UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

February 8, 2022

Mr. Robert Franssen
Site Vice President
Entergy Operations, Inc.
Grand Gulf Nuclear Station
P.O. Box 756
Port Gibson, MS 39150

SUBJECT: GRAND GULF NUCLEAR STATION – INTEGRATED INSPECTION REPORT 05000416/2021004

Dear Mr. Franssen:

On December 31, 2021, the U.S. Nuclear Regulatory Commission (NRC) completed an inspection at Grand Gulf Nuclear Station. On January 13, 2022, the NRC inspectors discussed the results of this inspection with you and other members of your staff. The results of this inspection are documented in the enclosed report.

Four findings of very low safety significance (Green) are documented in this report. All of these findings involved violations of NRC requirements. We are treating these violations as non-cited violations (NCVs) consistent with Section 2.3.2 of the Enforcement Policy.

If you contest the violations or the significance of the violations documented in this inspection report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; the Director, Office of Enforcement; and the NRC Resident Inspector at Grand Gulf Nuclear Station.

If you disagree with a cross-cutting aspect assignment in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region IV; and the NRC Resident Inspector at Grand Gulf Nuclear Station.

This letter, its enclosure, and your response (if any) will be made available for public inspection and copying at http://www.nrc.gov/reading-rm/adams.html and at the NRC Public Document Room in accordance with Title 10 of the *Code of Federal Regulations* 2.390, "Public Inspections, Exemptions, Requests for Withholding."

Sincerely,

/RA/

Jeffrey E. Josey, Chief
Reactor Projects Branch C
Division of Reactor Projects

Docket No. 05000416
License No. NPF-29

Enclosure:
Inspection Report 05000416/2021004
w/attachment: Detailed Risk Evaluation

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GRAND GULF NUCLEAR STATION – INTEGRATED INSPECTION
REPORT 05000416/2021004 – DATED FEBRUARY 8, 2022

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U.S. NUCLEAR REGULATORY COMMISSION
Inspection Report

Docket Number:	05000416
License Number:	NPF-29
Report Number:	05000416/2021004
Enterprise Identifier:	I-2021-004-0143
Licensee:	Entergy Operations, Inc.
Facility:	Grand Gulf Nuclear Station
Location:	Port Gibson, MS
Inspection Dates:	October 1, 2021, to December 31, 2021
Inspectors:	S. Alferink, Reliability and Risk Analyst J. Braisted, Reactor Inspector D. Bryen, Reactor Inspector N. Okonkwo, Reactor Inspector D. Reinert, Reactor Inspector T. Steadham, Senior Resident Inspector M. Thomas, Resident Inspector
Approved By:	Jeffrey E. Josey, Chief Reactor Projects Branch C Division of Reactor Projects

Enclosure

SUMMARY

The U.S. Nuclear Regulatory Commission (NRC) continued monitoring the licensee's performance by conducting an integrated inspection at Grand Gulf Nuclear Station, in accordance with the Reactor Oversight Process. The Reactor Oversight Process is the NRC's program for overseeing the safe operation of commercial nuclear power reactors. Refer to https://www.nrc.gov/reactors/operating/oversight.html for more information.

List of Findings and Violations

Failure to Perform Relief Valve Scope Expansion Testing as per Procedure			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000416/2021004-01 Open/Closed	[P.2] - Evaluation	71111.04
The inspectors identified a Green finding and associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to test the standby liquid control pump B relief valve within the time limits prescribed by licensee procedures. Specifically, when the standby liquid control pump A relief valve failed as-found pressure testing, the pump B relief valve was required to either be tested within 3 months or have an approved engineering justification extending the time frame, neither of which occurred. When the pump B relief valve was tested 11 months later, it failed as-found pressure testing.			

Failure to Implement Fire Protection Program Requirements for a Fire Barrier Seal			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000416/2021004-02 Open/Closed	[P.1] - Identification	71111.05
The inspectors identified a Green finding and associated non-cited violation of License Condition 2.C(41), "Fire Protection Program," for the failure to implement all provisions of the approved fire protection program described in the Updated Final Safety Analysis Report. Specifically, the licensee failed to maintain the Division 2 diesel generator room penetration seal, DE-8A, functional at all times without adequate compensatory measures.			

