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CP-200901307
TXX-09114

Ref. # GL 2004-02

September 10, 2009

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION
DOCKET NOS. 50-445 AND 50-446
SUPPLEMENT TO RESPONSE TO NRC GENERIC LETTER (GL) 2004-02, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY RECIRCULATION DURING DESIGN BASIS ACCIDENTS AT PRESSURIZED-WATER REACTORS"

REFERENCES:
1. Letter Logged TXX-08033 from M. Blevins to the NRC dated February 29, 2008, SUPPLEMENT TO RESPONSE TO NRC GENERIC LETTER (GL) 2004-02, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY RECIRCULATION DURING DESIGN BASIS ACCIDENTS AT PRESSURIZED-WATER REACTORS"
2. Letter Logged TXX-08141 from M. Blevins to the NRC dated November 26, 2008, SUPPLEMENT TO RESPONSE TO NRC GENERIC LETTER (GL) 2004-02, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY RECIRCULATION DURING DESIGN BASIS ACCIDENTS AT PRESSURIZED-WATER REACTORS"
3. SUMMARY OF JULY 9, 2009, CATEGORY 1 MEETING WITH LUMINANT GENERATION COMPANY LLC ON RESOLUTION OF GENERIC LETTER 2004-02 dated July 31, 2009 (TAC NOS. MC4676 AND MC4677) [ML091970578]
4. Letter dated July 15, 2009, from Balwant K. Singal (NRC) to Rafael Flores (Luminant) - REQUEST FOR ADDITIONAL INFORMATION REGARDING RESPONSE TO GENERIC LETTER 2004-02, "POTENTIAL IMPACT OF DEBRIS BLOCKAGE ON EMERGENCY RECIRCULATION DURING DESIGN BASIS ACCIDENTS AT PRESSURIZED-WATER REACTORS" (TAC NOS. MC4676 AND MC4677) [ML091670738]

Dear Sir or Madam:

By letters dated February 29, 2008 [Reference 1] and November 26, 2008 [Reference 2] (Agencywide Documents Access and Management System (ADAMS) Accession Nos. ML080660596 and ML083500465, respectively), Luminant Generation Company LLC (Luminant Power) submitted supplemental responses to Generic Letter (GL) 2004-02, "Potential Impact of Debris Blockage on Emergency Recirculation during Design Basis Accidents at Pressurized-Water Reactors," for Comanche Peak, Units 1 and 2.

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Luminant Power met with the NRC on July 9, 2009, in a public meeting [Reference 3] addressing NRC questions regarding responses to GL 2004-02 [Reference 4] and subsequently participated in a public phone call on August 10, 2009 to wrap up the discussion of the NRC request for additional information from the public meeting. During the phone call with the NRC, Luminant Power agreed to provide specific information in response to RAI 24 and RAI 37 regarding Secondary Line Breaks to the NRC on September 10, 2009. The attachment to this letter provides that information.

This letter contains no new or revised licensing commitments regarding Comanche Peak Units 1 and 2.

Should you have any questions, please contact Mr. J. D. Seawright at (254) 897-0140.

I state under penalty of perjury that the foregoing is true and correct.

Executed on September 10, 2009.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

Rafael Flores

Attachment -

c - E. E. Collins, Region IV
B. K. Singal, NRR
Resident Inspectors, Comanche Peak

# RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION REGARDING SECONDARY LINE BREAKS

RAI 24 - "It is not clear that the main steam line break (MSLB) case was bounded by the testing that was conducted with a procedure that the NRC staff considers to be acceptable in principle. The reference for the testing was dated August 2006, which is prior to the time at which the NRC staff largely accepted a PCI/AREVA test methodology. In fact, trip reports from NRC staff observations of the early testing identify several non-conservative aspects of the testing. The more recent testing, conducted with the upgraded test procedure, did not appear to bound the debris loading for the MSLB (e.g., fibrous and Min-K debris). Please provide information that justifies that the testing used to bound the MSLB case was conducted in a manner that would result in prototypical or conservative results and that it was conducted with debris representative of that break."

