Entergy

Entergy Nuclear Operations, Inc.
Palisades Nuclear Plant
27780 Blue Star Memorial Highway
Covert, MI 49043

June 29, 2007 10 CFR 50.90

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Palisades Nuclear Plant
Docket 50-255
License No. DPR-20

License Amendment Request: Replacement of Containment Sump Buffer

Dear Sir or Madam:

Entergy Nuclear Operations, Inc., (ENO) submitted the subject license amendment request on June 28, 2007. The letter did not contain the 10 CFR 50.30(b) required oath or affirmation statement. This submittal contains the appropriate affirmation and resubmits the license amendment request in its entirety. There are no other changes to the previous submittal.

Pursuant to 10 CFR 50.90 ENO requests Nuclear Regulatory Commission (NRC) review and approval of a proposed license amendment for the Palisades Nuclear Plant (PNP). ENO proposes to replace the containment sump buffering agent, trisodium phosphate, with sodium tetraborate. The requirement for trisodium phosphate in the PNP containment is in Technical Specification 3.5.5, "Trisodium Phosphate." The guidance of NRC Staff letter, "NRC Staff Review Plans for Buffer Replacement Amendments," dated March 29, 2007, was used in developing the proposed amendment.

Enclosure 1 provides a detailed description of the proposed change, Background and Technical Analysis, No Significant Hazards Consideration Determination, Applicable Regulatory Criteria and Environmental Review Consideration. Enclosure 2 provides the revised TS page reflecting the proposed change. Enclosure 3 provides the annotated TS page showing the proposed changes.

ENO requests approval of this proposed license amendment by October 1, 2007. ENO further requests implementation of the amendment to occur during the 2007 refueling outage. The amendment would be implemented prior to Mode 3 entry following refueling.

A copy of this request has been provided to the designated representative of the State of Michigan.

Summary of Commitments

This letter contains no new commitments and no revision to existing commitments.

I declare under penalty of perjury that the foregoing is true and correct. Executed on June 29, 2007.

Christopher J. Schwarz
Site Vice President
Palisades Nuclear Plant

Enclosures (3)

CC Administrator, Region III, USNRC
Project Manager, Palisades, USNRC
Resident Inspector, Palisades, USNRC

ENCLOSURE 1
DESCRIPTION OF REQUESTED CHANGES

1.0 DESCRIPTION

Entergy Nuclear Operations, Inc. (ENO) requests to amend the Renewed Facility Operating License DPR-20 for the Palisades Nuclear Plant (PNP). The proposed change would revise Technical Specification (TS) 3.5.5, "Trisodium Phosphate."

2.0 PROPOSED CHANGE

Technical Specification 3.5.5 currently requires the use of Trisodium Phosphate (TSP) as the buffering agent in the containment sump. TS 3.5.5 requires that the TSP baskets shall contain ≥ 8,300 lbs and ≤11,000 lbs of active TSP.

The proposed amendment replaces the containment sump buffering agent, TSP, with sodium tetraborate decahydrate (STB). ENO proposes to revise TS Limiting Condition for Operation (LCO) 3.5.5, with a new weight requirement for STB. The proposed TS would require ≥ 8,186 lbs and ≤10,553 lbs of equivalent weight STB in the form of sodium tetraborate decahydrate ($Na_2B_4O_7 \cdot 10H_2O$). The Surveillance Requirements SR 3.5.5.1 and SR 3.5.5.2 would be revised to reflect STB.

In addition, ENO proposes to revise the title of TS 3.5.5 from "Trisodium Phosphate" to "Containment Sump Buffering Agent and Weight Requirements."

3.0 BACKGROUND

TS currently require the use of TSP as the buffering agent in the containment sump. The TSP is stored in wire mesh baskets located on the containment floor at elevation 590'-0". Following the initiation of containment spray, boric acid solution with a pH of approximately 4 to 5 is sprayed into containment. As the safety injection water collects on the containment floor and fills the sump, the borated water dissolves the buffering agent. Mixing is achieved as the solution is continuously recirculated.