Failure to Attend Diesel Control Panel Doors while they were Open and Unlatched			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000416/2021004-03 Open/Closed	[H.12] - Avoid Complacency	71111.22
The inspectors identified a Green finding and associated non-cited violation of Technical Specification 5.4, "Procedures," when the licensee failed to follow Surveillance Procedure 06-OP-1P75-R-0003, "Standby Diesel Generator 11: Functional Test," Revision 139, during the conduct of a 24-hour test of the Division 1 diesel generator. Specifically, the licensee failed to attend the diesel generator control panel doors while the diesel was operable with control panel doors open and unlatched during the conduct of the surveillance test.			

Failure to Ensure the Adequacy of Flood Protection Measures			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000416/2021004-04 Open/Closed	None	71152
The inspectors identified a Green finding and associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, “Design Control” when the licensee failed to ensure the adequacy of the design of installing sandbag berms as a compensatory measure for degraded door seals. Specifically, the licensee failed to maintain adequate triggers for installing the sandbag berms, failed to ensure that the sandbag berms could be constructed in accordance with the applicable engineering change, and failed to include adequate instructions for the periodic sandbag inspections.			

Additional Tracking Items

Type	Issue Number	Title	Report Section	Status
NOV	05000416/2020013-01	Untimely Corrective Actions Associated with Multiple Spurious Operations	71111.21N.05	Closed

PLANT STATUS

Grand Gulf Nuclear Station, Unit 1, began the inspection period at rated thermal power (RTP). On October 9, 2021, operators reduced power to 62 percent RTP for power suppression testing due to a suspected fuel leak. The unit was returned to RTP on October 11, 2021, after completing suppression testing. On October 16, 2021, operators reduced power to 58 percent RTP for a routine control blade sequence exchange. The unit was returned to RTP on October 23, 2021. On December 14, 2021, operators reduced power to 60 percent RTP for additional power suppression testing. The unit was returned to RTP on December 23, 2021, after completing an additional sequence exchange and subsequent control blade pattern adjustment, where it remained at or near for the remainder of the inspection period.

INSPECTION SCOPES

Inspections were conducted using the appropriate portions of the inspection procedures (IPs) in effect at the beginning of the inspection unless otherwise noted. Currently approved IPs with their attached revision histories are located on the public website at http://www.nrc.gov/reading-rm/doc-collections/insp-manual/inspection-procedure/index.html. Samples were declared complete when the IP requirements most appropriate to the inspection activity were met consistent with Inspection Manual Chapter (IMC) 2515, "Light-Water Reactor Inspection Program - Operations Phase." The inspectors performed activities described in IMC 2515, Appendix D, "Plant Status," conducted routine reviews using IP 71152, "Problem Identification and Resolution," observed risk significant activities, and completed on-site portions of IPs. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel to assess licensee performance and compliance with Commission rules and regulations, license conditions, site procedures, and standards.

REACTOR SAFETY

71111.04 - Equipment Alignment

Partial Walkdown Sample (IP Section 03.01) (5 Samples)

The inspectors evaluated system configurations during partial walkdowns of the following systems/trains:

(1) Division 1 emergency diesel generator while the Division 2 train was out of service on November 12, 2021
(2) Standby gas treatment system train A while train B was inoperable on November 12, 2021
(3) Division 3 emergency diesel generator system on November 12, 2021
(4) Control room heating ventilation and air conditioning on December 20, 2021
(5) Standby liquid control on December 20, 2021

71111.05 - Fire Protection

Fire Area Walkdown and Inspection Sample (IP Section 03.01) (6 Samples)

The inspectors evaluated the implementation of the fire protection program by conducting a walkdown and performing a review to verify program compliance, equipment functionality, material condition, and operational readiness of the following fire areas:

(1) Division 3 emergency diesel generator room on November 9, 2021
(2) Division 1 emergency diesel generator room on November 9, 2021
(3) Standby gas treatment system room on November 10, 2021
(4) Spent fuel pool area on November 10, 2021
(5) Auxiliary building - all general elevations on December 10, 2021
(6) Division 2 emergency diesel generator room on December 13, 2021

71111.06 - Flood Protection Measures

Inspection Activities - Internal Flooding (IP Section 03.01) (1 Sample)

The inspectors evaluated internal flooding mitigation protections in the:

(1) Internal flooding in the Division 1 emergency diesel generator room on November 26, 2021

71111.07T - Heat Sink Performance

Heat Exchanger (Service Water Cooled) (IP Section 03.02) (3 Samples)

The inspectors evaluated heat exchanger/sink performance on the following:

(1) High pressure core spray diesel generator jacket water cooler P81-B001-B
(2) Low pressure core spray room cooler T51-B002-A
(3) Residual heat removal pump C room cooler T51-B005-B

Ultimate Heat Sink (IP Section 03.04) (1 Sample)

(1) Ultimate heat sink, specifically Sections 03.02a and 03.02b were completed

71111.11Q - Licensed Operator Requalification Program and Licensed Operator Performance

Licensed Operator Performance in the Actual Plant/Main Control Room (IP Section 03.01) (1 Sample)

(1) The inspectors observed and evaluated licensed operator performance in the control room during power suppression testing on October 9, 2021.

Licensed Operator Requalification Training/Examinations (IP Section 03.02) (1 Sample)

(1) The inspectors observed and evaluated a licensed operator requalification test in the simulator on October 18, 2021.

71111.12 - Maintenance Effectiveness

Maintenance Effectiveness (IP Section 03.01) (1 Sample)

The inspectors evaluated the effectiveness of maintenance to ensure the following structures, systems, and components (SSCs) remain capable of performing their intended function:

(1) Condition Report CR-GGN-2021-05519, maintenance rule functional failure

evaluation when the Division 1 emergency diesel generator pedestal bearing was found with oil leak on November 12, 2021

71111.13 - Maintenance Risk Assessments and Emergent Work Control

Risk Assessment and Management Sample (IP Section 03.01) (4 Samples)

The inspectors evaluated the accuracy and completeness of risk assessments for the following planned and emergent work activities to ensure configuration changes and appropriate work controls were addressed:

(1) Yellow risk when Division 2 emergency diesel generator was inoperable due to a failed surveillance during the week of October 6, 2021
(2) Yellow risk when Division 2 standby service water was inoperable for planned maintenance during the week of October 11, 2021
(3) Yellow risk during Division 2 work during the week of November 9, 2021
(4) Emergent work control for leakage water return valve actuator motor replacement on December 30, 2021

71111.15 - Operability Determinations and Functionality Assessments

Operability Determination or Functionality Assessment (IP Section 03.01) (2 Samples)

The inspectors evaluated the licensee's justifications and actions associated with the following operability determinations and functionality assessments:

(1) Condition Report CR-GGN-2021-06274, degraded hardware on standby service water cooling tower fan motor bearing on November 5, 2021
(2) Condition Report CR-GGN-2021-07581, Division 2 emergency diesel generator failed to shutdown due to faulty combustion air intake valve actuator on November 22, 2021

71111.18 - Plant Modifications

Temporary Modifications and/or Permanent Modifications (IP Section 03.01 and/or 03.02) (3 Samples)

The inspectors evaluated the following temporary or permanent modifications:

(1) Engineering Change EC-41518, new strategy for protecting probable maximum precipitation external doors on October 7, 2021
(2) Engineering Change EC-72162, leakage water return valve actuator motor replacement on December 29, 2021
(3) Engineering Change EC-79722, design of probable maximum precipitation flood doors on December 30, 2021

71111.19 - Post-Maintenance Testing

Post-Maintenance Test Sample (IP Section 03.01) (9 Samples)

The inspectors evaluated the following post-maintenance test activities to verify system operability and functionality:

(1) Work Order 568991, post maintenance test on the Division 2 emergency diesel generator following droop circuit troubleshooting on October 7, 2021
(2) Work Order 569085, post maintenance test on the Division 2 emergency diesel generator following maintenance on the air intake butterfly valve actuator on October 8, 2021
(3) Work Order 52959274, post maintenance test following maintenance on standby service water B pump house ventilation on October 14, 2021
(4) Work Order 567113, post maintenance test on the Division 1 emergency diesel generator following maintenance to lube oil bulkhead fittings on October 19, 2021
(5) Work Order 52921671, post maintenance test following maintenance on standby liquid control pump A on October 25, 2021
(6) Work Order 52980976, post maintenance test on the standby service water B cooling tower fan on November 9, 2021
(7) Work Order 52904371, post maintenance test on the Division 2 standby service water pump discharge valve on November 10, 2021
(8) Work Order 569533, repair fire protection seal in Division 2 emergency diesel generator room on December 2, 2021
(9) Work Order 571835 drywell equipment drain controller P45R452 repair/replacement on December 27, 2021

71111.21N.05 - Fire Protection Team Inspection (FPTI)

1. The inspectors performed a walkdown inspection associated with the 2020 Triennial Fire Protection Inspection to identify equipment alignment discrepancies and inspected for deficient conditions such as corrosion, missing fasteners, cracks, and degraded insulation, to complete the 2020 Triennial Fire Protection Inspection.
2. The inspectors confirmed if operator actions could be accomplished as described in the fire hazards analysis and plant procedures to complete the 2020 Triennial Fire Protection Inspection.
3. The inspectors reviewed the licensee's response to NOV 05000416/2020013-01 (ADAMS Accession No. ML20338A271) to determine if the reason, corrective actions taken to address recurrence, and the date when full compliance was achieved for this violation were adequately addressed and captured on the docket.
4. The inspectors reviewed the corrective actions to verify if the manual actions were included in Procedure 10-S-03-2, "Response to Fires," Revision 30. The inspectors performed a walkdown of the manual actions with operations personnel to verify if operators could reasonably perform the manual actions as needed during fire scenarios.

Structures, Systems, and Components (SSCs) Credited for Fire Prevention, Detection, Suppression, or Post-Fire Safe Shutdown Review (IP Section 03.01) (4 Samples)

The inspectors evaluated whether the components and/or systems would function as required to support the credited functions stated for each sample.

(1) (Partial)
The inspectors completed walkdowns of the fire suppression and detection in Fire Area 11, auxiliary building 139-foot elevation (1A201) and evaluated areas for deficient conditions such as equipment alignment discrepancies, excessive corrosion, missing fasteners, cracks, and degraded insulation on December 9, 2021. The inspectors completed Sections 03.01.b and 03.01.e. This completes the on-site sample associated with the 2020 triennial fire protection inspection documented in

report 05000416/2020013 (ADAMS Accession No. ML20338A271).

(2) (Partial)
The inspectors completed walkdowns of the fire suppression and detection in Fire Area 31, Division 1 switchgear room (OC202) and evaluated areas for deficient conditions such as equipment alignment discrepancies, excessive corrosion, missing fasteners, cracks, and degraded insulation on December 9, 2021. The inspectors completed Sections 03.01.b and 03.01.e. This completes the on-site sample associated with the 2020 triennial fire protection inspection documented in report 05000416/2020013.

(3) (Partial)
The inspectors completed walkdowns of the low-pressure coolant injection (LPCI) valve 1E12-F042A and confirmed operator actions could be accomplished as described in the fire hazard analysis and plant procedures on December 9, 2021. The inspectors completed Sections 03.01.b and 03.01.e. This completes the on-site sample associated with the 2020 triennial fire protection inspection documented in report 05000416/2020013.

(4) (Partial)
The inspectors completed walkdowns of the fire suppression system, CO2 Cardox system, on December 9, 2021. The inspectors completed Sections 03.01.b and 03.01.e. This completes the on-site sample associated with the 2020 triennial fire protection inspection documented in report 05000416/2020013.

