Entergy

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Christina Perino
Licensing Manager

GNRO-2010/00058

August 17, 2010

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

SUBJECT: Report of 10CFR50.59 Evaluations and Commitment Changes – July 1, 2009 through June 30, 2010
Grand Gulf Nuclear Station, Unit No. 1
Docket No. 50-416
License No. NPF-29

Dear Sir or Madam:

Pursuant to 10CFR50.59(d)(2) Entergy Operations, Inc. hereby submits a description of 50.59 and commitment change evaluations for the period of July 1, 2009 through June 30, 2010 in Attachment 1. Attachment 2 contains copies of the full evaluations.

If you have any questions or require additional information, please contact Dennis Coulter at 601-437-6595.

This letter does not contain any commitments.

Sincerely,

Rita R. Jackson for CLP

CLP/DMC:dmc

Attachments: 1. Table of Contents
2. 10CFR50.59 Evaluations and Commitment Change Evaluations

cc: (See Next Page)

cc: NRC Senior Resident Inspector
Grand Gulf Nuclear Station
Port Gibson, MS 39150

U.S. Nuclear Regulatory Commission
ATTN: Mr. Elmo E. Collins, Jr. (w/2)
Regional Administrator, Region IV
612 East Lamar Blvd, Suite 400
Arlington, TX 76011-4125

U. S. Nuclear Regulatory Commission
ATTN: Mr. Carl F. Lyon, NRR / DORL (w/2)
Mail Stop OWFN/8 B1
Washington, DC 20555-0001

Attachment 1

Table of Contents

Grand Gulf Nuclear Station
10CFR50.59 Evaluation and Commitment Change Evaluation Report
for the Period July 1, 2009 through June 30, 2010

10CFR50.59 Evaluations

Evaluation Number	Initiating Document	Description
SE 2009-0001-R00	Engineering Change (EC) 14143	EC 14143 implements revised offsite and control room atmospheric dispersion coefficients developed using the latest five years (2002-2006) of site meteorological data.
SE 2010-0001-R00	EC 13138	Evaluation of the use of Noble Metals at GGNS
SE 2010-0002-R00	Licensing Basis Document Change Request 2010-013	This change extends the Technical Requirements Manual surveillance frequency for the Horizontal Fuel Transfer System from 7 days to 31 days.

Commitment Change Evaluations

Commitment Number	Source Document	Description
N/A	N/A	There were no commitment change evaluations for the period that required NRC notification.

Attachment 2

10CFR50.59 Evaluations
and
Commitment Change Evaluations

GGNS 50.59 Evaluation Number

SE 2009-0001-R00

I. OVERVIEW / SIGNATURES[1]

Facility: GGNS **Evaluation # / Rev. #: 2009-0001 Rev. 00**

Proposed Change / Document: EC 14143

Description of Change: EC 14143 implements revised offsite and control room atmospheric dispersion coefficients (χ/Q's) developed using the latest five years (2002-2006) of site meteorological data. The dose consequences of the Loss of Coolant Accident (LOCA), Control Rod Drop Accident (CRDA), Fuel Handling Accident (FHA), Main Steam Line Break Outside Containment (MSLBOC), and Offgas System Failure are revised to reflect the impact of new dispersion coefficients. Affected dose calculations are: XC-Q1111-98019 (FHA), XC-Q1P53-05011, XC-Q1M46-04004, and XC-Q1111-98017 (LOCA), XC-Q1N11-94004 (MSLBOC), XC-Q1N64-98004 (Offgas System Failure), and XC-Q1111-98016 (CRDA).

Is the validity of this Evaluation dependent on any other change? ☐ Yes ☒ No

If "Yes," list the required changes/submittals. The changes covered by this 50.59 Evaluation 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.

Based on the results of this 50.59 Evaluation, does the proposed change require prior NRC approval? ☐ Yes ☒ No

Preparer: Guy B. Spikes/ [signature] /ESI/Fuels and Analysis/ 9/18/09
Name (print) / Signature / Company / Department / Date

Reviewer: Ardesar Irani/ [signature] /ESI/Fuels and Analysis/ 9/18/09
Name (print) / Signature / Company / Department / Date

OSRC: Riley Collins / [signature] / 10/23/09
Chairman's Name (print) / Signature / Date

018-2009
OSRC Meeting #

✓	QA RECORD
	RT- 014.33
	NON-QA RECORD
✓	INITIALS
NUMBER of PAGES	16
DATE	11/3/09
RELATED DOCUMENT NUMBER-	

[1] Signatures may be obtained via electronic processes (e.g., PCRS, ER processes), manual methods (e.g., ink signature), e-mail, or telecommunication. If using an e-mail or telecommunication, attach it to this form.

II. 50.59 EVALUATION

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

☐ Yes
☒ No

Does the proposed Change:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the UFSAR?

☐ Yes
☒ No

BASIS:
This activity implements revised atmospheric dispersion coefficients by revising the calculations and dose consequences associated with a Loss of Coolant Accident (LOCA), Control Rod Drop Accident (CRDA), Fuel Handling Accident (FHA), Main Steam Line Break Outside Containment (MSLBOC), and Offgas System Failure. This activity does not affect or physically change any structure, system, or component (SSC) and does not affect how any SSC is controlled or operated. Since this activity only affects the evaluations of accidents, the activity will not impact the frequency of occurrence of these accidents or any accident previously evaluated in the FSAR.

