50.59 REVIEW COVERSHEET FORM

Station/Unit(s): Oyster Creek Unit 1

Activity/Document Number: ECR 06-00879 **Revision Number:** 0

Title: Drywell Floor/Trough/Drainage Inspection and Repairs

NOTE: For 50.59 Evaluations, information on this form will provide the basis for preparing the biennial summary report submitted to the NRC in accordance with the requirements of 10 CFR 50.59(d)(2).

Description of Activity:
(Provide a brief, concise description of what the proposed activity involves.)

ECR 06-00879 specifies repairs to the lower drywell elevation. The joint at the perimeter of the concrete floor slab is caulked to the steel shell of the drywell. Degraded concrete around the pipes to and from the drain trough is repaired with grout. The existing trench into the concrete slab, in bay 5, is excavate slightly deeper. The degraded concrete surface of the raised slab in the sub-pile room is accepted as-is. The non-uniform slope of the sub-pile room drain trough is also accepted as-is.

Reason for Activity:
(Discuss why the proposed activity is being performed.)

Water was found in one of the 2 trenches in the drywell concrete floor slab. Extensive study (ref. A2152754 E05) was performed to evaluate the potential causes and effects. ECR 06-00879 was created to implement repairs to limit the amount of water that would bypass the intended drainage path and enter the floor slab crevices.

Effect of Activity:
(Discuss how the activity impacts plant operations, design bases, or safety analyses described in the UFSAR.)

The specified repairs do not impact plant operations or operability. There is no deviation from any described system function, method of operation, design basis or safety analysis described in the UFSAR. The repairs will help to ensure that the drywell drainage paths function as originally intended and designed.

Summary of Conclusion for the Activity's 50.59 Review:
(Provide justification for the conclusion, including sufficient detail to recognize and understand the essential arguments leading to the conclusion. Provide more than a simple statement that a 50.59 Screening, 50.59 Evaluation, or a License Amendment Request, as applicable, is not required.)

A 50.59 screening was prepared, and all five questions are answered "no". The repairs do not invalidate any stated or implied conditions of the UFSAR regarding plant SSC condition, operation or reason for acceptance, but rather serve to restore the intended design function of the drywell drainage system. Based on the assessment and screening responses, a 50.59 evaluation is not required, and the activity can proceed without prior NRC approval.

Attachments:
Attach all 50.59 Review forms completed, as appropriate.
(NOTE: if both a Screening and Evaluation are completed, no Screening No. is required.)

Forms Attached: (Check all that apply.)

[ ]	**Applicability Review**				
[X]	**50.59 Screening**	**50.59 Screening No.**	OC-2006-S-0379	**Rev.**	0
[ ]	**50.59 Evaluation**	**50.59 Evaluation No.**		**Rev.**	

50.59 SCREENING FORM

50.59 Screening No. OC-2006-S-0379 **Rev. No.** 0

Activity/Document Number: ECR 06-00879 **Revision Number:** 0

I. 50.59 Screening Questions (Check correct response and provide separate written response providing the basis for the answer to each question)(See Section 5 of the Resource Manual (RM) for additional guidance):

1.	Does the proposed Activity involve a change to an SSC that adversely affects an UFSAR described design function? (See Section 5.2.2.1 of the RM)	___ YES	X NO
2.	Does the proposed Activity involve a change to a procedure that adversely affects how UFSAR described SSC design functions are performed or controlled? (See Section 5.2.2.2 of the RM)	___ YES	X NO
3.	Does the proposed Activity involve an adverse change to an element of a UFSAR described evaluation methodology, or use of an alternative evaluation methodology, that is used in establishing the design bases or used in the safety analyses? (See Section 5.2.2.3 of the RM)	___ YES	X NO
4.	Does the proposed Activity involve a test or experiment not described in the UFSAR, where an SSC is utilized or controlled in a manner that is outside the reference bounds of the design for that SSC or is inconsistent with analyses or descriptions in the UFSAR? (See Section 5.2.2.4 of the RM)	___ YES	X NO
5.	Does the proposed Activity require a change in the Technical Specifications or Operating License? (See Section 5.2.2.5 of the RM)	___ YES	X NO

II. List the documents (e.g., UFSAR, Technical Specifications, other licensing basis, technical, commitments, etc.) reviewed, including sections numbers where relevant information was found (if not identified in the response to each question). See below.

III. Select the appropriate conditions:

X	If all questions are answered NO, **then** complete the 50.59 Screening and implement the Activity per the applicable governing procedure.
	If question 1, 2, 3, or 4 is answered YES and question 5 is answered NO, **then** a 50.59 Evaluation shall be performed.
	If questions 1, 2, 3, and 4 are answered NO and question 5 is answered YES, **then** a License Amendment is required prior to implementation of the Activity.
	If question 5 is answered YES for any portion of an Activity, **then** a License Amendment is required prior to implementation of that portion of the Activity. In addition, **if** question 1, 2, 3, or 4 is answered YES for the remaining portions of the Activity, **then** a 50.59 Evaluation shall be performed for the remaining portions of the Activity.

IV. Screening Signoffs:

50.59 Screener: PR Kester / DP Knepper (Print name) Sign: [signature] (Signature) Date: 10/27/06 11/3/06

50.59 Reviewer: Peter Tamburro (Print name) Sign: [signature] (Signature) Date: 11/3/06

Approved by Mike Godknecht for SAMG & PRA Issues
Per telecon Pat TL 11/4/06

50.59 SCREENING FORM

50.59 Screening No. OC-2006-S-0379 **Rev. No.** 0

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Expanded Responses:

1. Does the proposed Activity involve a change to an SSC that adversely affects an UFSAR described design function?

No. The UFSAR contains extensive discussion on the concrete outside of, and beneath, the steel drywell shell, including the gap between the two. That is because that concrete provides important shielding and support functions, and the gap is essential to these functions. However, there is very little mention of the concrete floor slab inside of the drywell. Section 3.8.3.1.1, "Fill Slab", states that the concrete provides a working surface and transfers the loads of the drywell internal structures to the shell through direct bearing. Design functions of the fill slab are not impacted by the repairs performed under ECR 06-00879. The caulk installation serves to prevent water from entering any gaps between the slab and shell, and has no impact on the load transfer or support functions. Inspection of the caulk will be performed every four years under the structural monitoring program to ensure that it does not degrade.
The drywell sump's purpose is to collect all leakage in the drywell so that it can be monitored and quantified, as well as appropriately discharged. The trough and its supply and discharge paths direct the drains to the sump. The concrete repairs specified serve to restore the full capability of these functions by preventing any unintended diversion of the drains. The conditions of the raised floor slab section and the trough slope were determined to have no impact on the drainage function or the structural function of the concrete. This activity will leave the two trenches empty. This empty space may slightly delay the measurement of unidentified leak rate, which is measured by the 1-8 sump. The open trenches may collect unidentified leakage and temporarily prevent the leakage from reaching 1-8 sump. This delay has been evaluated in the ECR attachment 1 and is concluded to be minor. Tech. Spec. 3.3.D.1 requires that reactor coolant shall be limited to a 2 gpm increase in a 24 hour period. Assuming a 2 gpm leak were to instantaneously develop and leak into both trenches at the same time, it would take about 30 minutes for the trenches to fill and overflow at which point the leakage would enter the 1-8 sump. In addition the Tech Spec. requires that reactor coolant shall be limited to 5 gpm. Increases over 5 gpm over a short time frame are bounded by the tech spec requirement for the 2 gpm increase over a 24 hour period. Assuming a 5 gpm leak were to instantaneously develop and leak into both trenches at the same time, it would take about 12 minutes for the trenches to fill and overflow at which point the leakage would enter the 1-8 sump.

The torus suction strainers serve the function of preventing debris from damaging the ECCS pumps. The UFSAR section 6.3.2.2.3 describes the design analysis which ensures that excessive debris is not created such that the suction strainers could become too clogged by debris to allow sufficient flow to the pumps. That analysis was reviewed. The result of the materials (that could generate clogging debris) added and removed from the drywell by the subject ECR is a net reduction in these materials. Therefore there is no adverse effect on the analysis.

The 1986 removal of concrete from the floor and curb, that formed the trenches in Bay 5 and 17, does not affect any safety related design functions. A review of the Design Basis Accidents documented in chapter 15 of the UFSAR shows that the floor and curb are not credited for mitigation of design accidents. In addition it does not adversely affect the design inputs, assumptions or conclusions of the GE Design Bases Analysis of the Drywell Vessel (reference GE Report "An ASME Section VIII Evaluation of Oyster Creek Drywell for Without Sand Case Part I Stress Analysis -Index 9.3" dated Feb 1991). The effects of the missing curb will not have a significant effect on the Design Basis Accident Analysis of the Containment Shell as discussed in attachment 1 section 4.1.9 of the ECR.

The curb feature (which is unique to Oyster Creek) has been credited in some Severe Accident Mitigation Events. However the overall benefit of the curb is marginal. The PRA implications of the curb removal were not specifically addressed at the time the PRA was developed, which was after 1986. IR 550022 has been issued to address this omission. An initial review has been completed and the results demonstrate a less than significant impact on LERF and no impact on CDF.

The minor amount of concrete removed from the existing trench in bay 5 is in an area where it also has no impact on these functions.

Therefore the scope of ECR 06-00879 does not adversely affect any design function that is described, implied or referred to in the UFSAR.

50.59 SCREENING FORM

50.59 Screening No. OC-2006-S-0379 **Rev. No.** 0

Activity/Document Number: ECR 06-00879 **Revision Number:** 0

2. Does the proposed Activity involve a change to a procedure that adversely affects how UFSAR described SSC design functions are performed or controlled?

   No. All of the changes made by the subject ECR are passive in nature, and do not affect the performance or control of any plant operations or evolutions. The repairs do not impact operation of the drywell sump, drywell structures or equipment or ECCS systems. No plant processes or procedures are affected by the changes. Therefore the scope of ECR 06-00879 does not adversely affect the performance or control of any UFSAR described design function.

3. Does the proposed Activity involve an adverse change to an element of a UFSAR described evaluation methodology, or use of an alternative evaluation methodology, that is used in establishing the design bases or used in the safety analyses?

   No. The design analysis for suction strainer clogging described in the UFSAR was reviewed with regard to the materials added by the subject ECR. The net change in debris generating materials was evaluated using the existing methodology of the design analysis to establish its acceptability. There are no other evaluation methodologies involved with this activity. Therefore the evaluation methodology used within ECR 06-00879 does not deviate from those described in the UFSAR.

4. Does the proposed Activity involve a test or experiment not described in the UFSAR, where an SSC is utilized or controlled in a manner that is outside the reference bounds of the design for that SSC or is inconsistent with analyses or descriptions in the UFSAR?

   No. The purpose of the repairs is to direct drywell drains to the sump, as described in the UFSAR. The caulk and grout serve to restore this function. The addition of the materials has been evaluated in accordance with existing analyses and processes, and was found to be acceptable. The scope of ECR 06-00879 does not affect the use or control of any plant SSC. Therefore this activity does not involve any test or experiment that is not bounded by the UFSAR.

5. Does the proposed Activity require a change in the Technical Specifications or Operating License?

   No. The repairs in ECR 06-00879 are passive in nature and do not affect the operational parameters or operability of any plant SSC. Additionally, none of the required actions or limits for operation of the Technical Specification or Operating License are impacted by the repairs. Therefore no changes are required to the Technical Specifications or Operating License.

Documents Reviewed:

UFSAR: Overview of entire document, plus detailed review of sections 1.2, 1.9, 3.8.2, 3.8.3, 5.2.5, 6.2, 6.3, 9.3, 11.2.

Tech Spec: Overview of entire document, plus detailed review of sections 3.4, 3.5, 4.4, 4.5, 5.2.

Operating License DPR-16: Entire Document

References:

1. IR 546049, Water Observed Coming Into The Trench In Bay 5 Of Drywell

ECR 06-00879 Rev. 0
Attachment 1 – Design Attribute Review

DESIGN ATTRIBUTES (Numbers correspond to CC-AA-102 rev 13, Att. 1 list items)

4.1.4.1 IDENTIFY BASIC SSC FUNCTIONS:

The Containment is an enclosure for the reactor vessel, the Reactor Coolant Recirculation System, and other branch connections of the Reactor Coolant System. Per UFSAR section 6.2.1, the design criteria for the Containment are as follows:

a. To withstand the peak transient pressure (coincident with an earthquake) which could occur due to the postulated break of any pipe inside the drywell.
b. To channel the flows from postulated pipe breaks to the torus.
c. To withstand the force caused by the impingement of the fluid from a break in the largest local pipe or connection, without containment failure.
d. To limit primary containment leakage rate during and following a postulated break in the primary system to substantially less than that which would result in offsite doses approaching the limiting values in 10CFR100.
e. To include provisions for leak rate tests.

The concrete floor slab at the base of the drywell provides a foundation for the RPV support pedestal, as well as a level support surface for personnel and equipment. The slab internal to the pedestal has an additional 6"slab on top, and is therefore at a higher elevation than the slab outboard of the pedestal, with the exception of the 6" wide trough just inboard of the pedestal. Drains external to the pedestal can reach the trough (and sump) via four pipes in the base of the pedestal that connect the inboard and outboard areas. The higher slab inside of the pedestal is sloped downward from the center to shed water to the trough.

4.1.4.2 IDENTIFY SAFETY CLASSIFICATION OF CONFIGURATION CHANGE:

The structural support function of the concrete slab is safety related, in that it provides structural integrity for the reactor vessel and its supporting equipment. The steel drywell containment vessel is also safety related, providing the containment integrity. The concrete slab is not required to be impregnable to water, as justified in tech eval A2152754 E06*. Therefore any coatings and caulks are not safety related, and only provide the desired effect of minimizing water infiltration into the concrete/steel shell interface. This ECR is classified as safety related, however, because the added materials come into contact with the safety related steel and concrete, and could potentially have an adverse effect on them. Accordingly, the caulking material is Augmented, "A" Qualifty.

4.1.4.3 IDENTIFY SEISMIC CLASSIFICATION OF SSC :

The steel drywell vessel and the concrete floor slab are Seismic Category I structures. Any added coatings or caulks do not affect these seismic capabilities. Therefore there are no seismic qualification requirements for added coatings or caulks. The concrete/steel shell interface is not considered a seismic gap.

4.1.5 IDENTIFY PERFORMANCE REQUIREMENTS:

Coatings and caulk shall not degrade or alter the strength and integrity of the steel containment vessel and the concrete floor slab. Cementitious grout has a cured compressive strength as high, or typically higher than concrete, so it will behave in the same manner as the concrete to which it is applied. This prevents the need for consideration of any new failure effects for the grout. The caulk shall be qualified to remain adhered under all potential drywell conditions identified in procedure ES-027, with the exception of jet impingement.

4.1.6 DESIGN REQUIREMENTS FOR SURVEILANCE AND ACCEPTANCE TESTING:

The design allows for future inspections of the installed caulk as required under the ASME Section XI program.

4.1.7 SPECIFICATIONS, CODES, STANDARDS, OR REGULATORY REQUIREMENTS:

Specification IS-328227-004 Rev 13, "Function Requirements for Drywell Containment Vessel Thickness Examinations".

OC Station Procedure No. 2400-SMM-3150.16, "Mixing and Placement of Grouts".

GE NEDO-32686, Rev 0, "Utility Resolution Guidance for ECCS Suction Strainer Blockage".

EP-057, "Component Record List Control".

EP-011, "Methodology for Assigning and Maintaining the Quality Classification of Components".

ES-027, "Environmental Parameters – Oyster Creek NGS".

4.1.8 PWR SUMP PROGRAM IMPACTS FOR BRAIDWOOD, BYRON AND TMI:

Not applicable.

4.1.9 CALCULATIONS OR DESIGN ANALYSES AFFECTED:

The effect of the missing curb will not have a significant effect on the Design Basis Accident analysis of the Containment Shell For the following reasons:

The finite element models used in the GE analysis of the containment shell has fixed boundary conditions at the base where it is supported by the concrete foundation. With the sand bed removed, this interface is modeled at the base of the sand bed region (El 8' 11 7/8") The concrete floor inside the drywell at El 10'-3" extends up to an elevation of 12' –3". The concrete floor and curbs above the bottom of the sand pocket region were not considered to provide any support to the Drywell shell.

~~The thermal analysis considered that the temperatures of the shell behind the curb were~~ lower than that of the shell exposed to the drywell atmosphere. There are two portions of the curb that have been removed, each being approximately 16 inches wide. Cutting this small portion of the curb will expose a portion of the shell to higher temperatures. This will have a negligible affect on the shell thermal distribution and the

thermal analysis stresses. A review of the GE stress report indicated that in the sandbed region the highest stress (primary & secondary) is due to load Case VI (Post –Accident condition) – Gravity, Flooded Seismic) which is a primary stress check and does not included the DBA accident temperature load. The load condition that includes the DBA accident temperature is Load Case V-1. This load case has a maximum primary plus secondary stress in the sandbed region, which is approximately 73 percent of the allowable stress. The Load Case V-1 includes the pressure, gravity, unflooded seismic, seismic relative support displacement and temperature gradient during DBA loads. The load case would conservatively determine combined stresses because the pressure and thermal stress will not maximize simulataneously. The local change in the shell temperature where the curb has been removed will increase the thermal stress in a localized area but this increase is judged not to be significant. The stresses are secondary and localized. The event is a one time loading that has no affect on metal fatigue. Any localized change in the thermal stress can be accommodated by the existing margin to the allowable stress.

As documented in Technical Evaluations A2152754-05, the amount of potential drywell debris that could enter the ECCS suction strainers is evaluated in calculation C-1302-241-E610-081. The grout behaves as the concrete already present in the drywell, and therefore does not contribute to the potential debris. No additional debris will be created by its presence, since it provides the same surface area available for abrasion or spalling during the DBA as the concrete, and has equal or better strength than the concrete.

The caulk can become dislodged by a water jet, and therefore must be addressed as potential additional debris. However, the amount of caulk added is less than the amount of silicone foam and elastomer removed from either one of the two trenches, and the silicone material was removed from both trenches. Therefore there is no net increase in mass that could clog the suction strainers. The calculation does not specifically address the silicone foam in the trenches, but rather generically includes dust, dirt, concrete and debris in typical amounts for nuclear plants. The amounts are not based on the drywell inventory specific to Oyster Creek (except for insulation), but are numbers utilized by the industry as typical. Since the caulk being added is typically installed in nuclear plants, it can reasonably be considered to be captured in the generic debris amounts utilized in the calculation. Thus, from a practical perspective, there is no net increase in the mass of material in the drywell. And from a configuration control perspective, the caulk being installed is represented in the existing mass values used in the calculation. Therefore it is not necessary to revise the numerical values of the calculation, and the calculation remains accurate to the same degree as when it was originally created. However, text is added to alert calculation users of this issue, and that the mass values are considered to include the caulk installed by this ECR.

There are additional facts that reduce the threat of suction strainer clogging from the caulk. The caulk is at the lowest level of the drywell, installed in a corner joint. The position of the recirc pumps and piping are such that a break would impinge on the caulk in a direction that would push it into the corner rather than in a direction that would tear it from the corner. If it were to be dislodged, its position is below the downcomers such that it would have to travel upward in the drywell to reach the torus. In most line breaks,

flow in the drywell is downward to the downcomers, making it unlikely that the caulk strip would be washed upward. The cured caulk has a density roughly 1.5 times that of water, making it likely that it will remain at the bottom of the drywell and not reach the torus.

In some areas, backer rod will need to be installed in the gap between the concrete slab and the steel shell, to reduce the amount of caulk needed. The backer rod is a negligible contribution to debris. The installer estimates that 10' of perimeter will require its use. This amount of rod weighs on the order of a few ounces, which is insignificant compared to the calculation weights of 150 pounds for dust, dirt and concrete, and 25 pounds for miscellaneous additional debris. In addition, the backer rod will float, and therefore will not get to the suction strainers to contribute to their clogging. However, it is very unlikely that the backer rod will dislodge at all. It is a high friction, compressible material that will be wedged into the gap between the steel shell and the concrete. Any water jet or other DBA will not penetrate into this gap with any significant force, so the rod is expected to remain in its installed location under all conditions. Therefore use of the backer rod is acceptable, and no calculation changes are required to reflect its use.

4.1.10 REDUNDANCY, DIVERSITY AND SEPARATION REQUIREMENTS:

Not applicable to this modification.

4.1.11 FAILURE EFFECTS REQUIREMENTS :

As discussed above, the grout is no different than the concrete floor slab already present, so its presence does not add any new potential failure effects. It is used to restore the contour to the trough in the sub-pile room. The grout will be placed in accordance with Procedure 2400-SMM-3150.16 with adequate controls to ensure that the grout will not experience bonding failure to the existing concrete. However, if it became delaminated from the concrete substrate, it would result in localized ponding in the trough, and could potentially reach the sump. Localized ponding in the trough is not a concern, since it would not damage the remaining concrete and would allow a negligible volume of water to remain in the drywell. Any grout that reached the sump would remain on the bottom of the sump, and would not affect the operation of the sump pump.

Procedure ES-027 for the DBLOCA defines the environmental parameters inside the drywell. The caulking materials will survive the DBLOCA environmental parameters with exception of the impingement zone of influence caused by the recirculation piping in close proximity to the caulked joints. Failure of the caulk bond could result in water infiltrating the crevice between the concrete drywell floor and the steel drywell vessel. This is acceptable, as determined in A2152754 E06*. The caulk could become dislodged and travel through the downcomers to the torus. This has been addressed in the debris analysis as discussed above. The caulk is sufficiently flexible to accommodate any movement of the drywell vessel relative to its concrete floor slab, and will not restrict this movement. The caulk remains flexible and will remain adhered under the expected range of relative motion, having an elongation capability of 500 to 550 percent. The caulk

material used has also been successfully tested to the radiation dose associated with plant life service plus accident conditions (see ECR attachments).

4.1.12 USE ATTACHMENT 2 TO IDENTIFY FIRE PROTECTION AND APPENDIX R SAFE SHUTDOWN REQUIREMENTS:

All screening questions of CC-AA-102 Att. 2 are answered "no". Therefore a formal fire protection review is not required. In particular, question 1 is answered "no" based on the following reasons: The grout material is essentially concrete, and is not flammable. The MSDS for the caulk indicates that the material has an NFPA flammability rating of zero, and that it is not a fire hazard. Review by the fire protection program manager indicates that there is no impact to the fire protection and Appendix R safe shutdown requirements and that the amount of polyethylene backer rod material is insignificant, the material is not exposed, there is no fire source in the area, and the environment is inerted.

4.1.13 MATERIAL AND MATERIAL SUITABILITY REQUIREMENTS:

The cementitious grout used is compatible with the wet environment of the drywell and the concrete floor slab to which it is bonded, and is not adversely affected by the radiation levels present. The caulk material is designed for this type of application and has been qualified to perform satisfactorily under drywell design basis accident conditions. Furthermore, the caulking material is compatible with the DW steel shell structure and concrete structure and will not result in harmful chemical reactions to any of these structures. The backer rod is also compatible with the drywell environment, and will not react with the steel, concrete, or drywell atmosphere.

4.1.14 ENVIRONMENTAL CONDITIONS AND IMPACTS:

The installed materials are rated for the drywell normal and accident conditions provided in procedure ES-027. The materials are essentially inert once cured, and will have no effect on the drywell environment. They are not flammable and do not generate any flammable gases, with the exception of the small amount of backer rod added, which has been accepted in the fire protection review. This modification does not affect the temperature, pressure or humidity of the drywell environment.

4.1.15 EQUIPMENT ENVIRONMENTAL QUALIFICATION:

These modifications do not install any equipment requiring environmental qualification, and do not affect the EQ of any existing equipment.

4.1.16 OPERATING EXPERIENCE:

These repairs are based, in part, on the past findings documented in the structural monitoring program, as discussed in the ECR introduction. The caulk applied to the drywell floor joint is the same material used successfully in this application at Peach Bottom, Turkey Point, St. Lucie, Oconee, Catawba, McGuire, and Wolsong, per the coatings consultant on site for the outage (Jon Cavallo, VP of Corrosion Control Consultants and Labs, Inc.).

4.1.17 EPIX DATABASE IMPACTS:

None.

4.1.18 PRA IMPACTS:

Although the Level 2 PRA took some credit for the curb probabilistically, the minor amount of concrete removed from the trench in Bay 5 is not significant enough to markedly change LERF or the conclusions of the SAMA analysis, (Ref. IR 550022). The failure probabilities for the OC liner due to core material impingement are not significantly different than those for other Mark I containments where the concrete curb does not exist. Therefore there are no impacts to the PRA analysis.

4.1.19 SYSTEM OPERATIONAL REQUIREMENTS:

The ECCS suction strainers must not become clogged to the point that they affect the operability of the ECCS systems. The amount of installed material that could become dislodged and reach the suction strainers has been analyzed and found to be within the available margin for continued operability of ECCS systems. Also, materials installed will not affect the operation of the drywell sump pumps.

4.1.20 HUMAN FACTORS REQUIREMENTS:

Not applicable to this ECR.

4.1.21 USE ATTACHMENT 9 TO IDENTIFY PROCEDURE CHANGES:

The requirement to inspect the caulk will be added to procedure ER-OC-330-1006 for the Containment ISI program inspections IAW ASME Section XI program and is tracked under A2152754-11. Based on review of attachment 9 and the impact review performed, there are no other procedure impacts. Strct. Mon. Prog.

4.1.22 TRAINING REQUIREMENTS:

None required.

4.1.23 SYSTEM INTERFACE REQUIREMENTS:

This activity will leave the two trenches that were previously filed with a foam material empty. This empty space may slightly delay the measurement of unidentified leak rate which is measured by the 1-8 sump. The open trenches may collect unidentified leakage and temporarily prevent the leakage from reaching 1-8 sump. However this delay is conservatively estimated to be no more than a 30 minutes. The total empty volume of the both trench is estimated to be approximately 50 gallons. Tech. Spec. 3.3.D.1 requires that reactor coolant shall be limited to a 2 gpm increase in a 24 hour period. Assuming a 2 gpm leak were to instantaneously develop and leak into both trenches at the same time, it would take about 30 minutes for the trenches to fill and overflow at which point the leakage would enter the 1-8 sump.

5 ppm 12 mm

The installed materials are primarily structural and cosmetic repairs, and do not interface with any other plant systems.

4.1.24 LAYOUT AND ARRANGEMENT REQUIREMENTS:
There are no special requirements for these modifications.

4.1.25 USE ATTACHMENT 5 TO DETERMINE RADIATION PROTECTION / ALARA APPLICABILITY:
Based on the responses to the attachment 5 questions, an ALARA review is required for this scope of work.

