Omaha Public Power District

444 South 16th Street Mall
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November 18, 2005
LIC-05-0131

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

References:
1. Docket No. 50-285
2. Letter from Harry J. Faulhaber (OPPD) to Document Control Desk (NRC) dated August 31, 2005, Follow-up Response to Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors" (LIC-05-0101) (ML053070109)
3. NRC Information Notice 2005-26, "Results of Chemical Effects Head Loss Tests in a Simulated PWR Sump Pool Environment," dated September 16, 2005 (NRC-05-0116) (ML052570220)

SUBJECT: Request for an Extension to the Completion Date for Corrective Actions Taken in Response to Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors" and Information Regarding Actions taken as a Result of Information Notice 2005-26

In Reference 2, the Omaha Public Power District (OPPD) provided response information requested by Generic Letter 2004-02. The OPPD responses to requested information Items 2.(a) and (b) of Generic Letter 2004-02 indicated all actions necessary for Fort Calhoun Station (FCS) to be in compliance with the regulatory requirements listed in the Applicable Regulatory Requirements section of Generic Letter 2004-02 would be completed by December 31, 2007.

OPPD has conducted testing of sump strainer configurations using FCS-specific debris loadings. This testing was observed by the NRC as part of the pilot plant program for resolution of Generic Safety Issue (GSI) 191, "Assessment of Debris Accumulation on PWR Sump Performance." OPPD's strategy for compliance by December 31, 2007 was to procure sump strainers with sufficient margin to accommodate any chemical and downstream effects that were identified by industry testing. However, OPPD has determined that the chemical effects and potential downstream effects from the combination of trisodium phosphate (TSP) and calcium silicate insulation identified in Information Notice 2005-26 (Reference 3) cannot be accommodated by this strategy and will require additional testing (industry and plant-specific) and evaluation. This testing and evaluation may include:

- Debris generation and leaching testing of the FCS calcium silicate insulation surrogate material (the FCS calcium silicate insulation contains asbestos);
- Testing of FCS-specific formation of calcium phosphate based on the FCS specific calcium silicate and TSP dissolution rates;
- Testing to determine a substitute for TSP;

- Evaluation of chloride-induced stress corrosion cracking and radiological consequences using the substitute for TSP;
- Evaluation of removal and sequester of calcium silicate insulation;
- Testing of sump strainer designs that may be able to accommodate the formation of the calcium phosphate flocculent;
- Removal of calcium silicate insulation; and
- Evaluation and possible testing of the post-2008 refueling outage insulation, chemical, and sump strainer configuration.

This testing and evaluation will not be completed in time to support design and installation of replacement sump strainers during the scheduled fall 2006 refueling outage to ensure compliance by December 31, 2007. (The fall 2006 outage is the only refueling outage between April 1, 2006 and December 31, 2007.)

Therefore, pursuant to requested information Item 2.(b) of Generic Letter 2004-02, OPPD is revising our Reference 2 response and requests an extension of the completion date for some FCS corrective actions to the end of the 2008 refueling outage, which is currently scheduled to begin in the Spring of 2008. The attachment to this letter provides the justification for the extension request, including a discussion of how the regulatory requirements listed in the Applicable Regulatory Requirements section of Generic Letter 2004-02 will be met until the corrective actions are completed. This attachment also incorporates information identified in Reference 3 as it applies to FCS.

I declare under penalty of perjury that the foregoing is true and correct. (Executed on November 18, 2005.)

If you have additional questions, or require further information, please contact Thomas R. Byrne at (402) 533-7368.

Sincerely,

Harry J. Faulhaber
Division Manager
Nuclear Engineering

HJF/TRB/trb

Attachment 1 - Justification for Extension Request for Completion Date of the Fort Calhoun Station Containment Sump Modification
Attachment 2 – List of Commitments

Attachment 1

Omaha Public Power District (OPPD)
Fort Calhoun Station
Justification for Extension of Completion Date for Generic Letter 2004-02
Corrective Actions

Omaha Public Power District (OPPD)
Fort Calhoun Station
Justification for Extension of Completion Date for Generic Letter 2004-02 Corrective Actions

In Generic Letter 2004-02, the applicable regulatory requirements are noted as follows:

NRC regulations in Title 10, of the Code of Federal Regulations Section 50.46,10 CFR 50.46, require that the ECCS have the capability to provide long-term cooling of the reactor core following a LOCA. That is, the ECCS must be able to remove decay heat, so that the core temperature is maintained at an acceptably low value for the extended period of time required by the long-lived radioactivity remaining in the core.