2. 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 UFSAR?

☐ Yes
☒ No

BASIS:
This activity implements revised atmospheric dispersion coefficients by revising the affected design basis dose calculations and dose consequences. This activity does not physically change any structure, system, or component (SSC), does not affect how any SSC is controlled or operated, and does not change any plant procedures. Therefore, this activity does not affect the cause or mode of a malfunction of any SSC and does not increase the likelihood of occurrence of a malfunction of a SSC 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 UFSAR?

☐ Yes
☒ No

BASIS:
The dose consequences of the accidents impacted by the application of the revised atmospheric dispersion factors are documented in the FSAR. This activity revises the affected accident analyses to include the revised dispersion coefficients. The revised dispersion coefficients are generally higher than those applied in the current dose calculations. Since dose is proportional to the magnitude of the dispersion coefficient, the dose consequences calculated in the revised analyses increase. The revised accident doses are compared to the doses from the current calculations reported in the FSAR in the table below.

	Dose (Rem TEDE)		
Location	Results - Current Analysis	Revised Results	Applicable Regulatory Limit
Fuel Handling Accident (XC-Q1111-98019)			
Exclusion Area Boundary	2.565	2.642	6.30
Low Population Zone	N/A*	N/A*	N/A*
Control Room	2.648	2.804	5.0
Control Rod Drop Accident (XC-Q1111-98016)			
Exclusion Area Boundary	0.147	0.151	6.3
Low Population Zone	0.064	0.072	6.3
Control Room	0.262	0.262	5.0
Main Steam Line Break Outside Containment (XC-Q1N11-94004)			
Equilibrium Iodine			
Exclusion Area Boundary	1.1905E-01	1.2262E-01	2.5
Low Population Zone	N/A*	N/A*	N/A*
Control Room	1.5345E-01	1.5345E-01	5.0
Iodine Spiking			
Exclusion Area Boundary	2.32	2.39	25.0
Low Population Zone	N/A*	N/A*	N/A*
Control Room	3.01	3.01	5.0
LOCA (XC-Q1111-98017, XC-Q1P53-05001, XC-Q1M46-04004)			
Exclusion Area Boundary	8.45	8.70	25.0
Low Population Zone	4.56	5.15	25.0
Control Room	3.69	3.69	5.0
Offgas System Failure (XC-Q1N64-98004)			
Exclusion Area Boundary	1.45	1.69	6.25
Low Population Zone	0.325	0.385	6.25
Control Room	0.124	0.124	5.0
*The LPZ dose is not evaluated in these analyses because the LPZ dose is bounded by the EAB dose.			

A "minimal" increase in consequences is defined as 10% of the difference between the current calculated dose value and the regulatory limit (Ref. NEI 96-07, Rev. 1). As shown below, the increases in dose consequences in all accidents at all dose locations are less than the "minimal" increase. Therefore, this activity does not result in more than a minimal increase in the consequences of an accident previously evaluated in the FSAR.

	Dose (Rem TEDE)	
Location	**"Minimal" Increase**	**Actual Increase**
Fuel Handling Accident (XC-Q1111-98019)		
Exclusion Area Boundary	0.374	0.077
Low Population Zone	N/A	N/A
Control Room	0.235	0.156
Control Rod Drop Accident (XC-Q1111-98016)		
Exclusion Area Boundary	0.615	0.004
Low Population Zone	0.624	0.008
Control Room	0.474	0.0
Main Steam Line Break Outside Containment (XC-Q1N11-94004)		
Equilibrium Iodine		
Exclusion Area Boundary	2.381E-01	3.570E-03
Low Population Zone	N/A	N/A
Control Room	4.847E-01	0.0
Iodine Spiking		
Exclusion Area Boundary	2.27	0.07
Low Population Zone	N/A	N/A
Control Room	0.199	0.0
LOCA (XC-Q1111-98017, XC-Q1P53-05001, XC-Q1M46-04004)		
Exclusion Area Boundary	1.655	0.25
Low Population Zone	2.044	0.59
Control Room	0.131	0.0
Offgas System Failure (XC-Q1N64-98004)		
Exclusion Area Boundary	0.48	0.24
Low Population Zone	0.592	0.060
Control Room	0.488	0.0

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 UFSAR? ☐ Yes ☒ No

BASIS:
This activity implements revised atmospheric dispersion coefficients by revising the affected design basis dose calculations and dose consequences. This activity does not physically change any structure, system, or component (SSC) and does not affect how any SSC is controlled or operated. Therefore, this activity does not affect a malfunction of any SSC and does not change the consequences of any

malfunction of a SSC 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 UFSAR? ☐ Yes ☒ No

BASIS:
This activity implements revised atmospheric dispersion coefficients by revising the affected design basis dose calculations and dose consequences. This activity does not physically change any structure, system, or component (SSC), does not affect how any SSC is controlled or operated, and does not change any plant procedures. Therefore, this activity 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 UFSAR? ☐ Yes ☒ No

BASIS:
This activity implements revised atmospheric dispersion coefficients by revising the affected design basis dose calculations and dose consequences. This activity does not physically change any structure, system, or component (SSC), does not affect how any SSC is controlled or operated, and does not change any plant procedures. This activity does not affect a malfunction of any SSC described in the FSAR. Therefore, this activity does not create a possibility for a malfunction of a SSC 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 UFSAR being exceeded or altered? ☐ Yes ☒ No

BASIS:
This activity revises the design basis dose calculations and dose consequences. This activity makes no physical changes to any SSC or assumptions regarding the operation of any SSC important to safety. Therefore, this activity does not affect a design basis limit for a fission product barrier (fuel cladding, reactor coolant system boundary, and containment) and will not result in a design basis limit for a fission product barrier described in the FSAR being exceeded or altered.