4.1.26 WALKDOWNS:
Several walkdowns and inspections were performed by engineering, planning and the work group to determine the best course of action and the preferred design solution. The walkdowns established the existing field conditions, and the installability of the intended design solutions.

4.1.27 ACCESS FOR MAINTENANCE, REPAIR, ISI, OR IST:
The design allows for future inspections of the installed caulk as required under the ASME Section XI program, and for future inspections of the trenches to determine if they contain water. The installed caulk and grout does not impede access to any plant equipment.

4.1.28 HANDLING, STORAGE, CLEANING, SHIPPING AND TRANSPORTING REQUIREMENTS:
Cleaning requirements in preparation for application of the caulking material are specified in AWA #3 of this ECR.

4.1.29 EMERGENCY PLAN IMPACT:
None for this modification.

4.1.30 INDUSTRIAL SAFETY REQUIREMENTS:
The MSDS for all materials should be obtained by the work group, and reviewed to determine the applicable hazards and precautions.

4.1.31 USE ATTACHMENT 6 TO DETERMINE IMPACT ON NUCLEAR FUEL, CORE COMPONENTS, CORE DESIGN, REACTIVITY MANAGEMENT, CRITICALITY CONTROL AND ACCOUNTABILITY OF NUCLEAR MATERIALS, AND TRANSIENT AND ACCIDENT ANALYSES:
There are no impacts. The materials used are qualified for the drywell environment. Potential creation of debris under DBA conditions has been evaluated and determined to be bounded by the existing conditions and analyses.

4.1.32 LOAD PATH REQUIREMENTS:
There are no special handling requirements for the materials used for these modifications.

4.1.33 MECHANICAL SYSTEM DESIGN LIMITS:

None applicable.

4.1.34 IDENTIFY CHEMISTRY REQUIREMENTS:
Chemistry has approved the materials applied by this ECR for use in the drywell. Leachable contaminants are within the limits of this environment.

4.1.35 ELECTRICAL REQUIREMENTS:
Not applicable.

4.1.36 INSTRUMENT AND CONTROL REQUIREMENTS:
Not applicable.

4.1.37 SECURITY REQUIREMENTS:
Not applicable.

4.1.38 IDENTIFY CIVIL / STRUCTURAL REQUIREMENTS:
The repairs do not perform a structural function, but only serve to direct water to the drywell sump. The materials utilized are compatible with, and do not affect the structural integrity of the existing structural elements.

4.1.39 IDENTIFY SEISMIC / DYNAMIC QUALIFICATION REQUIREMENTS:
Similar to the above item, the installed materials do not have a seismic function or requirements, and do not impact the seismic capabilities of existing SSC's.

4.1.40 PERSONNEL REQUIREMENTS:
Personnel shall be qualified for installation of the materials specified.

4.1.41 SPECIAL PROCEDURES OR SPECIAL INSTALLATION SPECIFICATIONS:
The applicable portions of Specification IS-328227-004 rev. 13 are referred to in the work instructions of AWA #5. Unless directed otherwise within this ECR, all materials shall be installed in accordance with the manufacturer's instructions. Grout is to be installed in accordance with Specification IS-551-81-6 as directed in AWA #1.

4.1.42 IDENTIFY / OBTAIN INTERFACING DEPARTMENT REVIEWS:
Interface reviews have been performed by the work group (Dave Ryan), the Venture planner (John Burt), Operations (Robin Brown), the structural monitoring program owner (Sugit Niogi), the system manager (Sylvain Schwartz), the fire protection program manager (Mark Carlson) and the ISI program manager (Greg Harttraft). The completed reviews are attached to this ECR. All identified impacts have been addressed, or have a tracking mechanism to ensure their completion.

4.1.43 USE ATTACHMENT 11 TO DETERMINE POTENTIAL IMPACT ON LICENSE RENEWAL:
This ECR directs a VT inspection of the drywell 1-8 sump pit liner and tracked under A2152754-13, which will satisfy the structural monitoring requirement for license renewal and tracked under A2152754-13. All of the questions of attachment 11 are

answered "no". The SSC's involved are not affected, and the materials installed do not perform any of the roles or functions addressed by the screening questions.

4.1.44 NEIL REQUIREMENTS:
None.

4.1.45 PERFORM A SINGLE POINT VULNERABILITY (SPV) REVIEW:
A single point vulnerability (SPV) review has been performed for this ECR to identify all events that can result in an unplanned reactor scram in a proactive manner, with the intent of taking action to prevent such events. No SPV's were identified. This ECR does not eliminate any existing SPV's, and does not create any new SPV's.

4.1.46 STEAM GENERATOR REPLACEMENTS:
Not applicable.

4.4 USE ATTACHMENT 7 TO IDENTIFY CONFIGURATION CONTROL ACTIVITIES:
In order to inspect the caulk at the drywell floor under the ISI program, it must be listed as a component in the component database (CRL). Therefore component ID NR01\MB001-INT (system 187) has been created for the caulk.
Drawing BR 4070 sheet 1 is posted by this ECR, to show the caulk installation.
Drawing GU 3B-153-34-1000 is also posted to indicate that the silicone foam and elastomer are no longer installed in the 2 trenches (no markup required).
The silicone foam and elastomer removed from the trenches was installed under specification IS-328227-003. This document could not be located in EDMS, but the posting of the drawing (above) to indicate removal of these materials provides sufficient configuration control.
No drawing revision is needed for the grout repairs around the embedded pipes to and from the trough. These repairs restore the trough to its design configuration and do not affect any drawings.
Calculation C-1302-241-E610-081 is revised to indicate that the caulk material is to be considered as included in the debris tally on sheet 5 of the calculation.

4.5 USE ATTACHMENT 8 TO IDENTIFY AFFECTED PROGRAMS:
The ISI program is impacted by this ECR. Future inspection of the caulk is required, and this is implemented by revision to procedure ER-OC-330-1006 and tracked under A2152754-11. Furthermore, the Structures Monitoring Program is impacted by this ECR and Procedure ER-OC-450 will be updated as required by the program owner and will be tracked under A2152754-11.
*Note: This document refers to A2152754 E06 in several places and relies on its conclusions. At the time of preparation of this document, that evaluation had been prepared and reviewed, but not yet approved. Therefore its approval, with conclusions that still support the information in this document, must be verified prior to closure of this document.

Evaluation A2152754 E06 has been complete without impact on this ECR

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NUMBER: OC 06-00879 000 ECR TYPE: DCP

ASSIGNED ORG: OEDM
ASSIGNED INDV: KESTER, PR
INITIATOR: TAMBURRO
REQUEST ORG: OED
A/R NO: A2152754
PROJECT NO: ____ ___ _____

PRINT DATE/TIME: 11/04/06 13:50
REQUIRED DATE: 11/04/06
ECR STATUS: APPVD
STATUS DATE: 11/04/06
INIT. DATE: 10/24/06
A/R STATUS: ASIGND

A/R SUBJECT: DRYWELL FLOOR/TROUGH/DRAINAGE INSPECTIONS AND REPAIRS

==========

A. IDENTIFICATION:

SYSTEM: COMP ID: OC 1 187 F MISC 187
INIT OPER: Y QA CLASS: Q POTL REPT: N
TECH SPEC: Y REQD IN MODES: 1 2 3
PAGES ATTACHED: Y NO. OF PAGES: 38 ID/DATE: JDH1 11/03/06

PROBLEM DESCRIPTION and PROPOSED DISPOSITION:

DURING 1R21, WATER WAS DISCOVERED IN THE EXCAVATED TRENCH OF THE DRYWELL ELEVATION 10'-3" FLOOR. THIS ECR WILL PROVIDE FOR INSPECTION AND REPAIR OF THE DRAINAGE PROVISIONS FOR THIS FLOOR, AS WELL AS PROTECTION OF THE DRYWELL SHELL.

.

IN PARTICULAR, THIS ECR ADDRESSES:
1- CLEANING, INSPECTION AND REPAIR, AS NEEDED, OF THE SUB-PILE ROOM TRENCH (CONCRETE AREA UNDER REACTOR VESSEL) INCLUDING THE ENTRANCE TO THE PIPE THAT DIRECTS THE DRAINS TO THE SUMP.
2- CLEANING AND INSPECTION OF THE DRYWELL SUMP.
3- CLEANING AND PREPARATION OF THE INTERFACE OF THE DRYWELL FLOOR AND DRYWELL SHELL, AND INSTALLATION OF A CAULKING MATERIAL INTENDED TO PREVENT WATER INFILTRATION.
4- ADDITIONAL EXCAVATION OF THE TRENCH AT BAY 5, TO ALLOW FOR FURTHER UT EXAMINATION OF THE DRYWELL SHELL, FOLLOWED BY PARTIAL GROUTING OF THAT TRENCH TO OPTIMIZE ONGOING PROTECTION OF THE DRYWELL SHELL.

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NOTE: THIS ECR WAS CREATED AS A REPLACEMENT FOR ECR 06-00875, IN ORDER TO HAVE THE ECR UNDER THE APPROPRIATE A/R.

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B. EVALUATION:

50.59 REVIEW REQD: Y ORIG 50.59 REVIEW AFFECTED: N 50.59 SE REQD: N
REPORTABLE: N DATE/TIME: _____ _____
STATION PROC/PROGRAM REVIEW COMPLT: ___ CAUSE: I
FINAL OPERABILITY: COMP: ___ SYSTEM: ___ PLANT: ___
SSV NAME: _____ SSV DATE/TIME: _____ _____
SCHED CODE/WINDW: 1R21 187 CEG0 10/21/06
ADVANCED WORK AUTH: Y FINAL DISP: RP INTERIM DISP: _

APPROVED DISPOSITION:

AWA FOR DRYWELL FLOOR REPAIRS:

THE FOLLOWING ADVANCED WORK AUTHORIZATIONS ARE PREPARED IN ACCORDANCE WITH CC-AA-103. THE WORK DESCRIBED BELOW DOES NOT AFFECT ANY IN-SERVICE EQUIPMENT. THE SCOPE AND SPECIAL INSTRUCTIONS ARE AS DESCRIBED IN EACH SECTION BELOW.

AWA #1 - SUB-PILE ROOM (CONCRETE AREA UNDER REACTOR VESSEL) TROUGH CLEANING, INSPECTION AND PARIAL REPAIR:

THE TROUGH IS THE DRAINAGE TRENCH AT THE SUB-PILE ROOM PERIMETER. THE TROUGH MUST BE THOROUGHLY CLEANED AND INSPECTED, TO DETERMINE IF REPAIRS ARE REQUIRED. ALL STANDING WATER SHOULD BE REMOVED FROM THE TRENCH. ALL LOOSE MATERIAL (DEBRIS, LOOSE AGGREGATE, ETC.) MUST BE REMOVED. IN PARTICULAR, ALL LOOSE OR EASILY LOOSENED MATERIAL IN THE TROUGH, AROUND THE PIPES THAT CONNECT TO THE SUMP SHOULD BE REMOVED. DAMAGE TO ANY AREAS OF THE TROUGH SHOULD BE QUANTIFIED. WHERE DEPRESSIONS IN THE TROUGH FLOOR ARE VISUALLY NOTICED, PLACE A 24" LONG STRAIGHT EDGE IN THE TROUGH AND MEASURE THE DEPTH OF THE DEPRESSION. NOTIFY ENGINEERING OF THE DEPTH, EXTENT, AND LOCATION OF ANY POCKETS OR DEPRESSIONS GREATER THAN 1/4" DEEP. AT THE DRAIN PIPES FROM THE TROUGH TO THE SUMP, PROVIDE ENGINEERING WITH MEASUREMENTS OF DEPTH, WIDTH AND HEIGHT OF ANY CONCRETE DAMAGE. AT THE FOUR PIPES THAT PASS WATER FROM OUTSIDE OF THE SUB-PILE ROOM, NOTE AND INFORM ENGINEERING OF THE BOTTOM ELEVATION OF THE PIPE RELATIVE TO THE BOTTOM SURFACE OF THE TROUGH (E.G. PIPE BOTTOM IS 3/8" LOWER THAN BOTTOM OF TROUGH).

GROUT REPAIRS CAN BE PERFORMED TO THE AREA AROUND THE PIPES TO THE SUMP AND THE PIPES FROM OUTSIDE THE SUB-PILE ROOM TO INSIDE, AS NEEDED, IN ACCORDANCE WITH SPECIFICATION OCIS 551-81-6 (AS A STRUCTURAL REPAIR). "MASTERFLOW 713 PLUS" OR "MASTERFLOW 928" SHALL BE USED FOR THE REPAIRS (SAFETY RELATED MATERIAL), AND IT SHALL BE MIXED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS RATHER THAN THOSE IN THE SPECIFICATION. TEST CUBE SAMPLES DO NOT NEED TO BE TAKEN AS DIRECTED IN THE SPECIFICATION, SINCE THIS APPLICATION DOES NOT

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APPROVED DISPOSITION:

RELY ON THE STRENGTH OF THE CURED GROUT.
BASED ON A PRELIMINARY INSPECTION BY SAM MARKOS, THE AREAS WHERE A GROUT REPAIR IS DEFINITELY REQUIRED AROUND THE DRAIN PIPE ARE: BOTH PIPES TO THE SUMP, AT THE POINT WHERE THEY EXIT THE TROUGH, AND THE INBOARD SIDE OF THE PIPE THROUGH THE PEDESTAL WALL, AT AZIMUTH 270.
THESE THREE PIPES REQUIRE REMOVAL OF ALL LOOSE MATERIAL AROUND THE PIPE, DOWN TO CLEAN, SOLIDLY SECURED AGGREGATE. THE AREA MUST BE PREPARED IN ACCORDANCE WITH THE STATION GROUTING PROCEDURE PRIOR TO GROUTING.
CARE MUST BE TAKEN NOT TO CREATE ANY BLOCKAGES TO FLOW THAT WOULD CREATE STANDING WATER IN THIS AREA. OTHER REPAIRS TO THE TRENCH WILL BE SPECIFIED BY ENGINEERING FOLLOWING REVIEW OF THE DATA PROVIDED.

THE ABOVE SCOPE OF WORK DOES NOT ALTER THE DESIGN OR FUNCTION OF ANY PLANT SSC. CLEANING AND INSPECTION ARE ROUTINE TASKS. ANY GROUT REPAIRS SERVE TO RESTORE THE AFFECTED SSC TO ITS INTENDED DESIGN CONDITION.

COORDINATION WITH THE OCC IS IMPERATIVE TO MAINTAIN THE TROUGH AREA DRY DURING THE REPAIR AND CURING PROCESSES.

AWA #1 PREPARED BY: P. KESTER
REVIEWED BY: DAN FIORELLO
AUTHORIZATION FOR THIS SCOPE IS PROVIDED TO GEORGE SEVCIK (OWP) BY HOWIE RAY (SMDE DESIGNEE FOR S. HUTCHINS) (SMDE) ON 10/24/06, 12:00.

AWA #2 - DRYWELL SUMP CLEANING AND INSPECTION:
==========

THE DRYWELL SUMP COULD BE A SOURCE OF WATER INFILTRATION INTO THE CONCRETE. THE SUMP INTERIOR SHOULD BE DRAINED AND CLEANED SO THAT THE STAINLESS STEEL LINER CAN BE INSPECTED FOR FLAWS OR DAMAGE. TEMPORARY DAMMING SHOULD BE PLACED TO PREVENT WATER FROM ENTERING THE SUMP UNTIL THE INSPECTION IS COMPLETE. THE SUMP SHOULD BE CLEANED SUFFICIENTLY SUCH THAT A VT-1 INSPECTION OF THE INTERIOR SURFACES OF THE SUMP LINER CAN BE PERFORMED. THE RESULTS OF THE INSPECTION SHOULD BE PROVIDED TO ENGINEERING. IF ANY FLAWS ARE FOUND, REPAIRS WILL BE SPECIFIED ACCORDINGLY.

THE ABOVE SCOPE OF WORK DOES NOT ALTER THE DESIGN OR FUNCTION OF ANY PLANT SSC. CLEANING AND INSPECTION ARE ROUTINE TASKS.

AWA #2 PREPARED BY: P. KESTER
REVIEWED BY: DAN FIORELLO
AUTHORIZATION FOR THIS SCOPE IS PROVIDED TO GEORGE SEVCIK (OWP) BY HOWIE RAY (SMDE DESIGNEE FOR S. HUTCHINS)

E C R Printout

NUMBER: OC 06-00879 000 ECR TYPE: DCP

APPROVED DISPOSITION:

(SMDE) ON 10/24/06, 12:00.

AWA #3 - DRYWELL FLOOR-TO-SHELL INTERFACE CLEANING, PREP FOR CAULKING:

A BEAD OF CAULK WILL BE APPLIED TO THE DRYWELL SHELL WHERE IT MEETS THE CONCRETE STEPPED CURBING AROUND THE PERIMETER OF THE CONCRETE DRYWELL FLOOR SLAB AT ELEVATION 10'-3". THE SCOPE OF THIS AWA IS THE CLEANING AND PREPARATION OF THE CONCRETE AND STEEL SURFACES FOR CAULKING, BUT DOES NOT INCLUDE THE INSTALLATION OF THE CAULKING. ALL DEBRIS AND LOOSE CONCRETE SHOULD BE REMOVED FROM THE INTERFACE. HAND TOOLS (DENTIST PICK, SMALL WIRE BRUSH, CHIPPING HAMMER, ETC.) AND A VACUUM SHOULD BE USED. THE CONCRETE SURFACE IS REPORTED TO BE SUFFICIENTLY ROUGH FOR ADHESION OF THE CAULK, AND THEREFORE MAY NOT REQUIRE ROUGHENING. THIS SHOULD BE ASSURED BY INSPECTION. A BAND OF AT LEAST 1" WIDTH OF CONCRETE ADJACENT TO THE DRYWELL SHELL SHOULD BE ASSURED TO HAVE A ROUGHNESS EQUIVALENT TO 60 GRIT SANDPAPER, OR ROUGHER. THE STEEL SURFACE SHOULD ALSO BE PREPARED FOR A BAND OF AT LEAST 1" ADJACENT TO THE CONCRETE. ANY LOOSE OR POORLY ADHERED MATERIAL SHOULD BE REMOVED USING HAND TOOLS SUCH AS A STIFF BRUSH, A PUTTY KNIFE OR SCOTCH-BRITE TO SSPC-SP 2 STANDARD. WELL ADHERED COATINGS DO NOT NEED TO BE REMOVED.

THE ABOVE SCOPE OF WORK DOES NOT ALTER THE DESIGN OR FUNCTION OF ANY PLANT SSC. CLEANING AND INSPECTION ARE ROUTINE TASKS.

AWA #3 PREPARED BY: P. KESTER
REVIEWED BY: DAN FIORELLO
AUTHORIZATION FOR THIS SCOPE IS PROVIDED TO GEORGE SEVCIK (OWP) BY HOWIE RAY (SMDE DESIGNEE FOR S. HUTCHINS) (SMDE) ON 10/24/06, 12:00.

AWA #4 - EXCAVATE ADDITIONAL CONCRETE FROM THE BAY #5 TRENCH

MORE OF THE DRYWELL SHELL MUST BE EXPOSED AT THE BOTTOM OF THE BAY #5 TRENCH TO FACILITATE ADDITIONAL DRYWELL SHELL UT MEASUREMENTS. THE BAY #5 TRENCH IS IN THE DRYWELL ELEV 10'-3" FLOOR SLAB, IN THE BAY #5 REGION, ADJACENT TO THE DRYWELL SHELL.

CONCRETE AT THE BOTTOM OF THE BAY #5 TRENCH SHALL BE EXCAVATED AS REQUIRED TO EXPOSE AN ADDITIONAL 3-1/2" (+/-) BAND OF THE DRYWELL SHELL. THE BAND SHALL BE ACROSS THE ENTIRE WIDTH OF THE TRENCH.

EXTREME CARE SHALL BE EXERCISED TO AVOID DAMAGE

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APPROVED DISPOSITION:

(NICKS, CUTS, SCRAPES) TO THE DRYWELL SHELL.

ALSO NOTE THAT A VERTICAL STEEL PLATE STIFFENER (APPROX 1" THICK) IS EMBEDDED IN THE CONCRETE AT THE BOTTOM OF THE BAY #5 TRENCH. THE STIFFENER PLATE IS PARALLEL TO THE DRYWELL SHELL AND APPROXIMATELY 7" FROM THE SHELL. A PORTION OF THE TOP EDGE OF THIS PLATE IS EXPOSED IN THE EXISTING TRENCH EXCAVATION. EXTREME CARE SHALL BE EXERCISED TO AVOID DAMAGE (NICKS, CUTS, SCRAPES) TO THIS STIFFENER PLATE.
ALL WORK SHALL BE DONE WITH HAND TOOLS.

ALL MATERIAL REMOVED SHALL BE QUARANTINED FOR FURTHER INSPECTION/TESTING AS REQUIRED.

DOCUMENT THE FINAL CONFIGURATION OF THE TRENCH (DEPTH AND WIDTH) AFTER THE EXCAVATION. FORWARD THIS INFORMATION TO THE PROJECT ENGINEERING TEAM (ATTENTION: HOWIE RAY).

DIGITAL PHOTOGRAPHS SHALL BE TAKEN OF THE NEWLY EXPOSED DRYWELL SHELL IMMEDIATELY AFTER EXCAVATION IS COMPLETE. DIGITAL PHOTOGRAPHS SHALL ALSO BE TAKEN OF THE SURFACE OF THE EXCAVATED CONCRETE THAT WAS ADJACENT TO THE DRYWELL SHELL. ALL DIGITAL PHOTOGRAPHS FILES SHALL BE TRANSMITTED TO THE PROJECT ENGINEERING TEAM (ATTENTION: HOWIE RAY).

THE SCOPE OF THIS AWA DOES NOT ALTER OR IMPACT THE FUNCTION OF ANY PLANT SSC'S.

AWA PREPARED BY: DP KNEPPER - PEDM
AWA REVIEWED BY: DAN FIORELLO

AUTHORIZATION FOR THIS SCOPE IS PROVIDED TO JIM HEARNS (OWP) BY HOWIE RAY (SMDE DESIGNEE FOR S. HUTCHINS) (SMDE) ON 10/24/06, 18:00.

AWA #5 - CAULK DRYWELL SHELL-TO-CONCRETE FLOOR JOINT:
==========

AT THE OUTBOARD PERIMETER OF THE ELEV. 10'-3" DRYWELL FLOOR, THE CONCRETE SLAB MEETS THE DRYWELL SHELL. THIS INTERFACE HAS BEEN PREPARED FOR CAULKING UNDER AWA #3. THE CAULK WILL BE APPLIED TO THAT JOINT UNDER THIS AWA. THE CAULK SHALL LAP ONTO THE CONCRETE AND STEEL SURFACES BY 1/4" TO 3/4" ON EACH SURFACE. THE CAULK IS TO FOLLOW THE CONCRETE-TO-STEEL INTERFACE, FOLLOWING THE CHANGES IN CURB ELEVATION (INCLUDING THE SIDES AND TOPS OF THE CURBS), AND THE DIPS INTO THE TWO TRENCHES. THE BAY 5 TRENCH SHOULD NOT BE CAULKED UNTIL ALL NDE WORK IS

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NUMBER: OC 06-00879 000 ECR TYPE: DCP

APPROVED DISPOSITION:

COMPLETED, BUT PRIOR TO RECOATING THE STEEL. TECHNICAL EVALUATION A2152754-5 IS BEING DEVELOPED TO DOCUMENT THE TECHNICAL BASIS FOR THIS AWA, AND PROVIDES A DETAILED SKETCH OF THE CAULK CONFIGURATION ALONG WITH MANUFACTURERS INSTRUCTIONS. THE CAULKING MATERIAL SHALL BE THIOKOL 2235M BY POLYSPEC. THE INSTALLATION OF THE CAULKING MATERIAL IS ACCEPTABLE PROVIDED THAT CAULKING MATERIAL IS QUALIFIED TO BE USED INSIDE THE DRYWELL AS AUGMENTED QUALIFY, QA CLASS "A" OR BETTER. THE SURFACE PREPARATION SHALL BE AS DESCRIBED IN AWA #3 OF THIS ECR, AND INSTALLATION SHALL BE IAW THE MANUFACTURER'S INSTRUCTIONS (EXCEPT THAT PRIMER, BACKER ROD AND BOND BREAKER TAPE ARE NOT REQUIRED). QV VERIFICATION IS REQUIRED FOR PREPARATION (PER AWA #3 OF THIS ECR) AND INSTALLATION (MIXING, POT LIFE, APPLICATION). DBA QUALIFICATION OF THE CAULK IS BEING FINALIZED.

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WORK SCOPE:

1- PERFORM UT OF DRYWELL SHELL IN THE BAY 5 TRENCH AFTER ADDITIONAL EXCAVATION DESCRIBED IN AWA #4 HAS BEEN COMPLETED. UT SCOPE IS SIMILAR TO THAT DESCRIBED IN SECTION 3.2.6 OF SPECIFICATION IS-328227-004 REV. 13, BUT FOR THE NEWLY EXPOSED STEEL AREA IN THE TRENCH (REF. AWA #4).

2- CLEAN/PREP STEEL AND CONCRETE SURFACES FOR CAULKING AS DESCRIBED IN AWA #3

3- INSTALL CAULKING AS DESCRIBED ABOVE. FINISHED CAULK SHOULD FORM A CONTINUOUS BARRIER AROUND THE CIRCUMFERENCE OF THE CONCRETE FLOOR, WHERE IT MEETS THE STEEL DRYWELL SHELL.

4- NDE SHALL PERFORM A PSI (PRE-SERVICE INSPECTION - VT3) OF THE FINAL CAULK CONFIGURATION IN ACCORDANCE WITH ASME SECTION XI REPAIR/REPLACEMENT PROGRAM.

5- RECOAT THE DRYWELL SHELL SURFACE IN BOTH THE BAY 5 AND BAY 17 TRENCHES AS DESCRIBED IN SECTION 3.2.2.4.3 OF SPECIFICATION IS-328227-004 REV. 13.

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THIS AWA DOES NOT AFFECT ANY IN-SERVICE EQUIPMENT.

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AWA #5 PREPARED BY: P. KESTER
REVIEWED BY: DAN FIORELLO
AUTHORIZATION FOR THIS SCOPE IS PROVIDED TO JOHN BURT (VENTURE) BY F.H. RAY (SMDE DESIGNEE FOR S. HUTCHINS) (SMDE) ON 10/25/06, 13:30.

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NOTE REVISION OF THE ABOVE AWA #5: THE MAXIMUM LAP LENGTH OF THE CAULK ONTO THE CONCRETE AND STEEL HAS BEEN REDUCED FROM 1" TO 3/4" TO LIMIT THE AMOUNT OF MATERIAL ADDED TO THE DRYWELL.

