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April 24, 2001
IPN-01-034

U.S. Nuclear Regulatory Commission
Mail Stop O-P1-17
Washington, DC 20555-0001
ATTN: Document Control Desk

Subject: Indian Point 3 Nuclear Power Plant
Docket No. 50-286
Proposed Change to the Final Safety Analysis Report
Regarding Protection of the
Component Cooling Water System from Natural Phenomena

Dear Sir:

This letter is an application for a License Amendment to revise the Indian Point 3 Final Safety Analysis Report (FSAR) to reflect original plant design, a portion of one loop of the Component Cooling Water (CCW) System is routed in the non safety related portion of the Fuel Storage Building (FSB). This is in non compliance with design criteria in the FSAR that safety related components are protected from natural phenomena by structures designed for the effects of those phenomena. The proposed changes identify the design bases for the Component Cooling Water System to reflect the as-built condition.

The signed original of the Application for a License Amendment is enclosed for filing. Attachment I contains a markup of the current FSAR pages to show changes and Attachment II is the Safety Evaluation for the proposed changes.

A copy of this application and the associated attachments are being submitted to the designated New York State official in accordance with 10 CFR 50.91.

A053

There are no new commitments made by Entergy Nuclear Operations, Inc. in this letter. If you have any questions, please contact Mr. K. Peters.

Very truly yours,

Jim Knubel
Vice President, Support

Attachments

cc: Regional Administrator
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BEFORE THE UNITED STATES
NUCLEAR REGULATORY COMMISSION

In the Matter of	)	
Entergy Nuclear Operations, Inc.	)	**Docket No. 50-286**
Indian Point 3 Nuclear Power Plant	)	

APPLICATION FOR AMENDMENT TO THE OPERATING LICENSE

Pursuant to Section 50.90 of the regulations of the Nuclear Regulatory Commission, Entergy Nuclear Operations, Inc, as holder of the Facility Operating License No. DPR-64, hereby applies for a License Amendment to revise the Final Safety Analysis Report.

This is an application for a License Amendment to revise the Indian Point 3 Final Safety Analysis Report (FSAR) to reflect original plant design, a portion of one loop of the Component Cooling Water (CCW) System is routed in the non safety related portion of the Fuel Storage Building (FSB). This is in non compliance with design criteria in the FSAR that safety related components are protected from natural phenomena by structures designed for the effects of those phenomena. The proposed changes identify the design bases for the Component Cooling Water System to reflect the as built condition.

The signed original of the Application for a License Amendment is enclosed for filing. Attachment I contains a markup of the current FSAR pages to show changes and Attachment II is the Safety Evaluation for the proposed changes.

Entergy Nuclear Operations, Inc.

Jim Knubel
Vice President, Support

STATE OF NEW YORK
COUNTY OF WESTCHESTER
Subscribed and sworn to before me

this 24th day of April 2001.

Notary Public

EILEEN E. O'CONNOR
Notary Public, State of New York
No. 4991062
Qualified in Westchester County
Commission Expires January 21, 2002

ATTACHMENT I TO IPN-01-034

PROPOSED FINAL SAFETY ANALYSIS REPORT CHANGE REGARDING PROTECTION OF THE COMPONENT COOLING WATER SYSTEM FROM NATURAL PHENOMENA

Markup of current FSAR to show changes.
Bold text is new material and a strike through indicates deleted text.
The affected pages are as follows:

9.3-10
9.3-12
16.1-4
16.1-13
16.2-1
16.2-3
16.2-9
16.4-6

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT 3 NUCLEAR POWER PLANT
DOCKET NO. 50-286
DPR-64

Spent Fuel Pit Piping

All piping in contact with spent fuel pit water is austenitic stainless steel. The piping is welded except where flanged connections re used at the pump, heat exchanger and filter to facilitate maintenance.

9.3.3 System Evaluation

Availability and Reliability

Component Cooling Loop

For component cooling of the reactor coolant pumps, the excess letdown heat exchanger and the residual heat exchangers inside the Containment, most of the piping, valves, and instrumentation are located outside the primary system concrete shield at an elevation above the water level in the bottom of the Containment at post-accident conditions. (The exceptions are the cooling lines for the reactor coolant pumps and reactor supports, which can be secured following the accident.) In this location the systems in the Containment are protected against credible missiles and from being flooded during post-accident operations. Also, this location provides shielding which allows for maintenance and inspections to be performed during power operation.

Outside the Containment, the residual heat removal pumps, the spent fuel heat exchanger, the component cooling pumps and heat exchangers, and associated valves, piping and instrumentation are maintainable and inspectable during power operation. replacement of one pump or one heat exchanger is possible while the other units are in service.

Several of the components in the component cooling loop were fabricated from carbon steel. The component cooling water contains a corrosion inhibitor to protect the carbon steel. Welded joints and connections are used except where flanged closures are employed to facilitate maintenance. At least 10% of the component cooling line welds inside the Containment are 100% radiographed. The entire system is seismic Class I and is housed in structures of the same classification, **with the exception of the piping and components which serve the Spent Fuel Pit Heat Exchanger. Analysis has demonstrated that the CCW safety function will be retained following natural phenomena. See Sections 16.1 and 16.2.** The components were designed to the codes given in table 9.3-4. In addition, the components are not subjected to any high pressures (see Table 9.3-1) or stresses. Hence, a rupture or failure of the system is very unlikely.

