WPSC (414) 433-1598
TELECOPIER (414) 433-5544

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WISCONSIN PUBLIC SERVICE CORPORATION

600 North Adams • P.O. Box 19002 • Green Bay, WI 54307-9002

July 20, 1989

U.S. Nuclear Reg. Commission
ATTN: Document Control Desk
Washington, DC 20555

Dear Sir/Madam:

Enclosed please find the 1989 revision of the Updated Safety Analysis Report (USAR) for the Kewaunee Nuclear Power Plant. The editorial and technical changes made to the USAR are described in a copy of the NRC cover letter which is also included in this package.

Please follow the instruction sheet enclosed when updating this manual. If you have any technical questions concerning this package, please contact me at (414) 433-1135 or Andrew L. Hess at (414) 433-5585.

Sincerely,

Kolin E. Hoops

cmg

Enclosure

ATTACHMENT 1

DESCRIPTION OF CHANGES & SAFETY EVALUATIONS

1989 USAR REVISION

JULY 20, 1989

One new figure was added this year:

Figure 9.6-2d

The following drawings have been revised due to the completion of plant design changes or minor drawing discrepancies:

Section 1

Figure 1.2-1
1.2-3
1.2-4
1.2-6
1.2-7
1.2-10

Section 4

Figure 4.2-1

Section 5

Figure 5.4-1

Section 6

Figure 6.2-1

Section 8

Figure 8.2-2
8.2-3

Section 9

Figure 9.2-2
9.2-5
9.3-2
9.3-4
9.6-2a
9.6-2b
9.6-2c
9.6-3
9.6-4
9.6-5

Section 10

Figure 10.2-1
10.2-3
10.2-5
10.2-7
10A.3-2
10A.3-4
10A.3-6
10A.3-7
10A.3-8
10A.4-2
10A.4-4
10A.4-5
10A.4-6
10A.4-7
10A.4-8
10A.5-2
10A.6-2

Section 11

Figure 11.1-1
11.1-2
11.1-3a
11.1-4
11.2-2
11.2-3
11.2-4

This Description of Change affects the entire USAR document.

Description of Change

Typographical errors due to last years reformatting of the USAR have been corrected.

Safety Evaluation

All these changes are editorial in nature and have no impact on plant safety.

The following pages have been revised to reflect technical changes to the content of the USAR:

Pages 2.6-3 and 2.10-3

Description of Change

A paragraph was added to reference the original Atomic Energy Commission (AEC) safety evaluation for Kewaunee which independently determined a more conservative maximum lake level.

Safety Evaluation

This revision has no safety effects associated with it since it only adds a reference to a related design document.

Pages 3-v, 3.2-38, 4.3-4, 5.3-1, 11.1-2, and 14.2-21; Tables 3.2-2, 8.2-2 (Sheet 1 of 2), 14.3-1, 14C-7; Figures 2.4-2, 2.7-8, 3.2-27a, 3.2-28a, 3.2-29a

Description of Change

Minor editorial changes were made to the USAR to clarify statements and correct editorial mistakes.

Safety Evaluation

These changes correct minor errors and clarify actual plant design and operation. Therefore, all of these changes are editorial in nature and have no impact on plant safety.

Pages 3.2-20, 3.2-30 and 3.2-34

Description of Change

The USAR has been revised to reflect the deletion of the requirement to use guide thimble plugs in reload cores. Specifically, a note was placed on the appropriate pages stating that the use of plugging devices in the reactor core is optional and dependent upon the specifics of the reload core design.

Safety Evaluation

Of the 121 fuel assemblies in the Kewaunee core, typically 66 assemblies had contained guide thimble plugs. The purpose of the thimble plugs was to increase the guide thimble flow resistance which decreases guide thimble coolant flow in fuel assemblies that do not contain either control rods or burnable poison rods. Refueling necessitated shuffling of the thimble plugs between fuel assemblies. This shuffling of thimble plugs took 8 to 12 hours. The thimble plug removal eliminated the shuffling process resulting in a decrease in radiation exposure. Additionally, the removal of the thimble plug inserts from the core eliminated the potential for loose parts generation, such as cracked plug springs, and lost time due to bent or damaged thimble plugs.

The removal of guide thimble plugs at KNPP decreases the effective core flow while increasing the total reactor coolant system flow. An in-house evaluation of these core and reactor coolant system flow changes was conducted by determining hydraulic loss coefficients with thimble plugs inserted and removed. Based on these analyses, the core bypass flow was increased to account for thimble plug removal.