Similarly, for PWRs licensed to the General Design Criteria (GDCs) in Appendix A to 10 CFR Part 50, GDC 38 provides requirements for containment heat removal systems, and GDC 41 provides requirements for containment atmosphere cleanup. Many PWR licensees credit a CSS [Containment Spray System], *at least in part, with performing the safety functions to satisfy these requirements, and PWRs that are not licensed to the GDCs may similarly credit a CSS to satisfy licensing basis requirements. In addition, PWR licensees may credit a CSS with reducing the accident source term to meet the limits of 10 CFR Part 100 or 10 CFR 50.67. GDC 35 is listed in 10 CFR 50.46(d) and specifies additional ECCS requirements. PWRs that are not licensed to the GDCs typically have similar requirements in their licensing basis.*

Fort Calhoun Station Unit No. 1 (FCS) was not licensed to the GDCs, but to plant-specific criteria contained in Appendix G of the Updated Safety Analysis Report. These criteria include:

CRITERION 42 - ENGINEERED SAFETY FEATURES COMPONENTS CAPABILITY

Engineered safety features shall be designed so that the capability of each component and system to perform its required function is not impaired by the effects of a loss-of-coolant accident.
This criterion is met. The engineered safety features consist of three individual and separate systems, as follows:

The Containment Spray System
The Safety Injection System
The Containment Air Recirculation and Cooling System

The major components of the containment spray system and the safety injection system, including the pumps and the shutdown heat exchangers, are located outside the containment. The spray nozzles, the spray and injection piping and the safety injection valves located inside the containment are designed for operation in the environment produced by a major loss-of-coolant accident. Safety injection piping is designed to accept any reactor vessel motion resulting from forces generated by a loss-of-coolant accident.

The containment air recirculation and cooling system components are located entirely within the containment. All components necessary for cooling and iodine filtration after the design basis accident are designed to withstand the accident and the environmental conditions following the accident. The heat transfer coil configuration and heat transfer capability have been tested by the manufacturer on a reduced version of the coil under post accident conditions. Motor control devices will be outside of the containment. A high temperature lubrication system and a high temperature, encapsulated insulation system for the motors has been specified. The means for providing reliable supplemental cooling, for control of moisture content of the cooling air, and for avoiding or neutralizing large air pressure differences across bearings has been specified. Frequent and careful preventative maintenance and periodic tests, particularly for insulation resistance, will be made.

CRITERION 52 - CONTAINMENT HEAT REMOVAL SYSTEMS
Where active heat removal systems are needed under accident conditions to prevent exceeding containment design pressure, at least two systems, preferably of different principles, each with full capacity, shall be provided.

This criterion is met. Two fully independent cooling systems are supplied to provide cooling of the containment building atmosphere following the MHA [Maximum Hypothetical Accident]. *Each system utilizes a different operating principle. The containment spray system reduces the temperature of the containment atmosphere by direct contact of the cool spray with the hotter containment atmosphere. The containment air recirculation and cooling system cools the containment atmosphere by recirculation of the hot gases through water cooled surface coolers. License Amendment No. 121 was approved and changed the Containment Spray surveillance testing and the basis requirement for minimum spray flow. USAR Section 14.16 provides the minimum requirements credited for each system.*

The containment spray pumps start automatically on a containment spray actuation signal which also opens the containment spray header isolation valves.

At the beginning of operation, the containment spray pumps take suction from the safety injection and refueling water tank. When this supply is depleted, pump suction is shifted to draw water from the containment building sump.

The testing of the containment spray system will be considered satisfactory if visual observations indicate that all but 10 nozzles per spray header have operated satisfactorily and no more than one nozzle on one spray header is missing. The minimum required single containment header spray flow is 1885 gpm.

The containment air recirculation and cooling system consists of four recirculation and cooling units. One, two or three units operate continuously during reactor operation. The other unit or units are automatically started on initiation of the safety injection system. The coolers have two sources of cooling water.

In the event of loss of outside power, equipment in the containment spray and the containment air recirculation and cooling systems which is required for containment cooling will receive power from the emergency diesel generators.

Both systems are considered highly reliable due to the inclusion of multiple components. In addition to system redundancy, the containment spray pumps and shutdown heat exchangers are located in separate rooms outside the containment building; consequently, it is possible to perform maintenance on this equipment during long-term operation.