During the recirculation phase following a Loss-of-Coolant Accident, the component cooling water pumps are required to deliver flow to the shell side of the residual heat exchangers. To ensure operability, system flow must be maintained within the maximum flow capacity of a single component cooling water pump. This has been accomplished by establishing fixed component throttle valve positions for power operation. In addition, the cooling water flow to the nonregenerative heat exchanger is required to be manually isolated prior to the start of a component cooling water pump during the switchover to the recirculation phase. These pumps are supplied by an emergency power source when required. However the component cooling water pumps are not started during the injection phase combined with a blackout following a LOCA. During this time the only heat removal requirement is for the bearings on the safety injection pumps and motor cooling for the recirculation pumps.

The component which is leaking can be located by sequential isolation or inspection of equipment in the loop. If the leak is in a component cooling water heat exchanger, it can be detected by a radiation monitor which monitors the Service Water Return line from the CCW Heat Exchangers sand the leaking heat exchanger can be isolated for repairs. System heat loads can be accommodated by one heat exchanger provided that service water flow is increased. Overall leakage within the Containment is limited to the value given in the Technical Specifications.

Should a large tube-side-to-shell-side leak develop in a residual heat exchanger, the water level in the component cooling surge tanks would rise, and the operator would be alerted by a high water alarm. The tanks are vented to the waste hold-up tanks, therefore any gross inleakage would overflow to these tanks. Additionally, a radiation alarm would actuate in the control room.

The severance of a cooling line serving an individual reactor coolant pump cooler would result in substantial leakage of component cooling water. This small bore (1 to 3") piping inside the missile shield (which is susceptible to missile damage) will however leak more slowly than larger piping (up to 12"), which is missile protected. Therefore, the water stored in the surge tank after a low level alarm, together with makeup flow, provides ample time for the closure of the valves external to the Containment to isolate the leak before cooling is lost to the essential components in the component cooling loop.

Should there be a tube rupture of the reactor coolant pump thermal barrier cooling coil, the water level in the component cooling surge tanks would rise, and the operator would be alerted by a high water alarm. The tanks are vented to the waste hold-up tanks; therefore, any gross inleakage would overflow to these tanks. A high flow signal from the RCP Thermal Barrier HX CCW return indicating flow switch FIC-625 closes RCP Thermal Barrier HX CCW return isolation valve AC-FCV-625. Piping and components downstream of the thermal barrier, inside containment are designed for RCS pressure.

The relief valves on the cooling water lines downstream from the sample, excess letdown, seal water, non-regenerative, spent fuel pit and residual heat exchangers were sized to relieve the volumetric expansion occurring if the exchanger shell side is isolated when cool, and high temperature coolant flows through the tube side. The set pressure equals the design pressure of the shell side of the heat exchangers.

The relief line to the waste hold-up tanks from the component cooling surge tanks is sized to relieve the maximum flow rate of water which enters the surge tank following a rupture of a reactor coolant pump thermal barrier cooling coil.

Should a tornado missile cause the rupture of small bore piping on the CCW line to the spent fuel pit heat exchanger, low level in the surge tank would alert the control room to the leakage from the line and an operator could be dispatched to investigate. The CCW pumps would be stopped at a low low surge tank level until corrective action allowing refilling of the system from the Primary Water Storage Tank. Isolation is not critical to system function because CCW is not immediately required for plant shutdown and cooling water to the RHR heat exchangers can be interrupted 30 days or more after an accident.

<u>Residual Heat Removal Loop</u>

During reactor operation all equipment of the residual heat removal loop is idle and the associated isolation valves are closed. During the Loss-of-Coolant Accident condition, water from the recirculation sump is recirculated through a loop inside the Containment using the recirculation pumps and the residual heat exchangers.

Item	Class
Residual Heat Removal Loop	I
Containment Penetration and Weld Channel Pressurization System	I
Component Cooling Loop*	I
Isolation Valve Seal Water System	I
Sampling System	II
Spent Fuel Pit Cooling Loop	II & III
Fuel Transfer Tube	I
Emergency Power Supply System	I
-Diesel generators and fuel oil storage tank	
-DC power supply steam system	
-Vital AC power supply system (instrument bus inverters)	
-Power distribution lines to equipment required for transformers and switchgear supplying the engineered safety features	
- Control panel boards	
-Motor control centers	
-Battery Chargers 31,32, 33 and 35	I
-Battery Charger 34	III
-Station Service Transformer	III
Control Equipment, facilities and lines necessary for the above seismic Class I items	I
Control Room Air Conditioning System	I
Hot Penetration Cooling System	I, III
Steam Generator Blowdown System	I, II & III
Waste Disposal System	I
Chemical drain tank	

Note * Class I Component Cooling Water piping located in and supported by the Fuel Storage Building has been evaluated. The building will provide suitable support and the loop components will not be damaged by non-Class I structures, systems or components.

eliminate bond and require continuous rebar, and because of the ACI-318 requirement that lapped splices in tension cannot be used for bars greater than No. 11.

Splicing of Reinforcing Steel by Welding

Welding of rebar for splicing is not permitted. Strength welding of rebar to structural steel elements or other heavy rebar was not permitted. Tack welding of rebar was not permitted.

Although rebar was not welded it should be pointed out that transition and closure splices in the Containment Dome employed Cadweld splice sleeves welded to structural steel plate (ASTM A 516 GR60). In addition to the destructive testing of random samples employed for all cadwelding, the root and final pass of each weld was magnetic particle inspected.

Class II and III

All seismic Class II* structures and components were designed on the basis of a static analysis for a ground acceleration of 0.05g acting in the vertical and 0.1g acting in the horizontal directions simultaneously. The structural design of all seismic Class III structures met the requirements of the applicable building code which was the "State Building Construction Code," State of New York, 1961. This code does not reference the Uniform Building Code.

