

## I. OVERVIEW / SIGNATURES

Facility: Waterford 3Document Reviewed: ER-W3-2004-0276-001Change/Rev.: 00System Designator(s)/Description: None

## Description of Proposed Change:

Full scope implementation of the Alternate Source Term methodology, in accordance with Regulatory Guide 1.183, has recently been approved by the NRC [Amendment No.198 to Facility Operating License (FOL) No. NPF-38, dated March 29, 2005]. ER-W3-2004-0276-000 was prepared to implement AST into Waterford 3's design and licensing basis. However, several plant condition reports were issued which impacted the Equipment Qualification (EQ) effort. Additionally, ER-W3-2004-0564-000 was prepared to install permanent shielding on the +46' elevation of the RAB. Due to these considerations, the EQ impacts of AST were deferred to this ER, with the remainder of the AST effort being addressed via ER-W3-2004-0276-000.

RG 1.183, Section 1.3.5 states that licensees may use either AST or the older dose methodology (based on NRC document TID-14844) when evaluating Equipment Qualification (EQ) dose rates and total integrated doses (TID). Waterford 3 had originally intended to continue to use the older TID dose methodology since there was little benefit to converting to AST for qualification of safety related equipment. However, a number of plant condition reports were issued concerning the existing EQ evaluations.

(Continued on Page 2)

Check the applicable review(s): (Only the sections indicated must be included in the Review.)

<input type="checkbox"/>	EDITORIAL CHANGE of a Licensing Basis Document	Section I
<input type="checkbox"/>	SCREENING	Sections I and II required
<input type="checkbox"/>	50.59 EVALUATION EXEMPTION	Sections I, II, and III required
<input checked="" type="checkbox"/>	50.59 EVALUATION (#: <u>05-020</u> )	Sections I, II, and IV required

Preparer: D. M. Tolman / Enercon / / 6/2/05  
 Name (print) / Signature / Company / Department / Date

Reviewer: R.K. Schwartzbeck / Enercon / / 6/2/05  
 Name (print) / Signature / Company / Department / Date

OSRC: J. Laque / / 6/3/05  
 Chairman's Name (print) / Signature / Date  
 [Required only for Programmatic Exclusion Screenings and 50.59 Evaluations.]

**Description of Proposed Change: (continued from Page 1)**

This ER address the following issues/concerns:

- CR-W3-2004-2461 documented the fact that the Controlled Ventilation Area System (CVAS) filter trains were not addressed in the original design basis radiological evaluations. Several additional condition reports were initiated as this issue was researched. Further review confirmed that the CVAS filters were not included in the original EQ design basis. Therefore, CR-W3-2004-2690 was issued to address current plant OPERABILITY. CR-W3-2004-3560 was issued because the essential water chillers located on the +46' elevation of the RAB were assumed to be a "mild" radiological environment ( $<1.0E4$  Rads per NUREG-0588); however, the CVAS filters themselves exceed the mild environment threshold by a considerable margin. Not considering the CVAS filters also impacted the calculated operator doses for the EDG B room which were subsequently recalculated in ECS05-005.
- CR-W3-2005-1999 documented the fact that the SBVS B shine dose model for the control room HVAC room (EQ Zone L) was based on Florida Power and light's St. Lucie plant, and this model is non-conservative for Waterford 3.
- ER-W3-2004-0564-000 installed permanent shielding in several locations on the +46' elevation of the RAB. That ER simply addressed the structural requirements for the shielding. The impact of the shielding on the overall area dose rates and TID is addressed in this ER.
- ER-W3-2004-0276-000, ER-W3-2001-1149-000 (EPU), and associated "interdisciplinary" ERs performed a detailed review of the plant radiological design basis. As a result of these reviews, several calculation revisions were identified which are directly related to EQ and will be addressed in this ER.
- FSAR Chapter 12 was originally intended to be updated via ER-W3-2001-1149-011; however, scheduling conflicts prohibited this from occurring. As a result, updates to FSAR Chapter 12 will be performed via this ER to reflect the revised operator doses.
- During preparation of this ER, editorial errors were found on FSAR Figures 12.3A-2 and 12.3A-3. Specifically, radiation TID values for Rooms 421 (Inside RCB, Outside D Rings) and 422 & 423 (SG #1 & 2 Inside D Ring) are not in agreement with FSAR Table 3.11-1, Sheets 3 & 4. It has been determined that the values in FSAR Table 3.11-1, Sheets 3 & 4, are correct and FSAR Figures 12.3A-2 and 12.3A-3 are being revised accordingly.
- During the revision of calculation of 3C3-032 it was discovered that the 40 year dose for the purification filters were not accurately transcribed from Sheet 6 to the results table on sheet 31. Further review confirms that this impacts the results for Zone H. CR-W3-2005-0050 documented the use of incorrect values in the results table calculation 3C3-032. As part of this ER and the calculation revision the normal / accident + normal doses for Zone H are being updated.