TSP is used as the buffering agent to increase the pH of the initially acidic post loss-of-coolant accident (LOCA) containment sump water to a more neutral pH. Under LOCA conditions, buffering agent must be added to the emergency core cooling system (ECCS) to ensure a coolant pH greater than 7.0. Buffering agent addition is mainly required to reduce release of iodine fission products from the coolant to the containment atmosphere as iodine gas, in order to control the radiological consequences of the accident. Maintaining a pH above 7.0 prevents significant amounts of iodine, released

from fuel failures and dissolved in the recirculation water, from converting to a volatile form and evolving into the containment atmosphere.

In addition to dose considerations, raising the pH in the post-LOCA containment pool to a value greater than 7.0 reduces the general corrosion rate of some structural materials and inhibits stress corrosion cracking in austenitic stainless steel.

Nuclear Regulatory Commission (NRC) sponsored testing at the Argonne National Laboratory (ANL) indicated that substantial head loss can occur if sufficient calcium phosphate is produced in a sump pool and transported to a pre-existing fiber bed on the containment sump screen. Consequently, the ECCS flow and containment spray system flow could be reduced by the increased head loss across the sump screen while in the post-LOCA recirculation phase. The NRC staff communicated these results to the industry in Information Notice 2005-26, "Results of Chemical Effects Head Loss Tests in a Simulated [pressurized water reactor] PWR Sump Pool Environment," dated September 16, 2005, and its associated Supplement 1 to IN 2005-26, "Additional Results of Chemical Effects Tests in Simulated PWR Sump Pool Environment," dated January 20, 2006.

Currently, PNP has sources of calcium, which include containment concrete and calcium silicate, and a source of phosphate with the TSP buffer, that could produce a calcium phosphate precipitate in a postulated LOCA. ENO is requesting this amendment for PNP to minimize the potential for exacerbating sump screen blockage due to a potential chemical interaction between TSP and certain calcium sources used in containment that results in calcium phosphate. ENO proposes to switch the buffering agent from TSP to sodium tetraborate in the form of sodium tetraborate decahydrate ($Na_2B_4O_7 \cdot 10H_2O$), to remove this phosphate source from containment, thereby reducing the amount of precipitate that may be formed in a postulated post-LOCA environment.

4.0 TECHNICAL ANALYSIS

ENO is proposing to replace the containment sump buffering agent, TSP, with STB. The proposed operating condition with STB is analogous to the existing operating condition with TSP. Following the initiation of containment spray, boric acid solution with a pH of approximately 4 to 5 is sprayed into the containment. This spray comes in contact with most surfaces in the containment including the equipment required for post-LOCA mitigation. To prevent evolution of radioactive iodine from sump water and stress corrosion cracking of certain metals during operation of the ECCS, the sump/spray water pH is raised with STB. A fully hydrated form of STB would be used which makes it is less likely to absorb large amounts of water from the potentially humid containment conditions. If exposed to dry containment

conditions, there is a potential for some loss of water. The chemical properties of the buffer do not change as the result of the potential water loss, but mass decreases. Provisions are provided to adjust measured weight to an equivalent weight of sodium tetraborate decahydrate as determined by boron assay of sampled material from the baskets. The existing TSP buffer basket design would be used for the STB. The existing 20 buffer baskets were confirmed to be adequately sized. The buffer baskets, containing the STB, would be located in the open area at elevation 590'-0" in containment, similar to where they are currently located.

Due to the change in buffering agents, ENO proposes to revise the title of TS 3.5.5, "Trisodium Phosphate," to "Containment Sump Buffering Agent Specification and Weight Requirements." This is an administrative revision to make the title more generic due to the buffer change.

The buffering agent, STB, is intended to control post-accident sump water pH at ≥ 7.0 and ≤ 8.0. There are three primary issues associated with replacement of the buffering agent from TSP to STB for post-accident sump pH control:

1. Chemical Effects - the impact of buffer change from TSP to STB on precipitate formation.

2. Dose Considerations - the amount of buffer (STB) required to maintaining sump pH above 7.0 to address radiological consequences.

3 Environmental Qualification (EQ), stress corrosion cracking (SCC), Hydrogen Generation – the impact of buffer change from TSP to STB on EQ, SCC, and hydrogen generation.

These three issues are addressed in detail below.