The design of seismic Class I piping was subject to loading combination and corresponding stress limits which included loads due to the Design Basis Earthquake and Operating Basis Earthquake while the seismic Class II piping was subject to loads associated only with the Operating Basis Earthquake.

It has been found that in some cases, in the Containment Building the loading combinations and stress limits involving the Operating Basis Earthquake will govern the design of piping systems with respect to seismic criteria. In these cases, seismic Class I or Class II piping were designed for Operating Basis Earthquakes. It was therefore designed for the governing condition.

In those cases where it was shown the loading combinations involving the Design Basis Earthquake governed, the adjacent seismic Class II piping and supports were designed to the seismic Class I criteria.

The Fuel Storage Building and associated block walls were evaluated to show that there would be no damage to CCW piping and components from an earthquake since the building meets the seismic requirements for a Class I structure.

* There are no seismic Class II structures.

16.2 TORNADO DESIGN CRITERIA

16.2.1 Definition of Design Basis Tornado

The plant is safeguarded from the tornados by the combined use of buildings and structures designed to withstand tornados, and by redundancy of components. All Class I buildings and structures were designed to withstand tornado winds corresponding to 300 mph tangential velocities, traverse velocities of 60 mph and a differential pressure drop of 3 psi in 3 seconds with no loss of function. The exception to this includes areas without safety related equipment or redundant equipment as discussed in FSAR Section 16.2.2.

All Class I buildings and structures were also designed to withstand various postulated tornado-generated missiles, including the following:

Horizontal Missiles

1) 4" x 12" x 12' plank at 300 mph
2) 4000 lb. passenger car at 50 mph less than 25 ft. above the ground.

Vertical Missiles

1) 4" x 12" x 12' plank at 90 mph
2) 4000 lb passenger car at 17 mph less than 25 ft. above the ground.

16.2.2 Tornado-Proof Systems and Equipment

Systems and Equipment Protected by Enclosure
All of the equipment which must be protected from tornados and tornado-generated missiles is contained within structures designed to withstand such loadings. The equipment or systems located within these structures include the following:

Primary Auxiliary Building

1) Safety Injection Pumps

2) Residual Heat Removal Pumps

3) Component Cooling Systems **except portions of the piping loop in the Fuel Storage Building**

4) Waste Disposal System (except for Waste Holdup Tank in Waste Holdup Tank Pit and Reactor Coolant Drain Tank and Pumps in the Containment)

Diesel Generator Building

Auxiliary Feedwater System Building

The service water pump motors are protected by the service water enclosure, which is surrounded by the Intake Structure Enclosure (ISE) Building. The service water enclosure is designed as seismic Class I structure. The sidings and roofings of the ISE are postulated to be airborne during a tornado but will be prevented from coming in contact with the service water pump motors by the service water enclosure.

The potential for damage to spent fuel assemblies stored in the fuel pool from either turbine-generated or tornado-generated missiles is very low. See Appendix 14A for the worst case assumptions of offsite exposures due to turbine missile damaged fuel assemblies. See WCAP-7572, "Effect of Tornado Missiles on Stored Spent Fuel" for analysis of offsite exposures due to tornado missile damaged fuel assemblies. In both cases, the resultant site boundary doses are well below the 10 CFR 100 guidelines.

Service Water Pipe Chase

The two redundant service water supply lines crossing the Discharge Canal are protected by the concrete pipe chase from tornado effects. A postulated tornado generated missile can collapse the 8" concrete slab (at the top of the pipe chase) locally and hit the upper supply line. The pipe is capable to withstand the impact of the missile and the fallen concrete. Pipe stress is still below the allowable stress limit permitted by code.

Systems and Equipment Protected by Redundancy

All components and equipment for safe shutdown and isolation of the reactor are housed within the tornado-proof structures described above, with the following exceptions. For these components and systems, adequate tornado protection is provided by redundancy:

1) Redundancy is provided for the vital 480 volt system by three independent systems. Onsite there are three emergency diesel generators which are redundant and tornado protected; offsite there is a 138 kV above-ground system and a 13.8 kV under-ground system.

2) The emergency feed requirements of the steam generators are assured by tornado protected pumps and redundant water supplies.

3) The water requirements of the primary system are assured by the availability of primary water storage tank, the refueling water tank and the boric acid tanks.

4) Service water supply is assured by redundancy of two supply lines, four screens and six pumps of which only two pumps, one screen and one supply line are required for prolonged shut-down. The intake structure itself is tornado proof. The Backup Service Water System is an additional source of service water independent of the intake structure. The redundant service water supply lines are either buried underground with a minimum of 2'-10" cover or are protected by a minimum of two feed of concrete or a 8 inch thick slab for their entire run. The minimum distance between the headers is one foot. This protection is sufficient for the missiles considered.

5) Component Cooling Water operation is assured by the ability to provide makeup from the Primary Water Storage Tank.

pressurizer heaters. Vital instruments and controls are provided both locally and in the Control Room.

a)Ventilation

The most essential ventilation requirements apply to the containment since in order to guarantee the satisfactory operation of the instrumentation and control systems the containment air temperature must be controlled to a tolerable level. This system again requires the satisfactory operation of the Service Water and Electrical Systems.

b)Electrical Systems

Protection from tornado is provided for the 480 volt switchgear and supply redundancy is provided by the diesel generators, gas turbine generator, the two above-ground incoming lines and the one below ground incoming line. The 6.9kV is fed by either the gas turbine generator or by an underground 13.8 kV feeder from the Buchanan substation. The Buchanan substation consists of four buses.