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

BASIS:
The GGNS design basis dose analyses use analytical and numerical (RAPTOR) methods to calculate the accident dose consequences. However, the dose analysis methodology is not explicitly described in the FSAR in any detail. Atmospheric dispersion coefficients are input parameters to the dose calculations but are not part of the methodology. The revised atmospheric dispersion coefficients were developed in accordance with NRC requirements using methodology previously approved by the NRC. Since dose is directly proportional to the dispersion coefficient (χ/Q), the doses were revised by multiplying the doses calculated using the current methodology by a simple ratio of the revised χ/Q to the χ/Q applied in the current analyses. Therefore, the revised calculations do not apply a new analysis methodology or change an element of the methodology such that this activity does not represent a departure from a method of evaluation described in the FSAR.

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 EN-LI-103.

GGNS 50.59 Evaluation Number

SE 2010-0001-R00

I. OVERVIEW / SIGNATURES[1]

✓	QA RECORD
	RT. B 14.33
	NON-QA RECORD
	INITIALS
	NUMBER OF PAGES 10
	DATE 3/19/10
	RELATED DOCUMENT NUMBER

Facility: Grand Gulf Nuclear Station (GGNS)

Proposed Change / Document: Evaluation # / Rev. #: 2010-0001, Rev. 00

Engineering Change EC13138, Revision 0

NMCA Evaluation: Evaluation of the Use of Nobel Metals at GGNS

Description of Change:

Engineering Change EC-13138 provides the Technical and Licensing Basis for the GE-Hitachi (GEH) On-Line NobleChem™ (OLNC) process for application at GGNS. The OLNC process will be used in conjunction with the plant's Hydrogen Water Chemistry (HWC) process for controlling intergranular stress corrosion cracking. The OLNC process provides a catalytic environment that promotes the recombining of hydrogen and oxygen in the reactor and recirculation lines. The catalytic nature of the OLNC process promotes the usage of lower hydrogen injection rates when compared to HWC alone. The OLNC process provides 1) a more effective approach for mitigating IGSCC than the traditional HWC process alone and 2) reduces the main steam line radiation levels from volatile N^{16} components.

The OLNC process utilizes the noble metal compound sodium hexahydroxyplatinate [$Na_2Pt(OH)_6$]. The compound is injected into the reactor by the Feedwater System during plant operations. The ionizing characteristics of the compound cause it to breakdown into the ionic forms of Platinum (Pt), Hydroxide (OH), and Sodium (Na). The platinum ions plate out onto the internal reactor components and the reactor recirculation line causing a thin film (a few atoms thick) on the metallic surfaces. The platinum causes a catalytic reaction between the free hydrogen and oxygen molecules in the reactor coolant. The catalytic reaction encourages the chemical reaction of hydrogen and oxygen to form water molecules. (The catalytic reaction reduces the need for an excessive amount of hydrogen to react with the oxygen. The ratio of hydrogen to oxygen is slightly higher than the stoichiometric molar ratio of 2.) The reduction of oxygen in the reactor coolant lowers the electrochemical corrosion potential of the coolant to levels that mitigate IGSCC.

The OLNC process will also reduce the amount of radionuclide N^{16} in the main steam lines. The nuclide N^{16} is produced in the reactor core when oxygen is radiated: $O^{16} + n \rightarrow N^{16} + H^1$. The N^{16} combines with the free hydrogen to form the volatile compounds NH3 and NH4 and then carried over to the steam lines where it decomposes. The magnitude of N^{16} in the steam lines is dependent on the

[1] Signatures may be obtained via electronic processes (e.g., PCRS, ER processes), manual methods (e.g., ink signature), e-mail, or telecommunication. If using an e-mail or telecommunication, attach it to this form.

amount of free hydrogen injected into the reactor vessel from the Hydrogen Chemistry System. The reduction of free hydrogen levels in the reactor coolant will produce lower N^{16} levels in the main steam lines.

The equipment and SSC interfaces (i.e., the civil, electrical, and mechanical interfaces) for the OLNC process have been installed in the plant by other ECs. The design and licensing for the equipment and interfaces are addressed in the individual ECs. The ECs are identified below:

EC-13132, Mitigation Monitoring System Installation

EC-13133, On-Line Noble chemistry Injection Skid Installation

EC-13134, Feedwater Tap installation

EC-13135, RWCU Tap Installation

EC-13136, Hydrogen Water Chemistry System program Changes

EC-13137, Physical Modifications to the Hydrogen Water Chemistry System

Is the validity of this Evaluation dependent on any other change? ☐ Yes ☒ No

If "Yes," list the required changes/submittals. The changes covered by this 50.59 Evaluation 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.

Based on the results of this 50.59 Evaluation, does the proposed change require prior NRC approval? ☐ Yes ☒ No

Preparer: Jeff Farnsworth / ENERCON Services / Mechanical Engineering / 2-16-2010
Name (print) / Signature / Company / Department / Date

Reviewer: KEN WALKER
See IAS / ENERCON Services / Mechanical Engineering / 2-17-2010
Name (print) / Signature / Company / Department / Date

OSRC: Riley Collins / 3/8/10
Chairman's Name (print) / Signature / Date

OSRC Meeting # 003-2010

II. 50.59 EVALUATION

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

☐ Yes
☒ No

Does the proposed Change:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the UFSAR?