The overall purpose of this ER is to provide documentation of environmental changes resulting from increased shine dose from the CVAS and SBVS filter trains. Calculations, environmental zone maps, design basis documents, EQ documentation, and the FSAR will be updated to reflect the changes in dose rates and total integrated dose. Based on the evaluations provided in this ER, the qualified life of affected components did not change. The operation and availability of safety related components addressed in this ER is unchanged by the resulting dose rates, integrated doses, or changes in existing or new environmental zones.

## II. SCREENINGS

A. Licensing Basis Document Review

1. Does the proposed activity impact the facility or a procedure as described in any of the following Licensing Basis Documents?

Operating License	YES	NO	CHANGE # and/or SECTIONS IMPACTED
Operating License	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
TS	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
NRC Orders	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If "YES", obtain NRC approval prior to implementing the change by initiating an LBD change in accordance with NMM ENS-LI-113. (See Section 5.2[13] for exceptions.)			

LBDs controlled under 50.59	YES	NO	CHANGE # (if applicable) and/or SECTIONS IMPACTED
FSAR	<input checked="" type="checkbox"/>	<input type="checkbox"/>	DRN 05-127: FSAR Chapter 3 (Sections 3.2, 3.5, 3.6, Table 3.11.1) DRN 04-144: FSAR Chapter 12 (Sections 12.2, 12.3, 12.3A, Table 12.3A-9, Figures 12.3A-2, 12.3A-3, 12.3A-7 & 12.3A-8)
TS Bases	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Technical Requirements Manual	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Core Operating Limits Report	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
NRC Safety Evaluation Report and supplements for the initial FSAR <sup>1</sup>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
NRC Safety Evaluations for amendments to the Operating License <sup>1</sup>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If "YES", perform an Exemption Review per Section III <u>OR</u> perform a 50.59 Evaluation per Section IV <u>OR</u> obtain NRC approval prior to implementing the change. If obtaining NRC approval, document the LBD change in Section II.A.5; no further 50.59 review is required. However, the change cannot be implemented until approved by the NRC. <u>AND</u> initiate an LBD change in accordance with NMM ENS-LI-113.			

LBDs controlled under other regulations	YES	NO	CHANGE # (if applicable) and/or SECTIONS IMPACTED
Quality Assurance Program Manual <sup>2</sup>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Emergency Plan <sup>2,3</sup>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Fire Protection Program <sup>3,4</sup> (includes the Fire Hazards Analysis)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Offsite Dose Calculations Manual <sup>3,4</sup>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If "YES", evaluate any changes in accordance with the appropriate regulation <u>AND</u> initiate an LBD change in accordance with NMM ENS-LI-113. No further 50.59 review is required.			

<sup>1</sup> If "YES," see Section 5.2[5]. No LBD change is required.

<sup>2</sup> If "YES," notify the responsible department and ensure a 50.54 Evaluation is performed. Attach the 50.54 Review.

<sup>3</sup> Changes to the Emergency Plan, Fire Protection Program, and Offsite Dose Calculation Manual must be approved by the OSRC in accordance with NMM OM-119.

<sup>4</sup> If "YES," evaluate the change in accordance with the requirements of the facility's Operating License Condition or under 50.59, as appropriate.

2. Does the proposed activity involve a test or experiment not described in the FSAR?  Yes  
 No

If "yes," perform a 50.59 Evaluation per Section IV OR obtain NRC approval prior to implementing the change AND initiate an LBD change in accordance with NMM LI-113. If obtaining NRC approval, document the change in Section II.A.5; no further 50.59 review is required. However, the change cannot be implemented until approved by the NRC.