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AS REVIEWER OF THE ORIGINAL AWA, I HAVE REVIEWED AND AGREE WITH THE REVISED LAP LENGTH - DAN FIORELLO

E C R Printout

NUMBER: OC 06-00879 000 ECR TYPE: DCP

APPROVED DISPOSITION:

CHANGE APPROVED ON 10/26/06 AT 07:00 BY HOWIE RAY.
JOHN BURT WAS NOTIFIED BY DAVE KNEPPER, AND A MARKED-UP SKETCH REFLECTING THE CHANGE WAS PROVIDED TO HIM.

REVISION 2 TO THE AWA #5:

AWA #5 AND ITS REVISION PROVIDE INSTRUCTIONS TO CAULK SURFACES BETWEEN THE DRYWELL VESSEL PLATE AND THE CONCRETE IN THE TWO TRENCHES. AWA #5 USED MASTERFLOW 928 GROUT MATERIAL. TO APPLY THE CAULK THE SURFACES MUST BE DRY. HOWEVER THE SURFACE AT THE BOTTOM OF THE TRENCH IN BAY 5 AND THE SEAM BETWEEN THE CONCRETE AND STEEL ARE MOIST EVEN AFTER APPLYING MASTERFLOW 928. THEREFORE, THE CAULK CANNOT BE APPLIED. IF THIS CONDITION CONTINUES TO EXIST, PREPARE THE SURFACES AND INSTALL THE MINIMUM ALLOWED LAYER 1/2 INCH AND MAXIMUM 2 INCH OF GROUT IN ACCORDANCE WITH AWA #1. THE GROUTING MATERIAL SHALL BE "747 RAPID-SETTING GROUT" MANUFACTURED BY BASF AND MIXING SHALL BE PLASTIC D ACHIEVE A FINAL SETTING TIME OF 80 MINUTES. THE LAYER OF GROUT SHALL BE INSTALLED AT THE BOTTOM OF THE TRENCH AT MOIST SURFACES OVER EXISTING MASTERFLOW 928 HAVE BEEN PLACED WHERE CONCRETE MEETS THE DRYWELL VESSEL. THE PURPOSE OF THE ADDITIONAL LAYER OF 747 RAPID-SETTING GROUT IS TO COVER THE MOIST AREAS TO ALLOW PROPER APPLICATION OF THE CAULK. WAIT A MINIMUM OF 80 MINUTES FOR THE GROUT TO SET BEFORE APPLYING ANY CAULK. THIS GROUT DOES NOT PERFORM ANY SAFETY RELATED FUNCTION. THE REQUIRED STRENGTH IS MINIMAL AND IS PLACED TO FORM A SUITABLE SURFACE FOR CAULK. THE MATERIAL WILL BE CONFIRMED TO BE SET BEFORE APPLICATION OF THE CAULK. THEREFORE, THE MATERIAL MAY BE COMMERCIAL GRADE.

THIS AWA AND ITS REVISIONS DO NOT AFFECT ANY IN SERVICE EQUIPMENT. CLEANING AND INSPECTION ARE ROUTINE TASKS.

AWA #5, REVISION 2 PREPARED BY: NIOGI, SUJIT (PIMS INPUT BY DJF)

REVIEWED BY: DAN FIORELLO

HIS AWA REVISION 2 IS APPROVED BY F. H. RAY
FOR S. HUTCHINS (SMDE)

THIS AWA #5, REVISION 2 IS PROVIDED TO DAVE RYAN AT 18:45 11/02/06 BY F.H. RAY

END OF AWA #5, REVISION 2

E C R Printout

NUMBER: OC 06-00879 000 ECR TYPE: DCP

APPROVED DISPOSITION:

****
AWA #5 REVISION 3
BASED ON THE LATE DELIVERY OF THE 747 GROUT, IT IS PERMISSABLE TO USE THE BASF MASTERFLOW 928 GROUT. PER THE MANUFACTURE PRODUCT DATA SHEET, MASTERFLOW 928 WILL REACH A FINAL SET IN 4 HOURS. THE CONSISTANCY OF THE 928 SHOULD BE MIXED TO PLASTIC CONSISTANCY. PER TELEPHONE WITH THE TECHNICAL REPRESENTATIVE OF POLYSPEC THE MANUFACTURER OF THIOKOL 2235M THE CAULK CAN BE APPLIED AFTER THE GROUT REACHES THE FINAL SET, REVISION 3 TO AWA #5 AUTHORIZES THE USE OF MASTERFLOW 928. THE MINIMUM THINKNESS OF THE APPLICATION NEEDS TO BE CONSISTANT WITH THE EARLIER GUIDANCE FOR MASTERFLOW 928.

AWA #5 REVISION 3 PREPARED BY J. HALLENBECK

REVIEWED BY:NIOGI, SUJIT

THIS AWA REVISION 3 IS APPROVED BY:MAKAR, JOHN

THIS AWA #5 REVISION 3 IS PROVIDED TO DAVE RYAN AT: 12:05 NOV 3, 2006

END OF AWA #5 REVISION 3
****
AWA #6 - USE OF BACKER ROD BEHIND CAULK JOINT:
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SCOPE OF AUTHORIZED WORK:

BASED ON THE SIZE OF THE GAP BETWEEN THE DRYWELL CONCRETE FLOOR SLAB AND THE STEEL DRYWELL SHELL, IT IS DESIRED TO INSTALL BACKER ROD IN SOME AREAS TO MINIMIZE THE AMOUNT OF CAULK NEEDED. THE BACKER ROD IS A POLYETHYLENE MATERIAL (204-07780) THAT WILL BE COVERED BY THE CAULK, AND THEREFORE WILL NOT BE EXPOSED. THE INSTALLER ESTIMATES THAT 10' OF PERIMETER WILL REQUIRE ITS USE. THIS AMOUNT OF ROD WEIGHS ON THE ORDER OF A FEW OUNCES. RELATIVE TO THE MATERIAL WEIGHTS IN THE SUCTION STRAINER CLOGGING CALCULATION, THE WEIGHT IS INSIGNIFICANT COMPARED TO THE CALCULATION WEIGHTS OF 150 POUNDS FOR DUST, DIRT AND CONCRETE, AND 25 POUNDS FOR MISCELLANEOUS ADDITIONAL DEBRIS. IN ADDITION, THE BACKER ROD WILL EITHER FLOAT , OR MELT AND FLOWN DOWN THROUGH THE GAP BETWEEN THE CONCRETE AND THE STEEL SHELL IF EXPOSED TO EXTREME TEMPERATURE. THEREFORE, THE BACKER ROD WILL NOT GET TO THE SUCTION STRAINERS TO CONTRIBUTE THEIR CLOGGING.
PRIMARILY, THOUGH, THE BACKER ROD WILL BE WEDGED INTO THE GAP BETWEEN THE SHELL AND THE CONCRETE, AND IS THEREFORE VERY UNLIKELY TO BE DISLODGED BY ANY DBA IN THE DRYWELL.

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NUMBER: OC 06-00879 000 ECR TYPE: DCP

APPROVED DISPOSITION:

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MARK CARLSON AND TIM TRETTEL WERE CONSULTED FOR FIRE PROTECTION CONCERNS, AND THEY INDICATED THAT BASED ON THE AMOUNT AND THE LOCATION, USE OF THE BACKER ROD IS ACCEPTABLE WITH REGARD TO FIRE LOADING ADDED TO THE DRYWELL. THEREFORE AUTHORIZATION IS GIVEN TO UTILIZE BACKER ROD IN THIS APPLICATION.

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PREPARED BY: P. KESTER
CHANGES TO THE ABOVE AWA WERE MADE BY THE REVIEWER BASED ON THE PREPARER INPUT.

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AS STATED IN CC-AA-103, THIS
WORK IS BEING PERFORMED AT RISK AND DOES NOT AFFECT ANY IN SERVICE EQUIPMENT.

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THIS AUTHORIZATION IS GIVING TO TOM BADDERS, VENTURE PLANNING.

.
INDEPENDENTLY REVIEWED BY S. MARKOS

.
THIS AWA HAS BEEN REVIEWED AND APPROVED BY THE OC SDEM
S. HUTCHINS, ON 10/26/06 @ 20:27
END OF AWA # 6
****
AWA #7 - REPAIR OF VOID IN THE TROUGH ADJACENT TO SUMP 1-8:

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SCOPE OF WORK:

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WALK DOWN BY WILLIAMS COATING INC. REVEALED THAT APPROXIMATELY 4 INCH WIDE VOID EXIST IN THE TROUGH ADJACENT TO THE SUMP 1-8. ALSO IT APPEARS THAT A FOREIGN GLASS OBJECT IS LODGED
IN TO THE VOID. THE OBJECT SHALL BE REMOVED AS MUCH AS POSSIBLE BY BREAKING IT IN TO SMALL PIECES AND VACUUM CLEANING THE BROKEN GLASS PIECES. ALL PIECES SHALL BE RETAINED FOR LATER EVALUATION. AFTER REMOVING THE BROKEN GLASS PIECES THE VOID SPACE SHALL FILLED WITH GROUT WITH "MASTERFLOW 713 PLUS" OR "MASTERFLOW 928". THIS HAS BEEN APPROVED FOR APPLICATION IN THE DRYWELL PER AWA #1.

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SPECIAL INSTRUCTIONS:

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ALL THE STEPS FOR CLEANING, SURFACE PREPARATION, MIXING AND PLACEMENT OF GROUT SHALL BE AS DELINEATED IN AWA #1 AND MANUFACTURER INSTRUCTIONS SHALL BE FOLLOWED. IF THE VOID IS MORE THAN 2" WIDE, 33% BY WEIGHT OF CLEAN, DAMP 3/8" PEA GRAVEL MEETING THE REQUIREMENTS OF ASTM C33 MAY BE ADDED TO THE MIXTURE. SEVENTEEN POUNDS OF PEA GRAVEL SHALL BE ADDED TO EVERY 50 POUNDS OF GROUT.

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APPROVED DISPOSITION:

GROUT AND PEA GRAVEL SHALL BE AT ROOM TEMPERATURE (APPROXIMATELY 70 DEGREES F). THE GROUT MIXTURE SHALL BE COMPACTED WITH A STEEL ROD OR SIMILAR DEVICE TO ELIMINATE VOIDS AND CONSOLIDATE THE GROUT MIXTURE AS IT BEING PLACED IN THE VOID.

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THE AWA DOES NOT AFFECT ANY IN SERVICE EQUIPMENT. CLEANING AND INSPECTION ARE ROUTINE TASKS. ANY GROUT REPAIRS SERVE TO RESTORE THE AFFECTED SSC TO ITS INTENDED DESIGN CONDITION.

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AWA #7 PREPARED BY S. NIOGI.
REVIEWED BY: P. TAMBURRO AND DAN FIORELLO

.

THIS AWA IS APPROVED BY F.H. RAY FOR S. HUTCHINS (SMDE)
THIS AWA IS PROVIDED TO G. SEVCIK AND B. MAZE AT 1930
ON 10/28/06 BY F.H. RAY.

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ENSURE ALL DEBRIS REMOVED FROM THE VOID IN THE CONCRETE TROUGH IS RETAINED FOR LATER EVALUATION.

**********REVISION 1 TO AWA #7**********
NOTE REVISION OF THE AWA #7: IF THE WIDTH OF THE VOID IS 2 INCHES OR SMALLER PEA GRAVEL IS NOT REQUIRED TO BE ADDED TO THE GROUT MIXTURE.

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REVISION 1 TO AWA #7 IS PREPARED BY SUJIT NIOGI
REVISION 1 TO AWA #7 WAS REVIEWED BY DAN FIORELLO

.

AWA 7, REVISION 1 AUTHORIZATION:
THIS AWA IS APPROVED BY F.H. RAY FOR S. HUTCHINS (SMDE)
AND I PROVIDED TO D. RYAN AND J. BURT AT 1100
ON 10/30/06 BY F.H. RAY.

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AWA #8 - SEALING TRENCH IN BAY 5

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SCOPE OF WORK

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AWA #5 PROVIDES INSTRUCTIONS TO CAULK SURFACES BETWEEN THE DRYWELL VESSEL PLATE AND THE CONCRETE IN THE TWO TRENCHES. TO APPLY THE CAULK THE SURFACES MUST BE DRY. HOWEVER THE SURFACE AT THE BOTTOM OF THE TRENCH IN BAY 5 AND THE SEAM BETWEEN THE CONCRETE AND STEEL ARE MOIST. THEREFORE THE CAULK CANNOT BE APPLIED. IF THIS CONDITION CONTINUES TO EXIST, PREPARE THE SURFACES AND INSTALL THE MINIMUM ALLOWED LAYER (1 INCH) OF GROUT IN ACCORDANCE WITH AWA #1. THE LAYER OF GROUT SHALL BE INSTALLED AT THE BOTTOM OF THE TRENCH AT MOIST SURFACES WHERE EXISTING CONCRETE MEETS THE DRYWELL VESSEL. THE PURPOSE OF THE LAYER OF GROUT IS TO COVER

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NUMBER: OC 06-00879 000 ECR TYPE: DCP

APPROVED DISPOSITION:

THE MOIST AREAS TO ALLOW PROPER APPLICATION OF THE CAULK. WAIT A MINIMUM OF 24 HOURS FOR THE GROUT TO CURE.

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APPLY THE CAULK ON DRY SURFACES BETWEEN THE GROUT AND THE STEEL VESSEL AND OVER LAP THE AREAS WHERE OTHER CAULKING HAS ENDED.

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THE AWA DOES NOT AFFECT ANY IN SERVICE EQUIPMENT CLEANING AND INSPECTION ARE ROUTINE TASKS. ANY GROUT REPAIRS SERVE TO RESTORE THE AFFECTED SSC TO ITS INTENDED CONFIGURATION.

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AWA #8 PREPARED BY P. TAMBURRO

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REVIEWED BY: DAN FIORELLO

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THIS AWA IS APPROVED BY F.H. RAY FOR S. HUTCHINS (SMDE)

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THIS AWA IS PROVIDED TO DAVE RYAN AT 1600 10/30/06 BY H. RAY.

END OF AWA 8

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AWA #9 - LEAK TEST OF TROUGH INSIDE THE PEDESTAL, EL.10'-9" UNDER VESSEL

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SCOPE OF WORK

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THE TROUGH IS APPROXIMATELY 8" DEEP AND LOCATED INSIDE THE REACTOR SUPPORT PEDESTAL AT EL.10'-9". THERE ARE FOUR 4" DIAMETER PIPE SLEEVES AT 90 DEGREES APART THROUGH THE 4 FEET REACTOR PEDESTAL WALL FOR DRAINING WATER FROM DRYWELL FLOOR EL. 10'-3" TO THE TROUGH. THE INVERT ELEVATION OF THE 4" DIAMETER PIPE SLEEVE IS 10'-3". THE TROUGH IS CONNECTED TO THE SUMP 1-8 BY TWO 2" DIAMETER PIPE SLEEVES. THE INVERT ELEVATION OF THE 2" DIAMETER PIPE SLEEVE IS 10'-1 1/4". THIS AWA #9 PROVIDES THE INSTRUCTIONS TO PLUG THESE SIX SLEEVES (FOUR 4" DIAMETER AND TWO 2" DIAMETER).

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THE SLEEVES CAN BE PLUGGED USING TAPERED SILICONE RUBBER PLUGS, MCMASTER-CARR CATALOG PART NO. 9277K75 FOR 4" DIAMETER PIPE SLEEVES (FOUR REQUIRED) AND MCMASTER-CARR CATALOG PART NO. 9277K79 FOR 2" DIAMETER PIPE SLEEVES (TWO REQUIRED). THESE PLUGS SHALL BE INSERTED FROM INSIDE THE PEDESTAL IN TO THE PIPE SLEEVES. AFTER THE PLUGS ARE INSERTED IN TO THE SLEEVES THE SURFACE AROUND THE PLUGS BETWEEN THE PIPE SLEEVE AND THE PLUG SHALL BE COVERED WITH DUCT TAPE OR

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NUMBER: OC 06-00879 000 ECR TYPE: DCP

APPROVED DISPOSITION:

EQUAL AS APPROVED BY THE CHEMISTRY AND OPERATION DEPARTMENT. THE SURFACES MUST BE DRY BEFORE THE TAPE IS APPLIED. ALTERNATE TYPE PLUGS AS APPROVED BY ENGINEERING MAY BE UTILIZED IF REQUIRED.

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BEFORE FILLING THE TROUGH WITH WATER, USING A THIN STEEL NARROW RULER OR THIS NARROW FLAT BAR (OR EQUIVALENT) TO VERIFY THAT NO ADDITIONAL VOIDS EXIST IN THE TROUGH THAT COULD ADD TO THIS LEAKAGE PATH.
IF SIGNFICANT VOIDS ARE DISCOVERED, REPAIR USING GROUT. REPAIR STEPS FOR CLEANING, SURFACE PREPARATION, MIXING AND PLACEMENT OF GROUT SHALL BE AS DELINEATED IN AWA #1 AND MANUFACTURER INSTRUCTIONS SHALL BE FOLLOWED.
IF REPAIR BY GROUT IS PERFORMED, ALLOW 24 HRS FOR CURING PRIOR TO PLUGGING THE DRAIN HOLES OR PERFOMING THIS PMT TEST OF THE SUBJECT TROUGH.
WATER IN BAYS 15 AND 17 TRENCHES SHOULD BE VACUUMED OUT.
FILL THE TROUGH WITH WATER AT LEAST 7" DEEP AND MONITOR THE HEIGHT OF THE WATER FOR TWO HOURS AND CAREFULLY RECORD THE DEPTH. REFILL THE TROUGH WITH WATER TO 7" HEIGHT IF ANY WATER IS LOST DURING THE FIRST TWO HOURS. AFTER THE TROUGH IS REFILLED, MEASURE THE HEIGHT OF WATER EVERY ONE HOUR FOR NEXT FOUR HOURS.
THE HEIGHT OF WATER SHALL BE MEASURED AT 90 DEGREE DISTANCES APART USING THE EXACT LOCATIONS EACH TIME.

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ACCEPTANCE CRITERIA - THE LEVEL AFTER 4 HOURS SHALL NOT HAVE DROPPED MORE THAN 1/4 INCH WITH A MEASURING ACCURACY OF 1/16 INCH

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THE AWA DOES NOT AFFECT ANY IN SERVICE EQUIPMENT. CLEANING AND INSPECTION ARE ROUTINE TASKS. ALL PLUGS AND THE TAPE SHALL BE REMOVED AFTER THE LEAK TEST AND THE AFFECTED AREA OF THE SSC SHALL BE RESTORED TO ITS INTENDED CONFIGURATION.

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THIS AUTHORIZATION IS GIVEN TO TOM BADDER OF VENTURE PLANNING.
AWA #9 PREPARED BY NIOGI, SUJIT

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REVIEWED BY: P. TAMBURRO

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THIS AWA IS APPROVED BY SP HUTCHINS (SMDE)

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THIS AWA IS PROVIDED TO DAVE RYAN AT 0500 11/01/06 BY.
F.H. RAY

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REVISION 1 TO AWA 9
NOTE THAT REVISION 1 TO AWA 9 CHANGED THE ACCEPTANCE CRITERIA TO A DROP IN WATER LEVEL OF 1/4 INCH WITH A

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APPROVED DISPOSITION:

MEASURING ACCURACY OF 1/16 INCH. THE PURPOSE OF THE TEST IS CHECK FOR ANY GROSS LEAKAGE FROM THE TROUGH THROUGH CRACKS AND VOIDS. THERE WILL BE SOME LOSS OF WATER THROUGH EVAPORATION. ALSO SINCE CONCRETE IS PERMEABLE, THERE WILL BE SOME LOSS OF WATER THROUGH SEEPAGE INTO THE SOUND CONCRETE.

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REVISION 1 TO AWA 9 PREPARED BY: DAN FIORELLO

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REVISWION 1 TO AWA 9 REVIEWED BY PETE TAMBURRO

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THIS AWA REVISION HAS BEEN PROVIDED TO DAVE RYAN AND JOHN BURT AT 15:00 ON 11/2/2006 BY F.H. RAY.

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REVISION 1 TO AWA 9 APPROVED BY: F.H. RAY FOR S. HUTCHINS AS SMDE.

. END OF AWA #9

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REVISON 2 TO AWA #9

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FOR BETTER ALARA PRACTICE: WATER LEVEL IN THE TROUGH AT [redacted] WILL BE MARKED ON THE REACTOR PEDESTAL WALL AT ONE LOCATION. A CAMERA WILL BE FIXED ON THE MARK TO FACILITATE MONITORING OF THE TROUGH WATER LEVEL WITH RESPECT TO THE LEVEL MARK ON THE PEDESTAL WALL. FINAL FIELD VERIFICATIONS WILL BE PERFORMED FOR WATER LEVEL AND DEPTH. RESULTS OF THE FIELD TEST WILL BE DOCUMENTED IN THE W.O. CREM FOR ACCEPTANCE.

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THIS REVISION OF THIS AWA DOES NOT AFFECT ANY IN SERVICE EQUIPMENT. THIS AWA IS GIVEN TO TOM BADDER OF VENTURE.

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PREPARED BY S. MARKOS
REVIEWED BY: JOHN A. CAMIRE
APPROVED BY SMDE: S. HUTCHINS

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END OF AWA #9, REV. 2

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BEGINING OF ECR

1.0 PROBLEM DEFINITION AND SCOPE:

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1.1 PROBLEM DEFINITION:

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DURING 11R, TWO TRENCHES WERE CUT FROM THE CONCRETE FLOOR WHERE IT MEETS THE DRYWELL SHELL TO EVALUATE SHELL THICKNESS AND TO REMOVE PLUG SAMPLES IN BAYS 5 AND 17. AFTER EVALUATION AND REPAIR, THE SHELL WAS SPRAY COATED IN THE TRENCH AREAS, FILLED UP WITH DOW CORNING 3-6548 SILICONE RTV FOAM AND SEALED AT THE TOP BY POURING A PROTECTIVE SEALING LAYER OF PROMATEC LOW DENSITY SILICONE ELASTOMER. IT WAS EVIDENT AFTER A 12R

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APPROVED DISPOSITION:

INSPECTION OF THE AREA, THAT WATER WAS SEEPING INTO THE TRENCHES. PROBABLE SOURCES OF WATER MAY BE (A): VARIOUS COMPONENT (E.G. VALVE) LEAKAGES, (B): SPILLS FROM DRAIN TANKS, AND (C): EXCESS WATER FROM OUTAGE ACTIVITIES (E.G. CRD CHANGES). IN APRIL 1994, THE TRENCH AREAS WERE VISUALLY INSPECTED AGAIN WHEN A WALKDOWN WAS CONDUCTED DURING A FORCED OUTAGE, THE AREAS WERE FOUND TOTALLY DRY. DURING THE 1995 STRUCTURAL MONITORING INSPECTIONS NO SIGNS OF CORROSION OF THE INNER SURFACE OF EXPOSED STEEL SHELL IN THE TRENCHES WAS FOUND. THE PRESENCE OF WATER IN THE TRENCHES WAS OBSERVED IN 16R REFUELING OUTAGE IN 1997. IN THE 17R REFUELING OUTAGE, NO SIGN OF WATER WAS OBSERVED IN THE TRENCHES. IN THE 18R REFUELING OUTAGE DRYWELL INSPECTION THERE IS NO MENTION OF WATER PRESENCE IN THE TRENCHES.

DURING 1R21, WATER WAS DISCOVERED IN THE TRENCH IN BAY 5. THIS WATER WAS VACUUMED OUT, BUT THE TRENCH SOON REFILLED INDICATING THAT WATER WAS CONTAINED IN OR AROUND THE SLAB. THE FLOOR SLAB IS POURED AGAINST THE BOTTOM OF THE DRYWELL SHELL. CHEMICAL ANALYSIS OF WATER SAMPLES SHOWED THAT THE WATER IS NEUTRAL TO WEAK BASIC. WHEN THE PLANT IS AT POWER THE DRYWELL IS INERTED WITH NITROGEN. LACK OF OXYGEN AND NEUTRAL TO WEAK BASIC WATER DO NOT FORM AN AGGRESSIVE ENVIRONMENT THAT COULD LEAD TO CORROSION OF THE DRYWELL STEEL SHELL. THIS HAS BEEN CONFIRMED WITH VISUAL INSPECTION OF THE INNER SURFACE OF THE DRYWELL EXPOSED SHELL IN THE AREA OF THE TRENCHES. THE ABOVE OBSERVATION INDICATES THAT (A): PROMATEC LDSE IS NO LONGER ACTING AS A SEAL TO PREVENT INTRUSION OF SURFACE WATER, AND (B): DOW CORNING RTV FOAM IS RETAINING THE WATER REACHING THE TRENCHES.

THE POTENTIAL SOURCES OF THE WATER ARE DIRECT LEAKAGE INTO THE FLOOR-TO-SHELL GAP DUE TO STANDING WATER ON THE FLOOR OR WATER RUNNING DOWN THE INTERIOR OF THE DRYWELL SHELL. IN ADDITION THE WATER COULD ALSO BE TRAVELING THROUGH CRACKS OR CONSTRUCTION JOINTS IN THE CONCRETE SLAB, COMING FROM THE TROUGH AROUND THE INNER FACE OF THE REACTOR PEDESTAL, OR FROM THE 1-8 SUMP IF HOLES EXIST IN THE SUMP LINER.

INSPECTION OF THE SUMP LINER SHOWS THAT IT IS IN GOOD CONDITION WITH NO HOLES. THEREFORE THE SUMP IS NO LONGER CONSIDERED AS A POSSIBLE SOURCE FOR THE WATER.

AFTER REMOVING DEBRIS FROM TROUGH AROUND THE INNER FACE OF THE REACTOR PEDESTAL (PER AWA #1) A VOID WAS FOUND IN CONCRETE IN THE BOTTOM OF THE TROUGH (IR 00550437). IT IS POSSIBLE THAT THIS VOID ALLOWS WATER TO BYPASS

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NUMBER: OC 06-00879 000 ECR TYPE: DCP

APPROVED DISPOSITION:

THE TROUGH ROUTING ARRANGEMENT TO THE 1-SUMP AND ALLOWS WATER TO ENTER THE CONCRETE FLOOR AND MIGRATE THROUGH CRACKS OR CONSTRUCTION JOINTS TO THE TRENCH IN BAY 5. AS A RESULT AWA # 7 WAS ISSUED TO THE FIELD TO REPAIR THIS VOID AND ELIMINATE THIS LEAKAGE SOURCE INTO THE CONCRETE FLOOR.

1.2-SCOPE:
THIS ECR THEREFORE ADDRESSES SEVERAL TOPICS:

1.2.1-THE GAP BETWEEN THE DRYWELL SHELL AND THE CONCRETE FLOOR SHALL BE CAULKED AT THE INTERFACE.