Chemical Effects

A Pressurized Water Reactor Owners Group (PWROG) task investigated the ability to reduce or eliminate the risk of calcium phosphate precipitate formation simply by replacing TSP with another chemical that does not react with the materials in containment to form precipitates. The program tested alternative buffering agents to determine the efficacy of these materials to replace TSP. The results of the PWROG activity were reported in WCAP-16596-NP, "Evaluation of Alternative Emergency Core Cooling System Buffering Agents," Revision 0 (Reference 2). ENO performed an evaluation (Reference 3) to determine whether STB is an acceptable alternative to TSP based on industry testing of buffers outlined in WCAP-16596-NP, and through plant-specific application of the chemical model developed in WCAP-16530-NP, "Evaluation of Post-Accident Chemical

Effects in Containment Sump Fluids to Support [generic safety issue] GSI-191," as modified (Reference 1).

With STB as the buffering agent, the maximum quantities of calcium, silicon, and aluminum dissolved at the maximum sump water temperature and sump pH between 7.0 and 8.0, were calculated. The corresponding quantity of the chemicals was also calculated with TSP at sump pH of 8.0 for comparison purposes. Using a composite envelope containment sump temperature profile of the right and left channel failure cases, the quantities of the calcium, silicon, and aluminum dissolved, and the total quantities of precipitate after 30 days following a LOCA were calculated. The dissolution rate and solubility of silicon from calcium silicate increases as the temperature decreases, while for most materials the dissolution rate and solubility increase as the temperature increases. To estimate the effect, the WCAP-16530-NP model was modified to consider all of the silicon being dissolved from the calcium silicate. The primary effect is that less of the aluminum will precipitate as aluminum oxyhydroxide and more of the aluminum will precipitate as sodium aluminum silicate. Table 1 below shows the mass of precipitate formed in the containment sump following a LOCA at maximum sump temperature.

Table 1: Mass of Precipitate Formed

Description of Case		Precipitate (kg)			
		$Ca_3(PO_4)_2$	$NaAlSi_3O_8$	AlOOH	TOTAL
STB	pH 7.0	0	955	1,827	2,782
	pH 8.0	0	1,024	3,343	4,367
TSP	pH 8.0	749	1,048	3,675	5,472

The change of buffering agent from TSP to STB is expected to result in a reduction in the mass of chemical precipitate of approximately 1,100 kg, or a 20% reduction.

Dose Considerations

Based on NUREG-0800, "Standard Review Plan," Section 6.5.2, "Containment Spray as a Fission Product Cleanup System," long-term iodine retention is assumed only when the equilibrium sump solution pH is above 7.0. This pH value should be achieved by the onset of the containment spray recirculation mode. A sump solution pH of 7.0 or greater is an assumption for the Maximum Hypothetical Accident (MHA) analyses, which document that dose will not exceed 10 CFR 100 limits and 10 CFR 50, Appendix A, General Design Criterion 19 (GDC-19), "Control Room," limits during a MHA. Since STB maintains sump pH at or greater than 7.0 at recirculation, dose limits continue to be met for the current source term (TID-14844) and alternative source term (Regulatory Guide 1.183, "Alternative Radiological Source Terms

for Evaluating Design Basis Accidents at Nuclear Power Reactors") which was submitted for NRC approval September 25, 2006 (ADAMS Accession number ML062830385).

ENO performed an analysis to determine the amount of STB needed to maintain the post-LOCA containment sump pH ≥ 7.0 following recirculation at PNP (Reference 4). STB pH and dissolution tests were performed and were used for the analysis. The test data showed that the buffer dissolves readily, confirming the information contained in WCAP-16596-NP. The analysis considered the minimum and maximum quantities of boron and borated water and the time-dependent post-LOCA sump temperatures. In addition, radiolysis of air and water, radiolysis of chloride bearing electrical cable insulation and jacketing, and spilled reactor core inventory were included. The quantity of STB required to maintain the pH of the sump pool was determined at the onset of recirculation and for 30 days. The minimum amount of sodium tetraborate decahydrate required to maintain a minimum sump pH of ≥ 7.0 is greater than or equal to 8,186 lbs. The amount of sodium tetraborate decahydrate required to maintain a maximum pH of ≤ 8.0 is less than or equal to 10,553 lbs. Actual weight of material in the baskets may vary due to variations in vendor purity specifications. For example, one vendor guarantees a purity of 99.0% minimum and 105% maximum. An equivalent weight range of 8,269 lbs minimum to 10,050 lbs maximum of STB from that vendor would meet the stated limit. Additional adjustments may also be necessary to account for gain or loss of water in the STB due to containment atmosphere conditions.