3. **Basis**

Explain why the proposed activity does or does not impact the Operating License/Technical Specifications and/or the FSAR and why the proposed activity does or does not involve a new test or experiment not previously described in the FSAR. Discuss other LBDs if impacted. Adequate basis must be provided within the Screening such that a third-party reviewer can reach the same conclusions. Simply stating that the change does not affect TS or the FSAR is not an acceptable basis.

**Operating License**

It was determined that the changes in radiation dose/exposure in certain plant areas are below the level of detail discussed in the Operating License.

**Technical Requirements Manual**

The changes in radiation dose or exposure in plant areas is not addressed in the TRM.

**Test or experiment not described in the FSAR**

ER-W3-2004-0276-001 does not include any physical modifications to the plant. The activities addressed in this ER authorize changes to various calculations and other plant documentation only. The activities addressed in this ER are analytical in nature and are not related (either directly or indirectly) with any test or experiment. No change is authorized that would allow plant equipment to be operated in an unanalyzed condition or require unique testing. Therefore, this activity does not involve a test or experiment that is not described in the FSAR.

**Technical Specifications and Bases**

All Technical Specification changes for EPU related to AST issues are being addressed under ER-W3-2001-1149-000. The revisions to various calculations and other plant documents addressed in this ER are to changes in radiation dose/exposure in certain plant areas and do not impact the Technical Specifications or Bases.

**FSAR**

The FSAR was reviewed to determine if the assumptions or descriptions contained within the FSAR would be impacted by the results of the engineering evaluations related to the change in radiation dose/exposure in certain plant areas. It was determined by the FSAR review that FSAR Chapters 3 and 12 will require revision. These changes are discussed below and in Section IV, 50.59 Evaluation, of this 50.59 Review and documented in DRNs 05-127 (Chapter 3 changes) and 05-144 (Chapter 12 changes).

FSAR Sections 3.2 and 12.3A.3.10 are being revised to correct typographical errors.

FSAR Sections 3.2.1, 3.5.1, 3.5.1.4.2, and 3.6.1.1 are being revised to replace reference to 10CFR100 with 10CFR50.57.

FSAR Table 3.11-1 is being revised to reflect the updated environmental conditions for areas discussed in the ER and this 50.50 Evaluation.

FSAR Section 12.3.2.1 is being revised to replace reference to 10CFR100 with 10CFR50.57.

FSAR Section 12.3A.2 is being revised to clarify source term requirements for the Control Room and EDG rooms.

FSAR Section 12.3A.3.8 is being revised to add mention of the CVAS filters and revise the diesel generator area maximum dose rate.

FSAR Table 12.3A-9 is being revised to revise the diesel generator area maximum dose rate and add a note regarding exposure during operator rounds to the diesel generator area.

FSAR Figures 12.3A-2 and 12.3A-3 are being revised to correct editorial errors for radiation TID values for Rooms 421 (Inside RCB, Outside D Rings) and 422 & 423 (SG #1 & 2 Inside D Ring). The correct values are listed in FSAR Table 3.11-1, Sheets 3 & 4.

FSAR Figure 12.3A-7 is being revised to reflect the new dose rate values for the CCW and Diesel Generator rooms.

FSAR Figure 12.3A-8 is being revised to reflect the new dose rate values for the CVAS/SBVS Equipment Rooms.

#### Other LBDs

None of the other LBDs listed in Section II.A.1 are impacted by the engineering evaluation within the scope of ER-W3-2004-0276-001.

#### 4. References

Discuss the methodology for performing LBD searches. State the location of relevant licensing document information and explain the scope of the review such as electronic search criteria used (e.g., key words) or the general extent of manual searches per Section 5.5.1[5](d) of LI-101. **NOTE: Ensure that manual searches are performed using controlled copies of the documents. If you have any questions, contact your site Licensing department.**

LBDs/Documents reviewed via keyword search:      Keywords:

Autonomy 50.59 search

CVAS, SBVS, radiological, radiation, shielding, environmental qualification, equipment dose, equipment qualification, dose rate, integrated dose

LBDs/Documents reviewed manually:

FSAR Chapters 1, 3, 6, 9, 12, 15

#### 5. Is the validity of this Review dependent on any other change?

Yes

No

**If "YES", list the required changes/submittals. The changes covered by this 50.59 Review cannot be implemented without approval of the other identified changes (e.g., license amendment request). Establish an appropriate notification mechanism to ensure this action is completed.**

*The revised total Integrated Dose (TID) to components in the emergency diesel generator rooms does not exceed the current mild environment radiation limit (Calculation 3C3-032). While no equipment changes are required as a result of the elevated equipment dose, AST Operator doses were addressed in ER-W3-2004-0276-000.*

**B. ENVIRONMENTAL SCREENING**

If any of the following questions is answered "yes," an Environmental Review must be performed in accordance with NMM Procedure ENS-EV-115, "Environmental Evaluations," and attached to this 50.59 Review. Consider both routine and non-routine (emergency) discharges when answering these questions.