The effect of thimble plug removal on the current safety analyses was also evaluated. It was concluded that the current safety analysis bounds plant operation with thimble plugs removed and adequate margin to established safety limits is maintained. A bounding analysis was also conducted by Advanced Nuclear Fuels (XN-NF-87-37(p), "Assessment of Increased Steam Generator Tube Plugging and Fuel Assembly Thimble Plug Removal For The Kewaunee Nuclear Plant.") which accounted for thimble plug removal in its support of a 10% steam generator tube plugging limit. A combination of plugging and sleeving up to the equivalent of 10% tube plugging was approved by the NRC (see letter from J. G. Giitter (NRC) to D. C. Hintz (WPSC) dated March 1, 1988). Therefore, this plant modification, does not constitute an unreviewed safety question according to 10CFR50.59 and has no deleterious effects on plant safety.

Pages 3.2-33, 3.2-46, Table 3.2-1 (Sheet 2 of 2) and 3.2-7 (Sheet 2 of 3), Figure 3.2-1, 3.2-2 and 3.2-4

Description of Change

The part-length rod control system, including control room controls and indication, has been removed. Associated USAR pages, tables, and figures have been revised to reflect this change.

Safety Evaluation

The part-length rod control system was removed due to unused and obsolete controls and indication in the control room. The part-length rods and the connecting drive shaft were previously removed from the core, but the control system was not taken out. The removal of these controls and indication decreases control room clutter and the probability of operator error. Therefore, this modification increases plant safety.

Page 3.2-38

Description of Change

The USAR has been revised to reflect the extension of Advanced Nuclear Fuels (ANF) fabricated high burnup fuel design limit from 43,000 MWD/MTU to 49,000 MWD/MTU on the peak rod.

Safety Evaluation

The NRC has reviewed and approved this increase in peak rod burnup to 49,000 MWD/MTU in Amendment No. 62 to Facility Operation License No. DPR-43 for KNPP (reference letter from M. B. Fairtile (NRC) to D. C. Hintz (WPSC) dated June 20, 1985). Therefore, this change reflects a plant modification which the NRC has already concurred will have no safety consequences.

Pages 4.1-4, 4.2-7, 4.2-13, 4.2-14, 4.2-19, 5.9-2, 5.9-12, 5.9-14, 5.9-15, 5.9-16, 5.9-26, B.7-1 and B.7-4, Tables B.7-1 and B.7-5, and Figure 5.9-8

Description of Change

The USAR has been revised to reflect the removal of three of the four steam generator upper lateral support hydraulic snubbers. Additional changes to the USAR were incorporated due to the exclusion of dynamic effects of postulated pipe rupture in the primary reactor coolant loop by application of "leak-before-break" (LBB) technology and the elimination of arbitrary intermediate breaks as allowed by NRC Branch Technical Position MEB 3-1, Rev. 2.

Safety Evaluation

Based on independent flow stability computations in conjunction with information submitted by WPSC, the NRC has concluded that the KNPP primary loop piping complies with the revised General Design Criterion 4 (GDC-4) of Appendix A to 10 CFR Part 50. Thus, the probability or likelihood of large pipe breaks occurring in the primary coolant system loops is sufficiently low such that the dynamic effects associated with postulated pipe breaks need not be a design basis. The NRC has reviewed and accepted this application of fracture mechanics "leak-before-break" (LBB) technology in a safety evaluation report (see Safety Evaluation Report in letter from K. E. Perkins (NRC) to D. C. Hintz (WPSC) dated February 16, 1988). This, along with the elimination of arbitrary intermediate breaks in accordance with NRC Branch Technical Position MEB 3-1, Rev. 2, provided the basis for the removal of three of the four snubbers on the upper lateral support of each of the steam generators which the NRC has approved in their safety evaluation for KNPP's steam generator snubber reduction (see Safety Evaluation Report in letter from J. G. Giitter (NRC) to D. C. Hintz (WPSC) dated March 18, 1988). Therefore, these changes reflect plant modifications which the NRC has already concurred will have no safety consequences.

Page 4.1-10

Description of Change

The data for the last fifteen years of plant operations has been used to calculate plant capacity and availability.

Safety Evaluation

This change has no safety consequences since this data and calculated values simply relate past plant performance.

Pages 4.2-23, 4.4-12, 4.4-13, 4.4-15, 5.9-15, 5.9-26, 9.6-1, 9.7-5, 14.1-32, 14.1-45, 14.3-64, 14.3-65, 14.3-74, B-i, TOCxxvi, B.4-3 and B.9-5

Description of Change

Various NRC Safety Evaluation Report summaries and references were added to their associated sections in the USAR.