RAI 37 - "The November 26, 2008, supplemental response indicates that plans do not exist to update the CPSES licensing basis for secondary pipe ruptures to include analysis of sump performance using mechanistic criteria consistent with Generic Letter (GL) 2004-02. Please address the following points regarding this decision:

a. Please identify the regulatory requirement(s) that resulted in crediting operation of the containment spray system in recirculation mode following a secondary line break inside containment in the CPSES licensing basis. Although, as the supplemental response noted, Title 10 of the *Code of Federal Regulations* (10 CFR) Section 50.46 was one of the applicable regulatory requirements identified in GL 2004-02, the GL was also based on a number of other regulatory requirements listed therein.

b. Although aspects of the licensee's secondary pipe rupture analysis are consistent with NEI 04-07, Section 3.3.4.1, the NRC staff stated in its SE for NEI 04-07 that the NEI 04-07 positions in this section were unacceptable. The NRC staffs SE discussion indicates that the same guidelines should be applied for secondary line breaks as for LOCAs. Please justify use of this section of NEI 04-07."

RESPONSE:

This response to RAI 24 and RAI 37 will be included in the next revision of ER-ESP-001. Reference sections of ER-ESP-001 are included in the response.

As noted in each previous Luminant response to Generic letter 2004-02, the Current Licensing Basis for CPNPP, as well as plant-specific features, resulted in exceptions and/or interpretations being taken to the guidance given in RG 1.82 and NEI 04-07 as modified by the SER. The SER guidance for secondary line breaks is cited in the supplemental responses as one of those exceptions.

Reference ER-ESP-001, Section 2.1 General Description

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. GDC 35 is listed in 10 CFR 50.46(d) and specifies additional ECCS requirements.

Although not traditionally considered as a component of the 10 CFR 50.46 ECCS evaluation model, the calculation of sump performance is necessary to determine if the sump and the ECCS are predicted to provide enough flow to ensure long-term cooling.

Similarly, Appendix A to 10 CFR Part 50, GDC 38 provides requirements for containment heat removal systems for LOCA, and GDC 41 provides requirements for containment atmosphere cleanup for LOCA. Comanche Peak Nuclear Power Plant credits the Containment Spray System (CSS), at least in part, with performing the safety functions to satisfy these requirements. In addition, CPNPP credits CSS with reducing the accident source term to meet the limits of 10 CFR Part 100 for LOCAs.

The mitigation of secondary line breaks, postulated in accordance with GDC 4, is not subject to 10CFR50.46, GDC 35, GDC 38 or GDC 41. Containment Spray is not required to meet the limits of 10CFR100 for secondary line breaks. Therefore, secondary line breaks were not covered by the backfit analysis in Generic Letter 2004-02.

Although the regulations identified in GL 2004-02 are not applicable to secondary line breaks, the CSS could be automatically actuated in the event of a secondary line break such as a Main Steam Line Break. Therefore, as requested by the Generic Letter, CPNPP has included an evaluation of the effect of secondary line breaks on CSS recirculation sump performance.

NOTE: The ECCS is not required for secondary line breaks.

Reference ER-ESP-001 Section 3.a.2 Secondary Line Break Selection

Secondary line breaks were considered in the evaluation (i.e., main steam lines, main feedwater lines, and steam generator blowdown lines) in order to address technical concerns with respect to containment heat removal during sump recirculation.

As noted in Section 1.1, emergency sump recirculation is not required to meet 10CFR50.46 [REF. 9.A] for secondary high energy line breaks. Core cooling for these design basis events is provided by the auxiliary feedwater and main steam system, not the emergency core cooling system (ECCS).

Regulatory Guide 1.82, Water Sources for Long-term Recirculation Cooling Following a Loss-of-Coolant Accident, Revision 3 states: "*Consistent with the requirements of 10 CFR 50.46, debris generation should be calculated for a number of postulated LOCAs of different sizes, locations, and other properties sufficient to provide assurance that the most severe postulated LOCAs are calculated. The level of severity corresponding to each postulated break should be based on the potential head loss incurred across the sump screen. Some PWRs may need recirculation from the sump for licensing basis events other than LOCAs.* ***Therefore, licensees should evaluate the licensing basis and include potential break locations in the main steam and main feedwater lines*** *as well in determining the most limiting conditions for sump operation.*"

Consistent with RG 1.82 R3, Comanche Peak Engineering evaluated the potential break locations in the current licensing basis and concluded that LOCA breaks are bounding for all debris and debris types.