Will the proposed Change being evaluated:

- |     | <u>Yes</u>               | <u>No</u>                           |  |
|-----|--------------------------|-------------------------------------|--|
| 1.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Involve a land disturbance of previously disturbed land areas in excess of one acre (i.e., grading activities, construction of buildings, excavations, reforestation, creation or removal of ponds)? |
| 2.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Involve a land disturbance of undisturbed land areas (i.e., grading activities, construction, excavations, reforestation, creating, or removing ponds)?  |
| 3.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Involve dredging activities in a lake, river, pond, or stream?   |
| 4.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Increase the amount of thermal heat being discharged to the river or lake?   |
| 5.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Increase the concentration or quantity of chemicals being discharged to the river, lake, or air?   |
| 6.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Discharge any chemicals new or different from that previously discharged?  |
| 7.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Change the design or operation of the intake or discharge structures?  |
| 8.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Modify the design or operation of the cooling tower that will change water or air flow characteristics?  |
| 9.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Modify the design or operation of the plant that will change the path of an existing water discharge or that will result in a new water discharge?   |
| 10. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Modify existing stationary fuel burning equipment (i.e., diesel fuel oil, butane, gasoline, propane, and kerosene)? <sup>1</sup>   |
| 11. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Involve the installation of stationary fuel burning equipment or use of portable fuel burning equipment (i.e., diesel fuel oil, butane, gasoline, propane, and kerosene)? <sup>1</sup>               |
| 12. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Involve the installation or use of equipment that will result in a new or additional air emission discharge?   |
| 13. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Involve the installation or modification of a stationary or mobile tank?   |
| 14. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Involve the use or storage of oils or chemicals that could be directly released into the environment?  |
| 15. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Involve burial or placement of any solid wastes in the site area that may affect runoff, surface water, or groundwater?  |

<sup>1</sup> See NMM Procedure ENS-EV-117, "Air Emissions Management Program," for guidance in answering this question.

**C. SECURITY PLAN SCREENING**

If any of the following questions is answered "yes," a Security Plan Review must be performed by the Security Department to determine actual impact to the Plan and the need for a change to the Plan.

Could the proposed activity being evaluated:

- |     | <u>Yes</u>               | <u>No</u>                           |  |
|-----|--------------------------|-------------------------------------|--|
| 1.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Add, delete, modify, or otherwise affect Security department responsibilities (e.g., including fire brigade, fire watch, and confined space rescue operations)?  |
| 2.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Result in a breach to any security barrier(s) (e.g., HVAC ductwork, fences, doors, walls, ceilings, floors, penetrations, and ballistic barriers)?   |
| 3.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Cause materials or equipment to be placed or installed within the Security Isolation Zone?   |
| 4.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Affect (block, move, or alter) security lighting by adding or deleting lights, structures, buildings, or temporary facilities?   |
| 5.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Modify or otherwise affect the intrusion detection systems (e.g., E-fields, microwave, fiber optics)?  |
| 6.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Modify or otherwise affect the operation or field of view of the security cameras?   |
| 7.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Modify or otherwise affect (block, move, or alter) installed access control equipment, intrusion detection equipment, or other security equipment?   |
| 8.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Modify or otherwise affect primary or secondary power supplies to access control equipment, intrusion detection equipment, other security equipment, or to the Central Alarm Station or the Secondary Alarm Station? |
| 9.  | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Modify or otherwise affect the facility's security-related signage or land vehicle barriers, including access roadways?  |
| 10. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Modify or otherwise affect the facility's telephone or security radio systems?   |

Documentation for accepting any "yes" statement for these reviews will be attached to this 50.59 Review or referenced below.