Safety Evaluation

The safety evaluation report summaries encompass plant modifications and analyses that have been reviewed and accepted by the NRC. These summaries have been added to enhance the value of the USAR as a design bases and licensing bases document.

Pages 4.4-4, 4.4-5 and 4.4-15; Table 4.4-2,

Description of Change

The USAR was revised to indicate a modification to the surveillance capsule withdrawal schedule. Specifically, capsule P was removed for analysis during the 1988 refueling outage instead of capsule T. The Surveillance Capsule Withdrawal Schedule table was updated to reflect the knowledge gained by this removal of capsule P.

Safety Evaluation

Capsule P was removed due to the unsuccessful attempts to remove capsule T. The similarities between capsule T and capsule P allowed this modification to KNPP's surveillance capsule withdrawal schedule while satisfying the requirements of 10CFR50, Appendix H.

The entire safety significance of the removal and analysis of capsule P is described in WCAP-12020 which was submitted to the NRC on February 17, 1989. In summary, surveillance capsule analyses are used in calculations to predict reactor vessel fluence at the end of design life in order to ensure vessel integrity for its entire life. These reactor vessel calculations were performed by using a series of adjoint analyses. This is the most accurate method available thus ensuring plant safety.

Pages 5-iv, 5.2-35, 5.2-36, 5.5-1 through 5.5-9, 5.7-4, 8.2-21, 14.3-46 through 14.3-48, TOCxxx, H-i, H-iii, H-iv, H.3-1 through H.3-14, H.5-2; Figures 5.2-8 14.3-36, 14.3-37, H.3-2 through H.3-16; Tables H.3-1

Description of Change

The above sections of the USAR were revised to account for: modifications to the Shield Building Ventilation (SBV) system, increased as-built leakage into the annulus, and the revised drawdown transient analysis due to the increased leakage.

The SBV modifications included an upgraded control system and removal of the exhaust fans. As shown on the revised Figure 5.2-8, a test was run to determine the as-built shield building in-leakage. The results of this procedure warranted a new annulus pressure transient analysis. This analysis demonstrated a longer drawdown time to attain negative pressure as well as higher SBV exhaust flows.

Safety Evaluation

The modifications to the SBV system were made to ensure proper and reliable operation of the system. Performance tests conducted after the modifications were made showed acceptable system operation. The increased as-built shield building leakage and the resulting annulus pressure transient analysis were not the result of plant modifications and conservatively estimate current plant performance. As a result of these studies the post-accident off-site dose was slightly greater than that previously reported in the USAR. A new off-site dose analysis was done to document this increase and will replace the old off-site dose analysis. The new analysis is quite conservative and shows the KNPP off-site dose is a fraction of 10 CFR 100 limits and is less than that calculated by the AEC in the original Kewaunee Safety Evaluation. Therefore, plant safety is not affected by this change.

Table 5.2-2 (Sheets 1-6 and 8 of 8)

Description of Change

Table 5.2-2 was revised to clarify the isolation capabilities available for each penetration. The revisions include added isolation valves, revised descriptions of penetrations and their isolation valves, and minor editorial changes.

Safety Evaluation

No plant modification is associated with these revisions. These revisions more accurately describe the KNPP design and have no effect on plant safety.

Table 5.2-2 (Sheet 2 of 8)

Description of Change

Valve IA101 on penetration #20 was removed as a containment isolation valve. The "T" signal was removed from the valve actuation logic, and the valve's failure position was changed to fail open.

Safety Evaluation

The check valve inside containment (IA 103) and the check valve outside containment (IA 102) are tested according to 10 CFR 50 Appendix J requirements and serve as the containment isolation valves for this penetration. These isolation provisions meet the USAR requirements of a Class 3 penetration. Overall plant safety is increased due to the increased availability of the instrument air system to containment.

Pages 6.3-6 and 9.6-5, Table 5.2-2 (Sheet 4 and 5 of 8) and Table 5.2-2a and Figure 9.6-2d

Description of Change

Figure 9.6-2d and its associated references were added to the USAR. Table 5.2-2a, Engineering Drawing - USAR Figure No. Cross-Reference List, was updated to reflect the addition of Figure 9.6-2d and the addition or removal of USAR figures in previous years.

Safety Evaluation

No change was made to the plant design. Figure 9.6-2d was added to show the containment fan coil units and the containment penetrations. This change and the updating of Table 5.2-2a are editorial in nature and have no effect on plant safety.

