors	1. Check for damage to attached conduit/tubing and ground straps. 2. Check for damage due to impact or earthquake induced flooding or spraying. 3. Verify sensor operation with readout check at local/control room indicators.
– – Control and Instrumentation Cabinets	1. Check equipment anchorage for damage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of equipment. 2. Check for distortion of panel structure. 3. Check for damage to attached conduit and ground straps. 4. Check to see that instruments, gages, controls, and other equipment mounted to panels are secure and undamaged. 5. Check for damage due to impact or earthquake induced flooding or spraying. 6. Check local alarms, breakers and protective devices for actuation/trips.

ATTACHMENT C – VISUAL INSPECTION OF EQUIPMENT AND STRUCTURES AFTER EARTHQUAKE [Cont'd]

Equipment/Structure	Types of Inspections
-- Control and Instrumentation Cabinets (Cont'd)	7. Reset any trips. Investigate retrips after reset.
2. Low Pressure Storage Tanks	1. Check tank anchorage for damage; e.g., stretching or loosening of anchor bolts or nuts; deformation of bolt chairs; rocking or sliding on the base. 2. Check for damage to attached piping and ground straps. 3. Check for buckling of tank walls; e.g., "elephant foot" buckling. 4. Check for cracking or leakage at the base plate to cylindrical shell connection. 5. Check for damage due to impact or earthquake induced flooding or spraying.
3. High Pressure Tanks and Heat Exchangers	1. Check for damage to anchorage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of base plates on concrete. 2. Check for damage to attached piping.
4. Piping	1. Check for snubber damage; e.g., snubbers pulled loose from foundation bolts, evidence of excessive travel, jam up of inertia mechanism/leakage of hydraulic fluid and bent piston rods. 2. Check for damage at rigid supports; e.g., deformation of support structure, deformation of pipe due to impact with support structure. 3. Check for damage or leakage of pipe at rigid connections; e.g., anchor points with other equipment and structures. 4. Check for damage or leakage of piping and branch lines. 5. Check for damage to pipe at building joints and interfaces between buildings. 6. Check for damage due to impact or earthquake induced flooding or spraying.

ATTACHMENT C – VISUAL INSPECTION OF EQUIPMENT AND STRUCTURES AFTER EARTHQUAKE [Cont'd]

Equipment/Structure	Types of Inspections
5. Electric Raceways	1. Check for deformation of dead weight supports and sway bracing. 2. Check for damage to cables at building joints and interfaces between buildings. 3. Check for damage due to impact or earthquake induced flooding or spraying.
6. Air Handling Ducts	1. Check for deformation of dead weight supports and sway bracing. 2. Check for damage to ducts at joints. 3. Check for damage to ducts at building joints and interfaces between buildings. 4. Check for damage due to impact or earthquake induced flooding or spraying. 5. Check for tearing of fabric transitions/noise eliminators. 6. Check for damage to internal filters and racks.
7. Steel Framed Structures	1. Check for damage at bolted or welded connections. 2. Check for damage to anchorage; e.g., stretching or loosening of anchor bolts or nuts; rocking or sliding of base plates on concrete. 3. Check for distortion or buckling of braces and other compression members.
8. Reinforced Concrete Structures (Buildings, Containment, Cooling Towers, Intake Structure) and Masonry Walls.	1. Check for new open (>0.06 inches) cracks, spalling of concrete. [NOTE: Minor cracks, even if caused by the earthquake, are not considered significant unless they are large enough to result in yielding of rebar.] 2. Check for evidence of ground settlement. 3. Check for evidence of differential horizontal and vertical movement between adjacent and/or interconnecting buildings/structures.

ATTACHMENT C - VISUAL INSPECTION OF EQUIPMENT AND STRUCTURES AFTER EARTHQUAKE [Cont'd]

Equipment/Structure	Types of Inspections
9. Primary Coolant System	1. Check for reactor coolant leakage at flanged joints; e.g., CRD mechanisms. 2. Check for condition of supports and snubbers for large components; e.g., main coolant pumps, steam generators, pressurizer. 3. Check condition of CRDM support structure (PWRs only).
10. Buried Pipe	1. Check for damage or leakage at pipe interface with buildings and tanks. 2. Fire main leakage will be evidenced by self excavation and acatuation of back up fire pumps. 3. Fire mains, service and circulating water piping, especially dead legs, are susceptible to buildups of corrosion and growths which are knocked loose by earthquake motion. These loosened accumulations can clog screens and small diameter pipes such as fire hose hydrants. Checks for clogging and flushing of pipe mains are necessary.

TABLE 1 – SEISMIC MONITORS

4 Triaxial Accelerometers		Location
1.	Unit 1 Cntmt	32.5/210/697.5
2.	Unit 1 Cntmt	32.5/210/765.5
3.	Aux Bldg	J.0/9.0/695
4.	Unit 2 Cntmt	29/95/765.5

11 Triaxial Accelerographs		Location
1.	Aux Bldg	J.0/9.0/695
2.	Aux Bldg	N.8/9.0/755
3.	Aux Bldg	J.0./9.0/755
4.	Unit 1 Cntmt	32.5/210/697.5
5.	Unit 1 Cntmt	32.5/210/765.5
6.	Unit 2 Cntmt	29/95/765.5
7.	Unit 2 Cntmt	29/95/697.5
8.	Turb. Bldg.	C.6/8.8/695
9.	Turb. Bldg.	C.6/8.8/755
10.	Screenhouse	C1.0/81.8/670
11.	Screenhouse	C1.0/81.8/695

TABLE 2 - MAXIMUM CL FLOW RATE THROUGH EMERGENCY INTAKE LINE VS. RIVER ELEVATION

CL Flow Rate (gpm)	River Elevation
17824	675′
17209	674′
16571	673′
15908	672′
15216	671′
14491	670′
13728	669′
12920	668′
12057	667′
11602	666′-6″