☐ Yes
☒ No

BASIS:

The addition of noble metal compound and the OLNC process do not adversely affect any equipment treated by the OLNC process. The frequency of occurrence of accidents evaluated in the UFSAR is not related to the ability to mitigate IGSCC in the vessel or associated systems. The installation, testing, and operation of the OLNC system does not impact the ability of any structure, system, or component to perform its safety function. Core cooling mechanisms, reactivity control features, or pressure control systems are not impacted. There are no changes to operating procedures which would increase the frequency of occurrence of a previously evaluated accident. None of the precursors to a loss of coolant accident or other accidents in the UFSAR are impacted by this change.

The noble metal compound has no impact on the carbon steel main steam lines, and thus, the frequency of occurrence of a main steam line break (MSLB) in not changed from that previously evaluated in the UFSAR. The control rod drive equipment will continue to be operated and maintained within design specifications, and thus, the frequency of occurrence of a control rod drive accident is not changed from that previously evaluated in the UFSAR.

Neither the installation nor injection processes involves movement of fuel in the core or fuel pools nor do they modify any fuel handling equipment, thus the frequency of a fuel handing accident will not change.

Therefore, noble metal application with OLNC does not result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the UFSAR.

2. 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 UFSAR? ☐ Yes ☒ No

BASIS:

In combination with Hydrogen Water Chemistry, the OLNC process mitigates IGSCC and has no known detrimental effects. The likelihood of occurrence of a malfunction of the treated components in the reactor vessel and associated piping will not increase. The effects on equipment important to safety covered in the OLNC process will be negligible because the total thickness of multiple applications of noble metal compound is on the order of a millionth of an inch. The loading and operating condition (e.g., stress, pressure, environment, flow, and temperature) of affected SSCs will not change. Extensive fuel surveillances and examinations conducted by the OLNC vendor (General Electric-Hitachi's (GEH) "On-Line NobleChem™ Application Technical Safety Evaluation for Grand Gulf Nuclear Station", Rev. 0, Nov. 2009) confirm that the likelihood of fuel cladding failures is not increased, nor are the chances of further degradation of already failed fuel.

The ionizing characteristics of the noble metal compound will cause an increase in the reactor coolant conductivity. The increase in conductivity will be very small and has no adverse impact on water chemistry. Coolant conductivity is monitored per Plant procedures and the limits established by the procedures are not affected by the OLNC process.

The very small amount of noble metal compound causes no reduction in the plant nuclear safety functions evaluated in the UFSAR. Due to the very small amount of material deposited on equipment surfaces, there is no increased likelihood of interference causing an SSC malfunction. Thus control rod blade function and channel flow impacts are considered negligible. During the OLNC injection processes, plant operations will not be significantly affected. No initiators for anticipated operational occurrences (transients) in the UFSAR are affected. No changes to the transient analysis inputs are made.

The OLNC process will not degrade any SSC including those important to safety. Therefore, the addition of noble metal compound by the OLNC process does not result in more than a minimal increase in the likelihood of occurrence of a malfunction of a SSC important to safety previously evaluated in the UFSAR.

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

BASIS:

The noble metal compound does not affect the amounts or types (source terms) of radioactive materials assumed to be released in any UFSAR accident analyses. The OLNC process has no adverse impact on the boron moderator or reactivity control. The OLNC process has no adverse impact on the current type of fuel assemblies or future fuel assembly designs. The OLNC process does not adversely affect any engineered safety feature assumed to function in the UFSAR accident analyses, and thus, the plant's accident mitigation functions are not affected. The addition of the noble metal compound does not affect the peak enthalpy used in the design criteria of the control rod drop accident. The radioactive source terms for the accidents (MSLBA, LOCA, FHA, and CRDA) analyzed in the UFSAR are not affected by the noble metal compound.

Vendor evaluations (as provided in General Electric-Hitachi's (GEH) "On-Line NobleChem™ Application Technical Safety Evaluation for Grand Gulf Nuclear Station", Rev. 0, Nov. 2009) indicate that platinum particle deposition on fuel surfaces will have a negligible impact on the fuel crud layer and its associated heat transfer characteristics, thus the peak cladding temperature reached during a LOCA will not increase. Further, the assessments in the above vendor evaluation conclude that the inherent zirconium oxide layer on the fuel surfaces from the manufacturing process will inhibit any possible catalytic affect which could increase the Zr-Oxygen reaction and associated hydrogen generation.

Per the vendor evaluation above, which includes results of a multi-cycle ONLC surveillance program, the safety related functions of fuel cladding to maintain fuel geometry and fission product retention capability are not affected. The amount of noble metal deposited is extremely small relative to the existing crud layer and does not significantly impact the heat transfer characteristics either during normal operation or post-accident. Therefore, OLNC does not result in more than a minimal increase in the consequence of an accident previously evaluated in the UFSAR.