Generic Letter 2004-02 also noted the following:

2. Addressees are requested to provide the following information no later than September 1, 2005:

(a) Confirmation that the ECCS and CSS recirculation functions under debris loading conditions are or will be in compliance with the regulatory requirements listed in the Applicable Regulatory Requirements section of this generic letter. This submittal should address the configuration of the plant that will exist once all modifications required for regulatory compliance have been made and this licensing basis has been updated to reflect the results of the analysis described above.

(b) A general description of and implementation schedule for all corrective actions, including any plant modifications, that you identified while responding to this generic letter. Efforts to implement the identified actions should be initiated no later than the first refueling outage starting after April 1, 2006. All actions should be completed by December 31, 2007. Provide justification for not implementing the identified actions during the first refueling outage starting after April 1, 2006. If all corrective actions will not be completed by December 31, 2007, describe how the regulatory requirements discussed in the Applicable Regulatory Requirements section will be met until the corrective actions are completed.

The Omaha Public Power District (OPPD) responses to requested information Items 2(a) and (b) of Generic Letter 2004-02 indicated all actions necessary for FCS to be in compliance with the regulatory requirements listed in the Applicable Regulatory Requirements section of Generic Letter 2004-02 would be completed by December 31, 2007. These actions include strainer hardware modifications. The strategy for compliance by December 31, 2007 was to procure sump strainers with sufficient margin to accommodate any chemical effects that were identified by industry testing. However, OPPD has determined that the chemical effects and possible down stream effects from the combination of trisodium phosphate (TSP) and calcium silicate insulation identified in Information Notice 2005-26, "Results of Chemical Effects Head Loss Tests in a Simulated PWR Sump Pool Environment," cannot be accommodated by this strategy and will require additional testing (industry and plant-specific) and evaluation. The results of the testing and evaluation will not be available in time for completion of the design and manufacturing to support installation of replacement sump strainers during the scheduled fall 2006 refueling outage to ensure compliance by December 31, 2007. (The fall 2006 outage is the only refueling outage between April 1, 2006 and December 31, 2007.)

Therefore, pursuant to requested information Item 2.(b) of Generic Letter 2004-02, OPPD in this letter revises the responses to Generic Letter 2004-02 and requests an extension of the completion date for

some FCS corrective actions (specifically, the strainer hardware modifications) to the end of the 2008 refueling outage, which is currently scheduled to begin in the Spring of 2008.

Below is a description of how regulatory requirements noted in Generic Letter 2004-02 continue to be met and safety maintained until all corrective actions are completed. These items also discuss evaluation and actions OPPD is taking based on our review of Information Notice 2005-26.

1. Corrective measures to be completed during the 2006 refueling outage:
   - Replacement of the existing steam generators, pressurizer and reactor vessel head, resulting in replacement of approximately 760 ft^3 of calcium silicate insulation with reflective metal insulation, and removal of approximately 7100 ft^2 of unqualified coatings (both values are based on preliminary debris calculations);
   - Removal of the automatic start feature for the third containment spray (CS) pump (this is being accomplished through a separate License Amendment Request);
   - Installation of debris exclusion devices on reactor cavity and refueling cavity drain lines;
   - Installation of reactor vessel spacer rings to reduce the water hold-up in the upper cavity; and
   - Replacement of calcium silicate insulation on the pressurizer spray line to eliminate generation of calcium silicate debris from the small break loss of coolant accident that presents the greatest risk of debris generation and transport.

2. Procedural guidance, training and actions:
   As discussed in our responses to NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors," OPPD has implemented a number of interim corrective actions to assure core cooling and containment integrity (References 1 and 2). To better understand these interim corrective actions it is useful to consider the physical arrangement of the FCS containment and ECCS system. Figures 1 and 2 show cross-sectional views of the containment structure. The FCS containment utilizes two cylindrical strainers thirty inches in diameter and thirty-six inches high. Each strainer is set approximately six inches above the floor of the containment building as shown on Figure 1. In Figure 2 the communication path from the reactor cavity to the containment floor is shown and this path enables safety injection water to surround the rector vessel and provide ex-vessel cooling. Figure 3 shows a schematic of the emergency core cooling system. Note that fully redundant suction paths are provided from the containment sumps to the safety injection and containment spray pumps. Further note that two high pressure safety injection (HPSI) pumps and one containment spray (CS) pump take suction from one header while one HPSI pump and two CS pumps take suction of the other header.