## IV. 50.59 EVALUATION

License Amendment Determination

Does the proposed Change being evaluated represent a change to a method of evaluation  Yes  
**ONLY?** If "Yes," Questions 1 – 7 are not applicable; answer only Question 8. If "No," answer  No  
 all questions below.

## Does the proposed Change:

1. Result in more than a minimal increase in the frequency of occurrence of an accident  Yes  
 previously evaluated in the FSAR?  No

## BASIS:

*ER-W3-2004-0276-001 is analytical in nature and does not require any physical modifications to the plant. All evaluations of the equipment qualification or personnel doses addressed in this ER address post-accident functions, which are intended to mitigate the consequences of an event rather than prevent an event from occurring.*

*The total integrated dose used for equipment qualification includes both the normal 40-year normal operations dose and the post-accident dose. Any significant change to the normal dose or dose rate might have a detrimental effect on equipment and result in an increase in the frequency of occurrence of an accident previously evaluated in the FSAR if the equipment is required for accident prevention. Based on the analyses and reviews conducted in support of this ER, there is no change in the normal operations dose rate or dose. Therefore, there is no increase in the frequency of occurrence of an accident previously evaluated in the FSAR. The CVAS and SBVS filters are only operated following a design basis accident (other than normal surveillance's), thus addition of those filter trains to the plant radiological design basis has no impact to normal operation dose rates or doses.*

*In summary, the changes addressed in ER-W3-2004-0276-001 do not result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the FSAR.*

2. Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a  Yes  
 structure, system, or component important to safety previously evaluated in the FSAR?  No

## BASIS:

*Operation of safety-related equipment during normal and post-accident conditions is ensured by compliance with the requirements of NUREG-0588 and Regulatory Guide 1.89. One of the requirements given in these guidance documents is demonstration that safety-related equipment can perform its intended function after being exposed to radiation levels equivalent to the dose received during 40-years of normal operation plus the dose received during the post-accident survivability period. Any significant increase in this total integrated dose could result in the possibility of an equipment malfunction.*

*RG 1.183, Section 1.3.5 states that licensees may use either AST or the older dose methodology (based on NRC document TID-14844) when evaluating Equipment Qualification (EQ) dose rates and integrated doses. The AST dose methodology was used to evaluate the impact of these conditions as the required analyses were similar to the AST analyses developed to determine filter shine doses to control room operators.*

*Calculation ECS04-018 was generated to determine the new EQ dose rates and doses accounting for the design deficiencies noted in the various condition reports. This calculation reviewed the potential post-accident sources on the +46' elevation of the RAB, namely CVAS, the Shield Building Ventilation System (SBVS), and the control room ESF filters (EVCS). The bounding dose location was on the CVAS filter train at the center of the high efficiency and medium efficiency particulate air (HEPA and MEPA) filter assembly. The calculated doses exceeded the current design basis values for Zone "M" contained on drawing G-M0001 by a considerable margin. To minimize the impact of the increased doses a new EQ zone was created. This area was chosen to ensure that the dose rates to the remainder of Zone "M" remain at or below the 2.5E6 Rads currently contained in G-M0001.*

*The AST LOCA dose analysis credits filtration by the SBVS filter train(s) for the duration of the event. The CVAS heater control panels [EHC-E48(3A-SA) and EHC-E48(3B-SB)] are located at the south end of the*

room between the two CVAS filter trains. LPLEQA10.2 discusses the fact that the heater control panels themselves are not qualified to meet the requirements of a "harsh" radiological environment. Since these panels are not qualified for radiation exposure, they can not be credited to operate post-accident unless it is demonstrated that the panels remain in a "mild" radiological environment ( $<1.0E4$  Rads per NUREG-0588). Due to the plant condition reports the dose rates and doses to the heater control panels were recalculated via ECS05-004. The "A" heater control panel is not of concern as it is inherently shielded by the shielding for the essential water chillers (Shield 6 from ER-W3-2004-0564-000). The accident doses to the "B" heater control panel based on AST were conservatively calculated to be approximately  $5.0E4$  Rads for the 30 day total integrated dose, and  $8.0E4$  Rads for 120 days (per ECS05-004). The calculation results indicated that the SBVS B heater control panel would exceed  $1.0E4$  Rads roughly 50 hours into the event. The results also determined that a shielding thickness of 3.5" of steel would ensure that the TID to the panels would remain below  $1.0E4$  Rads for 120 days. This required shielding is being installed via ER-W3-2004-0564-000; therefore the additional requirements of NUREG-0588 and Regulatory Guide 1.89 are not applicable to the heater control panels. CR-W3-2005-2432 has been issued to track the qualification of the SBV filter train B heater control panel (SBVEPNL1263-B) and is not included in the scope of the ER being evaluated.