Shutdown to Cold Condition

Plant cooldown is not an immediate requirement following major damage due to a tornado. For a cooldown, the basic services required are:

a) Residual Heat Removal

b) Reactivity Control

c) Pressurizer Pressure Level Control

d) Ventilation

e) Electrical Systems

A cooldown would not be attempted until full equipment facilities had been guaranteed.

Tornado missile damage to a small bore pipe in the Component Cooling Loop in the Fuel Storage Building (FSB) would require isolation and repair or isolation of piping. Prior to establishing Residual Heat Removal during plant cooldown the CCW System would have to be refilled using operator action. The Primary Water Storage Tank is available to replace lost water inventory.

Criterion III

Following a Loss-of-Coolant Accident the residual heat is removed through internal recirculation conditions with the facility for external recirculation if required. The duty implies the continued operation of the Auxiliary Feedwater System together with the associated electrical and service water supplies. The recirculation systems are protected by the tornado proof containment and auxiliary buildings. The Electrical and Service Water Systems are assured by redundancy as previously discussed.

The manipulator crane in the Containment Building, a seismic Class III crane, is restrained from overturning and will not endanger seismic Class I structures.

16.4.3 Tornado Protection

As discussed in Section 16.2.2, all equipment which must be protected from tornados and tornado generated missiles is contained within tornado proof structures or protected by redundancy.

The tornado proof structures, which were constructed of reinforced concrete, were designed to prevent missile penetration and spalling (by selection of moderate degree of damage allowable stress indices for structural design in accordance with Reference (1) of concrete from the walls, roof slab or dome impacted by the missile). Therefore, secondary missiles are not created which could damage or make inoperable seismic Class I systems which must be protected from tornados.

Further discussion of criteria for determining missile protection requirements is presented in Section 16.2.3.

Tornado Load Capacity of Structures

Containment Structure

The containment can withstand all loads put on it by the design tornado specified in Section 16.2. Details are given in the Containment Design Report (Appendix 5A).

Primary Auxiliary Building (PAB) and Control Building

These structures are capable of resisting any wind loads generated by the design tornado specified.

Fuel Storage Building

Based on information furnished by the siding manufacturer, the siding panel on this structure will blow out at 170 psf (i.e., 1.18 psi) negative pressure. Panels fail at 60 psf external pressure which is equivalent to 162 mph external wind load. The girts will fail at 90 psf (i.e., 0.62 psi) negative pressure.

The 60 psf mentioned above controls the external loading condition.

Block walls are located below Elevation 95'0" on the south and east sides of the Fuel Storage Building. The primary Auxiliary Building protects the south wall from tornado loads. The block wall located on the west side above elevation 95'-0" does not present an interaction concern. The east wall would fail under tornado wind but would not affect safety related equipment. A missile through the east wall could damage small bore piping associated with the CCW system. FSAR Section 9.3 discusses operator action to maintain CCW function.

Intake Structure

The concrete sub-structure and the structural steel super structure of the service water enclosure are capable of resisting tornado wind loads.

ATTACHMENT II TO IPN-01-034

SAFETY EVALUATION OF THE PROPOSED FINAL SAFETY ANALYSIS REPORT CHANGE REGARDING PROTECTION OF THE COMPONENT COOLING WATER SYSTEM FROM NATURAL PHENOMENA

ENTERGY NUCLEAR OPERATIONS, INC.
INDIAN POINT 3 NUCLEAR POWER PLANT
DOCKET NO. 50-286
DPR-64

I. DESCRIPTION

This section provides a description of the proposed changes to the Final Safety Analysis Report (FSAR). The proposed changes identify the design bases for the Component Cooling Water (CCW) System to reflect the as built condition. The FSAR states that the CCW System is seismic Class I and housed in structures of the same classification. The as built CCW piping to the Spent Fuel Pit Heat Exchanger (SFPHX) is in the Fuel Storage Building (FSB) which is seismic Class III except for the spent fuel pit which is seismic Class I. This was reported to the NRC in Licensee Event Report 2000-002. The proposed changes to the FSAR reflect the as built configuration. The specific changes are as follows:

1. FSAR Page 9.3-10

   Replace:

   In the third paragraph of Section 9.3.3, delete "The entire system is seismic Class I and is housed in structures of the same classification."

   With:

   "The entire system is seismic Class I and is housed in structures of the same classification, with the exception of the piping and components which serve the spent Fuel Pit Heat Exchanger. Analysis has demonstrated that the CCW safety function will be retained following natural phenomena. See Sections 16.1 and 16.2."

2. FSAR Page 9.3-12

   Insert:

   Above "Residual Heat Removal Loop" add "Should a tornado missile cause the rupture of small bore piping on the CCW line to the spent fuel pit heat exchanger, low level in the surge tank would alert the control room to the leakage from the line and an operator could be dispatched to investigate. The CCW pumps would be stopped at a low low surge tank level until corrective action allowing refilling of the system from the Primary Water Storage Tank. Isolation is not critical to system function because CCW is not immediately required for plant shutdown and cooling water to the RHR heat exchangers can be interrupted 30 days or more after an accident."

3. FSAR Page 16.1-4

   Insert:

   Next to "Component cooling loop" add "*." At the bottom of the page add "Note * Class I Component Cooling Water piping located in and supported by the Fuel

Storage Building has been evaluated. The building will provide suitable support and the loop components will not be damaged by non-Class I structures, systems or components."