The CPNPP licensing basis for break selection for secondary line breaks is Regulatory Guide 1.46 and BTP MEB 3-1 in accordance with GDC-4 as documented in the FSAR Section 3.6B [Ref. 2.B]. The NRC Staff position in NEI 04-07 SE Section 3.3.4.1 [Ref. 4.A] is that the break locations evaluated in the licensing basis "...may not have been defined specific to sump performance" and "...could not have anticipated the range of concerns identified in the course of resolving GSI-191." However, the NRC's backfit analysis in Generic letter 2004-02 was based on 10CFR50.46, GDC 35, GDC 38, and GDC 41 which are not applicable to secondary line breaks. For CPNPP, sump performance was specifically reviewed in NUREG-0797, Supplements 9 and 11 [Ref. 2.L] with respect to insulation and coating debris effects on sump performance. In SER Supplement 9, Appendix L, the NRC Staff addressed insulation debris as evaluated in Gibbs & Hill Report, "Evaluation of Paint and Insulation Debris Effects on Containment Emergency Sump Performance," [Ref 2.M]. That assessment was based on GDC-4 criteria for break selection.

In NUREG-0797 SER Supplement 21, Section 3.6.2.5, the NRC approved the request to eliminate from design consideration those pipe breaks generally referred to as arbitrary intermediate breaks." Arbitrary intermediate breaks (AIBS) are defined as those break locations that, on the basis of pipe stress analysis results, are below the stress and fatigue limits specified in Branch Technical Position (BTP) PIEB 3-1 (NUREG-0800), but are selected to provide a minimum of two postulated breaks between the terminal ends of a piping system. Comanche Peak specifically requested NRC approval of the application of alternative pipe break criteria to high energy piping systems both inside and outside containment, excluding the reactor coolant system primary loop, to exclude the dynamic effects (pipe whip, jet impingement, and compartment pressurization loads) associated with AIBs for the Comanche Peak design basis.

As described in the SER, the elimination of the dynamic effects do not affect the environmental

analysis for equipment qualification. Secondary line breaks are postulated at locations that result in the most severe environmental consequences.

Therefore, CPNPP has not changed its licensing and design basis for break selection in secondary piping for the purposes of sump performance. This position is in accordance with the GR Section 3.3.4.1. However, because the Containment Spray System would operate in the recirculation mode following a secondary line break, CPNPP elected to evaluate sump performance using the same break selection criteria as for LOCA. Exceptions to other parts of the GR and SE based on the CPNPP licensing basis for secondary line breaks are justified where taken.

In recognition of the NRC technical concerns, CPNPP has performed evaluations of secondary pipe break locations consistent with the methodology being used for LOCA as described in 3.a.1, above. Therefore, break selection was performed to assure bounding breaks were identified and evaluated.

Reference ER-ESP-001 Section 3.e.4 MSLB Debris Located at the Sump

Secondary line breaks differ from LOCAs in that the entire content of the RWST is injected into containment before the start of recirculation. With a minimum useable volume of 440,300 gallons and a maximum injection rate of 15,200 gpm, there would be a minimum of 29 minutes for wash down and settling of debris. Break flow would terminate once the faulted steam generator completes blow down. The function of the CSS to limit containment pressure and temperatures is a short term function which primarily occurs during injection. Recirculation is primarily for the longer term cool down to return to ambient conditions.

The containment cross sectional area is 14314 $ft^2$. The spray flow of 5440 gpm from one train of CSS at the top floor elevation (El 905'-6") would be 0.7 inches per minute. Wash down of Elevation 860 (floor area 6257 $ft^2$) from one train of CSS at 1340 gpm (207 $ft^3$/min) would be 0.4 inches per minute equivalent to a 24 inch per hour rainfall. Wash down of debris would be expected to be complete well before start of recirculation. Clean water entering the pool following wash down would push the settled debris away from the turbulent areas where fibrous debris would naturally tend to agglomerate. Settling of the particulate debris would further tend to weight down the settled fibers and retard transport. The primary transport mechanism to the sump in recirculation would be by tumbling which is mitigated by the debris interceptor around the strainer. Regardless, these physical phenomena were not credited in the transport analysis. The same conservative transport analysis as was used for LOCA was used for secondary line breaks.