71111.22 - Surveillance Testing

The inspectors evaluated the following surveillance tests:

Surveillance Tests (other) (IP Section 03.01) (3 Samples)

(1) Work Order 52964795, Procedure 06-OP-1P75-R-0004-01, 24-hour functional test of the Division 2 emergency diesel generator on October 7, 2021
(2) Work Order 52978379, Procedure 06-OP-1P75-R-0004-01, hot restart surveillance test of the Division 2 emergency diesel generator on October 9, 2021
(3) Work Order 52905992, Procedure 06-OP-1P75-R-0003-01, 24-hour functional test of the Division 1 emergency diesel generator on October 20, 2021

Inservice Testing (IP Section 03.01) (1 Sample)

(1) Work Order 567683, Procedure 06-ME-1C41-R-0001-02, standby liquid control pump discharge relief valve test on November 2, 2021

71114.06 - Drill Evaluation

Drill/Training Evolution Observation (IP Section 03.02) (1 Sample)

The inspectors evaluated:

(1) Drill/exercise performance opportunity during an evaluated licensed operator requalification simulator scenario on October 18, 2021

OTHER ACTIVITIES – BASELINE

71151 - Performance Indicator Verification

The inspectors verified licensee performance indicator submittals listed below:

MS09: Residual Heat Removal Systems (IP Section 02.08) (1 Sample)

(1) October 1, 2020, through September 30, 2021

MS10: Cooling Water Support Systems (IP Section 02.09) (1 Sample)

(1) October 1, 2020, through September 30, 2021

71152 - Problem Identification and Resolution (PI&R)

Semiannual Trend Review (IP Section 02.02) (1 Sample)

(1) The inspectors reviewed the licensee's corrective action program for potential adverse trends in how conditions adverse to quality are screened by the station's Performance Review Group that might be indicative of a more significant safety issue.

Annual Follow-up of Selected Issues (IP Section 02.03) (3 Samples)

The inspectors reviewed the licensee's implementation of its corrective action program related to the following issues:

(1) Condition Report CR-GGN-2021-07032, annual follow-up after identification of not properly following work planning practices on December 10, 2021
(2) Condition Report CR-GGN-2021-06911, high pressure core spray pump minimum flow valve malfunction on December 17, 2021
(3) Condition Report CR-GGN-2011-07687, development of alternate flood mitigation strategy on December 27, 2021

71153 - Follow Up of Events and Notices of Enforcement Discretion

Personnel Performance (IP Section 03.03) (1 Sample)

(1) The inspectors evaluated the licensee's response to an unplanned down power following a reactor feed pump A trip that occurred on September 14, 2021.

INSPECTION RESULTS

Failure to Perform Relief Valve Scope Expansion Testing as per Procedure			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000416/2021004-01 Open/Closed	[P.2] - Evaluation	71111.04
The inspectors identified a Green finding and associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for the failure to test the standby liquid control pump B relief valve within the time limits prescribed by			

licensee procedures. Specifically, when the standby liquid control pump A relief valve failed as-found pressure testing, the pump B relief valve was required to either be tested within 3 months or have an approved engineering justification extending the time frame, neither of which occurred. When the pump B relief valve was tested 11 months later, it failed as-found pressure testing.

Description: On November 20, 2020, Division 1 standby liquid control (SLC) pump relief valve 1C41F029A failed it's as-found pressure test under Work Order (WO) 52875634. The licensee replaced the valve with a pre-certified relief valve and entered the issue into their corrective action program as Condition Report CR-GGN-2020-11603. In accordance with the licensee's Code of Record (ASME OM Code 2004 edition with 2006 addenda) Mandatory Appendix I-1350, for each valve tested for which the as-found set-pressure (first test actuation) exceeds the greater of either the +/- tolerance limit of the Owner-established set-pressure acceptance criteria of 1-1310(e) or ±3 percent of valve nameplate set-pressure, two additional valves shall be tested from the same valve group. Because the Division 1 and 2 SLC pump relief valves (1C41F029A and 1C41F029B, respectively) were the only valves within their group, valve 1C41F029B was required to be tested to meet ASME OM Code requirements. On November 24, 2020, the licensee initiated Condition Report CR-GGN-2020-11730 to perform the required scope expansion testing on valve 1C41F029B and developed WO 52952579 to perform the test.