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 UFSAR? ☐ Yes ☒ No

BASIS:

In combination with HWC, surfaces coated with the noble metal compound help to mitigate IGSCC. The effect on equipment important to safety is negligible, because the total thickness of multiple applications of noble metal compound is on the order of a millionth of an inch. The loading and operating conditions (e.g., stress, pressure, environment, flow, and temperature) of affected SSCs will not change. The use of noble metal compound has no effect on plant nuclear safety functions or radioactive material sources evaluated in the UFSAR. During and after OLNC application, plant operations and SSCs are not adversely affected by the noble metal deposit. Fuel cladding is not detrimentally affected, thus the consequences of a fuel failure are no more severe than before OLNC implementation.

Because noble metal compound does not degrade any SSC involved in the process, including those important to safety. The platinum ions plating out on the reactor surfaces can be activated by thermal neutrons but the amount of platinum in the reactor is negligible when compared to the source terms postulated for the UFSAR accident analyses. The radioactive material sources assumed to be released in the safety analyses are not affected. Therefore, the noble metal compound and the OLNC process do not result in an increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the UFSAR.

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

BASIS:

The noble metal compound and the OLNC process do not adversely affect the reactor or plant safety analyses previously evaluated in the UFSAR. Minor changes made to the plant's operating procedures will be necessary for OLNC application. The procedure changes will not affect the initiating events described in UFSAR such as opening, closing, starting, or stopping an evaluated component or system. No new equipment interaction, accident scenario, or accident precursors will be created by noble metal compound application or the OLNC process described in the UFSAR. The presence of platinum on reactor fuel surfaces will not initiate a component failure or a system malfunction. The platinum will not interfere with any pressure boundary component; interfere with core heat transfer mechanisms; alter reactor coolant flow or inventory; or change core reactivity or power levels. Thus the noble metal compound and the OLNC process do not create a new fission product release path, result in a new fission product barrier failure mode, or create a new sequence of events that results in unacceptable fuel failures or other types of accidents which could result in radiological consequences not evaluated in the UFSAR.

Therefore, the injected noble metal compounds cannot create the possibility of a new type of accident not previously evaluated in the UFSAR.

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 UFSAR? ☐ Yes ☒ No

BASIS:

A thin film of platinum molecules will plate onto the surfaces wetted by the noble metal compound. The OLNC process will be controlled to ensure the platinum film does not exceed the equivalent of 10 µg/cm2 loading on the fuel assuming that all platinum injected deposits only on fuel surfaces. Vendor provided procedures will be used to manage the injection of NobleChem into the Feedwater System. The plating of platinum will be monitored by the OLNC mitigating monitoring skid. The platinum film will be a only few atoms thick. (One atom layer is about 10^{-8} inches thick.) The total thickness of the platinum film is less than 10^{-6} inches, which is less than the manufacturing tolerance for the components wetted by the OLNC process. Thus, running clearance between moving parts is not affected by the OLNC process. In addition, the pathways for flow through the reactor core and recirculation piping are not affected by the OLNC process. The weight added by the platinum film is insignificant compared to the design weight established for each of the reactor components. The application of the OLNC process will have no impact on the structural integrity of reactor components; therefore, such components are no more likely to fail than that previous to ONLC addition.

The deposit of platinum on the fuel assemblies will have no adverse impact on fuel heat transfer rate or the ability of the fuel cladding to resist failure. Platinum from the OLNC process and crud from the reactor coolant will deposit on the fuel assemblies. The normal deposits of crud will overshadow the small amount of platinum that will plate out on the fuel rods. The thermal conductivity of the crud will dominate the heat transfer characteristics of the deposits. Minor restructuring of corrosion products on exposed piping and other reactor internal surfaces may result from application of noble metals, however the amount that redeposits onto fuel surfaces is considered negligible considering the inventory of crud on fuel.

Noble metal deposits by the OLNC process do not adversely affect any plant operating condition, nor plant operations with respect to nuclear safety. In combination with HWC, noble metal compound addition has been shown to mitigate IGSCC of the treated components in the reactor vessel, and thus the likelihood of occurrence of a malfunction of the treated components in the reactor vessel and associated piping is not increased. Also, SSC environment, operating rates and loading (e.g., stress or pressure) will not be affected. Thus, there would be no change to the operational status or operational conditions of any SSC during or after OLNC process. In addition to the responses to Questions 2 and 4 above, a noble metal application with OLNC process does not change the behavior of any SSC import to safety.

Therefore, the OLNC application does not create a possibility for a malfunction of a SSC important to safety with a different result than any previously evaluated in the UFSAR.

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

BASIS:

The noble metal compound does not adversely affect any fission product barrier such as the reactor pressure vessel, piping, and related pressure retaining components. Vendor evaluations (as provided in General Electric-Hitachi's (GEH) "On-Line NobleChem™ Application Technical Safety Evaluation for Grand Gulf Nuclear Station", Rev. 0, Nov. 2009) show that fuel cladding heat transfer characteristics are negligibly impacted by OLNC process. No increase in hydrogen generation will result from platinum catalyst effects. Based on the assessments, operating experience, and performance characterizations obtained to date, the fuel design bases remain applicable and adequate for normal operation, as well as anticipated operational occurrences, and accidents.

Noble metal application does not change or reduce the design basis limit, capability, or the function of the containment and the emergency ventilation system. No safety analyses inputs are changed and the analyses results in the UFSAR (which demonstrate that design basis limits are not exceeded) are not affected by the noble metal deposit or by the OLNC application process.

Therefore, noble metal application does not result in any design basis limit for a fission product barrier as described in the UFSAR to be exceeded or altered.