The bounding debris load was conservatively calculated using the same methodology for transport as for LOCA except the MSLB transport only evaluated maximum two train transport. The bounding debris load is the total for both sumps.

| Bounding Debris Load for MSLB Conditions [Ref. 7.A.5] | | | | |
|---|---|---|---|---|
| Debris Type | Bounding Debris Load | Transport Fraction | Prototype Test Debris Load [Ref. 8.D.2] | Bounded by prototype test |
| RMI Small Pieces | 3044.80 $ft^2$ | 0.44 | 12318 $ft^2$ | Yes |
| RMI Large Pieces | 0.00 $ft^2$ | 0.00 | 0.00 $ft^2$ | N/A |
| Anti-sweat Fiberglass Fines (@ 4.9 lb/ft3) | 8.69 $ft^3$<br>42.6 lbs | 1.00 | 98.3 $ft^3$ @ 5.5 $lb/ft^3$<br>540.65 lbs | Yes |
| Anti-sweat Fiberglass Small (@ 4.9 lb/ft3) | 32.67 $ft^3$<br>160.0 lbs | 0.94 | | |
| Anti-sweat Fiberglass Large | 0.00 $ft^3$ | 0.01 | 0.00 $ft^3$ | N/A |
| Anti-sweat Fiberglass Jacketed | 0.00 $ft^3$ | 0.00 | 0.00 $ft^3$ | N/A |
| Kaowool | 44.2 $ft^3$<br>353.6 lbs | 1.00 | 56.1 $ft^3$<br>448.8 lbs | Yes |
| Sil-temp | 0.88 $ft^3$<br>52.4 lbs | 1.00 | 1.2 $ft^3$<br>71.4 lbs | Yes |
| Min-K Fines (Fibrous portion) | 0.81 $ft^3$<br>12.96 lbs | 1.00 | 0.5 $ft^3$<br>30 lbs | Yes |
| Min-K Fines (Particulate portion) | 3.26 $ft^3$<br>52.16 lbs | 1.00 | 34.3 lbs | Yes |
| Acceptable IOZ Paint (inside ZOI) | 366.9 lbs | 1.00 | 267.5 lbs | |
| Unqualified IOZ (outside ZOI) | 16834.2 lbs | 1.00 | 25634 lbs | |
| Acceptable Epoxy Paint (inside ZOI) | 217.5 lbs | 1.00 | 3860.9 lbs | Yes |
| Unqualified Epoxy (outside ZOI) Fines (6 mil) | 2838.02 lbs | 1.00 | 12920 lbs as particulate fines (walnut shells) | Yes |
| Unqualified Epoxy (outside ZOI) Fines (1/64") | 0.00 lbs | 0.00 | | |
| Unqualified Epoxy (outside ZOI) Small(1/8"-1/4",1/4"-½", ½"-1") | 0.00 lbs | 0.00 | | |
| Unqualified Epoxy (outside ZOI) Curled (½"-2") | 4705.95 lbs | 1.00 | | |
| Unqualified Alkyd (outside ZOI) | 103.67 lbs | 1.00 | 992 lbs | Yes |
| Dirt/Dust | 136.00 lbs | 0.80 | 170 lbs | Yes |

| Bounding Debris Load for MSLB Conditions [Ref. 7.A.5] | | | | |
|---|---|---|---|---|
| Debris Type | Bounding Debris Load | Transport Fraction | Prototype Test Debris Load [Ref. 8.D.2] | Bounded by prototype test |
| Latent Fiber | 10.00 $ft^3$ | 0.80 | 12.5 $ft^3$ | Yes |
| Unqualified Labels | 200.00 $ft^2$ | 1.00 | N/A | Sacrificial Area |
| Tape | 5.00 $ft^2$ | 1.00 | N/A | Sacrificial Area |
| Electromark Labels - Clear Outer Laminate Layer | 1229.00 $ft^2$ | 1.00 | N/A | Bounded by LOCA Testing |
| Electromark Labels - Sub-Layer | 1229.00 $ft^2$ | 1.00 | N/A | Bounded by LOCA Testing |

The above comparison shows that the prototype testing conservatively bounded the current debris generation and transport results for both fiber and particulate. To assess if the design basis LOCA testing debris load would bound the secondary line break, the following comparison was made.