   Operations personnel have procedural guidance to shutdown one of the redundant HPSI pumps on one header (2C in Figure 3), and one of the redundant CS pumps on the other header (3B or 3C in Figure 3). One of the remaining CS pumps is shutdown if containment pressure and temperature requirements are met and the containment coolers are operable. Upon initiation of recirculation this leaves one HPSI pump and one CS pump aligned to one header and one HPSI pump aligned to the other header. This action minimizes the approach velocity of material to the strainers while maintaining the design basis of the plant.

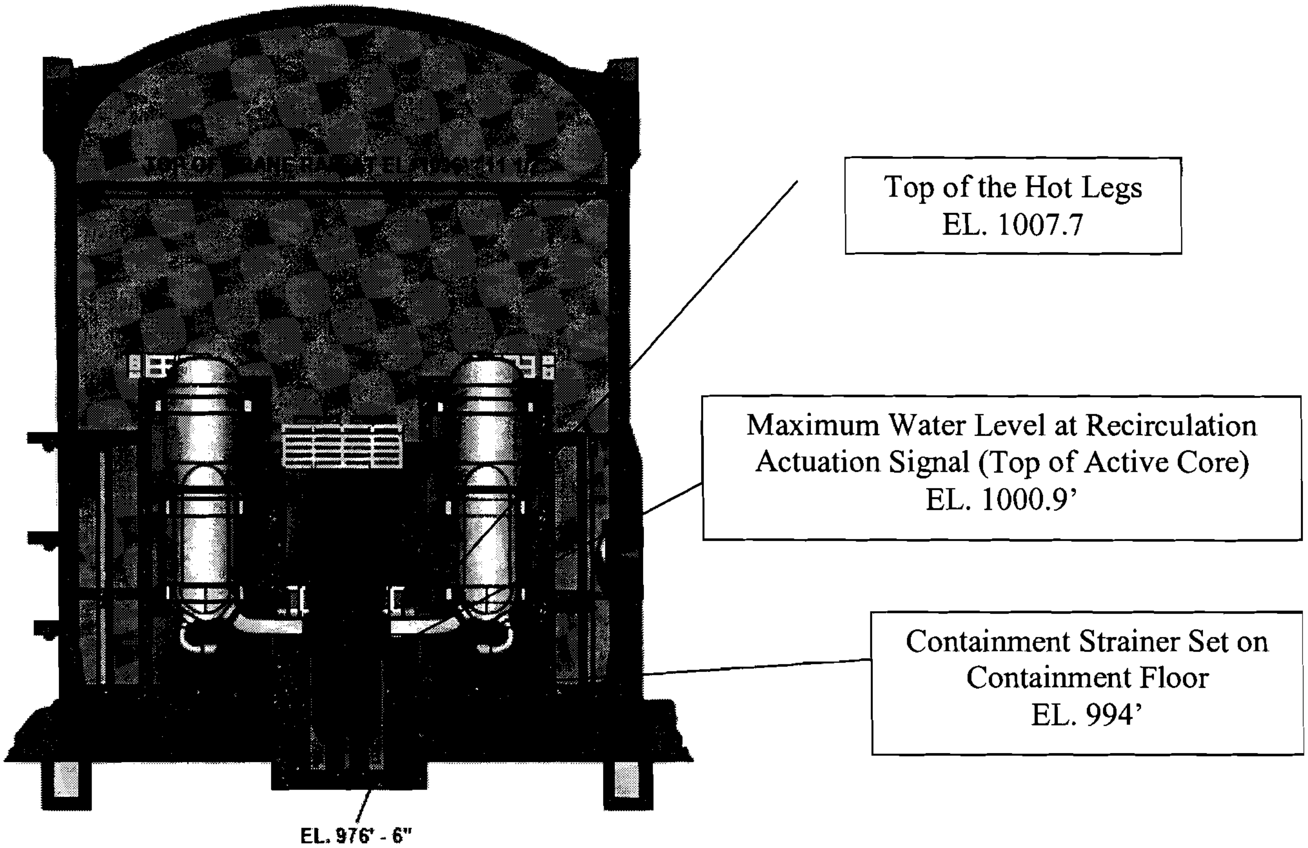

Figure 1 Containment Cross Section

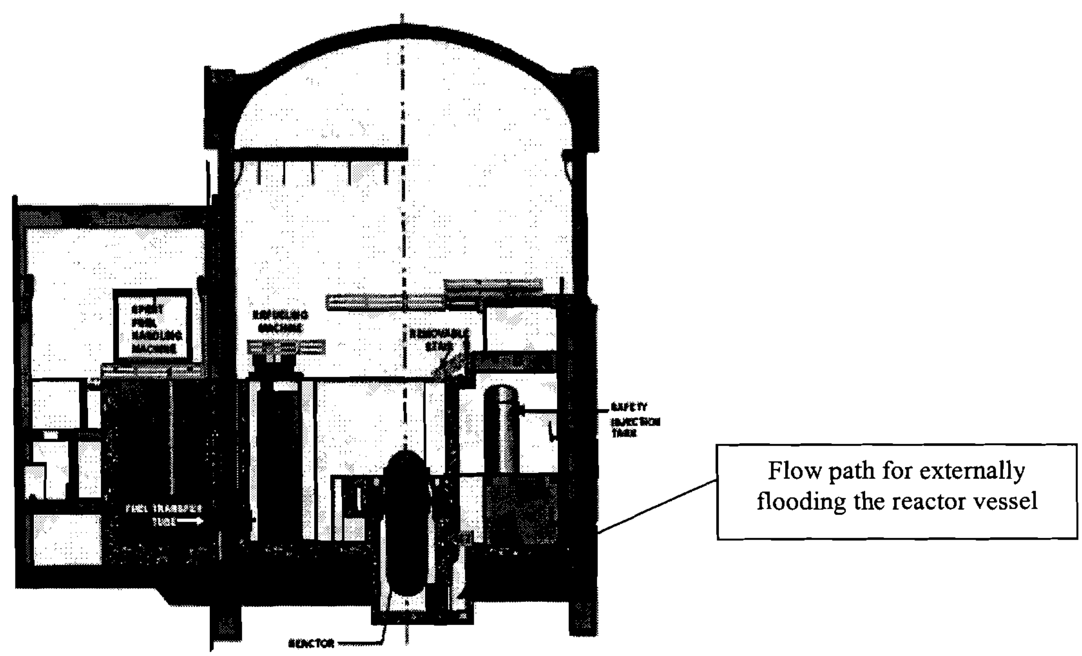

Figure 2 Containment Side View Showing Spent Fuel Pool

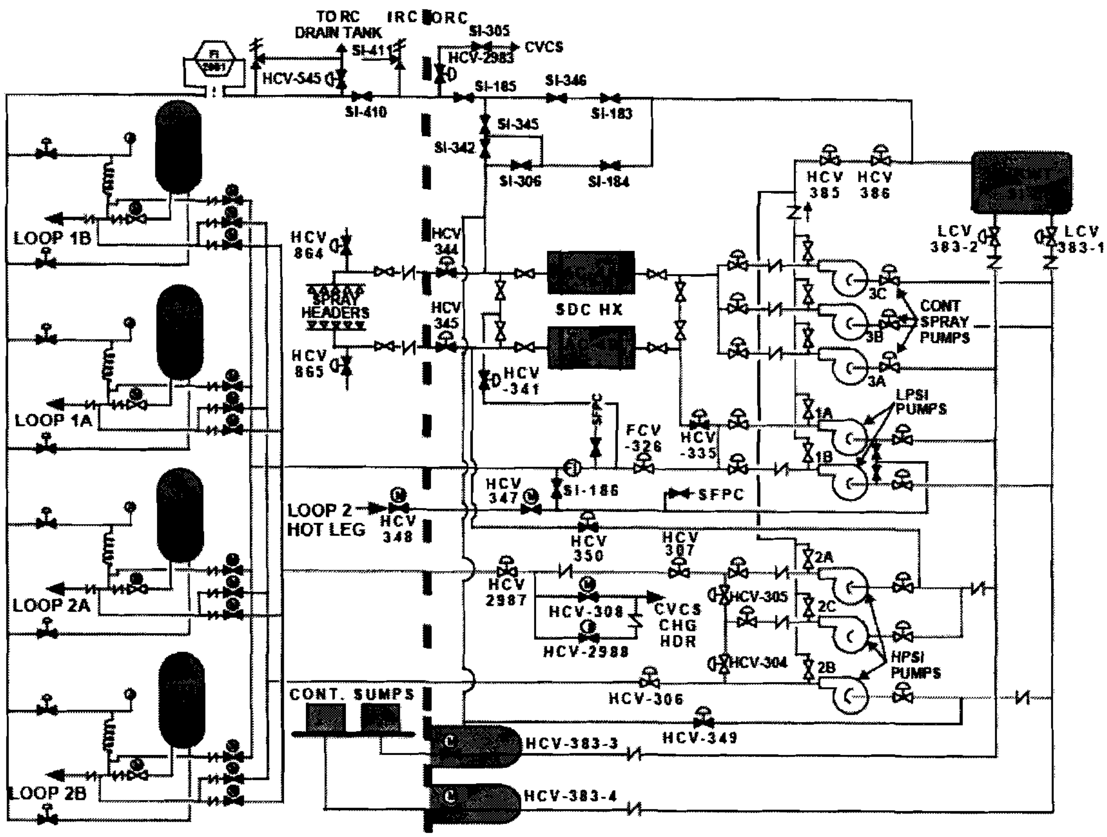

Figure 3 Emergency Core Cooling System

Operations personnel also have procedural guidance to monitor emergency core cooling system pumps for evidence of pump cavitation following initiation of recirculation. This procedural guidance and associated training instruct the operators to consider reducing the total sump flow when pump cavitation is detected.

This would be achieved by first throttling HPSI flow, then if necessary turning off the containment spray pump and relying on the containment air coolers for atmosphere control and heat removal. The flow from only one HPSI pump is needed to keep the core cooled and covered.

Procedural guidance on the refill of safety injection refueling water tank (SIRWT) has been provided. There are sufficient sources of borated and demineralized water at FCS such that the SIRWT can be refilled and safety injection can be continued until the containment is filled to the top of the reactor coolant system (RCS) hot legs (Elevation 1007.7' as shown in Figure 1) while maintaining reactivity control.