Attachment 2 to licensee Procedure CEP-IST-4, "Standard on Inservice Testing," Revision 309, states that for relief valves tested online, which these two valves were: "When additional relief valves are to be tested due to exceeding as-found set pressure tolerances...the time period for testing the additional valves should be at the earliest opportunity that testing is practical, but should be no later than 3 months from the as-found set-pressure failure. If it is determined that the additional testing cannot be performed during the 3 months, then engineering justification, with a test schedule, shall be provided with the appropriate site management concurrence."

On March 22, 2021, the licensee initiated Condition Report CR-GGN-2021-02255 describing the requirement to test valve 1C41F029B within 3 months from November 20, 2020. At the time, as-found testing of valve 1C41F029B was 1 month late with no associated engineering justification, test schedule, or management concurrence as required by Procedure CEP-IST-4. This condition report was screened as administrative non-adverse and closed 3 days later with no actions taken because WO 52952579 already existed in the work management system and was scheduled to be performed in September 2021.

On November 2, 2021, while performing the as-found pressure set testing for valve 1C41F029B, the valve failed its acceptance criteria. The licensee initiated Condition Report CR-GGN-2021-08194 to document the as-found set-pressure test failure. The inspectors reviewed Condition Report CR-GGN-2021-08194 and, while the condition report was still open at the time, there were no actions to address the failure to test valve 1C41F029B within the scheduling requirements outlined in Procedure CEP-IST-4. The inspectors determined that because Condition Report CR-GGN-2021-02255 was closed, the licensee had reasonable opportunity to identify the procedure noncompliance and take appropriate corrective actions. When this procedure noncompliance was identified by the inspectors, the licensee entered the concern into their corrective action program as Condition Report CR-GGN-2021-09598.

Corrective Actions: Immediate corrective actions for the set-pressure test failure of valve 1C41F029B involved installing a pre-certified valve and scheduling a work order to

disassemble the valve to determine the cause of failure. Corrective actions for the failure to test the valve within the requirements of Procedure CEP-IST-4 remained under development.

Corrective Action References: This issue was entered into the licensee's corrective action program as Condition Report CR-GGN-2021-09598.

Performance Assessment:

Performance Deficiency: The failure to perform as-found set-pressure testing of valve 1C41F029B, as a result of, the as-found set-pressure test failure of valve 1C41F029A within the scheduling requirements required by Procedure CEP-IST-4 was a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Equipment Performance attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, when a relief valve fails as-found set-pressure testing, the licensee is required to test additional valves as a means to address any generic concerns which could apply to other similar valves thereby ensuring the availability, reliability, and capability of those additional valves to perform their intended safety function. The licensee failed to take prompt and effective action as a result of the valve 1C41F029A failure, which resulted in the delayed identification of the failure of valve 1C41F029B, and consequently a failure to ensure the availability, reliability, and capability of the standby liquid control system to respond to initiating events.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Utilizing Exhibit 2 of Appendix A, the inspectors screened the finding as Green because after review of the actual as-found set pressures for both valves 1C41F029A and 1C41F029B, both trains of standby liquid control remained capable of performing their intended safety functions. Consequently, the structure, system, and component maintained its probabilistic risk assessment functionality.

Cross-Cutting Aspect: P.2 - Evaluation: The organization thoroughly evaluates issues to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, the need to perform scope expansion testing on valve 1C41F029B within 3 months of the as-found failure of valve 1C41F029A was identified by the licensee and entered into the corrective action program. However, because the requirements and circumstances involved were not adequately evaluated, valve 1C41F029B was not tested for another 7 months.