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

BASIS:

The noble metal compound does not adversely affect any treated equipment, such as the reactor pressure vessel, piping, and related pressure retaining components. Injection of noble metal does not require changes to any safety related design limit or safety or accident analysis methods or inputs that may affect design basis limits for a fission product barrier as described in the UFSAR. There are no changes to radioactive release models or assumptions. Assumptions regarding fuel crudding and heat transfer characteristics remain valid. The design and safety analyses in the UFSAR are not affected by the noble metal deposit or by the OLNC process.

Therefore, noble metal application does not result in a departure from a method of evaluation described in the UFSAR 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 EN-LI-103.

GGNS 50.59 Evaluation Number

SE 2010-0002-R00

I. OVERVIEW / SIGNATURES[1]

Facility: **Grand Gulf Nuclear Station** **Evaluation # / Rev. #:** 2010-002-R00

Proposed Change / Document: **LBDCR 2010-013-TRM 6.9.7**

Description of Change:

This change involves extending the Technical Requirements Manual (TRM) 6.9.7 HORIZONTAL FUEL TRANSFER SYSTEM (HFTS) Surveillance Requirements (SR) from 6.9.7.1.a. through c. from a frequency of 7 days to every 31 days. SR 6.9.7.1 requires the following:

a. Room 1A525, Auxiliary Building, elevation 182', the room through which the transfer system penetrates, is sealed.
b. All interlocks with the refueling and fuel handling platforms are OPERABLE.
c. All HFTS primary carriage position indicators are OPERABLE.

An extensive review of HFTS operational data was performed to determine the feasibility of lengthening the frequency of the surveillance requirements. This review included HFTS surveillance tests performed during and since RF-13 (February 2004), operations and refueling floor logs dating back to June 2005. A review of CRs was also performed for the last three refueling outages. Specifically, these records included:

- Surveillance Procedure 06-OP-1C71-V-0002, Attachment III, Refueling Interlock Check - Horizontal Fuel Transfer System
- Shift Operations Management System (Nuclear eSOMS) narrative log entries and LCO tracking log

The data packages for the completed surveillance procedure were reviewed to check for any unsatisfactory performances relating to HFTS. The comment sections of the surveillances were also reviewed for applicable comments. Both full surveillance tests as well as partial tests (generally for retest following maintenance) were reviewed. This effort revealed no unsatisfactory performances of surveillances associated with TRM SR 6.9.7.1. Operations and refueling floor logs were reviewed for HFTS failures or breakdowns due to performance deficiencies with the Room 1A525 sealing, refueling and fuel handling platform interlocks, or primary carriage position indicators. Any noted fuel handling platform interlock deficiencies were self-revealing and properly caused the system to lock up.

In addition, a review of HFTS operating, design, and licensing information was performed which included the following:

- System Operating Instruction SOI-04-1-01-F11-2, Horizontal Fuel Transfer Mechanism, Revision 111
- Surveillance Procedure, 06-OP-1C71-V-0002, Refueling Interlock Check, Revision 110
- Radiation Protection Procedure, 08-S-02-75, Coverage and Control of Refueling Operation, Revision 11
- Licensing Basis Document Change (LBDC) No. 2005-066, Clarify TRM 6.9.7.1b and UFSAR Chapter/Section 16B.1-200, 9.1.4.2.3.11
- TRM Bases Section 6.9.7, Horizontal Fuel Transfer System
- UFSAR 3.2, Table 3.2-1 – System Qualification, and Note (p)
- UFSAR 7.6.1.1, Refueling Interlocks System - Instrumentation and Controls
- UFSAR 7.6.2.1, Refueling Interlocks System - Instrumentation and Controls
- UFSAR 9.1.4.2.3.11, Fuel Transfer System
- UFSAR 15.4, Reactivity And Power Distribution Anomalies
- UFSAR 15.7.4, Fuel Handling Accident

✓	QA RECORD
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[1] Signatures may be obtained via electronic processes (e.g., PCRS, ER processes), manual methods (e.g., ink signature), e-mail, or telecommunication. If using an e-mail or telecommunication, attach it to this form.

The proposed change to TRM SR 6.9.7.1 affects all three surveillance requirements a through c, as described below:

TRM SR 6.9.7.1.a requires operators to "verify Room 1A525, Auxiliary Building, elevation 182', the room through which the transfer system penetrates, is sealed." The required frequency is once every 7 days, and this change extends that frequency to once every 31 days.

Per the TRM 6.9.7 Bases:

> *The purpose of the horizontal fuel transfer system specification is to control personnel access to those potentially high radiation areas immediately adjacent.*

In accordance with the HFTS System Operating Instruction SOI-04-1-01-F11-2, Step 4.1.2 (instructions for preparing for HFTS operation), prior to operation of the HFTS, the fuel transfer tube room on Elevation 182' is checked to verify the room is unoccupied, locked, and posted. These actions provide redundant protection against accessing the room during HFTS operations. In accordance with Surveillance Procedure 06-OP-1C71-V-0002, Attachment III, Refueling Interlock Check - Horizontal Fuel Transfer System, Step 5.4.1, within 24 hours prior to operation of HFTS and at least once per 7 days thereafter, Room 1A525 Auxiliary Building Elevation 182' is verified sealed. Extension of this surveillance frequency from 7 days to 31 days avoids unnecessarily interrupting fuel movement to perform the required testing. Reviews of operating and surveillance history and refueling logs show no door/seal performance issues or inappropriate room access. Therefore, extension of the surveillance frequency is justified. The Auxiliary Building Room 1A525 sealing check is performed to protect against personnel radiation overexposure accidents only to ensure compliance with 10CFR20. In addition to a verification of sealing of this room, the access area to the room is also required to be posted and locked as a Exclusion/Locked High Radiation Area in accordance with Radiation Protection Procedure, 08-S-02-75, Coverage and Control of Refueling Operation, Revision 11 prior to fuel movement.