ENO is proposing to modify TS 3.5.5 to reflect the use of STB as a buffering agent, with a new weight requirement of greater than or equal to 8,186 lbs and less than or equal to 10,553 lbs. PNP's current TS 3.5.5 specifies a minimum and a maximum weight of TSP, as opposed to a specified volume as found in NUREG-1432, "Standard Technical Specifications [STS] Combustion Engineering Plants." A maximum of 10,553 lbs of STB will ensure a pH of ≤ 8.0 will be controlled for issues such as environmental qualification, stress corrosion cracking, and hydrogen generation. Specifying minimum and maximum weight makes the proposed PNP TS consistent with the present TS requirements. ENO proposes to maintain this consistency with the present TS that are different than the STS that use a minimum volume requirement. The STS volume requires that it be derived from the required mass of the buffering agent. Specifying the mass of the buffer, as is currently done, allows ENO to use the current surveillance test procedure format. The proposed deviation from STS is acceptable because the PNP TS would still be sufficient to assure plant safety.

ENO proposes to revise SR 3.5.5.1 and 3.5.5.2 to reflect STB as the buffering agent and the minimum and maximum weights specified in the limiting condition for operation (LCO). The proposed surveillance requirements are

appropriate, as they are consistent with the LCO, and analogous to the current requirements.

ENO is proposing to maintain a minimum sump pH of ≥ 7.0 by requiring a minimum weight of sodium tetraborate decahydrate of greater than or equal to 8,186 lbs. Maintaining a minimum sump pH of 7.0 prevents significant amounts of iodine, released from failed fuel and dissolved in the recirculation water, from converting to a volatile form and evolving into the containment atmosphere. The proposed amendment does not affect the MHA analyses, as the initial condition of reducing the amount of re-evolving iodine is achieved by maintaining a sump pH of ≥ 7.0. Therefore, 10 CFR 100 limits and GDC-19 limits during a MHA would not be exceeded.

EQ, SCC, Hydrogen Generation

EQ – Environmental Qualification

Replacing TSP with STB as a buffering agent for containment sump pH control was designed to negate EQ concerns by maintaining the same pH range as the current buffering agent, TSP. Chemical effects on EQ from the new buffering agent, STB were also evaluated. It was determined that the change from TSP to STB had no impact on the post-accident pH conditions in containment. In addition, any chemical interaction between STB with organic sub-components of EQ equipment would not be significantly different than the interaction between TSP and the organic sub-components of EQ equipment. Therefore, the use of STB does not conflict with the existing EQ design and requirements and is enveloped by the current program.

SCC – Stress Corrosion Cracking

NUREG-0800, "Branch Technical Position MTEB 6-1," (Reference 5) sets a minimum pH of 7.0 for post-accident emergency coolant water to reduce the probability of SCC of austenitic stainless steel components, non-sensitized or sensitized, non-stressed or stressed. Replacing the buffering agent TSP with STB would not increase SCC because the STB would ensure that a minimum pH of 7.0 is maintained during recirculation. Additionally, both TSP and STB are used as corrosion inhibitors for carbon/low alloy steels (Reference 6).

Hydrogen Generation

Control of pH is critical for the compatibility of the recirculation water with equipment located in containment. Post-LOCA containment sump pH values greater than 8.0 may adversely affect the EQ and hydrogen generation design basis and thus, maximum sump water pH is limited. The amount of sodium tetraborate decahydrate placed in baskets will be controlled to be less than or equal to 10,553 lbs.

ENO's evaluation of a replacement buffering agent determined that STB is an acceptable alternative to TSP for use as the ECCS buffering agent at PNP. STB results in a substantial reduction in precipitate formation with no adverse side effects. STB provides a comparable buffering capacity to TSP with a comparable quantity of buffering agent, so the existing buffer delivery scheme is used. Furthermore, no new types of precipitates are formed with STB, corrosion of steel structural materials is comparable to that expected with TSP, and corrosion of aluminum submerged in STB is comparable to that in TSP. Additionally, STB is already in use at ice condenser plants and has a long and acceptable track record. STB is also currently in use at Ft. Calhoun.