4. FSAR Page 16.1-13

Insert:

"The Fuel Storage Building and associated block walls were evaluated to show that there would be no damage to CCW piping and components from an earthquake since the building meets the seismic requirements for a Class I structure."

5. FSAR Page 16.2-1

Insert:

After "Component Cooling Systems" add "except portions of the piping loop in the Fuel Storage Building."

5. FSAR Page 16.2-3

At the bottom of the page add "5) Component Cooling Water operation is assured by the ability to provide makeup from the Primary Water Storage Tank."

6. FSAR Page 16.2-9

Above Criterion III add "Tornado missile damage to a small bore pipe in the Component Cooling Loop in the Fuel Storage Building (FSB) would require isolation and repair or isolation of piping. Prior to establishing Residual Heat Removal during plant cooldown the CCW System would have to be refilled using operator action. The Primary Water Storage Tank is available to replace lost water inventory."

7. FSAR Page 16.4-6

Under Fuel Storage Building add a new paragraph "Block walls are located below Elevation 95'-0" on the south and east sides of the Fuel Storage Building. The Primary Auxiliary Building protects the south wall from tornado loads. The block wall located on the west side above elevation 95'-0" wall does not present an interaction concern. The east wall would fail under tornado wind but would not affect safety related equipment. A missile through the east wall could damage small bore piping associated with the CCW system. FSAR Section 9.3 discusses operator action to maintain CCW function."

II. PURPOSE OF PROPOSED CHANGE

The license amendment is revising the FSAR to identify the design bases for the Component Cooling Water System to reflect the as built condition.

III. SAFETY IMPLICATIONS OF THE PROPOSED CHANGES

The proposed FSAR changes will change the FSAR to reflect the as built configuration of the CCW system which has a portion of piping from one loop routed in the FSB to service the Spent Fuel Pit Heat Exchanger (SFPHX). The FSB is built of reinforced concrete, concrete masonry walls and a steel superstructure above elevation 95'-0". The FSB is a seismic Class III structure except for the reinforced concrete spent fuel pit which is seismic Class I. This change has been evaluated for the effects of natural phenomena (i.e., seismic loads, wind loads and tornado effects (wind, differential pressure and missiles)) on the CCW loop.

Plant design requires that the seismic Class I CCW piping to the SFPHX and the SFPHX be protected from the effects of a seismic event and tornado. A dynamic analysis of the FSB was performed (Reference 1) and in-structure response spectra were generated following the requirements of the FSAR, the Design Basis Document and the guidelines of ASCE 4 (Reference 2). This was accomplished by:

- A synthetic earthquake ground motion (time history of acceleration) was generated, following the guidelines of ASCE 4, that envelopes the IP3 design spectrum at 5% damping.
- A three dimensional (3-D) mathematical model was developed for the FSB, representing its stiffness and inertia properties.
- A dynamic analysis of the 3-D model for the FSB was made using the computer code STARDYNE and the synthetic time history as seismic excitation. Independent analyses were performed for the E-W and N-S directions. Time histories of structural response were obtained at required locations and directions. The in-structure response spectra were calculated for required damping ratio values (i.e., 2, 4 and 7 percent) and broadened by $\pm$ 15 percent.

To check the FSB structural adequacy, the 3-D finite element model was analyzed, using STARDYNE, for dead, live and, separately, design basis earthquake (DBE), wind, and design basis tornado (DBT) loads. Member forces and element stress resultants were obtained and the member / element required strength was compared to the available strength (when the ultimate strength design (USD) approach was used) or the member / element calculated stresses with the allowable stresses (when the allowable stress design (ASD) approach was used). Available strength and / or allowable stress were obtained from the applicable material design codes (ACI 318 for reinforced concrete and AISC Steel Manual for steel). The structural adequacy of the concrete masonry unit (CMU) walls was approached in a similar manner with allowable stresses from Reference 3.

The results, presented in References 1 and 4, are as follows:

- The steel columns and vertical braces, the concrete framework (beams and columns), and the CMU walls are adequate for wind loads.
- The steel columns and vertical braces, the concrete framework (beams and columns), and the CMU walls are adequate for seismic loads.
- The tornado wind speed pressure of 332 psf and the tornado pressure drop cannot be tolerated by the seismic Class III structure when acting either alone or in combination. Failure will occur in the concrete block walls.
- The CMU walls with trussed horizontal joint reinforcement at 16" on center can resist the design basis 2" x 4" timber plank per Reference (DOE Standard 1020-1994) but the larger 12' long 4" x 12" wood plank will cause sudden / explosive failure of any CMU wall.

The effects of tornado loads on the CCW piping and SFPHX were evaluated (References 5 and 6). The evaluations consider the location of the FSB which is a rectangular building (92 feet by 48 feet) with the longest side running north-south. The south end of the FSB forms a tee with the north side of the Primary Auxiliary Building (PAB), separated by approximately 19 feet. The PAB is a safety related structure which is rectangular with the longest side running east-west. The major components of the CCW System (i.e., pumps, heat exchangers, surge tanks) are housed in the PAB at the 41 foot elevation. The northern end of the FSB extends to a point about the center of the Vapor Containment Building (VC). The Fan House (FH) abuts the FSB along the southwest wall of the FSB. The FH is a seismic Class I building up to elevation 80'-0" (some portions at higher elevations are also seismic Class I). The west side of the FH generally follows the contour of the containment. The seismic Class I spent fuel pit is located on the north end of the FSB from elevation 51'-0" to elevation 95'-0". The SFPHX and associated piping are located in the south end of the building on the 55'-0" elevation. The FSB has block walls on the south and east walls below elevation 95'-0". The block walls on the south and east walls are from elevation 55'-0" to under the reinforced concrete floor at elevation 95'-0". Above the 95'-0" elevation the FSB is constructed of metal siding. The block walls on the west side are interior walls associated with the FSB and Fan House. They extend from the top of the 95' reinforced concrete floor to elevation 111'-0". The evaluation of the effect of tornado loads concluded the following:

- The floor above the heat exchanger, at 95' elevation, is a reinforced concrete slab capable of resisting concrete blocks.
- The FSB has blow off siding designed for about 170 psf that will blow off during a tornado and allow the same pressure drop through the walls.
- The block walls on the west side cannot affect the CCW or SFPHX because they

are separated by the 95' reinforced concrete floor from the CCW piping and the SFPHX.

- The block walls on the south side of the FSB will be shielded from tornado effects by the PAB in the south and the spent fuel pit on the north.

- The block wall on the east side is directly exposed to the tornado effects. The failure of the block wall will not result in the concrete blocks falling directly on the SFPHX or the CCW piping to the SFPHX. The failure of the wall due to tornado winds would provide direct access for a tornado missile. Tornado missile damage could cause a break to the CCW 3/4 inch vent line containing valve AC-23 or the 3/4 inch line containing relief valve AC-802. Only one break would occur since the two lines are not in the same missile path. Tornado missile damage would not cause a break or loss of function to the larger CCW piping or SFPHX. Tornado missile damage effects considered the block wall collapsed by the tornado wind with the following east to west missile cases:

    1. A wood plank hitting the side of the SFPHX or the CCW piping above the SFPHX (the secondary side of the spent fuel cooling heat exchanger faces the east direction and shields most of the Class I piping).

    2. A car hitting the seismic class I side of the SFPHX or, hitting the stair framing at the south east of the building and then striking the CCW piping.

The FSAR requires the plant to meet the following tornado criteria:

I. A tornado will not cause a Loss-of-Coolant Accident.

II. A tornado will not impair the ability to safely shut the plant down.

III. A tornado, following a Loss-of-Coolant Accident, will not impair the long term safety of the plant.

Criterion I does not apply to this CCW concern because the CCW System cannot cause a LOCA.

Criterion II can be met using operator action and applying current acceptance criteria in the FSAR (Reference 6). The FSAR states that all equipment which must be protected from tornados and tornado generated missiles is contained within tornado proof structures or protected by redundancy. In this situation, the Primary Water Storage Tank (PWST) can be aligned by operator action to provide makeup water to the CCW surge tanks. This makeup capability serves as a redundant component to the damaged CCW piping. The plant design basis is a single tornado missile. This allows separated systems or components that perform a redundant function to be credited when the system or components are not protected by a tornado proof structure. The PWST is designed seismic Class I and designed for tornado wind and differential pressure

loadings but not missile loadings (Reference 7). The piping from the PWST is designed seismic Class I up to and including pump discharge valves PW-23 and 24. The pipe from those valves is designed seismic Class II up to the CCW surge tank makeup valves 831A and B. Most piping is located in the safety related PAB. These four valves must be opened and the primary water make-up pumps started (this includes reloading the MCC if it were to strip) to supply makeup to both surge tanks. This function is similar to the FSAR approved use of city water as a redundant water supply for the Auxiliary Boiler Feed pumps. The Condensate Storage Tank, the normal water supply, is designed seismic Class I and designed for tornado wind and differential pressure loadings but not missile loadings.

The CCW supports safety and non safety systems (e.g., Residual Heat Removal (RHR), Safety Injection (SI), SFPHX) by providing the cooling function. The CCW is required for accident mitigation and safe shutdown. It must be functional or available for operation during and after postulated design basis events such as loss of offsite power or Loss of Coolant Accident (LOCA). It is designed for a single active or passive failure. The system includes three CCW pumps, two heat exchangers (HX), four Auxiliary Component Cooling pumps, and two independent supply / return piping circuits with surge tanks on the pump suction side.

Cross connections with isolation valves are provided at the CCW pump suction and discharge, and at the CCWHX discharge header for splitting the CCW into two independent loops. During normal plant operation the headers are cross connected. Each train of safety related equipment (e.g., one RHRHX, one RHR pump, one recirculation pump, one SI pump) is supplied by a CCW loop so that each loop provides the cooling required to mitigate a design basis event. One CCWHX is aligned to the Essential Service Water header and the other is aligned to the Non-Essential Service Water header. This design allows the CCW to be aligned to accommodate an active or passive failure following a LOCA without loss of cooling to required safety related equipment.

Two independent surge tanks are connected to the respective side of the CCW pump suction header to accommodate system volume changes as a result of thermal expansion and contraction, and to provide net positive suction head (NPSH) to the CCW pumps. The surge tanks also allow for operator reaction time to changes in volume as a result of leaks into or out of the system, and sufficient volume to allow continuous system operation until a small leak can be isolated. Off normal Operations procedures direct the operator to identify any leak and isolate the leaking component.