The H&V Control Room Equipment Room will also see elevated doses as a result of activity buildup on the filters. The impact of the increased doses required the establishment of a new EQ zone on G-M0001 (DRN04-1791) and G-M0011 (DRN05-761). This area was chosen to ensure that the dose rates of Zone "L" remain "mild". The new zone was designated as Zone "Z" for incorporation on G-M0001.

While researching the impact to equipment qualification, it was discovered that the dose to the essential water chillers exceeded the "harsh" radiation environment threshold of  $1.0E4$  Rads; however, the chillers were not qualified to such an environment. This discrepancy was documented in CR-W3-2004-3560. The essential water chillers (WC1-(3A-SA), WC1-3B-SB), and WC1-3C-SA/B) are located on the west side of the +46' elevation of the RAB. These chillers are required to operate for 120 days following postulated DBAs. The equipment is not qualified to withstand a "harsh" radiological environment, therefore the dose to the chillers (and associated equipment) must remain below  $1.0E4$  rads in accordance with NUREG-0588 guidance. CR-W3-2004-3691 documented the fact that doses to the essential water chiller skid following a DBA LOCA would indeed exceed the  $1.0E4$  rads threshold.

New permanent shielding was installed via ER-W3-2004-0564-000, however that ER only addressed the structural requirements with installing this shielding. ER-W3-2004-0276-001 addresses the overall impact on area dose rates and doses. Six shields were installed as a result of that modification. Shield 1 was designed to reduce radiation levels in the control room. Shields 2 and 3 were designed to protect the CVAS heater control panels. Shields 4 and 5 were designed to protect the essential water chiller skid from the CVAS HEPA/MEPA and charcoal filters, respectively. Finally, shield 6 was designed to protect the essential water chiller skid area from the SBVS A filter train.

Shields 4, 5, and 6 were designed to ensure that the essential water chiller area remains below the  $1.0E4$  rads threshold as required. Calculation ECS05-004 was prepared to determine the required shielding thicknesses for each of these shields. The calculation demonstrates that 2.5" steel shields (Shields 4 and 5) will significantly reduce the dose contribution from CVAS. Shield 6 was comprised of multiple bays which can vary in thickness. The shield directly across from the HEPA/MEPA filter assembly must be 3" of steel, however east of the center of Water Chiller B ("center" is assumed to be west of line 6A) may be only 2" of steel. Similarly, west of the water chiller may also be 2" of steel since the bounding concern is water chiller B. Note that the final shielding design of ER-W3-2004-0564-000 was reviewed, and the final design exceeds the requirements of ECS05-004.

The revised TID of  $2.4E3$  (Calculation 3C3-032) to components in the emergency diesel generator rooms does not exceed current mild environment radiation limit of  $1.0E4$ . Therefore, no equipment changes are required as a result of the elevated equipment dose. AST Operator doses were addressed in ER-W3-2004-0276-000 (see Calculation ECS05-005).

ER-W3-2004-0276-001 documents the increase in the post-accident dose rates and integrated doses for several radiation zones. These increased dose rates and integrated doses do not cause any equipment to exceed its qualification dose (Note: The essential water chillers are addressed via ER-W3-2004-0564-000). Electrical cables and splices in the affected area are qualified for post LOCA conditions and are acceptable for the elevated doses in the EQ zones M, Y, and Z. FSAR Section 3.11.1.1 states that all

cable, with the exception of lighting cable, installed at Waterford was purchased as Class1E and qualified for use inside containment, therefore it is qualified for all plant areas. Therefore, the equipment should operate as expected following an accident. The dose rates and integrated doses due to a LB LOCA bound those from all other design basis events with respect to equipment qualification; therefore, no additional concerns exist from the evaluation of other accident scenarios.

Since the qualification of safety-related equipment is maintained, this change does not result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component important to safety previously evaluated in the FSAR.