Page 6.4-5

Description of Change

A statement was added to clarify that only one train of caustic standpipe level indication has a control room readout.

Safety Evaluation

This change is editorial in nature and will more accurately describe the as-built plant configuration. Since there are other means of verifying caustic system operation, the single train of control room indication is not a safety concern.

Pages 6.4-9, TOC-xxiv, 14-v, 14.3-30 through 14.3-41, 14.3-70; Tables 14.3-8, 14.3-9; Figures 14.3-35 through 14.3-41

Description of Change

The USAR Section 14.3.5 and its associated tables, figures and references were revised to provide a more accurate estimate of the Kewaunee Nuclear Power Plant (KNPP) off-site dose consequences post-LOCA.

Safety Evaluation

The changes in the off-site dose analysis are mainly attributable to new calculational methods. However, current system operating characteristics have also been incorporated to ensure compliance with design criteria. Inputs to the analysis included current data regarding Shield Building Ventilation system performance and containment vessel leakage. The new analysis also accounts for containment spray iodine removal capabilities. The resultant dose meets the NRC acceptance criteria stated in the Atomic Energy Commission's original safety evaluation for KNPP, Supplement 1 dated December 18, 1972, in that it is a fractional amount of the 10CFR100 guidelines. The resultant dose is also less than that calculated by the AEC in that same safety evaluation. This change more accurately reflects plant performance and has no safety significance.

Pages 7.7-9 and 7.7-10

Description of Change

The USAR has been revised to reflect the replacement of the auxiliary feedwater area panel with the upgraded dedicated shutdown panel. In addition, descriptions of the controls now present on the dedicated shutdown panel have been added to in the USAR text.

Safety Evaluation

These changes encompass the actual configuration of the dedicated shutdown panel and its description in the USAR. The replacement of the auxiliary feedwater area panel by the dedicated shutdown panel was conducted to comply with the requirements of 10CFR50 Appendix R, Section III.G. This modification increases the level of fire protection at KNPP to the point where, in the event of a credible fire, the ability to safely shutdown the plant is always maintained.

Pages 8.1-4 and 8.2-17

Description of Change

The USAR has been revised to reflect the removal of the control circuitry which automatically started the Emergency Diesel Generators on a main turbine trip. Statements describing an automatic Diesel Generator start on a turbine trip have been deleted.

Safety Evaluation

The automatic start of the Emergency Diesel Generators on a turbine trip was originally installed to provide a continuous source of power for the turbine AC oil pumps at low turbine speeds. This would prevent turbine bearing damage if a blackout occurred after a turbine trip. Turbine bearing damage would only result in an economic loss and is not a safety related concern. Therefore, an automatic Diesel Generator start on a turbine trip has no safety-related significance and its removal will increase plant safety by removing an unnecessary challenge to safeguards equipment.

Page 8.2-7

Description of Change

The USAR had erroneously stated that both bus tie breakers between 125-V d-c distribution cabinets BRA-102 and BRB-102 were padlocked in the open position. This statement has been deleted.

Safety Evaluation

No change was made to plant design. The USAR was clarified to more accurately describe the control of these two breakers. Both bus tie breakers have never been locked and are not designed to facilitate being locked; however, these breakers are administratively controlled by plant operating procedures that prevent the closing of these breakers during plant operation. In addition, an alarm in the control room is activated if the bus tie breaker on either BRA 102 or BRB 102 is closed. Since administrative controls adequately prevent these breakers from closing, plant safety is ensured.

Pages 8.2-8, 8.2-9, 8.2-10 and 8.2-12

Description of Change

The portions of Section 8.2.2, Plant Distribution System, which discuss cable and wiring installation were revised to reflect the as-built plant design.

Safety Evaluation

Cable sizing and installation at Kewaunee is done using conservative margins with respect to the cable's current-carrying capacities, insulation properties, and mechanical construction. In addition, all safety related cables are qualified for their environment as required by 10 CFR 50.49.

Page 8.2-17

Description of Change

The USAR has been clarified to indicate the addition of a Diesel Generator Stator Hi Temperature Alarm to the 4160V Stator Temperature Hot annunciator in the control room.

Safety Evaluation

The Diesel Generator Stator Hi Temperature Alarm was added to the audible and visual alarm system located in the control room to enhance operator information and response to an alarm condition. The addition of this alarm has been included in a USAR listing of control room alarms. This change was made to more quickly alert operators to a diesel generator problem and therefore increases plant safety.