If the HPSI suction via the containment sump strainers is lost the HPSI can be re-aligned to the SIRWT and safety injection can be continued until the containment is filled to the top of the hot leg. Procedural guidance is provided to align equipment necessary for shutdown cooling prior to submergence. During this filling process core coverage is maintained by the HPSI pump flow,

core cooling is maintained by break flow and containment cooling is provided by the containment coolers. In addition core cooling will be provided by water on the outside of the reactor vessel. Once the containment is filled to the top of the hot leg shutdown cooling can be initiated. Unless the break is located in the shutdown cooling line, core cooling will be provided by shutdown cooling system taking suction from the hot leg. If the break is in the shutdown cooling line then suction will be taken from the containment pool or a combination of the hot leg and the pool depending on the size of the break.

3. Leak-Before-Break
   OPPD currently has NRC approval to invoke the leak-before-break principle to address the dynamic effects of a cold leg or hot leg break in the RCS. This approval was based on the evaluation (Mechanistic Fracture Evaluation of Reactor Coolant Pipe Containing a Postulated Circumferential Throughwall Crack, WCAP 9558, Rev. 2, Westinghouse Class 2 Proprietary, May 1981) of the inherent toughness of the cold leg and hot leg piping at FCS. The evaluation concluded that the probability of a pipe failure before noticeable leakage could be detected and the plant brought into a safe-shutdown condition was negligibly small. While leak-before-break cannot be used to establish the design basis debris load on the sump strainer, it does provide a basis for safe continued operation until the beginning of the 2008 refueling outage.