5.0 REGULATORY SAFETY ANALYSIS

5.1 No Significant Hazards Consideration

Entergy Nuclear Operations, Inc. (ENO) proposes to revise Technical Specification 3.5.5, "Trisodium Phosphate," to replace the buffering agent from trisodium phosphate (TSP) to sodium tetraborate decahydrate (STB). ENO has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of Amendment," as discussed below:

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

   Response: No.

   The proposed amendment does not involve a significant increase in the probability of an accident previously evaluated because the containment buffering agent is not an initiator of any analyzed accident. The proposed change does not impact any failure modes that could lead to an accident.

   The proposed amendment does not involve a significant increase in the consequences of an accident previously evaluated. The buffering agent in containment is designed to buffer the acids expected to be produced after a loss of coolant accident (LOCA) and is credited in the radiological analysis for iodine retention. The proposed change of replacing TSP with STB in containment results in the radiological consequences remaining under 10 CFR 100 limits and General Design Criterion (GDC) -19 limits.

   Therefore, operation of the facility in accordance with the proposed amendment would not involve a significant increase in the probability or consequences of an accident previously evaluated.

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

   Response: No.

   The proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated. STB is a passive component that is proposed to be used at PNP as a buffering agent to increase the pH of the initially acidic post-LOCA containment water to a more neutral pH.

   Changing the proposed buffering agent from TSP to STB does not constitute an accident initiator or create a new or different kind of accident previously analyzed. The proposed amendment does not involve operation of any required systems, structures or components (SSCs) in a manner or configuration different from those previously recognized or evaluated. No new failure mechanisms will be introduced by the changes being requested.

   Therefore, the proposed amendment does not create the possibility of a new or different kind of accident from any accident previously evaluated.

3. Does the proposed amendment involve a significant reduction in a margin of safety?

   Response: No.

   The proposed amendment does not involve a significant reduction in a margin of safety. The proposed amendment of changing the buffering agent from TSP to STB results in equivalent control of maintaining sump pH at 7.0 or greater, thereby controlling containment atmosphere iodine and ensuring the radiological consequences of a MHA are within regulatory limits. The use of STB also reduces the present potential for exacerbating sump screen blockage due to a potential chemical interaction between TSP and certain calcium sources used in containment to form calcium phosphate. This proposed amendment removes this phosphate source from containment, thereby reducing the amount of precipitate that may be formed in a postulated LOCA. The buffer change would minimize the potential chemical effects and should enhance the ability of the emergency core cooling system to perform the post-accident mitigating functions.

   Therefore, the proposed amendment does not involve a significant reduction in the margin of safety.

Based on the evaluation above, ENO concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.2 Applicable Regulatory Requirements/Criteria

10 CFR 100

100.11 - Determination of exclusion area, low population zone, and population center distance.

(a) As an aid in evaluating a proposed site, an applicant should assume a fission product release from the core, the expected demonstrable leak rate from the containment and the meteorological conditions pertinent to his site to derive an exclusion area, a low population zone and population center distance. For the purpose of this analysis, which shall set forth the basis for the numerical values used, the applicant should determine the following:

(1) An exclusion area of such size that an individual located at any point on its boundary for two hours immediately following onset of the postulated fission product release would not receive a total radiation dose to the whole body in excess of 25 rem or a total radiation dose in excess of 300 rem to the thyroid from iodine exposure.

(2) A low population zone of such size that an individual located at any point on its outer boundary who is exposed to the radioactive cloud resulting from the postulated fission product release (during the entire period of its passage) would not receive a total radiation dose to the whole body in excess of 25 rem or a total radiation dose in excess of 300 rem to the thyroid from iodine exposure.

As described in Section 4, the proposed amendment of changing the buffer would result in the post-LOCA off-site radiological consequences at the exclusion area and low population zone boundaries to remain within 10 CFR 100 limits.