1.2.2-THE GAP BETWEEN THE DRYWELL SHELL AND THE TRENCH SIDES SHALL BE CAULKED AT THE INTERFACE.

1.2.3-THE EXISTING TRENCH IN BAY 5 IS EXCAVATED FURTHER TO DETERMINE THE CONDITION OF THE DRYWELL SHELL IN THAT AREA. ACTIONS ARE SPECIFIED FOR FINISHING THE TRENCH SURFACES AFTER THE UT INSPECTIONS ARE COMPLETED.

1.2.4- INSTRUCTIONS FOR CLEANING AND INSPECTION OF THE DRYWELL SUMP WERE PROVIDED UNDER AWA #2 TO DETERMINE IF ANY REPAIRS ARE REQUIRED. THE RESULTS WILL BE FORWARDED TO ENGINEERING FOR EVALUATION UNDER THE STRUCTURAL MONITORING PROGRAM.

1.2.5-THE TROUGH INSIDE OF THE SUB-PILE ROOM (THE AREA INSIDE OF THE PEDESTAL AT ELEVATION 10'-3") AND THE PIPES THAT CONNECT IT TO THE AREA OUTSIDE OF THE PEDESTAL AND THE SUMP WERE INSPECTED UNDER AWA #1. THE RESULTS INDICATED THAT CONCRETE REPAIRS ARE NEEDED AROUND THE PIPES CONNECTING THE TROUGH TO THE SUMP, THE AREA OUTSIDE OF THE SUB-PILE ROOM, AND THE VOID IN THE TROUGH. THEREFORE THESE REPAIRS ARE ADDRESSED IN THIS ECR.

1.2.6-THE TROUGH INSPECTION ALSO IDENTIFIED LOW POINTS IN THE TROUGH. ACCEPTANCE OF THESE LOW POINTS WITHOUT ACTION IS JUSTIFIED IN THIS ECR.

1.2.7-INSPECTIONS IN THE SUB-PILE ROOM REVEALED THAT THE RAISED FLOOR SLAB IS DEGRADED, WITH EXPOSED AGGREGATE. THIS CONDITION IS ADDRESSED IN THIS ECR, INCLUDING JUSTIFICATION FOR CONTINUED OPERATION UNTIL REPAIRS ARE DETERMINED AND IMPLEMENTED DURING A FUTURE REFUELING OUTAGE, IF DESIRED (SEE ATTACHED DESIGN ATTRIBUTES).

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NUMBER: OC 06-00879 000 ECR TYPE: DCP

APPROVED DISPOSITION:

1.3 ECR TYPE AND CLASSIFICATION:
BASED ON "NO" ANSWERS TO SOME OF THE SCREENING QUESTIONS OF CC-AA-103 ATTACHMENTS F AND G, THIS ECR IS CLASSIFIED AS A DESIGN CHANGE PACKAGE. SAFETY RELATED SSC'S ARE AFFECTED.

1.4 TECHNICAL TASK RIGOR/RISK ASSESSMENT:
A TECHNICAL TASK RIGOR/RISK ASSESSMENT WAS PERFORMED PER HU-AA-1212. THE INITIAL BRIEF FOR THIS TASK WAS CONDUCTED ON 10/18/06. FOR THE TASK OF DETERMINING THE SOURCE AND CONSEQUENCES OF THE WATER (ADDRESSED IN A2152754 E06, NOT IN SCOPE OF THIS ECR), A RISK RANK OF 2 WAS DETERMINED. AN EVALUATION TEAM OF MULTIPLE SME'S WAS ASSEMBLED, AND IT WAS DETERMINED THAT AN INDEPENDENT THIRD PARTY REVIEW WAS REQUIRED. THE SCOPE OF THIS ECR IS TO IMPLEMENT THE RESOLUTIONS OF THAT TECHNICAL TASK. FOR THE SCOPE OF THIS ECR, A RISK RANK OF 3 WAS DETERMINED. THEREFORE THIS ECR REQUIRES AN ON-SITE INDEPENDENT THIRD PARTY REVIEW.

2.0 SOLUTION / TECHNICAL EVALUATION:
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2.1 DESIGN CHANGE ATTRIBUTES:
DESIGN CHANGE ATTRIBUTES AND INPUTS HAVE BEEN REVIEWED PER ATTACHMENT 1A OF CC-AA-102, AND ADDITIONAL GUIDANCE PROVIDED IN ATTACHMENT 1 OF CC-MA-102-1001. THIS REVIEW IS PROVIDED IN ATTACHMENT 1 OF THIS ECR.

2.2 CONFIGURATION ACTIVITIES IMPACT REVIEW:
CONFIGURATION CONTROL ACTIVITIES HAVE BEEN REVIEWED IN ACCORDANCE WITH THE REQUIREMENTS OF ATTACHMENT 7 OF CC-AA-102 AND ADDITIONAL GUIDANCE PROVIDED IN ATTACHMENT 7A OF CC-MA-102-1001. THIS REVIEW IS DOCUMENTED IN ATTACHMENTS 1 AND 2 OF THIS ECR.

2.3 PROGRAM IMPACT REVIEW
PROGRAM ACTIVITIES HAVE BEEN REVIEWED IN ACCORDANCE WITH THE REQUIREMENTS OF ATTACHMENT 8 OF CC-AA-102 AND ADDITIONAL GUIDANCE PROVIDED IN ATTACHMENT 8A OF CC-MA-102-1001. THIS REVIEW IS DOCUMENTED IN ATTACHMENTS 1 AND 2 OF THIS ECR.

2.4 SOLUTION:
THE REPAIRS SPECIFIED UNDER THIS ECR ARE INTENDED TO CONTROL WATER FLOW IN THE BOTTOM OF THE DRYWELL. ALTHOUGH DETERMINED TO BE ACCEPTABLE IN A2152754 E06*, IT IS DESIRABLE TO MINIMIZE THE AMOUNT OF WATER IN THE PORES AND SMALL SPACES IN AND AROUND THE DRYWELL CONCRETE FLOOR SLAB AT ELEVATION 10'-3". TO DO THIS, THE SUMP HAS BEEN INSPECTED AS DIRECTED IN AWA #2 TO MINIMIZE ITS POTENTIAL AS A SOURCE OF LEAKAGE INTO THE SLAB. VT-1 INSPECTION OF THE SUMP SHOWS THAT THE

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APPROVED DISPOSITION:

STAINLESS STEEL LINER IS IN GOOD CONDITIONS AND HAS NO HOLES. THEREFORE THIS SOURCE OF THE LEAKAGE IS ELIMINATED AS A LEAKAGE SOURCE, (A2152754-13).

THE TROUGH AREA HAS ALSO BEEN INSPECTED, AND WILL BE REPAIRED AS REQUIRED TO DIRECT FLOW TO THE SUMP (BY REPAIRING THE CONCRETE AROUND THE PIPES). AFTER REMOVING DEBRIS FROM TROUGH AROUND THE INNER FACE OF THE REACTOR PEDESTAL (PER AWA #1) A VOID WAS FOUND IN THE CONCRETE IN THE BOTTOM OF THE TROUGH (IR 00550437). THIS VOID MAY ALLOW WATER TO BYPASSES THE TROUGH ROUTING ARRANGEMENT TO THE 1-8 AND ALLOWS WATER TO ENTER THE CONCRETE FLOOR, WHICH ALLOWS WATER TO MIGRATE THOUGH CRACKS AND CONSTRUCTION JOINTS IN THE FLOOR TO THE TRENCH IN BAY 5. AS A RESULT AWA # 7 WAS ISSUED TO REPAIR THIS VOID AND ELIMINATE THIS LEAKAGE SOURCE INTO THE CONCRETE FLOOR. THE REPAIR OF THE TROUGH SHOULD ELIMINATE THE LEAKAGE SOURCE, WHICH CONTINUES TO FILL THE BAY 5 TRENCH.

IN ADDITION, THE PERIMETER OF THE SLAB WILL BE CAULKED TO THE STEEL VESSEL TO PREVENT WATER FROM ENTERING THE GAP AT THIS INTERFACE. THESE REPAIRS SHOULD ELIMINATE MOST OF THE FLOW PATHS INTO THE SLAB AREA.

THE TRENCH AT BAY 5 WILL BE EXCAVATED SEVERAL INCHES DEEPER TO ALLOW FOR FURTHER UT INSPECTION OF THE DRYWELL SHELL. AFTER THIS, THE NEW CONCRETE EDGES AGAINST THE STEEL SHELL WILL BE CAULKED AND THE STEEL SHELL EXPOSED AREA WILL BE COATED. THE DEGRADATION OF THE RAISED SLAB IN THE SUB-PILE ROOM, AND THE LOW POINTS IN THE TROUGH DO NOT SIGNIFICANTLY AFFECT THE CONTROL OF WATER IN THIS AREA. THEREFORE NO REPAIRS ARE REQUIRED FOR THESE CONDITIONS AT THIS TIME.

2.5 TECHNICAL EVALUATION:
THE DESIGN SOLUTIONS ARE EXPLAINED HERE, AND SUPPORTED BY THE ATTACHED DESIGN ATTRIBUTES.

WATER HAS BEEN FOUND IN THE TRENCHES OF THE 10'-3" DRYWELL FLOOR SLAB DURING SEVERAL PAST INSPECTIONS. AS JUSTIFIED IN A2152754 E06* (SEE NOTE AT END OF D.A.R.),

THE PRESENCE OF THIS WATER IS NOT DETRIMENTAL TO THE STEEL DRYWELL SHELL. HOWEVER, CAULK WILL BE INSTALLED AT THE INTERFACE BETWEEN THE CONCRETE AND THE DRYWELL SHELL TO MINIMIZE THE AMOUNT OF WATER ENTERING THE GAP BETWEEN THE CONCRETE SLAB AND THE SHELL. THE CAULK WILL FOLLOW THE CONTOUR OF THE EDGE OF THE CONCRETE ALONG THE STEEL SHELL, GOING UP AND DOWN THE CHANGES IN CURB ELEVATION AND INTO THE DEPRESSIONS OF THE TRENCHES. THE CAULK DOES NOT INCREASE THE AMOUNT OF

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APPROVED DISPOSITION:

MATERIAL POTENTIALLY FOULING THE SUCTION STRAINERS BECAUSE A GREATER AMOUNT OF MATERIAL (SILICONE FOAM AND ELASTOMER) WAS REMOVED FROM THE TRENCHES AND IS NOT BEING REPLACED, REFER TO TECHNICAL EVALUATIONS A2152754-05 AND A2152754-12 FOR ASSESSMENT OF THE IMPACT ON THE SUCTION STRAINERS

THE TRENCH IN BAY 5 WAS EXCAVATED APPROXIMATELY 6" DEEPER TO EXPOSE THE DRYWELL SHELL FOR ACCESS FOR UT MEASUREMENTS. THE MINOR AMOUNT OF CONCRETE REMOVED HAS NO IMPACT ON THE STRUCTURAL INTEGRITY OF THE SLAB SINCE THE SLAB IS PRINCIPALLY A FILL LAYER TO PROVIDE A LEVEL FLOOR (EXCEPT FOR BEARING DIRECTLY UNDER THE PEDESTAL).

THE CONCRETE REMOVED IS A PORTION OF THE REMAINING THIN WEDGE AT THE BOTTOM OF THE TRENCH, BETWEEN THE (RELATIVELY) FLAT BOTTOM OF THE TRENCH AND THE SLOPED SHELL SURFACE. NO REINFORCING OR STRUCTURAL STEEL IS AFFECTED. THE STEEL SHELL REMAINS INTACT AS THE CONTAINMENT BOUNDARY. THE NEWLY EXPOSED DRYWELL VESSEL WAS UT INSPECTION RESULTS SHOW THE VESSEL THICKNESS IS CLOSE TO NOMINAL THICKNESSES.

THE NEW EDGE OF THE CONCRETE WILL BE CAULKED TO THE STEEL SHELL TO MAINTAIN
THE CONTINUITY OF THE CAULK BARRIER. THE STEEL WILL BE COATED WITH GREASE AS DESCRIBED IN SECTION 3.2.2.4.3 OF SPECIFICATION IS-328227-004 REV. 13, TO PREVENT CORROSION OF ANY AREAS THAT ARE NOT COATED WITH THE NORMAL ZINC BASED COATING. REMOVAL OF THE SILICONE FOAM AND ELASTOMER FROM THE TRENCHES HAS NO IMPACT ON THE FLOOR SLAB OR THE STEEL SHELL. WATER WAS FOUND IN THE TRENCHES UNDER THE SILICONE MATERIAL, SO THEY ARE NOT EFFECTIVE AS A WATER SEAL IN THIS APPLICATION. ANY WATER COLLECTING IN THE TRENCHES WILL NOT AFFECT THE STEEL DUE TO THE GREASE APPLIED, AND THE CONCRETE IS NOT DETRIMENTALLY IMPACTED BY CONTACT WITH THE WATER.

IN THE TROUGH AREA, THE CONCRETE WAS FOUND TO BE DEGRADED AROUND SEVERAL PIPES. THE TWO PIPES TO THE SUMP WERE FOUND TO HAVE VOIDS AND LOOSE MATERIAL UNDER THEM ON THE TROUGH SIDE, AS WAS THE AZIMUTH 270 PIPE FROM OUTSIDE OF THE SUB-PILE ROOM TO THE TROUGH. THESE THREE AREAS WILL BE RESTORED TO THEIR ORIGINAL CONFIGURATION USING SAFETY RELATED MASTERFLOW 928 GROUT, WHICH IS AS STRONG OR STRONGER THAN THE ORIGINAL CONCRETE.

IN ADDITION, AFTER REMOVING DEBRIS FROM TROUGH AROUND THE INNER FACE OF THE REACTOR PEDESTAL (PER AWA #1) A VOID WAS FOUND IN CONCRETE IN THE BOTTOM OF THE TROUGH (IR 00550437). MOST LIKELY THIS VOID ALLOWS WATER TO

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NUMBER: OC 06-00879 000 ECR TYPE: DCP

APPROVED DISPOSITION:

BYPASSES THE TROUGH ROUTING ARRANGEMENT TO THE 1-8 AND ALLOWS WATER TO ENTER THE CONCRETE FLOOR, WHICH ALLOWS WATER TO MIGRATE THOUGH FLOOR TO THE TRENCH IN BAY 5. AS A RESULT AWA # 7 WAS ISSUED TO THE FIELD TO REPAIR THIS VOID AND ELIMINATE THIS LEAKAGE SOURCE INTO THE CONCRETE FLOOR. THE REPAIR OF THE TROUGH SHOULD ELIMINATE THE LEAKAGE SOURCE, WHICH CONTINUES TO FILL THE BAY 5 TRENCH.

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THE DEPTH OF THE TROUGH WAS MEASURED RELATIVE TO STANDING WATER IN THE TROUGH TO DETERMINE IF THE FLOOR OF THE TROUGH WAS SLOPED TO THE SUMP AREA. IT WAS FOUND THAT, GENERALLY, THE LOW POINT OF THE TROUGH IS AT THE SUMP (0 DEGREES) AND THE HIGH POINT IS OPPOSITE THE SUMP (180 DEGREES). THE TROUGH IS RELATIVELY FLAT FROM 270 DEGREES TO 0 DEGREES, HAVING ONLY A 1/8" DIFFERENCE IN WATER DEPTH. THE FLOOR AND WALLS OF THE TROUGH WERE FOUND TO BE IN GOOD CONDITION, HAVING NO SIGNIFICANT CRACKS OR PATHS OF LEAKAGE INTO THE SLAB INTERIOR. BASED ON THIS INFORMATION, IT WAS DETERMINED THAT THERE WAS LITTLE BENEFIT TO RESURFACING THE TROUGH FLOOR TO PROVIDE A CONTINUOUS PITCH TO THE SUMP. ANY STANDING WATER IN THE TROUGH DOES NOT AFFECT THE CONCRETE. ALSO, RAISING THE FLOOR OF THE TROUGH IN THE 270 DEGREE REGION COULD CAUSE WATER TO COLLECT OUTSIDE OF THE PEDESTAL IN THAT AREA, OR EVEN FLOW OUT OF THE TROUGH TO THE OUTER AREA THROUGH THE PIPE THAT CONNECTS THE TWO AREAS. THEREFORE, BASED ON THERE BEING NO TANGIBLE BENEFIT AND POTENTIAL NEGATIVE CONSEQUENCES, NO REPAIRS ARE SPECIFIED FOR THE TROUGH FLOOR OR WALLS.

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THE RAISED SLAB IN THE CENTER OF THE SUB-PILE ROOM HAS EXPOSED AND LOOSE AGGREGATE, AND SPALLING ALONG THE EDGE IN A FEW PLACES. THIS SLAB IS PITCHED DOWNWARD FROM THE CENTER POINT IN ORDER TO SHED WATER INTO THE TROUGH. THERE IS NO STRUCTURAL FUNCTION OF THE RAISED PORTION OF THE SLAB OTHER THAN TO PROVIDE A WORKING SURFACE FOR UNDER VESSEL WORK. THE DISLODGED AND LOOSE AGGREGATE AND DEBRIS HAS BEEN REMOVED, SO THERE IS NO CURRENT CONCERN WITH THE CONDITION. FUTURE REPAIRS SHOULD BE CONSIDERED TO PREVENT FURTHER DEGRADATION AND CREATION OF DEBRIS. THEREFORE THE DEGRADED CONDITION OF THE SLAB IS ACCEPTABLE AT THIS TIME, AND NO REPAIRS ARE SPECIFIED.

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3.0 10CFR50.59 REVIEW:

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THIS ECR IS DETERMINED TO BE A DCP-TYPE PER CC-AA-103. AS SUCH, A 50.59 REVIEW IS REQUIRED. 50.59 SCREENING OC-2006-S-0379 HAS BEEN PERFORMED PER LS-AA-104 FOR THIS CONFIGURATION CHANGE. THE 50.59 SCREENING CONCLUDES THAT A 50.59 REVIEW IS NOT REQUIRED AND THAT

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APPROVED DISPOSITION:

PRIOR NRC APPROVAL IS NOT REQUIRED TO IMPLEMENT THIS CONFIGURATION CHANGE.

4.0 PLANNING, INSTALLATION AND TESTING INSTRUCTIONS:

4.1 PLANT MODE(S) APPLICABILITY:
THIS DESIGN CHANGE PACKAGE REQUIRES INSTALLATION OF MATERIALS IN THE DRYWELL. THEREFORE THIS MODIFICATION MUST BE INSTALLED AND INSPECTED DURING THE 1R21 OUTAGE.

4.2 INSTALLATION REQUIREMENTS:

4.2.1 GENERAL

4.2.1.1 WORK WILL BE IN A POSTED HIGH RAD AREA. AN ALARA PLAN MUST BE DEVELOPED FOR THE REQUIRED WORK ACTIVITIES.

4.2.1.2 THE MIXING AND PLACEMENT OF GROUT SHALL BE IN ACCORDANCE WITH 2400-SMM-3150.16 AND THE MANUFACTURER'S INSTRUCTIONS. A QV QUALIFIED INSPECTOR MUST WITNESS THE MIXING AND PLACEMENT OF THE GROUT.

4.2.1.3 THE MIXING OF THE CAULKING MATERIALS AND PLACEMENT MUST BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND THIS ECR, AND BE WITNESSED BY QV QUALIFIED INSPECTOR.

4.2.2 REPAIRS IN SUB-PILE ROOM (AREA INSIDE OF THE PEDESTAL)

4.2.2.1 LOOSE DEBRIS AND EASILY DISLODGED AGGREGATE SHOULD BE REMOVED FROM THE TROUGH AND THE RAISED FLOOR SLAB.

4.2.2.2 GROUT REPAIR IS REQUIRED AT THE TWO PIPES FROM THE TROUGH TO THE SUMP, AND AT THE AZIMUTH 270 PIPE THROUGH THE PEDESTAL WALL TO THE TROUGH, AS DESCRIBED IN AWA #1. IN ADDITION THE VOID SHALL BE REPAIRED PER AWA #7.

4.2.2.3 ENSURE THAT LOOSE MATERIAL IS REMOVED AND CLEAN AGGREGATE IS EXPOSED PRIOR TO INSTALLATION OF THE REPAIR GROUT, IN ACCORDANCE WITH PROCEDURE 2400-SMM-3150.16.

4.2.2.4 THE DRYWELL SUMP LINER SHOULD BE CLEANED AND INSPECTED AS DESCRIBED IN AWA #2, WITH ANY UNSATISFACTORY RESULTS BEING REPORTED TO ENGINEERING FOR CONSIDERATION OF REPAIRS AND BEING TRACKED UNDER A2152754-13.

E C R Printout

NUMBER: OC 06-00879 000 ECR TYPE: DCP

APPROVED DISPOSITION:

4.2.3 CAULKING THE ELEVATION 10'-3" SLAB PERIMETER

4.2.3.1 THE STEEL AND CONCRETE SURFACES SHOULD BE PREPARED AS DESCRIBED IN AWA #3. LOOSE COATINGS, DIRT, DEBRIS AND CONTAMINANTS MUST BE REMOVED PRIOR TO CAULKING. SURFACE CONDITIONS SHOULD MEET MANUFACTURERS INSTRUCTIONS FOR CAULK PLACEMENT.

4.2.3.2 CAULK SHALL BE APPLIED TO THE FULL PERIMETER OF THE SLAB, AT ITS INTERFACE WITH THE STEEL SHELL, AS DESCRIBED IN AWA #5 AND MODIFIED BY AWA #6 FOR USE OF BACKER ROD.

4.2.3.3 NOTE THE QV INSPECTIONS REQUIRED BY THE AWA, AND THE REVISION TO AWA #5 REDUCING THE MAXIMUM LAP OF THE CAULK ONTO THE STEEL AND CONCRETE TO 3/4".

4.2.4 TRENCH EXCAVATION AND RESTORATION

4.2.4.1 THE TRENCH IN BAY 5 SHALL BE FURTHER EXCAVATED AS DESCRIBED IN AWA #4.

4.2.4.2 AFTER COMPLETION OF UT EXAMINATIONS, CAULK CAN BE APPLIED AT THE INTERFACE WITH THE STEEL SHELL AND THE CONCRETE PER SECTION 4.2.3. REMOVE ALL STANDING WATER FROM THE TRENCH AND ALLOW THE SURFACES TO DRY SUFFICIENTLY TO ALLOW THE APPLICATION OF THE GROUT. CONDITIONS MAY NOT ALLOW FOR A COMPLETE DEWATERING OF THE TRENCH AND DRYING OF ALL SURFACES. IN THIS CASE APPLY A MINIMUM APPLICATION OF GROUT TO THESE SURFACES AND ALLOW 8 HOURS FOR IT TO DRY. ONCE DRY APPLY THE CAULK.

.4.2.4.3 RECOAT THE DRYWELL SHELL SURFACE IN BOTH THE BAY 5 AND BAY 17 TRENCHES AS DESCRIBED IN SECTION 3.2.2.4.3 OF SPECIFICATION IS-328227-004 REV. 13.

4.2.4.4 DO NOT REINSTALL THE SILICONE FOAM OR ELASTOMER TOPPING IN THE TWO TRENCHES.

4.3 ACCEPTANCE TESTING:

4.3.1 GROUT REPAIRS - LEAK TEST WILL BE PERFORMED TO ENSURE ADEQUATE REPAIRS AS DETAILED IN AWA #9. THE LEAK TEST IS USED AS A POST MAINTENANCE VERIFICATION.

.3.2 CAULKING - AN ISI PRE-SERVICE INSPECTION (PSI) WILL BE PERFORMED ON THE CAULK. SUCCESSFUL COMPLETION OF THIS VISUAL EXAMINATION PROVIDES SATISFACTORY ACCEPTANCE TESTING FOR THIS INSTALLATION.

4.3.3 TRENCH EXCAVATION/RESTORATION - ACCEPTANCE

E C R Printout

NUMBER: OC 06-00879 000 ECR TYPE: DCP

APPROVED DISPOSITION:

TESTING FOR THIS PORTION OF THE WORK IS A VISUAL VERIFICATION BY THE WORK GROUP THAT ALL STEEL SHELL SURFACE AREA IN THE TRENCHES IS COATED, EITHER WITH THE ORIGINAL ZINC BASED COATING OR THE GREASE SPECIFIED IN THIS ECR.

..

4.4 MATERIALS:
204-04825 MASTERFLOW 928 GROUT (PC1)
204-07780 BACKER ROD
POLYSPEC THIOKOL 2235M CAULK

.

5.0 REFERENCES
==========
1.-A2152754 E05, TECHNICAL BASIS FOR CAULK DEBRIS GENERATION
2.-A2152754 E06, EVALUATION OF WATER IN BOTTOM OF DRYWELL
3.-50.59 SCREENING OC-2006-S-0379
4.-CALCULATION C-1302-241-E610-081

.

6.0 ATTACHMENTS:
==========
1.-DESIGN ATTRIBUTE REVIEW, 9 PAGES
2.-IMPACT REVIEWS (ATTACHMENT 10'S OF CC-AA-102), 7 PAGES
3.-EP-011 QUALITY CLASSIFICATION FORM, 3 PAGES
4.-MARKUP TO DWG BR 4070, 1 PAGE
5.-KOREA ATOMIC ENERGY RESEARCH INSTITUTE RADIATION TEST REPORT (CAULK), 17 PAGES
6.-COPY OF C-1302-241-E3610-081, REV 2A MINOR REVISION, 1 PAGE.

IND. DESIGN REVIEW COMMENTS:

STRUCTURAL TECHNICAL REVIEW WAS PERFORMED BY DAN FIORELLO I PERFORMED A REVIEW OF THE WORD DOCUMENT CONTAINING THE PROBLEM RESOLUTION, I REVIEWED THE AWAS AND THE TECHNICAL EVALUATION OF THE DESIGN CHANGE AND AM IN AGREEMENT WITH THE CHANGES. I ALSO REVIEWED THE DESIGN ATTRIBUTES IN ATTACHMENT 1. MY COMMENTS WERE MINOR AND WERE INCOPORATED INTO THE DOCUMENT

.

. INDEPENDENT REVIEW BY PETE TAMBURRO

.