The use of the PWST as a redundant component would be required only if tornado missile damage were to occur to one of the 3/4 inch CCW lines. Operating cross connected, the loss of the 3/4 inch line would cause the level of the CCW surge tanks to drop from the lowest administrative level of 46 percent (alarm at this level) to the low-low level of 5 percent in about 14 minutes. An alarm response procedure (Reference 8) directs the operator to establish makeup water to the tanks at the 46 percent level. This requires operation in the field of a primary water isolation valve (PW-70) and makeup inlet valves (AC-831A and B for tanks 31 and 32, respectively). The 14 minutes is not

considered sufficient time for operator action in the field to be credited before the 5 percent water level is reached. Therefore, the surge tanks will fall to a 5 percent level. The alarm response procedure directs the operator to an off normal operating procedure, Reference 9, if level could not be maintained. The off normal procedure directs the operator to trip the CCW pumps for protection if the 5 percent low-low level is reached. Interruption of CCW would require the Reactor Coolant Pumps to be tripped and residual heat removal to be established by natural circulation. These actions would provide the operator with sufficient time to establish makeup to the surge tanks from the PWST. The refill line is a 2 inch line which can supply more flow to the surge tanks than is lost from the damaged 3/4 inch piping. The operators can therefore refill the CCW system and restart the CCW pumps to reestablish CCW flow. The off normal procedure would direct repairs to the CCW loop. The individual circumstances would dictate the scope of the repair. For instance, if access were difficult to establish, the CCW loops could be separated to preserve makeup water supply until access to the damaged CCW piping. If access were available there are a number of ways to fix a 3/4 inch damaged pipe relatively quickly (e.g., damage plug or freeze plug). While these actions are being taken, the plant can be safely shutdown.

Criterion III requires consideration of a tornado in the long term after a LOCA. The term "long term" has not been defined in the design basis but it is sometime after 30 days, the currently evaluated period for a LOCA. The response to tornado damage to the 3/4 inch CCW pipe would be the same as discussed above. The shutdown of the CCW system is not of safety concern at that time. An assessment (Reference 10) found that after 30 days the heat load from the reactor is about 4741.3 BTU/sec and requires an injection rate of about 36.7 gpm for cooling. The assessment found that there was more than adequate NPSH for the recirculation pumps to provide the required flow regardless of the sump temperature.

The risk of tornado damage to the CCW piping in the FSB is low. The IP3 examination of external events (Reference 11) found the probability of any tornado striking IP3 to be 1.59E-4/year. The frequency of a tornado classified as F3 or higher is 2.23E-6/year. For tornados with wind speeds in excess of 180 mph, the frequency decreases to 8.62E-7/year. For the design basis tornado with a 300 mph wind speed, the frequency is 1.02E-9/year. The risk of a tornado following a LOCA is lower. The possibility of any size LOCA is 2.31E-3/year. The frequency of a LOCA followed by any tornado within 30 days is 3.02E-8/year. The frequency of the event can be used as a conservative estimate of core damage frequency (CDF). When compared to the nominal CDF at IP3, the frequency of a tornado 30 days after a LOCA is negligible (Reference 12).

IV. EVALUATION OF SIGNIFICANT HAZARDS CONSIDERATION

Operation of the Indian Point 3 plant in accordance with the proposed amendment would not involve a significant hazards consideration as defined in 10 CFR 50.92 since it would not:

1. involve a significant increase in the probability or consequences of an accident previously evaluated.

The proposed change to the FSAR revises it to reflect the as built configuration of the Component Cooling Water (CCW) system. One loop is routed to the Spent Fuel Pit Heat Exchanger (SFPHX) located in the Fuel Storage Building (FSB). The portion of the FSB where the CCW is located is seismic Class III rather than the seismic Class I required by design criteria in the FSAR. The proposed change demonstrates that the CCW loop and SFPHX will not be affected by a seismic event and that operator, action with credit for the Primary Water Storage Tank (PWST) providing redundancy (a source of water to maintain CCW), will assure that the CCW system function can be performed following a tornado. The proposed change does not affect the probability of an accident previously evaluated because there is no design change and the probability of natural phenomena does not change. The proposed change does not affect the consequences of an accident previously evaluated because the CCW system function is maintained by operator action following a tornado with missile damage to a small bore CCW pipe.

2. create the possibility of a new or different kind of accident from any accident previously evaluated.

   The proposed change to the FSAR revises it to reflect the as built configuration of the CCW system. One loop is routed to the Spent Fuel Pit Heat Exchanger (SFPHX) located in the Fuel Storage Building (FSB). The portion of the FSB where the CCW is located is seismic Class III rather than the seismic Class I required by design criteria in the FSAR. The proposed change demonstrates that the CCW loop and SFPHX will not be affected by a seismic event and that operator action with credit for the PWST inventory (a source of water to maintain CCW) will assure that the CCW system function can be performed following a tornado. The proposed change does not create the possibility of a new or different kind of accident because the CCW system will not be operated differently than designed and operator action and the use of components to perform redundant functions to cope with a tornado is currently approved in the FSAR. Also, the CCW is designed to be operated by separating the loops.

3. involve a significant reduction in a margin of safety.

   The proposed change to the FSAR revises it to reflect the as built configuration of the CCW system. One loop is routed to the Spent Fuel Pit Heat Exchanger (SFPHX) located in the Fuel Storage Building (FSB). The portion of the FSB where the CCW is located is seismic Class III rather than the seismic Class I required by design criteria in the FSAR. The proposed change demonstrates that the CCW loop and SFPHX will not be affected by a seismic event and that operator action with credit for the PWST inventory (a source of water to maintain CCW) will assure that the CCW system function can be performed following a tornado. The proposed change does not involve a significant reduction in a margin of safety because the existing plant design considers the use of operator action and redundant components to mitigate the effects of a tornado. Also, the

proposed change is for damage caused by a low risk event. The risk of tornado damage to the CCW piping in the FSB is low. The IP3 examination of external events found the probability of any tornado striking IP3 to be 1.59E-4/year. For tornados with wind speeds in excess of 180 mph, the frequency decreases to 8.62E-7/year. For the design basis tornado with a 300 mph wind speed, the frequency is 1.02E-9/year. The risk of a tornado following a LOCA is lower. The frequency of a LOCA followed by any tornado within 30 days is 3.02E-8/year. The frequency of the event can be used as a conservative estimate of core damage frequency (CDF). When compared to the nominal CDF at IP3, the frequency is negligible.