3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the FSAR?  Yes  No

ER-W3-2004-0276-001 documents the increase in the post-accident dose rates and integrated doses for several radiation zones. These increased dose rates and integrated doses do not exceed the qualification dose to any essential equipment (Note: the essential water chillers are addressed via ER-W3-2004-0546-000). Electrical cables and splices in the affected area are qualified for post LOCA conditions and are acceptable for the elevated doses in the EQ zones M, Y, and Z. FSAR Section 3.11.1.1 states that all cable, with the exception of lighting cable, installed at Waterford was purchased as Class1E and qualified for use inside containment, therefore it is qualified for all plant areas. Therefore, all equipment in the affected areas of RAB Elevation +46' should operate as expected following an accident.

FSAR Section 12.3A documents the vital areas that would potentially require access following an accident. The doses to Emergency Diesel Generator "B" room (Zone O) increase as a result of the CVAS filters (CR-W3-2004-2690). While access to the room is not explicitly required following an accident, FSAR Section 12.3A.3.8 documents that access is desired once every 8 hours to monitor the EDG critical parameters. This access is possible even with the revised dose rates, which include the CVAS filter trains. The other vital areas listed in Subsection 12.3A are not impacted. Dose to the operator from actions to monitor the EDG's during post-LOCA operation is discussed in FSAR Section 12.3A. The impact of the higher dose rates has been previously evaluated in the 50.59 Evaluation for ER-W3-2004-0276-000. FSAR Section 12.3A reported the previous dose rates in the DG rooms with the conclusion that the room is acceptable for continuous operation. The FSAR is being revised to provide the updated maximum dose rate for the DG room. There is no explicit integral dose to the operator associated with entry to this room reported in the FSAR. Based on the occupancy of 15 minutes per 8 hour period already documented in FSAR Section 12.3A, the dose to the operator will continue to meet the 5 Rem TEDE acceptable limit. As noted in the 50.59 Evaluation for ER-W3-2004-0276-000, access to the room is not required to meet the assumptions of any design basis accident, therefore there would be no increase to the consequences of an event. Note the control panel is located at the west end of the room, where the dose rates are lower due to distance and a longer slant path through the concrete. The other vital areas listed in Subsection 12.3A are not impacted. Specifically, the RAB +46 HVAC Equipment Room, which contains the CVAS and SBVS filter trains and the chillers, are not areas that require accessibility following an accident and are not listed in FSAR Table 12.3A-9.

The CVAS and SBVS charcoal filter trains are used to mitigate the consequences of an accident. The ER reviewed components in the affected area which are required for post-accident operation at the elevated dose rates and determined the components will continue to perform their post-accident design functions and that all associated equipment is not affected the by increased dose rate or TID with the following exceptions. The SBVS A & B heater control panels were found to not be qualified for the elevated dose. The additional shielding installed under ER-W3-2004-0564-000 inadvertently lowered dose at the SBVS A & B heater control panel. The SBVS B heater control panel will be tracked via CR-W3-2005-2432 and will not be discussed further in this evaluation.

This review concludes that the proposed changes do not result in more than a minimal increase in the consequences of an accident previously evaluated in the FSAR

4. Result in more than a minimal increase in the consequences of a malfunction of a structure, system, or component important to safety previously evaluated in the FSAR?  Yes  No

BASIS:

The area dose rates from the CVAS and SBVS filters were calculated assuming the worst set of

assumptions to maximize the area dose rates. These assumptions corresponded to the assumed failure of one train (since the area dose rates are based on the contact dose rates for each train). If two trains were assumed, then the radioactivity would simply be divided between the two trains, which would reduce the contact dose rates. Since all equipment has been evaluated for these conservative dose rates and doses, the equipment will function as designed and there would be no impact to dose consequences.

The following changes to the FSAR are required as a result of this ER:

- FSAR Sections 3.2 and 12.3A.3.10 are being revised to correct typographical errors.
- FSAR Sections 3.2.1, 3.5.1, 3.5.1.4.2, and 3.6.1.1 are being revised to replace reference to 10CFR100 with 10CFR50.57.
- FSAR Table 3.11-1 is being revised to reflect the updated environmental conditions for areas discussed in the ER and this 50.50 Evaluation.
- FSAR Section 12.3.2.1 is being revised to replace reference to 10CFR100 with 10CFR50.57.
- FSAR Section 12.3A.2 is being revised to clarify source term requirements for the Control Room and EDG rooms.
- FSAR Section 12.3A.3.8 is being revised to add mention of the CVAS filters and revise the diesel generator area maximum dose rate.
- FSAR Table 12.3A-9 is being revised to revise the diesel generator area maximum dose rate and add a note regarding exposure during operator rounds to the diesel generator area.
- FSAR Figures 12.3A-2 and 12.3A-3 are being revised to correct editorial errors for radiation TID values for Rooms 421 (Inside RCB, Outside D Rings) and 422 & 423 (SG #1 & 2 Inside D Ring). The correct values are listed in FSAR Table 3.11-1, Sheets 3 & 4.
- FSAR Figure 12.3A-7 is being revised to reflect the new dose rate values for the CCW and Diesel Generator rooms.
- FSAR Figure 12.3A-8 is being revised to reflect the new dose rate values for the CVAS/SBVS Equipment Rooms.

Based on this review it is concluded that this changes does not result in more than a minimal increase in the consequences of a malfunction of a structure, system, or component important to safety previously evaluated in the FSAR.

5. Create a possibility for an accident of a different type than any previously evaluated in the FSAR?  Yes  
 No

BASIS:

This ER addresses the consequences of radiation buildup on the CVAS, SBVS, and EVCS filters post-accident. The post-accident buildup of activity can not produce an accident of a different type than any previously evaluated. All equipment evaluated will withstand it's post accident environment, so these changes do not create the possibility of a malfunction leading to a different type of accident. The changes to current radiation dose rates, integrated doses, or radiation zones correct previous errors or omissions while ensuring that the equipment remains qualified for its expected post-accident environment. Since this ER does not impact any equipment, it does not create the possibility for an accident of a different type than any previously evaluated in the FSAR.

6. Create a possibility for a malfunction of a structure, system, or component important to safety with a different result than any previously evaluated in the FSAR?  Yes  
 No

BASIS:

This ER does not make any physical plant modifications, it simply implements revised analyses which are currently in the FSAR. As discussed in Question 2, the equipment can withstand post accident environment, so these changes do not create the possibility of a malfunction. Since this ER does not impact any equipment, it does not create a possibility for a malfunction of a structure, system, or component important to safety with a different result than any previously evaluated in the FSAR.

7. Result in a design basis limit for a fission product barrier as described in the FSAR being exceeded or altered?  Yes  
 No

BASIS:

The CVAS and SBVS charcoal filter trains are used to mitigate the consequences of an accident. The changes addressed in this ER document that these filter trains will continue to perform their post-accident design functions. This change does not establish or change any fission product design basis limits. Therefore, the current fission product barrier design basis limits are not exceeded or altered.

8. Result in a departure from a method of evaluation described in the FSAR used in establishing the design bases or in the safety analyses?  Yes  
 No

**BASIS:**

Regulatory Guide 1.183 provides guidance for implementing the AST dose methodology into the plant design and licensing basis. One requirement is that licensees submit revised dose analyses using AST. Waterford 3 has submitted all required information to the NRC. The NRC has subsequently approved the full scope implementation of the Alternate Source Term methodology of RG 1.183 at Waterford 3, [see Amendment No.198 to Facility Operating License (FOL) No. NPF-38, dated March 29, 2005]. Therefore the AST methodology is the new design basis radiological accident methodology. The NRC AST SER approved the "results" of the control room shine dose analysis; however, they did not approve the use of a 2% flashing fraction after 24 hours. The staff recommended that the ECCS flashing fraction be either increased to 10 percent or the lower value justified when the licensee revises the LBLOCA control room filter shine dose analyses in the future. The analysis provided in ECS04-018, which is the basis for the changes presented in this ER, conservatively assumed an ECCS liquid leakage flashing fraction of 10% for the duration of the event consistent with Regulatory Guide 1.183 requirements. This is also consistent with the NRC's recommendation provided in the Waterford 3 AST SER. All of the issues with the current design and licensing basis were addressed via AST or with TID-14844 which are the current licensing basis of the plant (RG 1.183 allows the TID methodology to continue to be used as long as the results bound AST). Since all issues were addressed using the current methodology or the new AST methodology, ER-W3-2004-0276-001 does not result in a departure from a method of evaluation described in the FSAR used in establishing the design bases or in the safety analyses.

**If any of the above questions is checked "YES", obtain NRC approval prior to implementing the change by initiating a change to the Operating License in accordance with NMM Procedure ENS-LI-113.**