4. Containment Inspection and Cleanliness
   OPPD has implemented a number of actions to enhance containment cleanliness as documented in the response to Bulletin 2003-01. OPPD has revised surveillance procedures to provide specific guidance for inspection of containment sump screens to ensure no adverse gaps and breaches exist. These procedures require Quality Control verification of this inspection.

   In addition to our housekeeping and FME programs, OPPD drafted and validated a latent debris collection procedure during the 2005 RFO. The procedure is used to collect latent debris samples from more than 20 locations inside containment including both horizontal and vertical surfaces. The procedure is also used to calculate the total latent debris load that is compared to the values used in the debris generation and transport analysis to ensure FCS remains within the design parameters specified. The 2005 results indicated debris loads less than the values used in the design basis calculations. This procedure will be fully implemented prior to the completion of the 2006 refueling outage. By maintaining high standards of containment cleanliness and inspection, OPPD is able to minimize debris loads and ensure the sump strainer is in optimal condition should a loss of coolant accident (LOCA) occur.

5. Debris Quantity/Size/Transportability
   The FCS containment utilizes two cylindrical strainers thirty inches in diameter and thirty-six inches high with quarter inch screen spacing. Each strainer is set approximately six inches above the floor of the containment building. This configuration allows debris to sink in the floor of the containment building without entering the strainer.