TRM SR 6.9.7.1.b requires operators to "verify all interlocks with the refueling and fuel handling platforms are OPERABLE." This requirement is preceded by the note: "Not required to be met for HFTS operations when equivalent administrative controls are in effect." The required frequency is once every 7 days, and the proposed change extends that frequency to once every 31 days.

Per UFSAR 9.1.4.2.3.11:

> *The transfer control system functions on a semiautomatic basis with provision made for manual override. Automatic sequencing is accomplished by use of an electronic control system located in the auxiliary building. The control system monitors the step-by-step procedure of installation or removing cargo from the carrier and assures proper sequencing of the transfer operation. Control panels are provided in both the containment and auxiliary buildings. The transfer mechanism is equipped with sensors and instrumentation appropriate for confirming the successful completion of each step and signaling the control system which automatically initiates the next step. The completion of a transfer operation is signaled at the control panel. When the HFTS system is in operation, interlocks or equivalent administrative controls are provided to prevent incorrect operation. Interlocks and/or administrative controls assure the correct operational sequence of the transfer system components and fuel handling equipment.*

Per UFSAR 7.6.1.1.3.3:

> *The rod block interlocks, which prevent control rod withdrawal whenever the fuel loaded refueling platform is over the core, and the refueling platform interlocks, which prevent operation of the fuel loaded refueling equipment over the core whenever any control rod is withdrawn, provide two independent levels of interlock action. It is pertinent to note that the strict procedural control exercised during refueling operations may be considered another level of backup.*

Per UFSAR 7.6.1.1.3.4:

> *Although the refueling interlocks are not designed nor required to meet the IEEE 279-1971 criteria for nuclear power plant protection systems, a single interlock failure will not cause an accident. They are provided for use during planned refueling operations.*
>
> *The refueling interlocks have been carefully designed utilizing redundancy of sensors and circuitry to provide a high level of reliability and assurance that the stated design bases will be met.*
>
> *...a single interlock failure will not cause an accident or result in potential physical damage to fuel or result in radiation exposure to personnel during fuel handling operations.*

Per UFSAR 7.6.1.1.3.7:

> *Complete functional testing of all refueling interlocks before any refueling outage will positively indicate that the interlocks operate in the situations for which they were designed.*

Per UFSAR 7.6.2.1.1:

> *The refueling interlocks, in combination with core design and refueling procedures, limit the probability of an inadvertent criticality. The nuclear characteristics of the core assure that the reactor is subcritical even when the highest worth control rod is fully withdrawn. Refueling procedures are written to avoid situations in which inadvertent criticality is possible. The combination of refueling interlocks for control rods and the refueling platform provides redundant methods of preventing inadvertent criticality even after procedural violations. The interlocks on hoists provide yet another method of avoiding inadvertent criticality.*

The function of the HFTS interlocks with the bridge is to protect the suspended fuel bundle, control blade, etc., from interfering with or coming in contact with the fuel transfer carriage. This function ensures that the bridge is not moved into the HFTS canal while the HFTS carrier is not in the vertical position. All subcomponents of the HFTS are non-seismic category I, with the exception of the fuel transfer tube and hatch which are seismic category I. The function of the interlocks is not a design bases function under 50.59 since the function is (1) not required by, or otherwise necessary to comply with, regulations, license conditions, orders or technical specifications, or (2) credited in safety analyses to meet NRC requirements. The fuel handling accident discussed in UFSAR 15.7.4 is a bounding analysis and is based on a random failure of the fuel handling grapple. The refueling interlocks as discussed in section 7.6.1.1 and 7.6.2.1 primarily addresses inadvertent criticality avoidance. The interlock provides collision protection for a single bundle with the HFTS upender only. This event would be bounded by UFSAR chapter 15.7.4. Therefore, the extension of surveillance frequencies does not adversely affect the function or method of performing the functions of the HFTS.

TRM SR 6.9.7.1.c requires operators to "verify All HFTS primary carriage position indicators are OPERABLE." The required frequency is once every 7 days, and this change extends that frequency to once every 31 days.

For the HFTS primary carriage position indicator, procedural controls require that for every movement of the carriage, position indicator light checks are required. Additionally cable loading is required to be verified during the carriage movement. Should a malfunction occur of the carriage, it would easily be identified and self-revealing to the HFTS console operator. Should a need to shut the transfer tube hatches be required, the hatch area can be easily observed to ensure the HFTS carriage is stored in the auxiliary building prior to closure of the transfer tube hatches. No new failure mechanisms are being introduced as result extending the frequency for this surveillance.

Is the validity of this Evaluation dependent on any other change? ☐ Yes ☒ No

If "Yes," list the required changes/submittals. The changes covered by this 50.59 Evaluation 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.