10 CFR 50, Appendix A, GDC-19

Criterion 19 - Control room

A control room shall be provided from which actions can be taken to operate the nuclear power unit safely under normal conditions and to maintain it in a safe condition under accident conditions, including LOCAs. Adequate radiation protection shall be provided to permit access and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 5 rem whole body, or its equivalent to any part of the

body, for the duration of the accident. Equipment at appropriate locations outside the control room shall be provided (1) with a design capability for prompt hot shutdown of the reactor, including necessary instrumentation and controls to maintain the unit in a safe condition during hot shutdown, and (2) with a potential capability for subsequent cold shutdown of the reactor through the use of suitable procedures.

As described in Section 4, the proposed amendment of changing the buffer would result in post-LOCA on-site radiological consequences at the control room to remain within GDC 19 limits.

10 CFR 50.36

The PNP applicable Safety Analyses specifies that the LOCA radiological consequences analysis takes credit for iodine retention in the sump solution based on the recirculation water pH being above 7.0. Thus, in accordance with 10 CFR 50.36(c)(2)(ii), Criterion 3, PNP considers Technical Specifications related to post-LOCA containment sump pH control as required to be retained.

10 CFR 50.49

As described in Section 4, replacing TSP with STB as a buffering agent for containment sump pH control has been designed to negate EQ concerns by maintaining the same pH range as the current buffering agent, TSP. Chemical effects on EQ equipment from the new buffering agent, STB, were also evaluated. It was determined that the change from TSP to STB had no impact on the post-accident pH conditions in containment and any chemical interaction between STB with organic sub-components of EQ equipment will not be significantly different than the interaction between TSP and the organic sub-components of EQ equipment. As a result of these, the use of STB does not conflict with the existing EQ design and requirements and thus is enveloped by the current program. The evaluation contained in the project modification package concluded that all components analyzed will continue to be able to perform the safety function in accordance with the requirements of 10 CFR 50.49.

10 CFR 50.67

Licensees who seek to revise the current accident source term used in their design basis radiological analyses shall evaluate the consequences of applicable design basis accidents such that:

(i) An individual located at any point on the boundary of the exclusion area for any 2-hour period following the onset of the postulated fission product release, would not receive a radiation dose in excess of 0.25 Sv (25 rem)[2] total effective dose equivalent (TEDE).

(ii) An individual located at any point on the outer boundary of the low population zone, who is exposed to the radioactive cloud resulting from the postulated fission product release (during the entire period of its passage), would not receive a radiation dose in excess of 0.25 Sv (25 rem) total effective dose equivalent (TEDE).

(iii) Adequate radiation protection is provided to permit access to and occupancy of the control room under accident conditions without personnel receiving radiation exposures in excess of 0.05 Sv (5 rem) total effective dose equivalent (TEDE) for the duration of the accident.

On September 25, 2006 (Adams Accession ML062830385), Nuclear Management Company (former license holder) submitted an application to use the alternative source term at Palisades. ENO has evaluated the proposed change to the buffering agent against the acceptance criteria in 10 CFR 50.67 and determined that they would be met.

In conclusion, based on the considerations described above, (1) there is reasonable assurance that the health and safety of the public will not be endangered by operation in the proposed manner, (2) such activities will be conducted in compliance with the Commission's regulations, and (3) the issuance of the amendment will not be inimical to the common defense and security or to the health and safety of the public.

6.0 ENVIRONMENTAL CONSIDERATION

ENO has determined that the proposed amendment would change a requirement with respect to installation or use of a facility component located within the restricted area, as defined in 10 CFR 20, or would change an inspection or surveillance requirement. However, the proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

7.0 PRECEDENT

By letter dated August 21, 2006 (ADAMS Accession # ML062340039), as supplemented by letters dated September 6, 2006 (ADAMS Accession # ML062570173), and October 10, 2006 (ADAMS Accession # ML062860428), Omaha Public Power District (OPPD) submitted a similar license amendment request for Fort Calhoun. OPPD requested to replace TSP with STB due to minimizing the potential for exacerbating sump screen blockage due to a potential chemical interaction between TSP and certain calcium sources used in containment that result in calcium phosphate. The proposed change for PNP is similar in that both requests replace TSP with STB. However, they differ in that ENO is requesting a weight range, similar to current buffer requirements. OPPD requested a minimum volume, similar to STS. By letter dated November 13, 2006 (ADAMS Accession # ML063120248), the NRC approved the license amendment request for OPPD.