   During and following a LOCA, the debris predicted to accumulate on the FCS sump screens is fibrous and calcium silicate particulate insulations. As described in NUREG/CR-6808 (Knowledge Base for the Effects of Debris on PWR Emergency Core Cooling Sump Performance, February 2003), the results of debris generation experiments of fibrous materials demonstrate that impingement of a high-pressure jet onto fibrous insulation (jacketed or not) will

generate debris which spans a wide range of sizes ranging from individual fibers, to interwoven strands, to fiber clusters, to clumps of insulation, to nearly intact pillows. The results of debris generation experiments for calcium silicate particulate insulation demonstrate that a significant fraction of the insulation broken from the pipe disintegrates into dust and that the remainder breaks into various sized pieces.

With the implementation of the interim corrective actions discussed above, the approach velocity to the containment screen providing suction to the single HPSI pump is estimated to be 0.03 ft/sec. (The screen has a surface area of approximately 28 ft^2 and the flow with margin from one HPSI pump is 400 gpm.) Accordingly, only small fines of suspended fibrous insulation and particulates would be transported to the sump strainers. Based on the information provided in NUREG/CR-6808 a significant fraction of this material would settle to the floor of containment before reaching the strainer. The exact impact of the calcium phosphate on this settling rate would have to be empirically determined. However, calcium phosphate is used as a clarifier in water treatment and therefore has the property of coagulating small particles, which would aid in settlement of the small fines and particulates before they approached the strainers.

On September 16, 2005, NRC Information Notice 2005-26, "Results of Chemical Effects Head Loss Tests in a Simulated PWR Sump Pool Environment," was released to all holders of operating licenses for PWRs. Information Notice 2005-26 requests that recipients review the information contained in the notice for applicability to their facilities and consider taking actions, as appropriate, to avoid similar issues.

Information Notice 2005-26 identifies the initial results of head loss testing being performed at the Argonne National Laboratory (ANL) and is relevant to FCS, since FCS uses TSP as a sump pool buffering agent and portions of the FCS reactor coolant system utilize calcium silicate insulation. Although significant increases in head loss were observed due to chemical effects in these tests, the Information Notice notes that these head loss results were obtained in a recirculating test loop not intended to be prototypical of PWR plant containments. Parameters that may influence head loss in these tests include screen approach velocity, fiber bed thickness, relative arrival times for debris and chemical precipitates, concentration of particulates in the test and loop fluid recirculation time. The Information Notice notes that applicability of these results to plant specific environments may also be affected by these and other variables (e.g., insulation materials, break location, and sump design).

The ANL test results were discussed during a September 30, 2005 public meeting. During this meeting the non-prototypical nature of test conditions was discussed. The following key areas were noted:

1. The calcium concentration in PWRs is expected to be much less than the concentration used in the ANL head loss tests.
2. The manner in which the calcium phosphate was deposited on the screen in the ANL tests was inconsistent with the expected deposition behavior in PWRs.
3. The temperatures tested in the ANL test loop were lower than what will be experienced in a PWR sump preceding and immediately following switchover to recirculation.

These three points are notable in that they have the potential to significantly affect the extent of calcium phosphate formation and the resultant impact of formation on screen head loss for a PWR.

Although conditions will vary based upon the accident scenario, expected conditions for FCS are markedly different from the conditions tested at ANL. As an example, the pH range of the ANL testing is not representative of FCS containment pool at the start of recirculation. TSP dissolves very quickly and the pool pH is expected to be about 7.0 within a very short period after spray initiation.

In response to Information Notice 2005-26, OPPD has identified the following enhancements to the interim corrective actions identified above:

- Enhancement of procedures associated with refilling the SIRWT to provide a hierarchy of flow paths depending on equipment availability;
- Establishment of procedural guidance for throttling HPSI flow after the recirculation actuation signal to a value that is acceptable to the safety analysis, but less than full flow;
- Enhancement of procedures to identify equipment and instrumentation that could be affected by flooding the containment above the current flood level assumed for equipment qualification;
- Enhancement of procedures to measure water level in containment above the maximum water level at the start of recirculation; and
- Training on these enhancements and re-training on the existing compensatory measures.