Page 8.2-18, 8.2-21, 8.2-22, 8.2-25 and Figure 8.2-7

Description of Change

Added a revised version of Figure 8.2-7 which had been removed during the 1988 USAR update. In addition, the text was changed to reference the new figure and other editorial changes were made for the purpose of clarifying the post-LOCA emergency diesel generator loading sequence.

Safety Evaluation

Since no physical change was made to the plant and the revised pages better reflect the plant design, no safety implications are associated with this change.

Pages 9.3-6, 9.3-14, 9.3-16, 9.7-4, Table 9.3-3 (Page 1 of 2)

Description of Change

The USAR was revised to reflect the as-built condition of the spent fuel pool cooling return piping and the increased cooling capacity (by analysis) of the system.

Safety Evaluation

No modifications were associated with this change and the cooling capabilities of the spent fuel pool cooling system were evaluated and approved by the NRC in the safety evaluation report associated with fuel pool densification (Reference letter from A. Schwencer (NRC) to E. W. James (WPSC) dated 12/1/78). Therefore, no safety consequences are associated with this revision.

Page 9.3-12 and 9.3-13, and Figure 9.3-2

Description of Change

The USAR has been revised to indicate the replacement of the relief valve on the component cooling water surge tank with an elbow connected to an existing vent line to the waste hold-up tanks.

Safety Evaluation

This plant modification does not change the function of the Component Cooling Water System. The removal of the relief valve on the component cooling water surge tank eliminates the potential over-pressurization of the Component Cooling Water System. An existing 4" vent line to the waste hold-up tanks is now used to vent the tank. Pressure-drop calculations have concluded that the 4" vent line provides an adequate pressure drop, avoiding a possible over-pressurization event and, therefore, increases plant safety.

Page 9.6-9

Description of Change

The discussion of control room air conditioning post-accident fresh air addition was revised to clarify a description of the air monitored by a control room radiation monitor.

Safety Evaluation

This change clarifies the design and function of a control room radiation monitor and is editorial in nature. Therefore, this change has no effect on plant safety.

Page 10.2-14 and Figures 1.2-1, 10.2-7, 10A.3-2 and 10A.4-2

Description of Change

The USAR has been revised to reflect the installation of a Condenser Sodium Hypochlorite Injection System.

Safety Evaluation

The Condenser Sodium Hypochlorite Injection System was installed to prevent biofouling build-up in the condenser tubes, hence maintaining condenser efficiency. This system injects sodium hypochlorite into each of the circulating inlet waterboxes, allowing for a "targeted" type of injection into the condenser tubes and an acceptable level of total residual chlorine. The hypochlorite system is not a plant safety system and is classified as QA type 3. Therefore, no safety consequences are associated with this change.

Page 11.2-7 and Table 11.2-7 (Sheets 1-4 of 4)

Description of Change

The setpoints of various radiation monitors will no longer be listed in the USAR. The setpoints will be identified as either "statistically significant level above background" or "calculated in accordance with KNPP Off-site Dose Calculation Manual".

Safety Evaluation

This change does not constitute any decrease in plant safety since the radiation monitor setpoints will still be determined by the same method. The previously listed setpoints were identified as provisional, and actual setpoints have occasionally been changed from those listed. Those radiation monitors which control or quantify radioactive releases have setpoints calculated by the KNPP Off-site Dose Calculation Manual (ODCM). The ODCM was reviewed and approved by the NRC as documented by letter from S. A. Varga (NRC) to D. C. Hintz (WPSC) dated 2-19-85.

Page 14.2-13

Description of Change

A reference to sections discussing steam generator tube sleeving and the steam generator tube fatigue analysis was added to the tube rupture section.

Safety Evaluation

This change has no safety significance; it was made to refer the USAR reader to those related sections.

Page 14-vi, TOCxxiv, 14.3-64 and 14.3-75

Description of Change

A new section was added to Chapter 14 to include the steam generator tube fatigue analyses performed for Kewaunee as part of WPSC's response to U.S. NRC Bulletin 88-02.

Safety Evaluation

This addition enhances plant safety by requiring that the stress ratio and fatigue usage calculations be updated if there are any significant changes to the input parameters to the calculations.

Table B.9-1

Description of Change

Table B.9-1 has been corrected due to the omission of the spare rotor analysis results for Fragment #2.1. The missing values for Fragment #2.1 have been added to the table.

Safety Evaluation

The results of the spare rotor analysis were added to Table B.9-1 in the 1988 USAR, but the results for Fragment #2.1 were inadvertently omitted. This correction is editorial in nature and has no effect on plant safety.

ATTACHMENT 2

REVISED USAR PAGES

1989 USAR REVISION

JULY 20, 1989