8.0 REFERENCES

1. WCAP-16530-NP, "Evaluation of Post-Accident Chemical Effects in Containment Sump Fluids to Support GSI-191," Revision 0, as modified by Westinghouse errata letters WOG-06-102, WOG-06-232, WOG-06-273, and the responses to the NRC Requests for Additional Information (RAI) in WOG-06-387

2. WCAP-16596-NP, "Evaluation of Alternative Emergency Core Cooling System Buffering Agents," Revision 0, July 2006

3. Engineering Analysis EA-EC8349-02, "Post LOCA Chemical Effects Analysis in Support of GSI-191," Revision 0, June 2007

4. Engineering Analysis EA-EC8349-03, Post LOCA Containment Sump pH Control Using Sodium Tetraborate (NaTB), Revision 0

5. NUREG-0800, Standard Review Plan, Section 6.1.1, "Engineered Safety Features" attachment: Branch Technical Position MTEB 6-1, "pH for Emergency Coolant for PWRs"

6. Uhlig's Corrosion Handbook, 2nd Edition. Edited by Revie, R. Winston: John E. Wiley & Sons, 2000

ENCLOSURE 2

LICENSE AMENDMENT REQUEST: REMOVAL OF TSP FROM PALISADES CONTAINMENT

OPERATING LICENSE PAGE CHANGE INSTRUCTIONS
And
REVISED TECHNICAL SPECIFICATION PAGE
3.5.5-1

2 Pages Follow

ATTACHMENT TO LICENSE AMENDMENT NO.

FACILITY OPERATING LICENSE NO. DPR-20

DOCKET NO. 50-255

Remove the following page of Appendix A Technical Specifications and replace with the attached revised page. The revised page is identified by amendment number and contains marginal lines indicating the areas of change.

REMOVE	INSERT
3.5.5-1	3.5.5-1

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.5 Containment Sump Buffering Agent and Weight Requirements

LCO 3.5.5 Buffer baskets shall contain ≥ 8,186 lbs and ≤10,553 lbs of Sodium Tetraborate Decahydrate (STB) $Na_2B_4O_7 \cdot 10H_2O$.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. STB not within limits.	A.1 Restore STB to within limits.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	6 hours 30 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.5.1	Verify the STB baskets contain ≥ 8,186 lbs and ≤10,553 lbs of equivalent weight sodium tetraborate decahydrate.	18 months
SR 3.5.5.2	Verify that a sample from the STB baskets provides adequate pH adjustment of borated water.	18 months

ENCLOSURE 3

LICENSE AMENDMENT REQUEST: REMOVAL OF TSP FROM PALISADES CONTAINMENT

MARK-UP OF TECHNICAL SPECIFICATION PAGE
3.5.5-1
(showing proposed changes)
(additions are underlined; deletions are strikethrough)

1 Page Follows

3.5 EMERGENCY CORE COOLING SYSTEMS (ECCS)

3.5.5 ~~Trisodium Phosphate (TSP)~~ Containment Sump Buffering Agent and Weight Requirements

LCO 3.5.5 ~~The TSP baskets shall contain ≥ 8,300 lbs and ≤ 11,000 lbs of active TSP~~. Buffer baskets shall contain ≥ 8,186 lbs and ≤10,553 lbs of Sodium Tetraborate Decahydrate (STB) $Na_2B_4O_7 \cdot 10H_2O$.

APPLICABILITY: MODES 1, 2, and 3.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. ~~TSP~~ STB not within limits.	A.1 Restore ~~TSP~~ STB to within limits.	72 hours
B. Required Action and associated Completion Time not met.	B.1 Be in MODE 3. AND B.2 Be in MODE 4.	6 hours 30 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.5.5.1	Verify the ~~TSP~~ STB baskets contain ≥ ~~8,300~~ 8,186 lbs and ≤ ~~11,000~~ 10,553 lbs of ~~TSP~~ equivalent weight sodium tetraborate decahydrate.	18 months
SR 3.5.5.2	Verify that a sample from the ~~TSP~~ STB baskets provides adequate pH adjustment of borated water.	18 months