At this time, OPPD believes that these changes can be implemented without simulator validation or simulator training. The FCS simulator will be undergoing a major refurbishment and will not be available during January and February 2006. If simulator validation or training is needed, this will have to be conducted during March and April of 2006. Therefore, the date when these actions will be complete is April 30, 2006.

Additional testing and evaluation will be required relative to the issues identified in Information Notice 2005-26. This testing and evaluation may include:

- Debris generation and leaching testing of the FCS calcium silicate insulation surrogate material (the FCS calcium silicate insulation contains asbestos);
- Testing of FCS-specific formation of calcium phosphate based on the FCS specific calcium silicate and TSP dissolution rates;
- Testing to determine a substitute for TSP;
- Evaluation of chloride-induced stress corrosion cracking and radiological consequences using the substitute for TSP;
- Evaluation of removal and sequester of calcium silicate insulation;
- Testing of sump strainer designs that may be able to accommodate the formation of the calcium phosphate flocculent;
- Removal of calcium silicate insulation; and
- Evaluation and possible testing of the post-2008 refueling outage insulation, chemical, and sump strainer configuration.

In summary, the compensatory actions already in place, in addition to those to be implemented between now and the end of the 2006 refueling outage, will ensure that regulatory requirements noted in Generic Letter 2004-02 will be met and safety will be maintained until the deferred corrective actions can be completed during the 2008 refueling outage.

References:

1) Letter from OPPD (Richard P. Clemens) to NRC (Document Control Desk) dated August 8, 2003 Fort Calhoun Station Unit No. 1, 60 Day Response to NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors" (LIC-03-0105) (ML032240032)

2) Letter from Ralph L. Phelps (OPPD) to Document Control Desk (NRC) dated June 11, 2004, Response to Requests for Additional Information on the Fort Calhoun Station Unit No. 1 Response to NRC Bulletin 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized-Water Reactors" (LIC-04-0072) (ML041630106)

3) Letter from Ralph L. Phelps (OPPD) to Document Control Desk (NRC) dated March 4, 2005, 90 Day Response to Generic Letter 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation During Design Basis Accidents at Pressurized-Water Reactors" (LIC-05-0017) (ML050630538)

4) Letter from Alan B. Wang (NRC) to Ross Ridenoure (OPPD) dated June 3, 2005, Request for Additional Information (RAI) Related to Generic Letter 2004-02, Potential Impact Of Debris Blockage On Emergency Recirculation During Design Basis Accidents At Pressurized-Water Reactors (TAC No. MC4686) (NRC-05-0077) (ML051520156)

5) Letter from D. J. Bannister (OPPD) to Document Control Desk (NRC) dated August 1, 2005, Fort Calhoun Station Unit No. 1, Response to Request for Additional Information Related to Generic Letter 2004-02, Potential Impact Of Debris Blockage On Emergency Recirculation During Design Basis Accidents At Pressurized-Water Reactors (LIC-05-0090) (ML052130305)

Attachment 2

List of Commitments

List of Commitments

1. OPPD will complete the following corrective measures during the 2006 refueling outage:

   - Replacement of the existing steam generators, pressurizer and reactor vessel head, resulting in replacement of approximately 760 ft^3 of calcium silicate insulation with reflective metal insulation, and removal of approximately 7100 ft^2 of unqualified coatings (both values are based on preliminary debris calculations);
   - Removal of the automatic start feature for the third containment spray (CS) pump (this is being accomplished through a separate License Amendment Request);
   - Installation of debris exclusion devices on reactor cavity and refueling cavity drain lines;
   - Installation of reactor vessel spacer rings to reduce the water hold-up in the upper cavity; and
   - Replacement of calcium silicate insulation on the pressurizer spray line to eliminate generation of calcium silicate debris from the small break loss of coolant accident that presents the greatest risk of debris generation and transport.

2. OPPD will implement the following enhancements by April 30, 2006:

   - Enhancement of procedures associated with refilling the SIRWT to provide a hierarchy of flow paths depending on equipment availability;
   - Establishment of procedural guidance for throttling HPSI flow after the recirculation actuation signal to a value that is acceptable to the safety analysis, but less than full flow;
   - Enhancement of procedures to identify equipment and instrumentation that could be affected by flooding the containment above the current flood level assumed for equipment qualification;
   - Enhancement of procedures to measure water level in containment above the maximum water level at the start of recirculation; and
   - Training on these enhancements and re-training on the existing compensatory measures

3. The latent debris collection procedure will be fully implemented prior to the completion of the 2006 refueling outage.