I HAVE REVIEWED THE ATTACHED ECR IN ACCORDANCE WITH CC-AA-103 ATTACHMENT D.
THE ECR DESIGN INPUTS ARE CORRECT.
ALL ASSUMPTIONS ARE REASONABLE. THE APPROPRAITE QUALITY ASSURANCE REQUIREMENTS HAVE BEEN SPECIFIED.
ALL DESIGN
INTERFACE REQURIEMENTS ARE MET. THE INSTALLED CAULK HAS BEEN QUALIFIED. ADEQUATE MAINTENANCE AND

E C R Printout

NUMBER: OC 06-00879 000 ECR TYPE: DCP

IND. DESIGN REVIEW COMMENTS:

INSPECTION FEATURES HAVE BEEN ADDRESSED. RADIATION EXPOSURE HAS BEEN CONSIDERED. ALL RECORD RETENTION AND APPROVAL REQUIREMENTS HAVE BEEN ADDRESSED.
THEREFORE I RECOMMEND APPROVAL OF THIS ECR.
****
ALL COMMENTS RECEIVED FOR THE THIRD REVIEWER HAS BEEN SATISFACTORY RESOLVED AS DOCUMENTED IN EMAIL DATED 10/28. SIGNED FOR ELDRIDGE, SHARON DUE TO PIMS INACCESSIBILITY.
****

AWA 1 THROUGH 9 INCLUDING REVISIONS WHICH WERE REQUIRED TO IMPLEMENT AND CORRECT THE IDENTIFIED DISCREPANCIES HAVE BEEN REVIEWED AGAINST THE FINAL DISPOSITION AND ALL REVIEWER COMMENTS REMAIN VALID. THIS PACKAGE ALSO RECIEVED A FINAL INDEPENDENT THIRD PARTY REVIEW BY MPR ASSOCIATES AND WAS FOUND ACCEPTABLE WITHOUT REVISION.
****
MANAGERS COMMENTS
THIS DCP IS APPROVED FOR USE. THIS MODIFICATION WILL IMPROVED THE HEALTH OF THE DRYWELL AND CONCRETE TO ENSURE THAT THE PHYSICAL PLANT IS KEPT HEALTHY THROUGH LIFE EXTENSION.
*****

C. DOCUMENT CHANGES:

DOC CHANGES REQUIRED: Y DOC SCREEN STATUS: _____

AFFECTED DOCUMENTS:

F	Type	Document ID	Sheet	As-Built Type	As-Built Cat	Incorp Due Date	Dwg Inc Date	Inc Rev	Resp Orgn
OC	DWG	BR 4070	1	1.02	D				OED
OC	DWG	GU 3B-153-34-1000	N/A	6.01	F				OED

E C R Printout

NUMBER: OC 06-00879 000 ECR TYPE: DCP

D. APPROVALS:

	Name	User ID	Date
INTERFACING GROUPS:	FIORELLO DAN (STRUCTRUAL)	DJF2	10/27/06
	MARKOS FOR ELDRIDGE, SHARON L	STM1	10/31/06

CAQ: ___ ISSUE NBR: _____

RESP ENGINEER:	MARKOS, SAM / KESTER, PAUL	STM1	10/28/06
IND REVIEWER:	TAMBURRO, PETER	PXT0	11/03/06
MANAGER:	CAMIRE, JOHN A.	JC08	11/04/06

E. ECR WORK COMPLETION NOTIFICATION:

WORK REQUIRED: Y
AUTO CLOSE: N PRK1

FILM ID: _____ BLIP NBR: _____ BOX NBR: _____

C2013725 01 1 COMPLT 20061024
DESC: 187 MOBILIZE WORK AREA

C2013725 02 1 COMPLT 20061025
DESC: 187 DOP TEST HEPA UNIT

C2013725 03 1 COMPLT 20061024
DESC: 187 CLEAN TROUGH

C2013725 04 1 HOLD 20061024
DESC: 187 MATERIALS / PARTS WORK ORDER

C2013725 05 1 INPROG 20061024
DESC: 187 PERFORM CLEANLINESS INSPECTION

C2013725 06 1 COMPLT 20061030
DESC: 187 QUANTIFY EXTENT OF REPAIRS

E C R Printout

NUMBER: OC 06-00879 000 ECR TYPE: DCP

E. ECR WORK COMPLETION NOTIFICATION:

WORK REQUIRED: Y
AUTO CLOSE: N PRK1

FILM ID: _____ BLIP NBR: _____ BOX NBR: _____

C2013725 07 1 COMPLT 20061101
DESC: 187 REPAIR PER AWA #1

C2013725 08 1 READY 20061030
DESC: 187 ENGINEERING INSPECTION

C2013725 09 1 READY 20061025
DESC: 187 ENGINEERING ECR/MOD ACCEPTANCE

C2013725 10 1 COMPLT 20061102
DESC: 187 GROUT REPAIR PER AWA #7

C2013725 11 1 COMPLT 20061103
DESC: 187 MOBILIZE CHECK FOR VOIDS

C2013725 12 1 COMPLT 20061103
DESC: 187 INSTALL PLUGS

C2013725 13 1 COMPLT 20061103
DESC: 187 FILL TROUGH AND VERIFY NO LEAK

C2013725 14 1 COMPLT 20061103
DESC: 187 "TROUGH LEAK TEST"

C2013725 15 1 COMPLT 20061103
DESC: 187 GROUT REPAIR (CONTINGENT)

C2013725 16 1 COMPLT 20061104
DESC: 187 DEMOBILIZE

E C R Printout

NUMBER: OC 06-00879 000 ECR TYPE: DCP

E. ECR WORK COMPLETION NOTIFICATION:

WORK REQUIRED: Y
AUTO CLOSE: N PRK1

FILM ID: _____ BLIP NBR: _____ BOX NBR: _____

C2013726 01 1 COMPLT 20061029
DESC: 187 REMOVE CONCRETE IN BAY #5

C2013726 02 1 READY 20061025
DESC: 187 ENGINEERING ECR/AWA ACCEPTANCE

C2013726 03 1 COMPLT 20061104
DESC: BAY 5 & 17 COAT PREP AREAS WITH VERSILUBE

C2013726 04 1 COMPLT 20061104
DESC: 187 VACUUM WATER FROM BAY #5

C2013726 05 1 COMPLT 20061102
DESC: 187 GROUT REPAIR BAY #5 TRENCH

C2013726 06 1 COMPLT 20061101
DESC: 187 REMOVE WATER FROM BAY 17

C2013726 07 1 COMPLT 20061104
DESC: 187 PROVIDE ENGINEERING SUPPORT

C2013729 01 1 COMPLT 20061029
DESC: 187 CLEAN OUT PERIMETER CREVICE

C2013729 02 1 COMPLT 20061029
DESC: 187 CAULK PERIMETER CREVICE

C2013729 03 1 READY 20061027
DESC: 187 ENGINEERING INSPECTION

E C R Printout

NUMBER: OC 06-00879 000 ECR TYPE: DCP

E. ECR WORK COMPLETION NOTIFICATION:

WORK REQUIRED: Y
AUTO CLOSE: N PRK1

FILM ID: _____ BLIP NBR: _____ BOX NBR: _____

C2013729 04 1 READY 20061027
DESC: 187 ENGINEERING ECR/MOD ACCEPTANCE

C2013729 05 1 READY 20061030
DESC: 187 CONDITIONAL RELEASE OF MATERIAL

C2013729 06 1 COMPLT 20061104
DESC: 187 VERIFY MATERIALS HAVE BEEN

C2013729 07 1 COMPLT 20061029
DESC: 187 CLEAN GREASE FROM GALVANIZE

C2013729 08 1 COMPLT 20061103
DESC: 187 COMPLETE CAULKING

C2013732 01 1 COMPLT 20061029
DESC: 187 CLEAN OUT DRYWELL SUMP

C2013732 02 1 COMPLT 20061028
DESC: 187 PROVIDE SUPPORT FOR DRYWELL SU

C2013732 03 1 COMPLT 20061030
DESC: 187 ENGINEERING INSPECTION

C2013732 04 1 COMPLT 20061029
DESC: 187 DW10 ROV REMOTE VT EXAMS DRYWELL SUMP

C2013732 05 1 COMPLT 20061029
DESC: 187 REMOVE COVERS FROM DW SUMP

E C R Printout

NUMBER: OC 06-00879 000 ECR TYPE: DCP

E. ECR WORK COMPLETION NOTIFICATION:

WORK REQUIRED: Y
AUTO CLOSE: N PRK1

FILM ID: _____ BLIP NBR: _____ BOX NBR: _____

C2013732 06 1 COMPLT 20061029
DESC: SUB PILE ROOM C6-1568 INSTALL GRATING

C2013732 07 1 COMPLT 20061030
DESC: GRATING C6-1568 REMOVE GRATING

C2013732 08 1 SCHED 20061103
DESC: 187 PERFORM PMT

C2013732 09 1 COMPLT 20061031
DESC: 187 REINSTALL COVERS FROM DW SUMP

C2013732 10 1 COMPLT 20061030
DESC: 187 TO BE CLOSED NO WORK PERFORMED

C2013732 11 1 COMPLT 20061030
DESC: 187 OPS SUPPORT TO EMPTY SUMP

C2013732 12 1 COMPLT 20061030
DESC: 187 TO BE CLOSED OUT

C2013732 13 1 COMPLT 20061029
DESC: 187 POWERWASH DRYWELL SUMP

C2013732 14 1 COMPLT 20061029
DESC: 187 HYDROLAZE DRYWELL SUMP

C2013732 15 1 COMPLT 20061029
DESC: 187 MECHANICALLY CLEAN 1-8 SUMP

E C R Printout

NUMBER: OC 06-00879 000 ECR TYPE: DCP

E. ECR WORK COMPLETION NOTIFICATION:

WORK REQUIRED: Y
AUTO CLOSE: N PRK1

FILM ID: _____ BLIP NBR: _____ BOX NBR: _____

C2013732 18 1 COMPLT 20061029
DESC: 187 REMOVE TENT (CONTINGENT)

C2013732 17 1 COMPLT 20061029
DESC: 187 ERECT TENT (CONTINGENT)

C2013732 19 1 COMPLT 20061031
DESC: 187 PERMITS PERMITS

C2013732 20 1 COMPLT 20061030
DESC: 187 PERFORM WELD REPAIR AWA XXX

C2013732 21 1 COMPLT 20061103
DESC: 187 DEMOBILIZE

C2013732 22 1 COMPLT 20061031
DESC: 187 PERFORM STATIC TEST

C2013727 01 1 COMPLT 20061026
DESC: 187 DW10 PREP DW SHELL FOR UT INSPECTION

A2152754 05 COMPLT 11/04/06
DESC: TECHNICAL BASIS FOR AWA FOR ECR 06-00879

A2152754 06 RETURN 11/04/06
DESC: EVALUATE IMPACT OF WATER IN BAY 5 & 17 TRENCHES

A2152754 12 ACCEPT 10/28/06
DESC: ENSURE DRYWELL CAULK PASSES QUALIFICATION TESTING

E C R Printout

NUMBER: OC 06-00879 000 ECR TYPE: DCP

E. ECR WORK COMPLETION NOTIFICATION:

WORK REQUIRED: Y
AUTO CLOSE: N PRK1

FILM ID: _____ BLIP NBR: _____ BOX NBR: _____

A2152754 13 COMPLT 11/03/06
DESC: ENSURE DRYWELL SUMP LINER PASSES VT-1 INSPECTION

F. COMPONENT CHANGE REQUESTS:

Affected Component List	CCR Rev	Revw Flag	Prop Stat	User ID	Date
OC 1 187 M MISC NR01\MB001-INT	000	Y	F	JDA0	10/27/06

E C R Printout

COMPONENT CHANGE REQUEST

MECHANICAL MISCELLANEOUS

COMP ID : OC 1 187 M MISC NR01\MB001-INT ECR/NCR ID: E 06-00879 000
CCR REV : 000

LAST UPD : 10/31/06 PXT0 REVIEWED : Y
PROPOSD CRL STATUS: F CCR STATUS: APPVD REVIEWED BY : PXT0
REVIEW DATE : 10/31/06

COMPONENT INFORMATION

CMP FEG : OC 1 187 000 CLEAR PT : ___ ___

CMP DESCRIPT : DRYWELL INTERIOR MOISTURE BARRIER @ CONCRETE FLOOR
ELEV 10-3 WHERE DW FLOOR MEETS DW SHELL
CMP DESCRIPT :

MANUFACTURER :
MFGR STYLE :
COM NUMBER : COMPUTER ADDRESS:
MODEL NUMBER : THIOKOL 2235M
MFG TYPE :
SERIAL NUMBER:
LOCATION : LOC: DW 10 IAA
LOC:
LBL FOOTNOTES:

CODES AND CLASSIFICATIONS

QA CLASS	*	A	SEIS CAT		Z	SSEL/SQUG		N
PM EQPT			ENV QUAL		N			
E INTERFACE			REG.GDE. 1.23		N	REG.GDE. 1.26		N
REG.GDE. 1.97		N	REG.GDE. 1.143		N			
REG.GDE. 1.155		N	ATWS		N	FIRE PROTECTION		N
FIRE SSD		N	10CFR73.55		N	SWP/RWP		
IEB 79-18		N	IEB 80-11		N	EMER HT SNK		N
ECM			SET POINT CLASS:	X		ISI CLASS		M
ASME SEC XI ISI:		Y	ASME SEC XI IST:		N	ASME REPR/REPL		
ARES BND INSTR		N	MRULE/EPIX		N	A4 SCOPE		N
QSA CLASS		N	LR			TECH SPEC		
PRAM								
WHITE PIPE CD						IVOR REQ		
OTHER RR		Y	TMI-2 PDMS			BORON		

BASIC REFERENCE DOCUMENT:
BR 4070
REFS/OTHER COMMITMENTS :

THE AMOUNT OF POTENTIAL DRYWELL DEBRIS THAT COULD ENTER THE ECCS SUCTION STRAINERS IS EVALUATED IN CALCULATION C-1302-241-E610-081.

E C R Printout

COMPONENT CHANGE REQUEST

MECHANICAL MISCELLANEOUS

COMP ID : OC 1 187 M MISC NR01\MB001-INT ECR/NCR ID: E 06-00879 000
CCR REV : 000

LAST UPD : 10/31/06 PXT0
PROPOSD CRL STATUS: F CCR STATUS: APPVD
REVIEWED : Y
REVIEWED BY : PXT0
REVIEW DATE : 10/31/06

TECHNICAL COMPONENT DATA

LINE NUMBER :
COMP SUB-TYPE:
FLOW RATING :
DESIGN TEMP :
SPEED RATING :
BLWR PRES RT :
DRIVER SPEED :
DESIGN PRESS :
VOLUME :
DIMENSIONS :
HORSEPOWER :
CAPACITY :
RATED SPEED :
SHUTOFF HEAD :
TUBE PRESS : SHELL PRESS:
RELIEF PRESS :
TEMP CORRECT :
BACKPRESS COR:
BENCH TEST PR:
SERVICE FLUID:
VALVE SIZE :

DOCUMENTS

PC TYPE	DOCUMENT ID	SHEET	SUB TYPE	DESCRIPTION	INDICATED CRL ACTION
OC CALC	C-1302-241-E610-081		7047	SUCTION STRAINER DEBRIS GENERAT	A
OC DWG	BR 4070	1	7002	REACTOR PEDESTAL SECTION & DETA	A

CCR PURCHASE AND DESIGN DATA

IN SERVICE DATE: 10/27/06 PO NO:
VENDOR CODE :

SPEC NBR : ITEM NBR:
DESIGN CODE :
CONSTR CODE :
INSTALL CODE :
SE [illegible] :

E C R Printout

COMPONENT CHANGE REQUEST

MECHANICAL MISCELLANEOUS

COMP ID : OC 1 187 M MISC NR01\MB001-INT ECR/NCR ID: E 06-00879 000
CCR REV : 000

LAST UPD : 10/31/06 PXT0 REVIEWED : Y
PROPOSD CRL STATUS: F CCR STATUS: APPVD REVIEWED BY : PXT0
REVIEW DATE : 10/31/06

========== COMMENTS ========== ID == DATE =

NOTE: THIS IS THE CAULK JOINT AROUND THE PERIMETER OF THE	PRK1	10/27/06
DRYWELL CONCRETE FLOOR AT ELEVATION 10'3", WHERE IT MEETS	PRK1	10/27/06
THE STEEL DRYWELL SHELL.	PRK1	10/27/06

==========CCR IST PUMP AND VALVE TESTING DATA==========

MAX DESIGN STROKE TIME POSITION

OPEN:	P+ID COORD:	ACT TYPE :	NORMAL:	
CLOSED:	APP. J TYPE C :	G.L. 89-10 :	SAFE :	
	VALVE CAT :	SIZE: 0.00 0.00	FAIL :	

TESTING REQUIREMENTS (old)

TST TYP	FREQ/DIR	PROCEDURE	RT NBR	RR/CSTJ/ROJ

========== PENETRATION SEAL INFORMATION ==========

BARRIER RATING
BARRIER ID: _____ _____ _____ _____
STEAM : ___ ___ FIRE : ___ ___ SECURITY: ___ ___
WATER: ___ ___ EWATER: ___ ___ S+HG : ___ ___ RAD: ___ ___
AIR : ___ ___ S CTMT: ___ ___
A SIDE RM NBR: _____ _____ B SIDE RM NBR: _____ _____

PENETRATION/COMMODITY
PEN SIZE : _____ _____
PEN CONFIG: _____ _____ _____ _____
COMMODITY SIZE : _____ _____
COMMODITY MATERIAL: _____ _____
PIPING: MAX MVMT : _____ _____ AXIAL _____ _____ LATERAL
MAX PIPE TEMP: _____ _____
ELECTRICAL : NEW CABLE LOADING: _____ _____ (% FILL)
LOAD : _____ _____ EQUIV FT OF CONC. REQD
BA/BA RATIO: _____ _____ (ACTUAL)
WATER : _____ _____ PSIG(MAX FLD HT. - MIN PEN. ELEV X 0.43)

PENETRATION SEAL DETAIL:	A SIDE		B SIDE	

****
** END-OF-CCR *
****

ATTACHMENT 10A
Operations Department (including Radwaste) Configuration Change Review Checklist
Page 1 of 1

Configuration Change Document No.: ECR 06-00879 Rev. 0

This Attachment is a sample of a format that can be used to obtain InterDepartmental approvals of a Configuration Change. The content of the Attachment is the required level of questions that each department is expected to answer and provide concurrence before Engineering issues the Configuration Change. As long as the content of the Attachment is being addressed, there is no requirement to use this particular format. This review covers activities performed during the design phase of a Configuration Change, including initial meetings, walkdowns, detailed design development, and identification of impacts on other station programs and areas of responsibility.

Review Requirements	Initial/Date
1. The impact on the station equipment, changes in equipment responses, and changes in operator response for different scenarios have been discussed. As the representative of the Operations Department, I fully understand the impact, including training needs, upon my department and concur that my concerns have been adequately addressed.	RB 10-27-06
2. I have confirmed the identified Programs, Procedures and Training requirements are complete, or initiated tracking for completion, for my department in accordance with CC-AA-102 attachments listed below:	
• Attachment 7 – Configuration Activities (List Tracking No. None)	RB 10-27-06
• Attachment 8 – Programs (Tracking No. None)	RB 10-27-06
• Attachment 9 – Procedures and Training (Tracking No. None)	RB 10-27-06
3. Acceptance criteria for Post Maintenance Testing and any special tests required to adequately demonstrate system operability following implementation of a Configuration Change have been specified.	RB 10-27-06
4. ALARA for operation has been considered in the design.	RB 10-27-06
5. Appropriate component labeling is used in the design package, including drawings.	RB 10-27-06
6. The Configuration Change does not interfere with operation of existing nearby equipment.	RB 10-27-06
7. There are no operating procedure changes required by this Configuration Change that introduce new susceptibility to water hammer or hydraulic transients that might result in impacting plant operation.	RB 10-27-06
8. The design can be implemented within constraints of plant operation/mode. This includes an operation assessment of all affected systems and interfacing structures, systems and components during the mode(s) in which the design change is being implemented.	RB 10-27-06
9. The configuration change has been reviewed and will not introduce a new single point of vulnerability and there are no existing SPVs (unless approved by Site Engineering Director)	RB 10-27-06
10. Impact of this configuration change on Operator Aids has been reviewed and appropriate actions have been or will be taken (refer to OP-AA-115-101 and the Operator Aid Log) None	RB 10-27-06
11. The configuration change has been reviewed and impacts on margin are understood. The design summary adequately addresses known margin impacts. (refer to ER-AA-2007)	RB 10-27-06
12. Changes impacting the Clearance and Tagging Program have been identified and are being tracked.	RB 10-27-06

My department has reviewed the Configuration Change Document (or appropriate contents) and understands the impact regarding my department's operations, procedures, and programs. All Configuration Change support activities required of my department have been identified.

Robin Brown Date: 10-27-06
Operations Department Representative

Return the completed form to the Configuration Change Preparer

ATTACHMENT 10B
Plant Engineering Configuration Change Review Checklist
Page 1 of 1

Configuration Change Document No.: ECR 06-00879 Rev. 0

This Attachment is a sample of a format that can be used to obtain InterDepartment approvals of a Configuration Change. The content of the Attachment is the required level of questions that each department is expected to answer and provide concurrence before Engineering issues the Configuration Change. As long as the content of the Attachment is being addressed, there is no requirement to use this particular format. This review covers activities performed during the design phase of a Configuration Change, including initial meetings, walkdowns, detailed design development, and identification of impacts on other station programs and areas of responsibility.

Review Requirements	Initial/Date
1. My department has participated as required, and concurred with the proposed Configuration Change; and fully understands the Configuration Change implications for my department. Included in this review is verification that restoration activities will not result in hydraulic transients that could result in water hammer or affect the continued operation of the unit	# 10/27/06
2. I have confirmed the identified Programs, Procedures and Training requirements are complete, or initiated tracking for completion, for my department in accordance with CC-AA-102 attachments listed below:	# 10/27/06
Attachment 7 – Configuration Activities (Tracking No. A21527754 ECR 06-00879)	# 10/27/06
Attachment 8 – Programs (Tracking No._____)	# 10/27/06
Attachment 9 – Procedures and Training (Tracking No._____)	# 10/27/06
3. Acceptance criteria for DCP Testing and any special tests required to adequately demonstrate system operability following Configuration Change implementation have been specified.	# 10/27/06
4. Parameters for performance monitoring and trending are adequately instrumented.	NA
5. If applicable, changes to system descriptions in UFSAR and DBDs have been reviewed and are correct.	# 10/27/06
6. Existing Surveillance Procedures are adequate for monitoring system performance or revision are being tracked to assure timely completion. (Action Tracking No._____)	# 10/27/06
7. PMs are not impacted or actions initiated to create or revise PM's	# 10/27/06
8. New components are classified per MA-AA-716-210 in the PCM web-based tool, appropriate revisions in the PCM web-based tool for existing components have been made, or additions and changes are being tracked to assure timely completion. (Action Tracking No._____)	NA
9. Design conditions, inputs, and assumptions used in processes, designs or analyses subject to Nuclear Fuels Dept. design authority, if affected, have been discussed with NF and addressed if req'd.	NA
10. The configuration change has been reviewed and will not introduce a new single point of vulnerability and there are no existing SPVs. (unless approved by Site Engineering Director)	# 10/27/06
11. Changes to operator rounds data points have been initiated per OP-AA-102-102. (Action Tracking No._____)	NA
12. The configuration change has been reviewed and impacts on margin are understood. The design summary adequately addresses known margin impacts. (refer to ER-AA-2007)	# 10/27/06
13. Determine if the interim configuration has any potential impact on the operational and nuclear safety requirements of all affected systems and interfacing structures, systems and components during the mode(s) in which the design change is being implemented.	# 10/27/06

My department has reviewed the Configuration Change Document (or appropriate contents) and understands the impact regarding my department's operations, procedures, and programs. All Configuration Change support activities required of my department have been identified.

Hiram Cartwright — 10/27/06

Plant Engineering Representative — Date

Return the completed form to the Configuration Change Preparer or Sign Electronically in PIMS or PassPort

ATTACHMENT 10C
Engineering Programs Configuration Change Review Checklist
Page 1 of 1

CONFIGURATION CHANGE DOCUMENT NO.: ECR 06-00879

This Attachment is a sample of a format that can be used to obtain InterDepartmental approvals of a Configuration Change. The content of the Attachment is the required level of questions that each department is expected to answer and provide concurrence before Engineering issues the Configuration Change. As long as the content of the Attachment is being addressed, there is no requirement to use this particular format. This review covers activities performed during the design phase of a Configuration Change, including initial meetings, walkdowns, detailed design development, and identification of impacts on other station programs and areas of responsibility.

Review Requirements	Initial/Date
1. My department has participated as required, and concurred with the proposed Configuration Change; and fully understands the Configuration Change implications for my department.	MAC 10/27/06
2. I have confirmed the identified Programs, Procedures and Training requirements are complete, or initiated tracking for completion, for my department in accordance with CC-AA-102 attachments listed below:	MAC 10/27/06
• Attachment 7 – Configuration Activities (Action Tracking No. N/A)	MAC 10/27/06
• Attachment 8 – Programs (Action Tracking No. N/A)	MAC 10/27/06
• Attachment 9 – Procedures and Training (Action Tracking No. N/A)	MAC 10/27/06
3. DCP Testing has been specified to adequately demonstrate program compliance for components. These tests have been reviewed to assure that there is no likelihood of initiating a water hammer event.	MAC 10/27/06
4. Changes to system descriptions in UFSAR and component DBDs have been reviewed and are correct.	MAC 10/27/06
5. Existing Surveillance Procedures are adequate for monitoring system performance or revisions are being tracked to assure timely completion. (Action Tracking No. N/A)	MAC 10/27/06
6. The configuration change has been reviewed and impacts on margin are understood. The design summary adequately addresses known margin impacts. (refer to ER-AA-2007)	MAC 10/27/06

My department has reviewed the Configuration Change Document (or appropriate contents) and understands the impact regarding my department's operations, procedures, and programs. All Configuration Change support activities required of my department have been identified.

Mark Carl — 10/27/06

Engineering Programs Representative — Date

Return the completed form to the Configuration Change Preparer or Sign Electronically in PIMS or PassPort

ATTACHMENT 10C
Engineering Programs Configuration Change Review Checklist
Page 1 of 1

CONFIGURATION CHANGE DOCUMENT NO.: ECR 06-00879, REV. 0

This Attachment is a sample of a format that can be used to obtain InterDepartmental approvals of a Configuration Change. The content of the Attachment is the required level of questions that each department is expected to answer and provide concurrence before Engineering issues the Configuration Change. As long as the content of the Attachment is being addressed, there is no requirement to use this particular format. This review covers activities performed during the design phase of a Configuration Change, including initial meetings, walkdowns, detailed design development, and identification of impacts on other station programs and areas of responsibility.