| Comparison of MSLB and LOCA Test Conditions [Ref. 8.D.2 and 8.D.9] | | | | | |
|---|---|---|---|---|---|
| Debris Type | Bounding Debris Load | Prototype Test | | LOCA Test | Bounded by LOCA testing |
| | | MSLB | LOCA | | |
| RMI Small Pieces | 3044.80 $ft^2$ | 12318 $ft^2$ | 25387 $ft^2$ | 11268.82 $ft^2$ | Yes |
| RMI Large Pieces | 0.00 $ft^2$ | 0.00 $ft^2$ | 0.00 $ft^2$ | 2072.32 $ft^2$ | Yes |
| Anti-sweat Fiberglass Fines | 42.6 lbs | 540.65 lbs | 114.95 lbs | 35.9 lbs | No (1) (3) |
| Anti-sweat Fiberglass Small | 160.0 lbs | | | 116.4 lbs | |
| Anti-sweat Fiberglass Large | 0.00 $ft^3$ | 0.00 $ft^3$ | 0.00 $ft^3$ | 11.28 lbs | Yes |
| Anti-sweat Fiberglass Jacketed | 0.00 $ft^3$ | 0.00 $ft^3$ | 0.00 $ft^3$ | 11.28 lbs | Yes |
| Kaowool | 353.6 lbs | 448.8 lbs | n/a | n/a | No (1) |
| Unqualified IOZ (outside ZOI) | 16834 lbs | 25634 lbs | 25634 lbs | 17062 lbs | Yes |
| Sil-temp | 52.4 lbs | 71.4 lbs | n/a | n/a | No |
| Min-K Fines (Fibrous portion) | 12.96 lbs | 30 lbs | 30 lbs | 3.4 lbs | Prototype |
| Min-K Fines (Particulate portion) | 52.16 lbs | 34.3 lbs | 30.7 lbs | 10.2 lbs | Yes (2) |
| Acceptable IOZ Paint (inside ZOI) | 366.9 lbs | 267.5 lbs | 342.3 lbs | 376 lbs | |
| Unqualified IOZ (outside ZOI) | 16834 lbs | 25634 lbs | 25634 lbs | 17062 lbs | |
| Acceptable Epoxy Paint (inside ZOI) | 217.5 lbs | 3860.9 lbs | 4360.5 lbs | 262.91 lbs | Yes |
| Unqualified Epoxy (outside ZOI) Fines (6 mil) | 2838 lbs | 12920 lbs as particulate fines (walnut shells) | 12920 lbs as particulate fines (walnut shells) | 2838 lbs | Yes |
| Unqualified Epoxy (outside ZOI) Fines (1/64") | 0.00 lbs | | | 2394 lbs | |
| Unqualified Epoxy (outside ZOI) Small | 0.00 lbs | | | 224 lbs | |
| Unqualified Epoxy (outside ZOI) Curled | 4705.95 lbs | | | 2353 lbs | |
| Unqualified Alkyd (outside ZOI) | 103.67 lbs | 992 lbs | 992 lbs | 103.67 lbs | Yes |
| Dirt/Dust | 136.0 lbs | 170 lbs | 144.5 lbs | 136.0 lbs | Yes |
| Latent Fiber | 10.0 $ft^3$ | 12.5 $ft^3$ | 9.9 $ft^3$ | 10.0 $ft^3$ | Yes |
| Note 1: Antisweat fiberlass, Kaowool and Sil-Temp debris is not generated by the current design and licensing basis main steam and feedwater (secondary) line breaks. Therefore, LOCA testing does bound the debris for design basis main steam and feedwater line breaks. | | | | | |
| Note 2: The test surrogate for Inorganic Zinc both inside and outside the ZOI is conservative for both IOZ and for Min-K particulate. Therefore, testing bounded both Min-K and IOZ. | | | | | |
| Note 3: The MSLB testing conservatively applied 100% of the two train debris load on the prototype for one strainer. In a prototypical test, the debris would have been reduced to 50% to 60% to account for debris split between trains. In one train operation, the transport flow would be half of that for two train operation resulting in significantly reduced debris. Given this consideration, the design basis LOCA fiberglass test debris bounds the MSLB fiberglass debris. | | | | | |

Although the prototype testing in the small flume was done prior to the March 2008 NRC

guidance on testing, it provides valid data to compare that test to the design basis test in the large flume and evaluate the sump performance.