Based on the results of this 50.59 Evaluation, does the proposed change require prior NRC approval? ☐ Yes ☒ No

Preparer: 04/12/10 04/12/2010 /EOI/PLANT LICENSING
Michael Larson/Peggy Rescheske
Name (print) / Signature / Company / Department / Date

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Name (print) / Signature / Company / Department / Date

OSRC: / MARY RICHEY / / 4/15/10
Chairman's Name (print) / Signature / Date

007-2010
OSRC Meeting #

II. 50.59 EVALUATION

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

☐ Yes
☒ No

Does the proposed Change:

1. Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the UFSAR?

☐ Yes
☒ No

BASIS: A review of the Updated Final Safety Analysis Report (UFSAR) Chapter 15 was conducted to determine what accidents, if any, may be impacted by extending the surveillance frequency for testing the horizontal fuel transfer system (HFTS). UFSAR Section 15.7.4 discusses a fuel bundle drop accident onto stored irradiated fuel, however accidents involving HFTS are not discussed in this section nor any other UFSAR Chapter 15 sections.

Since accidents involving HFTS operations are not specifically discussed in Chapter 15, this change will not result in any increase in the frequency of occurrence of an accident previously evaluated in the UFSAR.

2. 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 UFSAR?

☐ Yes
☒ No

BASIS: HFTS is not considered in the prevention or mitigation of any analyzed malfunctions or accidents and its components are not defined as "important to safety." The extension of surveillance frequencies does not introduce a new failure mechanism into the system, nor does it cause more than a minimal decrease in the reliability of the system. The method by which testing is performed is not being changed.

This change, since it only involves a Technical Requirements Manual (TRM) surveillance frequency change, will not affect any SSC important to safety, therefore there is no affect on the occurrence of a malfunction of any SSC.

3. Result in more than a minimal increase in the consequences of an accident previously evaluated in the UFSAR?

☐ Yes
☒ No

BASIS: The HFTS system is not involved in either the initiation or mitigation of any accident identified in the UFSAR. Therefore, this change will not affect the consequences of an event previously evaluated in the UFSAR.

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 UFSAR?

☐ Yes
☒ No

BASIS: The HFTS is not considered in the initiation or mitigation of any analyzed malfunction or accident, and its components are not defined as "important to safety." Extension of the surveillance frequencies does not affect the offsite dose consequences of a malfunction previously evaluated.

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

BASIS: The interlocks and HFTS position indicators affected by this change provide collision protection for a single fuel bundle or blade with the HFTS upender only. Should a collision occur, a fuel bundle or blade could drop in HFTS canal. A collision resulting in a fuel bundle or blade drop in the HFTS canal would be bounded by worst case UFSAR Chapter 15.7.4 fuel handling accident. The UFSAR Chapter 15.7.4 fuel handling accident analysis considers the drop of a fuel assembly onto stored spent fuel bundles. A drop of a fuel bundle in the transfer canal would be a less severe accident than previously evaluated since the drop would occur onto the floor the HFTS canal and not onto other fuel bundles. Therefore, extension of the surveillance frequencies does not create new accidents or a different type of accident previously evaluated in the UFSAR.

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 UFSAR? ☐ Yes ☒ No

BASIS: The HFTS is not defined as a system important to safety involving the routine control of transfer tube operations. Increasing the surveillance frequency from 7 to 31 days has no effect on the reliability of any system important to safety. The interface of the HFTS with other systems is not being changed. This change does not involve any modification to any structure, system, or component important to safety therefore it cannot create any new malfunctions not previously evaluated.

Based on the operating history of the HFTS, any noted deficiencies have been self-revealing and properly caused the system to lock up. Should the HFTS interlocks fail, administrative controls may be instituted to ensure no collision can occur between a fuel bundle and the HFTS system as allowed by TRM 6.9.7.

For the HFTS primary carriage position indicator, procedural controls require that for every movement of the carriage, position indicator light checks are required. Additionally, cable loading is required to be verified during the carriage movement. Should a malfunction occur of the carriage, it would easily be identified and self-revealing to the HFTS console operator. Should a need to shut the transfer tube hatches be required, the hatch area can be easily observed to ensure the HFTS carriage is stored in the auxiliary building prior to closure of the transfer tube hatches. No new failure mechanisms are being introduced as a result of extending the frequency for this surveillance.

The Auxiliary Building Room 1A525 sealing check is performed to protect against a personnel radiation overexposure accidents only to ensure compliance with 10CFR20. In addition to a verification of sealing of this room, the access areas to the room is also required to be posted and locked as a Exclusion/Locked High Radiation Area in accordance with Radiation Protection Procedure, 08-S-02-75, Coverage and Control of Refueling Operation, Revision 11 prior to fuel movement. Entry in this area would be prohibited and controlled for all fuel movement, therefore no new failure mechanisms would be introduced since the room will remain sealed during any fuel movement activities. These controls provide an adequate barrier for radiological safety.

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

BASIS: Fission product barriers include fuel rod cladding, the reactor coolant system, and the primary/secondary containment buildings. Design basis limits would be those limits such as temperature, pressure, enthalpy, and strain. Extension of the surveillance frequencies does not affect any design basis limits for any of the fission product barriers. Therefore, this change will not result in a design basis limit for a fission product barrier as described in the UFSAR being exceeded or altered.

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

BASIS: The implementation of the surveillance frequency change does not constitute a change to any calculational or methodical framework used in the safety analysis as described in the UFSAR. Therefore this criteria is not applicable.

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 EN-LI-103.

GGNS Commitment Change Evaluation

There were no commitment change evaluations for the period that required NRC notification.