Review Requirements	Initial/Date
1. My department has participated as required, and concurred with the proposed Configuration Change; and fully understands the Configuration Change implications for my department.	S. Nigam 10/27/06
2. I have confirmed the identified Programs, Procedures and Training requirements are complete, or initiated tracking for completion, for my department in accordance with CC-AA-102 attachments listed below:	S. Nigam 10/27/06
• Attachment 7 – Configuration Activities (Action Tracking No. N/A)	S. Nigam 10/27/06
• Attachment 8 – Programs (Action Tracking No. N/A)	S. Nigam 10/27/06
• Attachment 9 – Procedures and Training (Action Tracking No. N/A)	S. Nigam 10/27/06
3. DCP Testing has been specified to adequately demonstrate program compliance for components. These tests have been reviewed to assure that there is no likelihood of initiating a water hammer event.	N/A
4. Changes to system descriptions in UFSAR and component DBDs have been reviewed and are correct.	N/A
5. Existing Surveillance Procedures are adequate for monitoring system performance or revisions are being tracked to assure timely completion. (Action Tracking No. N/A)	N/A
6. The configuration change has been reviewed and impacts on margin are understood. The design summary adequately addresses known margin impacts. (refer to ER-AA-2007)	N/A

My department has reviewed the Configuration Change Document (or appropriate contents) and understands the impact regarding my department's operations, procedures, and programs. All Configuration Change support activities required of my department have been identified.

SUJIT NIGAM — Engineering Programs Representative

10/27/06 — Date

Return the completed form to the Configuration Change Preparer or Sign Electronically in PIMS or PassPort

ATTACHMENT 10C
Engineering Programs Configuration Change Review Checklist
Page 1 of 1

CONFIGURATION CHANGE DOCUMENT NO.: ECR 06-00879 Rev. 0

This Attachment is a sample of a format that can be used to obtain InterDepartmental approvals of a Configuration Change. The content of the Attachment is the required level of questions that each department is expected to answer and provide concurrence before Engineering issues the Configuration Change. As long as the content of the Attachment is being addressed, there is no requirement to use this particular format. This review covers activities performed during the design phase of a Configuration Change, including initial meetings, walkdowns, detailed design development, and identification of impacts on other station programs and areas of responsibility.

Review Requirements	Initial/Date
1. My department has participated as required, and concurred with the proposed Configuration Change; and fully understands the Configuration Change implications for my department.	[illegible] 10/27/06
2. I have confirmed the identified Programs, Procedures and Training requirements are complete, or initiated tracking for completion, for my department in accordance with CC-AA-102 attachments listed below:	NA
• Attachment 7 – Configuration Activities (Tracking No._____)	NA
• Attachment 8 – Programs (Tracking No. A2152754 Eff	[illegible] 10/27/06
• Attachment 9 – Procedures and Training (Tracking No._____)	NA
3. DCP Testing has been specified to adequately demonstrate program compliance for components. These tests have been reviewed to assure that there is no likelihood of initiating a water hammer event.	NA
4. Changes to system descriptions in UFSAR and component DBDs have been reviewed and are correct.	NA
5. Existing Surveillance Procedures are adequate for monitoring system performance or revisions are being tracked to assure timely completion. (Action Tracking No._____)	NA
6. The configuration change has been reviewed and impacts on margin are understood. The design summary adequately addresses known margin impacts. (refer to ER-AA-2007)	NA

My department has reviewed the Configuration Change Document (or appropriate contents) and understands the impact regarding my department's operations, procedures, and programs. All Configuration Change support activities required of my department have been identified.

[signature] 10/27/06
Engineering Programs Representative — Date

Return the completed form to the Configuration Change Preparer or Sign Electronically in PIMS or PassPort

ATTACHMENT 10D
Maintenance Department Configuration Change Review Checklist
Page 1 of 1

Configuration Change Document No.: ECR 06-00879 Rev. 0

This Attachment is a sample of a format that can be used to obtain InterDepartmental approvals of a Configuration Change. The content of the Attachment is the required level of questions that each department is expected to answer and provide concurrence before Engineering issues the Configuration Change. As long as the content of the Attachment is being addressed, there is no requirement to use this particular format. This review covers activities performed during the design phase of a Configuration Change, including initial meetings, walkdowns, detailed design development, and identification of impacts on other station programs and areas of responsibility.

Review Requirements

		Initial/Date
1.	My department has participated as required and concurred with the proposed Configuration Change; and fully understands the Configuration Change implications for my department.	QPS 10/27/06
2.	I have confirmed the identified Programs, Procedures and Training requirements are complete, or initiated tracking for completion, for my department in accordance with CC-AA-102 attachments listed below:	QPS 10/27/06
	• MNGT RULE INSPECTION of CAULK EVERY 4 YRS • ISI PROCEDURE AND INSPECTION EVALS • Attachment 8 – Programs (Tracking No._____) • Attachment 9 – Procedures and Training (Tracking No._____)	NO NOTE Programs on Procedure Training NEEDED — QPS 10/27/06
3.	Constructability requirements have been considered (e.g., shop fabrication, field fabrication, scaffolding, rigging, ALARA, special tools, etc.) – 4	QPS 10/27/06
4.	Demolition and removal boundaries have been clearly specified. – N/A	QPS 10/27/06
5.	Equipment layout allows maintenance space for newly installed components and does not interfere with maintenance of existing equipment. – 4	QPS 10/27/06
6.	Items not in inventory, long lead time items, and required spare parts have been identified. (Tracking Number:_____) – 4	QPS 10/27/06
7.	Acceptance criteria for maintenance testing has been specified as required. – 4	QPS 10/27/06

My department has reviewed the Configuration Change Document (or applicable contents) and understands the impact regarding my department's operations, procedures, and programs. All Configuration Change support activities required of my department have been identified.

* GEORGE SEVCIK QPS Date: 10/27/06
Maintenance Department Representative

Return the completed form to the Configuration Change Preparer or Sign Electronically in PIMS or PassPort

* PER DISCUSSION WITH OCC MOM ON 10/27/06 @17:30, GEORGE SEVCIK WAS EMPOWERED TO ACT ON MAINTENANCE'S BEHALF.

EC# 06-00879 Rev 0
Attachment 2
Page 1 of 7

ATTACHMENT 10F
Configuration Change Review Checklist for Use by Other Departments
Page 1 of 1

Department MAINT. PLANNING

CONFIGURATION CHANGE DOCUMENT NO.: 06-00879

This Attachment is a sample of a format that can be used to obtain InterDepartmental approvals of a Configuration Change. The content of the Attachment is the required level of questions that each department is expected to answer and provide concurrence before Engineering issues the Configuration Change. As long as the content of the Attachment is being addressed, there is no requirement to use this particular format. This review covers activities performed during the design phase of a Configuration Change, including initial meetings, walkdowns, detailed design development, and identification of impacts on other station programs and areas of responsibility.

Review Requirements	Initial/Date
1. My department has participated in the Configuration Change process (scope meetings, walkdowns, impact review, etc.) as required, and concurred with the proposed Configuration Change; and fully understands the Configuration Change implications for my department.	10/27/06
2. I have confirmed the identified Programs, Procedures and Training requirements are complete, or initiated tracking for completion, for my department in accordance with CC-AA-102 attachments listed below:	
• Attachment 8 – Programs (Action Tracking No._____)	NA
• Attachment 9 – Procedures and Training (Action Tracking No._____)	NA
3. Other Considerations required to be completed in support of the Configuration Change:	NA
4. The configuration change has been reviewed and impacts on margin are understood. The design summary adequately addresses known margin impacts. (refer to ER-AA-2007)	10/27/06

My department has reviewed the Configuration Change document (or applicable contents) and understands the impact regarding my department's operations, procedures, and programs. All Configuration Change support activities required of my department have been identified.

_____ Date: 10/27/06

Affected Plant Department Representative

(See EC Milestone for Dept Review signature authentication)

Return the completed form to the Configuration Change Preparer or Sign Electronically in PIMS or PassPort

AmerGen.
An Exelon/British Energy Company

Exhibit 2A
QUALITY CLASSIFICATION EVALUATION FORM
(Typical) EP-011

ECR No: 06-00879 REV: 0 PAGE 1 OF ___

I. Component Information ☒ NEW COMPONENT ☐ REVISION ☐ INITIAL CLASSIFICATION

Facility: OC Unit: 1 Category: M Type: MISC CRL Component No.: NR01\MB001-INT.

Host System No.: 187 Host Component/Description: DRYWELL

System Classification:	☒ Q	☐ A	☐ N
Host Component Classification:	☒ Q	☐ A	☐ N

II. Evaluation

1. What are the safety functions of the host system and the host component? If both the host system and host component do not perform a safety function, mark this question and question 2 as "N/A" and continue to question 3.

Host System:
Host System:

The Containment is an enclosure for the reactor vessel, the Reactor Coolant Recirculation System, and other branch connections of the Reactor Coolant System. Per UFSAR section 6.2.1, the design criteria for the Containment are as follows:

a. To withstand the peak transient pressure (coincident with an earthquake) which could occur due to the postulated break of any pipe inside the drywell.
b. To channel the flows from postulated pipe breaks to the torus.
c. To withstand the force caused by the impingement of the fluid from a break in the largest local pipe or connection, without containment failure.
d. To limit primary containment leakage rate during and following a postulated break in the primary system to substantially less than that which would result in offsite doses approaching the limiting values in 10CFR100.
e. To include provisions for leak rate tests.

Host Component:
The concrete floor slab at the base of the drywell provides a foundation for the RPV support pedestal, as well as a level support surface for personnel and equipment

2. Does the item play a role in accomplishing the host system or host component's safety function? If "NO", go to Question 3. If "YES" mark questions 3 and 4 as "N/A" and go to section III. In either case, explain your answer.

NO

3. Does the item serve as an isolation device between a safety related and non-safety related interface with regard to fluid systems, electrical circuits, primary containment or effluent control? If "YES", explain your answer. If "NO", mark this question "NO" and go to Question 4.

NO

4. Are there any credible failure mechanisms/modes of the item that would prevent its host system or host component from performing its safety function? Explain.

The amount of potential drywell debris that could enter the ECCS suction strainers is evaluated in calculation C-1302-241-E610-081.

III. Component Classification

If the answer to question 2, 3 or 4 is YES, classify the item as Safety Related (Q).

If the item is not Q, is it required to meet any of the commitments or requirements of Exhibit 3 in EP-011? If YES, identify those commitments/requirements on Exhibit 2B and classify the item as Augmented Quality (A); otherwise, classify the item as "Not Safety Related" (N).

☐ Q (Safety Related) ☒ A (Augmented Quality) ☐ N (Not Safety Related)

Revisions

☐ UPGRADES – Operability Review/CAP Initiated ☐ DOWNGRADES – 10CFR50.59

Previous Report number: _____ (Required for EDMS) CAP No. _____ SE No.: _____

MAINT. RULE COORD. NOTIFIED OF CLASSIFICATION REVISION: ☒ PREPARER'S INITIALS: SM DATE: 10/27/06

AmerGen
An Exelon/British Energy Company

QC Evaluation (Typical)
Exhibit 2B – EP-011

ECR No: 06-00879	Rev No.: 0	Date: 10/27/06	Quality Class: A	EQ (10 CFR 50.49):
Facility: OC / Unit: 1	System : 187	Category: M	Type:	Cmp Nbr: NR01\MB001-INT

Item Description: DRYWELL INTERIOR MOISTURE BARRIER @ CONCRETE FLOOR ELEV 10'-3" WHERE DW FLOOR MEETS DW SHELL.

Functions: (include Safety Function for Safety Related items)

NONE. INSTALLED TO MINIMIZE WATER INTRUSION INTO CONCRETE FLOOR.

ALL ITEMS ARE TO BE EVALUATED

REGULATORY COMMITMENTS (Blank indicates "N", X indicates "Y")

- ☐ R.G. 1.23 (Meteorological Monitoring)
- ☐ R.G. 1.26 (Quality Group Classification)
- ☐ R.G. 1.143 (Radwaste Management Systems)
- ☐ R.G. 1.155 (Station Blackout)
- ☐ IEB 79-18 (Plant Paging)
- ☐ IEB 80-11 (Block Walls)
- ☐ 10 CFR 50.62 (ATWS)
- ☐ 10 CFR 73.55 (Security) ***(Note 1)***

R.G. 1.97: Check one Box only

- ☐ R.G. 1.97 CAT 1 required to be classified "Q"
- ☐ R.G. 1.97 CAT 2
- ☐ R.G. 1.97 CAT 3

SSEL/SQUG: Check One Box Only

- ☐ 1. (Host Component SQUG Eval- Active SSEL.)
- ☐ 2. ("Rule Of Box" SQUG Eval – Active SSEL)
- ☐ 3. (Essential Relay – Active SSEL)
- ☐ 4. (Operator Action Relay – Active SSEL)
- ☐ 5. (Host Component SQUG Eval- Inactive SSEL.)
- ☐ 6. ("Rule Of Box" SQUG Eval – Inactive SSEL)
- ☐ 7. (SQUG Qualified Component Not On SSEL)

Seismic Category: Check one Box only

- ☐ W – (Seismic Class 1 – Operable During & After SSE)
- ☐ X – (Seismic Class 1 – Operable After SSE)
- ☐ Y – (R.G. 1.29 Anti Fall-down)
- ☒ Z – (No Seismic Class applies)

M-RULE/EPIX/PSA

Y M-RULE (R / Y / N) ☐ A4 SCOPE (Y / N)

☐ PSA CLASS (Y / N) __ ORAM (O / S / B / N)

OTHER CLASSIFICATION REQUIREMENTS (Blank indicates "N", X indicates "Y")

☐ 1E Interface ☐ Emer Ht Sink ☐ Press Boundary Inst. ☒ License Renewal

ASME REQUIREMENTS (Blank indicates "N", X indicates "Y")

__ ISI CLASS (A / C / N / M / 1 / 2 / 3) ☒ SEC XI ISI

☐ SEC XI IST ☐ ASME REPAIR/REPLACE

10 CFR 50 APP. R/BTP APP. A (FHAR)

☐ FSSD (N / 1 / 2) ☐ FIRE PROT (Y / N)

☐ Refs/Other Commitments: _____

Comments: MUST MEET ENVIRONETAL CONDITIONS OF DBLOCA FOR SUCTION STRAINERS CLOGING.

References: C-1302-241-E610-081, Rev. 0

Reason for Revision: _____

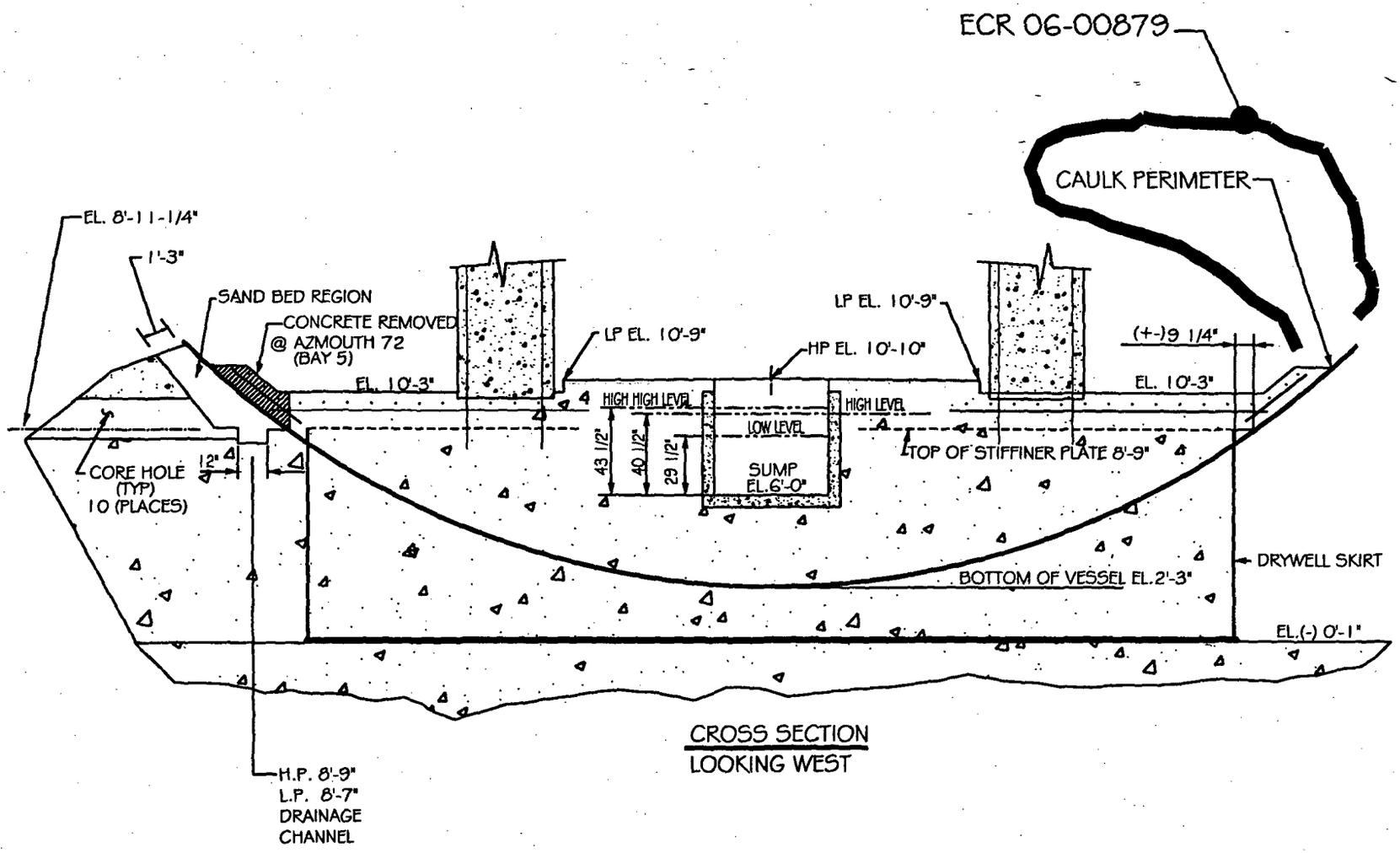
E2-2

Note 1: "Y" Requires the following Special Text Entry in PIMS: "****SECURITY REQUIRED PRIOR TO WORK ON THIS COMPONENT****"

Exhibit 2C – EP-011

QC Evaluation (Typical)
Multiple Component Sheet For ECR# _____

CMP NBR	CATG	TYPE	FUNCTION (Include Safety Function for "Q" components)



CROSS SECTION
LOOKING WEST

DRAWING AFFECTED:
BR 4070 SH. 1

ECR 06-00879
ATTACHMENT 4
PAGE 1 OF 1

BY: D. ABBRUSCATO DATE: 10/27/06

Korea Atomic Energy Research Institute

P. O. BOX 7. DAEDUK-DANJI. TAEJŎN. 305-606. KOREA
TEL.(042)868-2000 / TLX.KAERI K45553 / FAX.(042 868-2702

CERTIFICATE OF RADIATION PROCESSING

Date 1994. 7. 7.

CUSTOMER : Hyundai Engr & Const. Co. Ltd. /Wolsong #2 NPPP

SAMPLE : Thiokol (2235M, 2282)
SIZE : W 15 cm × H 15 cm × T 0.2 cm
QUANTITY : 3

SOURCE : Co-60 59,000 Ci

DOSIMETER : Ceric-Cerous Sulfate

DOSE : MIN 200 Mrad (2.00 MGy)
MAX 204 Mrad (2.04 MGy)

DOSE RATE : 0.5 Mrad/hr (AVR.)

EXPOSURE TIME : 400 hr
1994. 6. 20. 14:00 ~ 7. 7. 06:54 . LOSS TIME : 54 min

OPERATOR PARK, SOONCHEOL DATE '94. 7. 7

APPROVED : JIN, JOONHA DATE '94. 7. 7

Head, Radiation Processing Project

No. 1

의뢰시험성적서

(Test Report)

접 수 번 호 (Report No.)	: TP-04882 (1994.07.13)
신청인주소 (Applicant Address)	: #260, NA A-RI, YANG NAM-HYUN, KYUNG BUK, KOREA
회 사 명 (Company)	: HYUNDAI ENGR & CONST/WOLSONG #2 NPPP
대 표 자 명 (Representative)	: YOUNG-JONG, KIM
품 명 (Commodity)	: THIOKOL SEALANT 2282 (2M-A/KKKC-B)

시 험 결 과 (Test Result) BEFORE RADIATION.

TEST ITEM	UNIT	RESULT	TEST METHOD
Specific Gravity	-	1.44	KSM 5000-90
Solid Content	%	98.9	
Hardness(Shore A)	-	38	ASTM D 2240
Work Life(20℃)	min	55	ASTM C 603
Tack Free(20℃)	hr	7.1/2	ASTM C 679
Tensile Strength	kgf/cm	27	ASTM D 412
Elongation	%	450	

** Mixing Ratio = PTA:PTB = 17.0:3.4

USE : SUBMITTED PURPOSE FOR(SUBMITTAL TO KEPCO)

NOTE : .THIS SHALL NOT BE USED OUTSIDE THE DEFINED USAGE AS WELL AS FOR THE PURPOSE OF PROPAGANDA, LAWSUIT AND OTHER LEGAL REQUIREMENTS..
.THIS TEST REPORT WAS EXECUTED IN 1 PAGE(s).

ECR 06-00879, REV.0
ATTACHMENT 5
PAGE 2 OF 17

1994 7.22 시험검수부 부산지점

귀의 의뢰자로부터 제출한 시료에 대하여 시험한 시험성적서임을 증명함.
This is to certify that the above-mentioned commodities has been tested in the request test.

(Date) 1994 년 07 월 22 일

(Certificated by) 한국화학시험연구원장 S.H. Kim

Korea Testing and Research Institute for Chemical Industry
Director General

서울특별시 영등포구 영등포동 8가 88번지

No. 1

의뢰시험성적서

(Test Report)

접 수 번 호(Report No.) : TP-04833 (1994.07.12)

신청인주소(Applicant Address) : #260, NA A-RI, YANG NAM-MYUN, KYUNG BUK, KOREA

회 사 명(Company) : HYUNDAI ENGR & CONST / WOLSONG #2 NPPP

대 표 자 명(Representative) : JANG HENG-DUK

품 명(Commodity) : THIOKOL SEALANT (2282)

시 험 결 과(Test Result) AFTER RADIATION.

TEST ITEM	UNIT	RESULT	TEST METHOD
Tensile Strength	kgf/cm	10	ASTM D 412
Elongation	%	500	
Hardness(Shore A)	-	17	ASTM D 2240

USE :SUBMITTED PURPOSE FOR(SUBMITTAL TO KEPCO)

NOTE : .THIS SHALL NOT BE USED OUTSIDE THE DEFINED USAGE AS WELL AS FOR THE PURPOSE OF PROPAGANDA,LAWSUIT AND OTHER LEGAL REQUIREMENTS.

.THIS TEST REPORT WAS EXECUTED IN 1 PAGE(s).

ECR 06-00879, REV. 0
ATTACHMENT 5
PAGE 3 OF 17

위의 의뢰자료부터 제출한 시료에 대하여 시행한 시험성적서임을 증명함.
This is to certify that the above mentioned commodities has been tested in the request test.

(Date) 1994 7 15

(Certificated by) 한국화학시험연구원장 S.A. Kim
Korea Testing and Research Institute for Chemical Industry
Director General

서울특별시 영등포구 영등포동 8가 88번지

Thiokol®

LP®
POLYSULFIDE POLYMER TD-569N
5/69

RADIATION RESISTANCE OF LP® LIQUID POLYSULFIDE POLYMER BASED COMPOUNDS

INTRODUCTION

Several independent test laboratory studies have been conducted on the radiation resistance of LP® liquid polysulfide based compounds. In one study, an LP liquid polysulfide based compound withstood gamma radiation doses up to 6.6×10^7 roentgens, for a period of seven days, with little degradation to physical properties. In a second study, specially formulated LP liquid polysulfide based compounds immersed in JP-4 jet fuel withstood as much as 1.7×10^8 roentgens, with only a small loss in physical properties. Both studies showed that commercially available LP liquid polysulfide polymer base aircraft sealants formulated to meet Federal Specifications MIL-S-7502C and MIL-S-8802C had the best resistance to radiation.

DISCUSSION OF RADIATION RESISTANCE DATA FROM OTHER REPORTS

One report which contains radiation data is entitled, "Research on Elastomeric and Compliant Materials for Aerospace Sealants", Technical Documentary Report No. ASD-TDR-62-709. In this study, eight different polymer based sealants, which were all proprietary sealants, were evaluated and compared. Of those sealants tested, the LP liquid polysulfide based sealants gave the best resistance to gamma radiation. In testing the LP liquid polysulfide based sealant compounds for radiation resistance, three different curing agents were used. The best radiation and heat resistance results obtained were on those LP polysulfide polymer compounds which used either the chromate* or MnO_2 cure as compared to the PbO_2 cure. The best results obtained in this study were on an LP liquid polysulfide polymer based compound that withstood gamma radiation doses of 6.4×10^6 roentgens at temperatures of 190°F for 16 hours. After 100 hours at 250°F, this compound was still serviceable although some degradation was evident.

A second report that contains considerable radiation data on various sealant systems is entitled, "The Effects of Reactor Radiation on Elastomers and Sealants-III", by L. L. Morgan. This is Document No. NARF-60-37T, and is also listed as ASTIA No. 256,689. In this study, a number of proprietary compounds, as well as compounds prepared by Thiokol, were evaluated against a number of combined environments. The maximum gamma dosage which LP liquid polysulfide based sealants withstood, when exposed in air at 90°F, was 1.7×10^8 roentgens. After this maximum gamma radiation exposure, the samples still exhibited tensile properties of 400 psi and elongation values of 265%.

U.S. Patent No. 2,787,608 issued 4/2/57 to Products Research Company, Los Angeles, Cal. should be referred to before processing and marketing commercial products based on the chromate cure system.

ECR 06-00879, REV. 0
ATTACHMENT 5
PAGE 4 OF 17

Thiokol/ CHEMICAL DIVISION ☐ 930 Lower Ferry Road ☐ P.O. Box 1296 ☐ Trenton, N. J. 08607 ☐ (609) 396-4001

In another test, cured tensile specimen samples of several LP liquid polysulfide polymer based sealant compounds were immersed in JP-4 fuel for seven days. Next, the samples received a gamma dose of 1.7×10^8 roentgens, after which they were left immersed in the JP-4 fuel for thirty more days. After completion of the exposure tests, the samples still exhibited a tensile strength of 350 psi and an elongation of 125%. The LP liquid polysulfide polymer based compounds used in these exposure tests were based on a chromate and MnO_2 cure system.

Refer to Table I for typical LP liquid polysulfide polymer based formulations and the physical and heat resistant properties of the cured compounds. Then, refer to Tables II and III for a summary of results on five cure systems and their correlation between radiation and heat resistance. All data in the following Tables was compiled from tests conducted by Convair, a division of General Dynamics, Fort Worth, Texas. Convair conducted all the irradiation studies on the test samples, which were prepared and supplied by Thiokol Chemical Corporation. Among the sealants formulated by Thiokol, it was established that cure systems exhibiting the best heat resistance also exhibited the best radiation resistance. Exposure to higher temperatures during irradiation indicated that heat alone can cause degradation.