V. IMPLEMENTATION OF THE PROPOSED CHANGE

This amendment request meets the eligibility criteria for categorical exclusion set forth in 10 CFR 51.22(c)(9) as follows:

(i) The amendment involves no significant hazards consideration.

As described in Section IV of this evaluation, the proposed change involves no significant hazards consideration.

(ii) There is no significant change in the types or significant increase in the amounts of an effluent that may be released offsite.

The proposed change does not involve the installation or any new equipment, or the modification of any equipment that may negatively affect the types or amounts of effluents that may be released offsite. Therefore, there is no significant change in the types or significant increase in the amounts that may be released offsite.

(iii) There is no significant increase in individual or cumulative occupational radiation exposure. The proposed changes are associated with no physical plant changes. There are no new modes of plant operation. Therefore, there is no significant increase in individual or cumulative occupational radiation exposure.

Based on the above, Entergy Nuclear Operations, Inc. concludes that the proposed changes meet the criteria specified in 10 CFR 51.22 for a categorical exclusion from the requirements of 10 CFR 51.21 relative to requiring a specific environmental assessment by the Commission.

VI. CONCLUSION

The proposed changes will not involve a significant hazards analysis and meet the criteria for categorical exclusion for a specific environmental report. There will be no adverse affect on the Security and Fire Protection Programs since the plant design and operation is not being changed so there can be no affects on these programs. There will be no affect on the Emergency Plan since the plant design and operation is not

being changed. The FSAR will be revised as a result of the change. There will be no effect on overall plant operations since normal system operation will remain the same.

The Plant Operating Review Committee and Safety Review Committee have reviewed this proposed change to the FSAR and have concluded that it does not involve a significant hazards consideration and will not endanger the health and safety of the public.

VII. REFERENCES

1. Burns and Roe Enterprises , Inc. (BREI) Technical Report 2123-39-001, dated March 22, 1999.

2 ASCE 4, Draft/Public Comment version dated May 1998.

3. NYPA letter, Doreen Costabile, to Burns and Roe Enterprises , Inc. (BREI), Leon Zuchowski, dated September 4, 1998.

4. IP3-RPT-STR-03173, Revision 0 "Evaluation of Block Walls in the Fuel Storage Building and Fan House."

5. IP3-CALC-STR-03178, "Evaluation of Spent Fuel Pool Heat Exchanger in the FSB for Tornado Missiles."

6. RAS 00-3-036 CC-SFPC, Revision 0 dated March 30, 2000 "Component Cooling System Supply to the Spent Fuel Pool Heat Exchanger" and drawing 9321-F-27243, Revision 40.

7. United Engineers and Constructors Calculation IP3-CALC-STR-00623, Primary Water Storage Tank No. 31, J.O. #9321-05, dated August 13, 1969.

8. ARP-010, "Panel SGF - Auxiliary Coolant System," Rev 24.

9. ONOP-CC-1, "Loss of Component Cooling," Rev 12.

10. Memo RE-00-185 from N. Kurul to L. Lee, dated March 30, 2000.

11. IP3 Report IP3-RPT-UNSPEC-02182, "IP3 Examination of External Events," September 1997.

12. Memo RE-00-167 from J. Bretti to R. Drake, dated March 22, 2000.

DO NOT SUBMIT THIS ATTACHMENT TO THE NRC

INTERNAL LIST OF IMPLEMENTING ACTIONS

Number	Implementing Action	Due	Responsible Dept/Mgr.
IPN-01--01	Issue revised FSAR pages, upon approval, using SD-LIC-01 and AP 18.7.	11/15/01	ILIC/S. Prussman
IPN-01-034-02	Develop basis for administrative controls for the PWST level requirements. A tornado induced break will require sufficient water to refill the CCW system plus an allowance for refilling surge tanks while attempting repairs and prior to splitting header.	8/31/01	IDDE/S. Petrosi
IPN-00-034-03	Implement administrative controls. (surveillance) during modes when not on RHR to ensure adequate level is maintained in PWST.	10/30/01	IOPS/P. Rubin
IPN-00-034-04	Civil Engineering will prepare a 10 CFR 50.59 evaluation to revise the FSAR to address the effects of seismic and tornado events on seismic Class I components in fan house.	10/30/01	IDDE/S. Petrosi
IPN-01-034-05	Revise the classification of PWST, associated piping to CCW surge tanks, makeup pumps, and level indicators assure required functions are met (i.e., deliver water and measure tank level). This will be seismic Class I or II unless category M is justified. The classification should indicate that it is based upon the FSAR requirement for the PWST to be available to safely shutdown following a tornado (as well as any other classification requirements).	8/15/01	IDES/L. Banda
IPN-01-034-06	Reclassify FSB floors and walls to Class I consistent with the definition of FSAR Section 16.1.1 definition of Class I. The classification should reflect the reasons given in the submittal to the NRC (source document).	8/15/01	IDES/L. Banda

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INTERNAL LIST OF IMPLEMENTING ACTIONS