Prototype testing was done with an ultra-conservative test temperature below 50 degrees F. Fiberglass fibers settle in 20 to 60 minutes in 50 °F water versus 20 to 30 seconds in 120 °F water [NUREG/CR-2982, "...water temperature has a paramount effect on buoyancy..."]. Tests conducted at 128 °F and 169 °F confirmed the effect on settling of fiberglass [Test Report No. ITR-92-03N]. This is a significant conservatism in the prototype test because the fine fibrous debris is mixed at and around the test module at the beginning of flow and the suspended fibers did not settle as they would in a prototypical event.

The only MSLB debris type not bounded by the prototype LOCA test and the design basis LOCA test was the Kaowool and Sil-temp. These debris materials are not within the ZOI for LOCA or design basis Main Steam and Feedwater Line Breaks. A very small quantity of these materials are located in the vicinity of the steam generator blow down lines; however, these small breaks would be well bounded by LOCA breaks.

The NRC witnessed Comanche Peak prototype testing and documented observations in trip report "Staff Observations Regarding Flume Testing of a Prototype Portion of the Proposed Replacement Suction Screen Design for the Comanche Peak Steam Electric Station (DOCKET NOS. 50-445 AND 50-446)" dated June 30, 2006 [ADAMS Accession # ML061710147] It was noted that testing issues that the NRC had raised in earlier tests had been addressed.

The only notable protocol difference between the prototype MSLB and LOCA tests was the flow rate (approach velocity). Although the MSLB test had substantially more fiber, the head loss was negligible.

The test results were as follows:

- MSLB Head Loss – Small Flume 0.005 ft. (0.0044 fps)
- LOCA Head Loss – Small Flume 0.4682 ft. (0.0073 fps)
- LOCA Head Loss – Large Flume 0.6 ft. (0.0073 fps)

A comparison of the prototype LOCA testing to the design basis LOCA testing in the large flume shows that the new protocol is bounding although this is partially due to the included chemical precipitates. However, the results are still comparable. The prototype MSLB test was overwhelmingly bounded by the prototype LOCA test in the same flume with the same protocol. It is reasonable to conclude that the Prototype testing demonstrated that LOCA conditions of debris and strainer approach velocity bound the postulated MSLB conditions for sump performance for fibrous and particulate debris.

The prototype testing did not include chemical precipitates that met the current acceptance

criteria. Cooldown from a secondary line break is rapid in comparison to LOCA giving little time at high temperatures which accelerate chemical reactions. The CSS mission time for secondary line breaks is less than 10 hours. It is reasonable to assume that chemical precipitates would be insignificant in comparison to the large particulate conservatism in the MSLB prototype test and would be well bounded by the LOCA testing.

Based on the prototype testing and the arguments above, it was concluded that LOCA testing with chemicals would bound MSLB with chemicals and that testing for MSLB debris with chemicals would not be required.

Reference Section 2.1.1 Modifications and 2.1.2 Qualification of the Strainer System

Suction pressure monitoring instrumentation was added to the Containment Spray System during the GSI-191 modifications. This instrumentation gives a direct indication of the adequacy of the pump NPSH. In the event of indication of low NPSH, procedures would direct the operator to stop the affected pumps. Stopping the spray pumps for a short period of time would be insignificant to containment cooldown. Stopping suction pumps have shown a tendency to cause some of the debris bed on strainers to sluff off.

The compensatory actions in response to IE Bulletin 2003-01 were made permanent. This action is to start refill of the Refueling Water Storage Tank (RWST) so that additional water can be added to containment to increase water level and NPSH margin. Alternatively, the refilled water in the RWST could be used to back flush the strainer via the ECCS System. The discharge of one RHR pump can be cross tied to the discharge of the other RHR pump. By use of that pump's mini-flow bypass line, the running pump's discharge can be directed to the suction side of the non-running pump and to the emergency sump. Although this is not a credited design basis function, it significantly reduces the significance of potential strainer blockage due to a secondary line break.

Conclusion

Although secondary line breaks are not included in the regulatory basis for Generic Letter 2004-02 and break locations in accordance with the current licensing basis cannot generate significant quantities of fibrous debris, CPNPP has evaluated the impact of arbitrary intermediate line breaks on emergency sump performance. Conservative analysis and testings show that ECCS design basis LOCA breaks bound secondary line breaks for emergency sump performance. Therefore, Luminant concludes that the intent of Generic Letter 2004-02 has been satisfied for secondary line breaks. A change to the current licensing basis to include arbitrary intermediate line breaks and perform the associated design basis strainer head loss testing for those breaks is not warranted.