TABLE I

PHYSICAL PROPERTIES OF COMPOUNDS BASED ON THIOKOL'S LP-32 POLYMER

Compound (pbw)	A	B	C	D	E
LP-32 Polymer	100	100	100	100	100
Titanox RA-50	–	50	–	–	–
EH-330	–	–	1.2	–	–
25% Maleic Anhydride in Cyclohexanone	–	–	2	–	–
Durez 10694	5	–	–	5	–
SRF #3	30	–	–	40	30
MgO	–	–	4	–	–
Sulfur	0.1	–	–	0.1	–
Stearic Acid	1	–	–	1	–
Cumene Hydroperoxide	–	–	6	–	–
50% TeO_2 in Dibutyl Phthalate	–	4	–	–	–
50% PbO_2 in TP-680	15	–	–	–	–
43% Ammonium Chromate Solution in H_2O	–	–	–	15	–
Cabosil M-5	–	–	20	–	–
Sodium Stearate	–	5	–	–	–
MnO_2 - "D" Grade	–	–	–	–	3
Original Physical Properties					
Tensile, psi	390	310	435	800	390
300% Modulus, psi	240	780	130	610	280
Elongation, %	500	530	910	590	435
Hardness, Shore A	50	33	46	61	50
Physical Properties After One Week at 158°F.					
Tensile, psi	550	360	520	910	810
300% Modulus, psi	300	150	165	610	310
Elongation, %	540	630	830	490	700
Hardness, Shore A	53	50	48	62	50
Physical Properties After One Week at 212°F.					
Tensile, psi	710	420	870	950	780
300% Modulus, psi	380	140	290	680	290
Elongation, %	440	750	740	460	710
Hardness, Shore A	57	49	57	64	48
Physical Properties After One Week at 250°F.					
Tensile, psi	540	350	800	710	430
300% Modulus, psi		120	460	510	160
Elongation, %	190	850	460	420	750
Hardness, Shore A	64	48	58	57	43

TABLE II

PHYSICAL PROPERTIES OF EXPERIMENTAL SEALANTS, BASED ON THIOKOL'S LP-32 POLYMER, AFTER IRRADIATION IN AIR AT 90° F.

Compound	Gamma x 10^7	Neutron x10^{16}	Tensile, psi	Elongation, %
A	0	0	480	525
	1.4	1.4	460	490
	10.1	8	300	210
	10.1	7	250	160
B	0	0	450	700
	1.5	1.3	420	720
	10.1	8	260	280
	10.1	7	170	200
C	0	0	820	670
	1.4	1.3	580	560
	10.1	7.1	420	320
	10.1	7	400	260
D	0	0	1230	570
	2.2	1.3	1140	440
	10.1	7	650	210
	10.1	7	530	160
E	0	0	570	500
	2.2	1.3	480	450
	8.4	7	280	250
	17.4	10	250	210

Gamma irradiation in Roentgens, but originally expressed as ergs/gm. (C)
Neutron irradiation in n/cm^2 where E>0.33 MEV

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TABLE III

PHYSICAL PROPERTIES OF EXPERIMENTAL SEALANTS BASED ON THIOKOL'S LP-32 POLYMER, AFTER IRRADIATION AND IMMERSION IN JET FUEL

Compound	Gamma x 10^7	Neutron x10^{15}	Tensile, psi	Elongation, %
A	0	0	480	540
	2.9	1.2	290	340
	11.3	7	60	40
B	0	0	340	670
	2.9	1.2	160	240
	13.0	6	20	50
C	0	0	740	650
	2.9	1.2	570	620
	13.0	7	170	110
D	0	0	1020	530
	17.2	1	350	120
E	0	0	600	530
	11.5	8	115	70

Treatment (JP-4 immersion 7 days at 75°F., irradiation during immersion followed by 30 days immersion in JP-4 Fuel at 75°F.).
Gamma irradiation in Roentgens, but originally expressed as ergs/gm. (C)
Neutron irradiation in n/cm^2 where E>0.33MEV

LIST OF BRAND NAME COMPOUNDING INGREDIENTS

Material Trade Name	Chemical Composition	Manufacturer
TP®-680	Polymeric	Thiokol/Chemical Division
Cabosil M-5	Fumed silica	Cabot Corporation
Durez 10694	Phenolic resin	Hooker Chemical Corp.
EH-330	Catalyst, tertiary amine	Thiokol Chem. Corp.
MnO_2 - "D" grade	Manganese dioxide, special grade MnO_2	Manganese Chemical Corporation
Titanox RA-50	Titanium dioxide	Titanium Pigments Corporation

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DIVISION HEADQUARTERS

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Thiokol/ CHEMICAL DIVISION

A DIVISION OF THIOKOL CORPORATION
TRENTON, NEW JERSEY 08607

Engineering Paper No. 893

THE EFFECT OF NUCLEAR RADIATION ON SEALANTS

by

Raymond A. Siebert

Process Engineer

Materials Research & Process Engineering

Douglas Aircraft Company, Inc.

This paper to be presented at the Society of Aircraft Materials and Process Engineers, Symposium on Sealants and Sealing Aircraft, Missiles, and Electrical Components, October 28, 1959, in the Institute of Aeronautical Sciences, 7660 W. Beverly Blvd., Los Angeles, California

In addition to the obvious thermal and mechanical effects of an atomic explosion, additional effects may result from exposure to high intensity nuclear radiation. An aircraft or missile which might survive the heat and shock wave of an atomic detonation could conceivably become disabled because of radiation effects on components of an essential system such as hydraulic controls or power plant. Recently, Douglas Aircraft Company had the opportunity to investigate the effects of nuclear radiation from an atomic explosion on various process materials used in the construction of aircraft and missiles. Included in the test materials were various sealants which were selected because of their general usage in the airframe and missile industry.

1. Material A is a polysulfide based MIL-S-8802 type jet fuel resistant integral fuel tank sealant which employs a chromate based accelerator.

2. Material B is a black, polysulfide based MIL-S-7502 type integral fuel tank sealant which utilizes a lead peroxide based accelerator.

3. Material C is a polysulfide based MIL-S-8516 type electrical potting compound which utilizes a lead peroxide based accelerator.

4. Material D is a room temperature curing silicone based sealant.

5. Material E is a heat curing silicone based sealant which is putty-like in consistency before cure.

Specimen Preparation

Test specimens were prepared from 1/8 inch thick sheets of cured sealant which had been milled to removed entrapped air immediately after addition of the accelerator. After the sheets had cured 7 days at 77 ± 2°F., dumbbell specimens were cut using the die described in ASTM D-412-51T as Die D. The resulting specimens measured 4 inches in length with a maximum width of 5/8 of an inch and a throat width of 1/8 of an inch. Since Material E, the heat curing silicone, was too viscous for air-free milling, 1/2 by 4 inch rectangular specimens were cut from a 1/8 inch thick sheet which had been pressed from a portion of the uncured compound.

Each specimen was then weighed to the nearest milligram and enclosed in a piece of 1100 aluminum (2S) tubing with an inside diameter of 3/4 of an inch and a length of 5 inches. The ends of the tubes were crimped closed and the sealants allowed to cure an additional 37 days at 77 ± 2oF.

The specimens were then divided into 5 groups,with each group consisting of 3 specimens of each sealant. Each group, with the exception of the control group, was encased in a 6 inch aluminum sphere having a wall thickness of 1-1/2 inches in order to protect the specimens from thermal and mechanical damage. These speres were shipped to the test site where they were placed at varying distances from ground zero. The control specimens were maintained at 77 ± 2°F. for the duration of the test.

Evaluation of Effects

Eighteen days after the detonation, the test specimens were removed from the aluminum tubes and checked for induced radioactivity. Only the polysulfide specimens - Materials A, B and C - which had been exposed at Positions 1 and 2 exhibited any measurable induced radioactivity, as shown in the Table of Results. All specimens including the controls were reweighed and per cent changes in weight calculated. There were no significant trends apparent in the weight changes except, perhaps, in Material E which will be discussed later.

All dumbbell specimens, with a total cure of 62 days, were tested for ultimate tensile strength and elongation properties at 77 ± 2°F. using a Scott Tester, Model L equipped with Type Z-1 clamps and operating at a clamp separation rate of 2 inches per minute. All specimens of Material E were measured for hardness using a Rex Durometer, Model A.

As indicated in the Table of Results, there was no consistent pattern in either the ultimate tensile strengh or elongation of the exposed specimens compared to the controls. The exposed specimens of fuel tank sealants, Materials A and B, exhibited very slight increase in ultimate tensile strength but this increase was not proportional to the amount of radiation received by the various groups. The only consistent changes were observed in the hardness readings or exposed specimens of Material E, where a progressive increase in hardness with increasing proximity to ground zero was noted.

The changes in weight and hardness exhibited by the exposed specimens of Material E were possibly caused by increased temperatures as the specimens were situated closer to ground zero. However, if the temperature at Position 1 was sufficient to cure Material E to a hardness of 45-50, which normally requires 5 to 6 hours at 250°F., the specimens of Materials A, B and C at this position should have exhibited detectable signs of heat exposure, such as increased tensile strength or reduced elongation. Since there appeared to be no other evidence of heat effects, the changes exhibited by Material E were probably a result of bombardment by thermal neutrons whose energy effects may have been sufficient to polymerize the relatively low molecular weight silicone compound.

Generally, the sealants tested did not experience sufficient damage to impair their serviceability at the levels of radiation involved in this test. Since an aircraft or missile exposed to higher levels of radiation from an atomic explosion would probably be destroyed or disabled by the heat or shock wave, any effects on sealant materials at these levels would appear to be of secondary interest.

TABLE [redacted]ESULTS

Material	Exposure in Roentgen[1]	Weight Change		Ultimate Tensile Strength		Ultimate Elongation		Hardness	Induced Radioactivity Counts/Minute
		Actual Weight Change,%	Variation from Control	Actual Tensile Strength,psi	Variation from Control,%	Actual Elongation,%	Variation from Control,%		
A	1.1×10^6	-0.30	-0.08	419	+7.5	175	+2.9	-	1200
	4.0×10^5	-0.26	-0.12	419	+7.5	205	+20.5	-	300
	9.0×10^4	-0.34	-0.04	432	+10.8	195	+14.8	-	None
	2.7×10^4	-0.26	-0.12	422	+8.2	180	+5.9	-	None
	Control	-0.38	-	390	-	170	-	-	None
B	1.1×10^6	-3.12	+0.50	435	+1.4	390	+4.0	-	600
	4.0×10^5	-2.74	+0.02	445	+3.7	390	+4.0	-	100
	9.0×10^4	-2.62	-0.10	438	+2.1	365	-2.7	-	None
	2.7×10^4	-2.80	+0.08	451	+5.1	380	+1.3	-	None
	Control	-2.72	-	429	-	375	-	-	None
C	-	-	-	-	-	--	-	-	--
	4.0×10^5	-1.71	+0.70	196	-5.8	195	-16.3	-	400
	-	-	-	-	-	-	-	-	-
	2.7×10^4	-0.96	-0.05	208	0.0	219	-10.6	-	None
	Control	-1.01	-	208	-	245	-	-	None
D	-	--	-	-	-	-	-	-	-
	4.0×10^5	-0.89	+0.49	532	-6.8	138	-12.7	-	None
	-	-	-	-	-	-	-	-	-
	2.7×10^4	-0.66	+0.26	588	+3.0	160	+1.3	-	None
	Control	-0.40	-	571	-	158	-	-	None
E	1.1×10^6	-1.65	+0.86	-	-	-	-	45-50	None
	4.0×10^5	-1.25	+0.46	-	-	-	-	35-40	None
	9.0×10^4	-1.45	+0.66	-	-	-	-	30-35	None
	2.7×10^4	-1.10	+0.31	-	-	-	-	25-30	None
	Control	-0.79	-	-	-	-	-	15-20	None

[1]A Roentgen is defined as that quantity of X- or Gamma-radiation such that the associated corpuscular emission per 0.001293 gram of air produces, in air, ions carrying one electrostatic unit or quantity of electricity of either sign.

NSF International

NOV 20, 1997

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100 NORTH RIVERSIDE PLAZA
CHICAGO, IL 60606-1598
Attn: MR. MARK NOWAK

Plant 32301

MORTON INTERNATIONAL, INC.
5724 ELDER FERRY ROAD
MOSS POINT, MS 39581
Attn: MR. HAL MC LAUGHLIN

Thank you for having your product tested by NSF.

The enclosed report details the results of the testing performed on your product. Your program representative will be contacting you in the near future if there are any remaining issues concerning the status of this product.

Please do not hesitate to contact us if you have any immediate questions pertaining to your product.

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ATTACHMENT 5
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12-1-97
cc: P. ANDERSON
J. GILMORE
M. REYNOLDS - MOSS POINT
M. SCHERRER

F. Y. I.

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To JON CAVALO	From CHERYL	
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P.O. Box 130140 Ann Arbor, Michigan 48113-0140 USA
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E-Mail: info@nsf.org Web:http://www.nsf.org

Tracking ID: IA01875
Region: 04
Collection Date: 10-APR-1996 00:00:00.00

Description: Thiokol 2235-M
Lab Number: S60502730
Sampled: APR 10, 1996 Received: APR 16, 1996

Class Function: JASM/GSK
Tracking ID: IA01875
Listed or Retest: A1
Normalization Amount (Field): 7.75
Normalization Volume (Field): 1
Normalization Factor - NF2: 0
Testing Standard: 61

Parameter	Result	Units	Entered

Description: Thiokol 2235-M, Sample exposed at 30C and pH 5
Lab Number: S61003055
Sampled: APR 10, 1996 Received: APR 16, 1996

Parameter	Sample	Control	Units	Entered
Additives sample preparation information				
Date exposure completed				10-30-96
Sample: 11-OCT-1996 00:00				
Control: 11-OCT-1996 00:00				
Surface area exposed (A1)	128	128	in2	10-30-96
Final volume of solution (V1)	7.30	7.50	liters	10-30-96
Length of exposure (T1)	24.00	24.00	hours	10-30-96
Arsenic	ND(4)	ND(4)	ug/L	11-08-96
Cadmium	ND(1)	ND(1)	ug/L	11-08-96
Lead	ND(1)	ND(1)	ug/L	11-08-96
Mercury	ND(0.0002)	ND(0.0002)	mg/L	10-17-96

Description: Thiokol 2235-M, Sample exposed at 30C and pH 8
Lab Number: S61003056
Sampled: APR 10, 1996 Received: APR 16, 1996

Parameter	Sample	Control	Units	Entered
Additives sample preparation information				
Date exposure completed				10-30-96
Sample: 11-OCT-1996 00:00				
Control: 11-OCT-1996 00:00				
Surface area exposed (A1)	128	128	in2	10-30-96
Final volume of solution (V1)	7.30	7.60	liters	10-30-96
Length of exposure (T1)	24.00	24.00	hours	10-30-96
Phenolics	0.032	ND(0.001)	mg/L	10-15-96
2-Mercaptoethanol	ND(50)	ND(50)	ug/L	11-05-96
Phthalates, in Water, Scan, 6 compounds, 625				
Bis (2-Ethylhexyl) Phthalate	ND(1)	ND(1)	ug/L	11-18-96
Butyl Benzyl Phthalate	3	ND(1)	ug/L	11-18-96

ND indicates Not Detected.

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S61003056 Continued

Parameter	Sample	Control	Units	Entered
Phthalates, in Water, Scan, 6 compounds, 625 Continued				
Di-n-Butyl Phthalate	<1	1	ug/L	11-18-96
Diethyl Phthalate	1	<1	ug/L	11-18-96
Dimethyl Phthalate	ND(10)	ND(10)	ug/L	11-18-96
Di-n-Octyl Phthalate	ND(1)	ND(1)	ug/L	11-18-96

Note:

Also found approximately:

8.2 ug/L AS: Benzenemethanol
3.3 ug/L AS: 1-Phenyl ethanone
3.9 ug/L AS: 2-Phenyl-2-propanol
0.61 ug/L AS: Bis(2-chloroethoxy)methane

External [0 lines] Phthalates, in Water, Scan, 6 compounds, 625

20 ug/L LP: Oxygen containing, MW>103
7 ug/L LP: Tetramethyl urea
6 ug/L LP: Mix of oxygen containing, MW 89 and oxathiolane and ethyl hexanol
6 ug/L LP: Nitrogen containing, MW>114
9 ug/L LP: (Propenyloxy) benzene
200 ug/L LP: Mix of Dioxathiocane and surrogate standard d5-nitrobenzene
10 ug/L LP: Trimethyl pentanediol
3 ug/L LP: (Propenyl) phenol
3 ug/L LP: Oxygen containing, MW=>144
7 ug/L LP: Tetramethyl thiourea
3 ug/L LP: Nitrogen, oxygen containing, MW>157
20 ug/L LP: Oxygen containing, MW=>142
10 ug/L LP: Oxygen containing, MW>159
40 ug/L LP: Oxygen containing, MW>173
900 ug/L LP: Mix of nitrogen containing, MW=>199 and surrogate standard d5-fluorobiphenyl
20 ug/L LP: Aromatic oxygen containing, MW=>162
100 ug/L LP: Aromatic oxygen containing, MW=>164, #1
30 ug/L LP: Aromatic nitrogen, oxygen containing, MW>178
100 ug/L LP: Aromatic oxygen containing, MW=>164, #2
4 ug/L LP: Mix of oxygen containing, MW=>180 and ditert butyl methoxy phenol
2 ug/L LP: Oxygen containing, MW=>202
7 ug/L LP: Nitrogen containing, MW>176
8 ug/L LP: Mix of nitrogen containing, MW>198 and oxygen containing, MW=>204
3 ug/L LP: Mix, two oxygen containing, MW=>186 and MW>165 and aromatic oxygen containing, MW=>206
6 ug/L LP: Aromatic oxygen containing, MW=>204, #1
6 ug/L LP: Aromatic oxygen containing, MW=>204, #2
6 ug/L LP: Nitrogen containing, MW>200
100 ug/L LP: Nitrogen containing, MW>212, #1
10 ug/L LP: Nitrogen containing hydrocarbon, MW>192
3 ug/L LP: Aromatic oxygen containing, MW=>236
4 ug/L LP: Aromatic oxygen containing, MW=>204, #3
30 ug/L LP: Aromatic oxygen containing, MW=>192
50 ug/L LP: Aromatic oxygen containing, MW=>194
6 ug/L LP: Nitrogen containing, MW>212, #2
6 ug/L LP: (Methyl phenyl ethyl) phenol
8 ug/L LP: Nitrogen containing, MW>240
7 ug/L LP: Unknown hydrocarbon, MW>209
6 ug/L LP: Mix of nitrogen containing, MW>230 and oxygen containing, MW=>226

ND indicates Not Detected.

S61003056 Continued

Parameter	Sample	Control	Units	Entered
Phthalates, in Water, Scan, 6 compounds, 625 Continued				
3 ug/L LP: Nitrogen containing, MW>244				
80 ug/L LP: Nitrogen containing, MW=>257				
8 ug/L LP: Oxygen containing, MW=>166				
100 ug/L LP: Nitrogen containing hydrocarbon, MW>270				
40 ug/L LP: Nitrogen containing, MW>286				
10 ug/L LP: Nitrogen containing, MW>260				
10 ug/L LP: Nitrogen containing, MW=>299				
100 ug/L LP: Unknown hydrocarbon, MW=>300				
30 ug/L LP: Unknown hydrocarbon, MW=>312				
20 ug/L LP: Mix of nitrogen containing, MW>328 and oxygen containing, MW=>310				
2 ug/L LP: Oxygen containing, MW=>390				
200 ug/L LP: Nitrogen containing hydrocarbon, MW=>335				
10 ug/L LP: Unknown hydrocarbon, MW>344				
3 ug/L LP: Unknown hydrocarbon, MW>253				
40 ug/L LP: Nitrogen containing hydrocarbon, MW=>379				
Volatiles: Unregulated VOC's				
Comment		N.A.		10-18-96
Sample: Aslo had 520 ug/L carbon disulfide.				
Dichlorodifluoromethane	ND(0.5)	ND(0.5)	ug/L	10-18-96
Chloromethane	ND(0.5)	ND(0.5)	ug/L	10-18-96
Bromomethane	ND(0.5)	ND(0.5)	ug/L	10-18-96
Chloroethane	ND(0.5)	ND(0.5)	ug/L	10-18-96
Trichlorofluoromethane	ND(0.5)	ND(0.5)	ug/L	10-18-96
Trichlorotrifluoroethane	ND(0.5)	ND(0.5)	ug/L	10-18-96
Methylene Chloride	ND(0.2)	ND(0.2)	ug/L	10-18-96
trans-1,2-Dichloroethylene	ND(0.5)	ND(0.5)	ug/L	10-18-96
1,1-Dichloroethane	ND(0.5)	ND(0.5)	ug/L	10-18-96
2,2-Dichloropropane	ND(0.5)	ND(0.5)	ug/L	10-18-96
cis-1,2-Dichloroethylene	ND(0.5)	ND(0.5)	ug/L	10-18-96
Chloroform	1.2	ND(0.5)	ug/L	10-18-96
Bromochloromethane	ND(0.5)	ND(0.5)	ug/L	10-18-96
1,1-Dichloropropene	ND(0.5)	ND(0.5)	ug/L	10-18-96
Carbon Tetrachloride	ND(0.5)	ND(0.5)	ug/L	10-18-96
1,2-Dichloropropane	ND(0.5)	ND(0.5)	ug/L	10-18-96
Bromodichloromethane	ND(0.5)	ND(0.5)	ug/L	10-18-96
Dibromomethane	ND(0.5)	ND(0.5)	ug/L	10-18-96
2-Chloroethylvinyl Ether	ND(0.5)	ND(0.5)	ug/L	10-18-96
cis-1,3-Dichloropropene	ND(0.5)	ND(0.5)	ug/L	10-18-96
trans-1,3-Dichloropropene	ND(0.5)	ND(0.5)	ug/L	10-18-96
1,1,2-Trichloroethane	ND(0.5)	ND(0.5)	ug/L	10-18-96
1,3-Dichloropropane	ND(0.5)	ND(0.5)	ug/L	10-18-96
Tetrachloroethylene	ND(0.5)	ND(0.5)	ug/L	10-18-96
Chlorodibromomethane	ND(0.5)	ND(0.5)	ug/L	10-18-96
Chlorobenzene	ND(0.5)	ND(0.5)	ug/L	10-18-96
1,1,1,2-Tetrachloroethane	ND(0.5)	ND(0.5)	ug/L	10-18-96
Bromoform	ND(0.5)	ND(0.5)	ug/L	10-18-96
1,1,2,2-Tetrachloroethane	ND(0.5)	ND(0.5)	ug/L	10-18-96
1,2,3-Trichloropropane	0.5	ND(0.5)	ug/L	10-18-96
1,3-Dichlorobenzene	ND(0.5)	ND(0.5)	ug/L	10-18-96
1,4-Dichlorobenzene	ND(0.5)	ND(0.5)	ug/L	10-18-96
1,2-Dichlorobenzene	ND(0.5)	ND(0.5)	ug/L	10-18-96
Methyl-tert-Butyl Ether	ND(0.5)	ND(0.5)	ug/L	10-18-96
Methyl Isobutyl Ketone	ND(5)	ND(5)	ug/L	10-18-96
Methyl Ethyl Ketone	ND(5)	ND(5)	ug/L	10-18-96

ND indicates Not Detected.

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ATTACHMENT 2
Design Analysis Minor Revision Cover Sheet
Page 1 of 4

Design Analysis (Minor Revision) | **Last Page No.** [6] sht. 5

Analysis No.: [1] C-1302-241-E610-081 **Revision:** [2] 2A

Title: [3] Suction Strainer Debris Generation and Transport

EC/ECR No.: [4] 06-00879 **Revision:** [5] 0

Station(s): [7] Oyster Creek

Unit No.: [8] 1

Safety/QA Class: [9] Safety Related

System Code(s): [10] 241, 187

Is this Design Analysis Safeguards Information? [11] Yes ☐ No ☒ If yes, see SY-AA-101-106

Does this Design Analysis contain Unverified Assumptions? [12] Yes ☐ No ☒ If yes, ATI/AR#:

This Design Analysis SUPERCEDES: [13] N/A **in its entirety.**

Description of Changes (list affected pages): [14]

Add a note to sheet 5, stating that the caulk added at the bottom of the drywell is considered to be included in the total weight of dust/dirt/concrete debris per ECR 06-00879 Rev. 0.

Disposition of Changes: [15] This revision indicates that the caulk is considered to be included in the existing debris category tallies, and is not new, additional debris, as described in ECR 06-00879 rev. 0. This note is intended to aid future users who may wish to assign the weights listed to specific materials or items. A21527S4 eval 5 provides the technical evaluation, concluding that the added caulk represents less potential debris than the silicone foam and elastomer that are removed by the same ECR.

	Print Name	Sign Name	Date
Preparer: [16]	Paul Kester	Paul Kester	10/27/06
Reviewer: [18]	Daniel Fiorello	Daniel Fiorello	10/27/06

Method of Review: [17] Detailed Review ☒ Alternate Calculations ☐ Testing ☐

Review Notes: [19] Independent review ☒ Peer review ☐

(For External Analyses Only)

	Print Name	Sign Name	Date
External Approver: [20]			
Exelon Reviewer [21]			
Exelon Approver: [22]	T. Howie Ray	T. Howie Ray	10/27/06

Exelon Nuclear

Risk Management Team Memorandum

Date: November 3, 2006

To: G.A. Krueger
Mike Godknecht

cc: D.E. Vanover
B.D. Sloane

From: E.T. Burns
L.K. Lee

Subject: A Reassessment of the Oyster Creek Risk Metrics Using Current Drywell Configuration

The enclosed is in response to a request by Mike Godknecht to assess the impact of a modified Oyster Creek drywell floor curb configuration.

Enclosed is our current understanding of the Oyster Creek drywell floor configuration and its associated impacts.

The actions taken with regard to the reassessment are as follows:

- A URE has been created and evaluated (See URE OC2006-001)
- The draft reassessment was provided for comment on Thursday 11/2/06
- The draft reassessment has been finalized and reissued as an Exelon Support Application
- The reassessment has been reviewed
- A design record file has been created with the details of the sensitivity calculations. This DRF is retained by the Oyster Creek Model Owner on the Campbell network server.

This memo forwards the following with regard to the drywell curb modeling:

- An assessment of the risk metric impacts
- An assessment of possible SAMA effects

A REASSESSMENT OF THE OYSTER CREEK RISK METRICS USING CURRENT DRYWELL CONFIGURATION

RM Documentation Approval

RM DOCUMENTATION NO. OC-2006-SA-001	REV: 0	PAGE NO. 1

STATION: Oyster Creek Nuclear Generating Station
UNIT(S) AFFECTED: 1

TITLE: A Reassessment of the Oyster Creek Risk Metrics Using Current Drywell Configuration

SUMMARY: The Oyster Creek Level 2 PRA was performed in 2004 assuming that a six inch curb surrounded the pedestal in the drywell. The current Oyster Creek configuration differs from that modeled in the 2004 PRA.

The current Oyster Creek configuration of the drywell floor has the 6 in. barrier between the pedestal and the drywell shell, except that two "sections" have been cut out of the barrier and trenches cut in the concrete toward the shell. One of the sections cut out is approximately across from the drywell pedestal doorway (i.e., the discharge point for debris from the pedestal). Given this configuration, the curb is likely not an effective barrier to the debris.

This support application evaluates the impact of the change in the model for both risk significance and potential impact on SAMA.

The results are that the risk impact is very small per RG 1.174 and there is no measurable effect on the SAMA evaluation that would influence decision-makers.

[ ] Review required after periodic Update

[X] Internal RM Documentation [X] External RM Documentation

Electronic Calculation Data Files: See body of the documentation.

Method of Review: [X] Detailed [ ] Alternate [ ] Review of External Document

This RM documentation supersedes: _____ in its entirety.

	Print	Sign	Date
Prepared by:	Ed Burns / Larry Lee	E T Burns / Lawrence Lee	11/3/2006
Reviewed by:	Don Vanover	Don Vanover	11/3/06
Approved by:	Greg Krueger	Barry Sims for Greg Krueger	11/3/06

A REASSESSMENT OF THE OYSTER CREEK RISK METRICS USING CURRENT DRYWELL CONFIGURATION (CUTOUTS IN THE DRYWELL CURB)

A REASSESSMENT OF THE OYSTER CREEK RISK METRICS USING CURRENT DRYWELL CONFIGURATION (CUTOUTS IN THE DRYWELL CURB)

Overview

The Oyster Creek Level 2 PRA was performed in 2004 assuming that a six inch curb surrounded the pedestal in the drywell. The current Oyster Creek configuration differs from that modeled in the 2004 PRA.

This evaluation summarizes the changes in the risk metrics used by the NRC in risk-informed applications if the assumption regarding the presence of a curb is removed from the PRA. The NRC specified risk metrics used here to assess the importance of this change are as follows:

- Core Damage Frequency (CDF)
- Large Early Release Frequency (LERF)

Background

The Oyster Creek containment drywell configuration as modeled in the PRA includes a plant feature not present at other BWR Mark I plants, i.e., a six inch curb that surrounds the drywell pedestal near the shell. This curb may provide a barrier to prevent the flow of molten debris from reaching the drywell shell.

In the Oyster Creek PRA, when DW sprays are available, Theofanous, et. al. in NUREG/CR-5423 assessed the conditional shell failure probability as 1E-4 without any barrier. This assessment was adopted for Oyster Creek "as is".

In the Oyster Creek PRA model, the following assessments were made of the effect of the curb barrier for postulated severe accidents when no effective drywell water injection was available (e.g., no drywell sprays):

- For severe accidents in which core melt progression proceeds at high pressure until RPV breach, the barrier is found not to provide an effective method of preventing contact between the shell and

the molten debris. Therefore, the barrier is treated with a 1.0 failure probability. This makes Oyster Creek the same as other Mark I BWRs as assessed in NUREG/CR-5423 by Theofanous, et. al.

- For severe accidents in which core melt proceeds at a low pressure at the time of RPV breach (e.g., LOCAs or cases with successful emergency depressurization), the barrier was judged to potentially be successful in preventing an "early" shell breach. This benefit is for cases where debris was retained mostly in the drywell sumps and in the RPV because then residual debris on the floor would be prevented from reaching the shell by the barrier. The conditional success probability of the debris being retained in the RPV and the sumps plus the benefit from the curb preventing significant debris contact was 0.25. Therefore, 75% of the low pressure core melt sequences which did not have effective debris cooling available resulted in early failure of the drywell shell due to direct debris contact.

Updated Information

The current Oyster Creek configuration of the drywell floor has the 6 in. barrier between the pedestal and the drywell shell, except that two "sections" have been cut out of the barrier and trenches cut in the concrete toward the shell. One of the sections cut out is approximately across from the drywell pedestal doorway (i.e., the discharge point for debris from the pedestal). Given this configuration, the curb is likely not an effective barrier to the debris. Therefore, the revised Oyster Creek drywell shell analysis becomes essentially the same as other Mark I plants, i.e., direct debris contact will occur with the shell.

Specifically, the conditional probability of shell failure identified by Theofanous in NUREG/CR-5423 under conditions of no water injection and the debris in contact with the shell is used and all credit for the presence of the curb is to be removed from the revised calculation.

Results

The sensitivity quantitative reassessment of the PRA is performed to reflect this Oyster Creek configuration by assuming the following:

- The Oyster Creek drywell curb does not provide an effective barrier to prevent debris contacting the shell for either high or low pressure core melt scenarios when no water is available to cool the debris.
- The Theofanous assessment of drywell shell failure probability for low pressure core melt scenarios is used.

This reassessment of the Oyster Creek Risk Metrics using the current drywell configuration that includes two cutouts in the curb adjacent to the drywell shell results in the following changes in risk metrics:

Risk Metric	PRA Model (2004B)	Reassessment	Risk Metric Change	
CDF	1.05E-5/yr	1.05E-5/yr	0%	0.0/yr
LERF	5.80E-7/yr	6.38E-7/yr	9.8%	5.8E-8/yr

The significance of the risk metric changes are assessed by comparing the changes with the acceptance guidelines issued by the NRC in RG 1.174. The result of this evaluation is that these changes are considered to be very small risk changes by the NRC guidance.

AN EXAMINATION OF SAMA RESULTS THAT MAY BE AFFECTED BY CURRENT DRYWELL CONFIGURATION

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1.0 OVERVIEW

An extensive evaluation of potential candidates for Severe Accident Mitigation Alternatives (SAMA) was undertaken by AmerGen as part of license renewal. This evaluation included both a base evaluation plus extensive sensitivity calculations with relatively large changes in input parameters to assess the robustness of SAMA cost-benefit calculations.

The SAMA evaluation was performed assuming that the Oyster Creek drywell had a curb in the drywell that was adjacent to the drywell shell. The following reassessment considers no credit for the presence of the curb.

This summary uses the original extensive analysis to place the change to the drywell configuration modeled in the PRA into perspective relative to the SAMA cost benefit calculations.

2.0 CALCULATIONS

2.1 Maximum Impact

The Maximum Averted Cost-Risk (MACR) used in the Oyster Creek SAMA evaluation is $4,462,000.

To characterize the potential impact on the SAMA evaluation, one approach is to use the change in LERF to represent the entire impact on the radionuclide release spectrum. It is recognized that when the change in the full Level 2 PRA model is performed that there will be comparable reductions in other radionuclide release categories (e.g., H/I) and very small increases in the low radionuclide release categories (e.g., L/E). These compensating changes are addressed in the alternative MACR calculation shown in Section 2.2.

The 9.8% increase in the LERF due to the elimination of the credit for a drywell curb results in an increase in the following SAMA input parameters:

- Dose of 0.46 person-rem/yr or 1.2% change
- Weighted Cost Risk ($/yr) of $2,187/yr or 1.85% change

These changes translate into a total MACR of $4,528,110 or an increase of 1.5% above the base MACR value used in the original SAMA evaluation submitted to the NRC.

This approximates the maximum change that is possible from the change in modeling of the curb effects. In fact, the increase in the LERF category results in a comparable frequency reduction in other radionuclide release categories. Therefore, the net change will be even less than that cited above. Section 2.2 provides a "best estimate" evaluation of the change in input SAMA parameters.

2.2 Detailed Level 2 Calculation

A detailed recalculation of the radionuclide releases with credit for the curb removed indicated that the LERF increase was made up of a comparable decrease in the High/Intermediate release category and relatively minor changes in other radionuclide release categories.

Therefore, a more accurate assessment of the risk changes results in the following SAMA input parameters:

- Dose increase of 0.1 person-rem or 0.3%
- Weighted Cost Risk increase of $1,000/yr or 0.85%

These changes translate into a total MACR of $4,488,000 or an increase of 0.58% above the base MACR value used in the original SAMA evaluation submitted to the NRC.

These are judged to be very small changes in base values used in the cost benefit evaluation of SAMAs. Sections 2.3 and 2.4 further discuss this effect to place it in perspective.

2.3 SAMA Sensitivity Results

The SAMA evaluation developed a comprehensive list of potential alternatives to assess. This list was initially screened based on excessive costs. These screened out alternatives are discussed in Section 3.0. The alternatives that were retained received a detailed quantitative evaluation.

As part of the SAMA evaluation and the subsequent RAIs, there were extensive sensitivity calculations performed to assess the cost benefit of the SAMA items under varying inputs and assumptions and to demonstrate the robust nature of the calculations. Those sensitivity cases examined relatively large changes in the input parameters. The insights from these sensitivity calculations were then used to provide input to the decision-makers regarding individual SAMA items.

As part of the sensitivities, the calculations included:

- A CDF increase of a factor of 150% and therefore of all radionuclide releases. This represents a significantly more severe case then that postulated for the small changes associated with the impact of the elimination of credit for the curb. The 150% change can be compared with the relatively small change of 0.3% and 0.85% to the dose and weighted cost risk, respectively, associated with removal of credit for the curb taken from the detailed calculation discussed in Section 2.2.
- Real Discount Rate Changes: The sensitivity changes applied to the examined alternatives resulted in net changes in MACR of over $100,000 in some cases. This sensitivity is significantly more inclusive than the small changes noted for the curb modifications.

The removal of credit for the drywell curb has a negligible impact on the base SAMA evaluations. In addition, the sensitivity cases performed demonstrate the benefit of

the SAMAs over a much broader range of variation than that introduced by the curb evaluation.

3.0 SPECIFIC EXAMPLE SAMAS

Examples of SAMA items that could offset the impact of the modified curb, but were previously discarded based solely on cost were reviewed again when the credit for the curb is removed to assess their potential benefit. (See Table 1).

It is noted that some SAMA items were screened out based on: (1) inapplicability (e.g., ATWS mitigation SAMA 9, 79); or (2) as indicated in the NRC submittal on SAMA (Appendix F of the License Renewal) that regardless of assumptions, the item is not a SAMA that would ever be considered (e.g., SAMAs 65, 69, 70, 72, 77, 80, 103, 115, 137). Therefore, these are not included in Table 1.

4.0 CONCLUSION

There are no specific SAMA items for which the cost benefit assessment would be significantly changed by the explicit incorporation of the modified curb in the baseline SAMA calculations. The SAMA sensitivity calculations identified in the original submittal to the NRC and subsequent RAI responses encompassed the very small variation in benefits assigned to the curb.

In other words, the removal of credit for the drywell curb has a negligible impact on the base SAMA evaluations. In addition, the sensitivity cases performed demonstrate the benefit of the SAMAs over a much broader range of variation than that introduced by the curb evaluation.

Table 1
SUMMARY OF SENSITIVITY REVIEW OF PHASE I SCREENED SAMA
REVIEW OF ITEMS SCREENED DUE TO COST (C) OR COST EXCEED BENEFIT (F) FOR

NO.	SAMA TITLE	SAMA DESCRIPTION	PHASE I DISPOSITION	SCREENING REVIEW
2	Additional HP Injection System	An additional high pressure injection system would increase high pressure injection diversity and reduce the probability of requiring RPV depressurization early in an accident. An additional HP injection system would also impact the contribution of liner melt-through sequences in the Level 2 evaluation by reducing the frequency of high pressure core melt accident class. The benefit of this SAMA would be increased if the pump was 1) diesel powered, 2) could provide power to operate its own injection valves, and 3) be located in a flood safe zone.	F, I –Installation of another high pressure injection system is costly and is not offset by benefits. Benefits associated with an additional high pressure injection source are minimized by the Oyster Creek features of IC and CRD. IC is a passive high pressure inventory control method and the Oyster Creek CRD includes a dedicated bypass line that allows significant flow. SAMA improvement related to CRD is included in Item 92. Improving CRD flow would provide an additional high pressure injection system for scenarios wherein CRD is not currently credited. Cost of a self-powered, high pressure injection system, located in a separate fire and flood zone is expected to cost $10,000,000. This is in excess of the maximum averted cost.	As a sensitivity, the base model was requantified after modifying logic to "AND" a new basic event with feedwater. This basic event is intended to represent a new high pressure injection system, with no support system requirements. The value was set equal to 5E-2. The resultant CDF was 7.34E-6/yr for a delta CDF of 3.15E-6/yr. This benefit (CDF reduction) is similar in magnitude to that of SAMA 130. SAMA 130 yields an averted cost of $747,000. Using this averted cost as a surrogate to estimate the benefit of SAMA 2 and multiplying this by a factor of 2.5, to bound both the RDR and 95th sensitivities, a value that is still far below the implementation cost is obtained (i.e., $1,867,500 versus $10,000,000). Therefore, this SAMA remains not cost beneficial despite the use of the conservatively biased sensitivity inputs. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.

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NO.	SAMA TITLE	SAMA DESCRIPTION	PHASE I DISPOSITION	SCREENING REVIEW
3	Enhance Depressurization and Injection Cues	RPV depressurization, while a reliable action, is an important contributor to plant risk. The cognitive portion of this action is specifically identified as an important contributor for another BWR. Potential means of improving the probability of identifying the need for depressurization include: adding a unique audible alarm and/or a highly visible alarm light to denote the need for depressurization. Installation of a large, graphical core display for water level is an additional enhancement.	F - Monticello estimated the cost of this modification to be about $700,000. This is the result of combining the costs of performing the training/procedural changes and the required hardware changes. Procedural changes are generally on the order of $50,000 to $100,000 [F-20] and the hardware costs are estimated based on the $600,000 cost of installing computer aided instrumentation in the main control room. This will not significantly reduce operator error rate as annunicators are currently in place and improvement potential is minimal.	Regardless of the assumptions used to assess the value of risk-reduction, this SAMA is not judged cost-beneficial because the potential for improvement over the current capabilities is negligible. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.
6	Drywell Igniters or Passive Hydrogen Ignition System	This SAMA would provide a means to reduce the chance of hydrogen detonation.	F - Benefit is negligible because Oyster Creek containment operates with an inerted environment. Therefore, for inerted containments, such as the Oyster Creek Mark I containment, the NRC has previously concluded that igniters are not safety significant. The Calvert Cliffs application for license renewal [F-3] estimates the cost of a passive hydrogen ignition system to be $760,000.	Regardless of the assumptions used to assess the value of risk-reduction, this SAMA is not judged cost-beneficial because the potential for improvement over the current capabilities is negligible. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.

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NO.	SAMA TITLE	SAMA DESCRIPTION	PHASE I DISPOSITION	SCREENING REVIEW
8	Additional DFP for Fire Service Water System	An additional diesel fire pump would provide another source of water for RPV injection and containment spray. This could be achieved through the implementation of a procedure to direct the pressurization of the Fire Protection system using a fire truck.	D – Oyster Creek currently has 1 electric and 2 diesel fire pumps. The electric pump is powered from normal AC power and uses a tank with limited volume. The two-diesel fire pumps are located outside the protected area in a standard metal sided building with concrete foundation. F – Addition of a third diesel fire pump is judged to have exceedingly small incremental benefit for RPV injection. This is because: • OC has numerous injection sources • Common-cause failure among the fire pumps dominates regardless if there are 2 or 3 pumps. The containment spray enhancement is treated under SAMA 111.	As a sensitivity, the base model was requantified after modifying logic to "AND" a new basic event with the other fire pumps. This basic event is intended to represent a new diesel fire pump, with no support system requirements. The value was set equal to 5E-2. The resultant CDF was 1.05E-5/yr for a delta CDF of 1.91E-8/yr. This benefit remains very small and clearly would yield a small averted cost. This SAMA is not cost-beneficial even if the benefit is multiplied by a factor of 2.5, or more. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.

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NO.	SAMA TITLE	SAMA DESCRIPTION	PHASE I DISPOSITION	SCREENING REVIEW
14	Post an Operator at the ASDS Panel Full Time	In the event that a fire in the Main Control Room requires evacuation to the ASDS panel, having a full time operator at the panel would allow for a more rapid transition to alternate reactor control. This is important for loss of injection cases where there is currently not enough time for the operators to evacuate the main control room and assume control at the ASDS panel (Class 1A).	C - The cost of implementation for this SAMA is based on an estimated base salary and the cost of benefits for 5 additional licensed operators. Five operators are justified considering that personnel are required to cover all shifts, 7 days a week and that 20 percent of operator time is spent in training. Assuming that an operator's salary and benefits cost $100,000 per year and that the panel will be manned for the 20 year license renewal period, the cost of implementation would be $10 million, not including raises. This cost is above the maximum averted cost for Oyster Creek.	The benefit of this SAMA is difficult to quantify because it intends to improve an already excellent operating capability. A complete reduction in Class IA events would produce a delta CDF of 2.46E-6/yr. This level of risk-reduction is less than that noted for SAMA 130. SAMA 130 yields an averted cost of $747,000. Using this averted cost as a surrogate to estimate the benefit of SAMA 14 and multiplying this by a factor of 2.5, to bound both the RDR and 95th sensitivities, a value that is still far below the implementation cost is obtained (i.e., $1,867,500 versus $10,000,000). Therefore, this SAMA remains not cost beneficial despite the use of the conservatively biased sensitivity inputs. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.
32	Use fuel cells instead of lead-acid batteries.	SAMA would extend DC power availability in an SBO.	I, F - Oyster Creek has diverse battery design presently. The system is already reliable. Evaluation of a portable DC charger is viewed as more beneficial. See Item 109. Also, note that the fuel cell option is new technology, never used in such a manner. It is judged expensive. A small, engine driven charger is considered a more cost-efficient and proven approach.	Due to competing risks and the availability of a more conventional option (i.e., SAMA 109), this SAMA is not considered cost-beneficial. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.

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NO.	SAMA TITLE	SAMA DESCRIPTION	PHASE I DISPOSITION	SCREENING REVIEW
44	Install an independent method of suppression pool cooling.	This SAMA would decrease the probability of loss of containment heat removal.	F – IC provides an alternate method of DHR that eliminates heat discharge to the torus for non-LOCA scenarios. Development of another means beyond containment spray is viewed as limited benefit compared to a high cost for such a modification. An independent system is judged to cost $5,000,000. This is in excess of the maximum averted cost.	A complete reduction in Class II events would produce a delta CDF of 1.65E-6/yr. This level of risk-reduction is less than that noted for SAMA 130. SAMA 130 yields an averted cost of $747,000. Using this averted cost as a surrogate to estimate the benefit of SAMA 44 and multiplying this by a factor of 2.5, to bound both the RDR and 95th sensitivities, a value that is still far below the implementation cost is obtained (i.e., $1,867,500 versus $5,000,000). Therefore, this SAMA remains not cost beneficial despite the use of the conservatively biased sensitivity inputs. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.
45	Install a filtered containment vent to remove decay heat.	This SAMA would provide an alternate decay heat removal method for non-ATWS events, with the released fission products being scrubbed. Option 1: Gravel Bed Filter Option 2: Multiple Venturi Scrubber	F – Cost is high at > $4M as assessed for Shoreham. The benefits in dose reduction are limited because of the Mark I shell failure mode and ATWS challenges that would fail containment. SAMA would not address core damage and does not address Noble gas release. This was not found cost-beneficial for Peach Bottom. Estimated to cost in excess of the maximum averted cost.	Regardless of the assumptions used to assess the value of risk-reduction, this SAMA is not judged cost-beneficial because the potential for improvement over the current capabilities is small. Considering the high cost, the small variations in quantification characterization do not point to altering the conclusion for this SAMA. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.

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NO.	SAMA TITLE	SAMA DESCRIPTION	PHASE I DISPOSITION	SCREENING REVIEW
46	Install a containment vent large enough to remove ATWS decay heat.	Assuming that injection is available, this SAMA would provide alternate decay heat removal in an ATWS event.	F – Cost is high and benefits, in terms of dose reduction, are limited because of the small ATWS contribution to the risk profile. Containment vent size is sufficient to prevent containment failure as long as reactivity management tasks are completed as modeled in the PRA (i.e., RPV level control and SLC initiation). ATWS power levels without reactivity control would be in the range of 10% to 40% of full power. This requires a substantially larger containment vent than the current hard pipe vent. To achieve an operational "ATWS Vent" of hard pipe configuration and adequate size is estimated to cost in excess of $2M. This is above the benefit to be achieved for elimination of the small ATWS contribution to risk at Oyster Creek.	Completely removing the ATWS contribution would lead to a delta CDF of 1.81E-7/yr. This level of benefit does not lead to any significant averted cost for this SAMA even if it could completely eliminate all ATWS risk. Therefore, the implementation cost far outweighs the small averted cost and the SAMA is not cost beneficial even for these conservatively biased assumptions. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.
48	Install a passive containment spray system.	This SAMA would provide redundant containment spray method without high cost.	F – High cost modification. Gravity feed system would provide limited benefit beyond that considered in Item 111 and would likely increase internal flooding risk.	Due to competing risks and the availability of a more conventional option (i.e., SAMA 111), this SAMA is not considered cost-beneficial. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.

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NO.	SAMA TITLE	SAMA DESCRIPTION	PHASE I DISPOSITION	SCREENING REVIEW
49	Construct a building to be connected to primary/secondary containment that is maintained at a vacuum.	This SAMA would provide a method to depressurize containment and reduce fission product release.	C – This item is viewed as having a very large cost (> $10 Million) and is well beyond the maximum averted cost for Oyster Creek.	Regardless of the assumptions used to assess the value of risk-reduction, this SAMA is not judged cost-beneficial because the potential for improvement over the current capabilities is small. Considering the high cost, variations in quantification assumptions do not point to altering the conclusion for this SAMA. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.
51	Provide an additional diesel generator.	This SAMA would increase the reliability and availability of onsite emergency AC power sources.	C – Cost of an additional building and diesel is estimated at more than $5M. This is greater than the maximum cost averted benefit.	The EDGs have a risk reduction worth (RRW) importance of 1.14. This suggests a potential delta CDF of 1.47E-6/yr (1.05E-5*(1.14-1)). This level of risk-reduction is less than that noted for SAMA 130. SAMA 130 yields an averted cost of $747,000. Using this averted cost as a surrogate to estimate the benefit of SAMA 51 and multiplying this by a factor of 2.5, to bound both the RDR and 95th sensitivities, a value that is still far below the implementation cost remains not cost beneficial despite the use of the conservatively biased sensitivity inputs. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.

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NO.	SAMA TITLE	SAMA DESCRIPTION	PHASE I DISPOSITION	SCREENING REVIEW
62	Modify Reactor Water Cleanup (RWCU) for use as a decay heat removal system and proceduralize use.	This SAMA would provide an additional source of decay heat removal.	C – The RWCU system is currently proceduralized and used "as is" to provide decay heat removal over a portion of the spectrum of shutdowns. However, the RWCU system has very small heat removal capability and therefore, does not have the capability to provide a significant benefit. No options for significant capacity improvement have been identified that would cost less than $4M.	A complete reduction in Class II events would produce a delta CDF of 1.65E-6/yr. This level of risk-reduction is less than that noted for SAMA 130. SAMA 130 yields an averted cost of $747,000. Using this averted cost as a surrogate to estimate the benefit of SAMA 62 and multiplying this by a factor of 2.5, to bound both the RDR and 95th sensitivities, a value that is still far below the implementation cost is obtained (i.e., $1,867,500 versus $4,000,000). Therefore, this SAMA remains not cost beneficial despite the use of the conservatively biased sensitivity inputs. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.

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NO.	SAMA TITLE	SAMA DESCRIPTION	PHASE I DISPOSITION	SCREENING REVIEW
68	Improved Vacuum Breakers (redundant valves in each line)	This SAMA reduces the probability of a stuck open vacuum breaker.	F - Oyster Creek has 14 single torus to drywell vacuum breakers arranged in 7 parallel lines, which can impact vapor suppression. Adding valves in series is highly expensive and reduces the success probability for the open on demand function. Benefit impacts only low frequency accident sequences. Added redundancy has only minor impact on the risk profile. Cost estimated by system manager to be $2,000,000.	A complete reduction in Class III (i.e., LOCA) events would produce a delta CDF of 1.42E-6/yr. This level of risk-reduction is less than that noted for SAMA 130. SAMA 130 yields an averted cost of $747,000. Using this averted cost as a surrogate to estimate the benefit of SAMA 68 and multiplying this by a factor of 2.5, to bound both the RDR and 95th sensitivities, a value that is still below the implementation cost is obtained (i.e., $1,867,500 versus $2,000,000). Therefore, this SAMA remains not cost beneficial despite the use of the conservatively biased sensitivity inputs. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.
105	Improve loss of circulating water response	The plant could be modified to provide an auto-swap from circulating water to service water. (See also Item 104)	F – More costly than Item 104 with similar benefit. See Item 104 for disposition.	SAMA 104 was not determined to be cost-beneficial under the RDR and 95th percentile cases documented in Tables F.7-1 and F.7-2. With a higher cost and similar benefit, this SAMA cannot be considered cost-beneficial under an set of analysis assumptions. The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.

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REVIEW OF ITEMS SCREENED DUE TO COST (C) OR COST EXCEED BENEFIT (F) FOR

NO.	SAMA TITLE	SAMA DESCRIPTION	PHASE I DISPOSITION	SCREENING REVIEW
135	Increase structural integrity of IC makeup piping	The water supply to makeup to the Iso Condensers is neither safety related nor seismic. Upgrade of the Condensate Transfer System supply to the ICs would possibly increase their long term availability.	C – The Oyster Creek IPEEE analysis included IC performance during seismic events. Using the EPRI hazard curves, the IC contributed 4.97% to the overall CDF of 3.6E-6/yr. If the IC could be made perfect, it would reduce contribution by a value of 1.79E-7/yr (3.6E-6*4.87%). Considering such a modification is expected to cost at least $5,000,000, this option is considered not cost-beneficial.	The 1.79E-7/yr risk reduction discussed in the Phase I disposition is far less than that noted for SAMA 130. SAMA 130 yields an averted cost of $747,000. Using this averted cost as a surrogate to estimate the benefit of SAMA 135 and multiplying this by a factor of 2.5, to bound both the RDR and 95th sensitivities, a value that is still far below the implementation cost is obtained (i.e., $1,867,500 versus $5,000,000). Therefore, this SAMA remains not cost beneficial despite the use of the conservatively biased sensitivity inputs (i.e., $1,867,500 versus $5,000,000). The change in curb configuration would have no more than a 0.58% change and the conclusion would remain the same.