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion V, requires, in part, that "Activities affecting quality shall be prescribed by documented...procedures...of a type appropriate to the circumstances and shall be accomplished in accordance with these...procedures." Licensee Procedure CEP-IST-4, Revision 309, required, in part, engineering justification, with a test schedule, to be provided with the appropriate site management concurrence when tests for additional relief valves to be tested due to exceeding as-found set pressure tolerances could not be completed within three months.

Contrary to the above, from on or about February 20, 2021, through November 2, 2021, the

licensee failed to provide the required engineering justification, with a test schedule and with the appropriate site management concurrence when tests for additional relief valves to be tested due to exceeding as-found set pressure tolerances could not be completed within three months. Specifically, 1C41F029A failed as-found set-pressure testing on November 20, 2020, and the additional relief valve to be tested as a result of this failure, 1C41F029B, was tested on November 2, 2021, with no engineering justification or site management concurrence to exceed three months.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Implement Fire Protection Program Requirements for a Fire Barrier Seal			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000416/2021004-02 Open/Closed	[P.1] - Identification	71111.05

The inspectors identified a Green finding and associated non-cited violation of License Condition 2.C(41), "Fire Protection Program," for the failure to implement all provisions of the approved fire protection program described in the Updated Final Safety Analysis Report. Specifically, the licensee failed to maintain the Division 2 diesel generator room penetration seal, DE-8A, functional at all times without adequate compensatory measures.

Description: On October 13, 2021, the inspectors observed seal material for a fire penetration in the Division 2 emergency diesel generator room that was partially dislodged in the top right corner of the penetration. This dislodged material created a visible gap between the surrounding wall and the penetration seal material. The penetration was between the Division 2 diesel generator room and the diesel generator breezeway. The diesel generator breezeway contained safe shutdown components for Division 1 and Division 2 emergency diesel generators.

The inspectors reported the degraded seal, labeled DE-8A, to the licensee who verified the seal did not meet the acceptance criteria. The licensee determined that the fire rated assembly, DE-8A, was nonfunctional, and implemented the required hourly fire watch per Technical Requirements Manual (TRM) 6.2.8 and documented this issue in their corrective action program. Additionally, fire protection engineers reviewed the penetration seal and confirmed the as found condition of the penetration material was not installed according to the design drawing because the seal was not "friction fitted within the penetration opening."

As part of the licensee's fire protection program, Updated Final Safety Analysis Report (UFSAR), Section 9.5.1.2.2.9, requires that fire-rated penetration seals are to be provided to maintain the integrity of fire walls. The east wall of the Division 2 diesel generator room is a fire wall with a 3-hour rating whose penetration seals are also required to be of 3-hour rating.

Corrective Actions: Corrective actions included declaring the fire barrier nonfunctional, implementing technical requirements manual requirements for an hourly fire watch, and repairing the degraded penetration seal.

Corrective Action References: Condition Report CR-GGN-2021-07701

Performance Assessment:

Performance Deficiency: The licensee's failure to implement fire protection program requirements for a fire barrier was a performance deficiency. Specifically, the licensee failed to maintain the 3-hour rating of a fire barrier as required by the fire protection program described in UFSAR, Section 9.5.1.2.2.9.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Protection Against External Factors attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the performance deficiency resulted in a nonfunctional fire barrier in the Division 2 diesel generator room that impacted the capability of the 3-hour fire wall.

Significance: The inspectors assessed the significance of the finding using Inspection Manual Chapter 0609, Appendix F, "Fire Protection Significance Determination Process." Even though the finding involved the ability to confine a fire, because there was an adequate automatic suppression system on either side of the fire confinement element, the finding screened to Green.

Cross-Cutting Aspect: P.1 - Identification: The organization implements a corrective action program with a low threshold for identifying issues. Individuals identify issues completely, accurately, and in a timely manner in accordance with the program. In this case, personnel who routinely traverse this area of the plant failed to identify, with a low threshold, a degraded condition in the Division 2 diesel generator room.

Enforcement:

Violation: Facility Operating License, NPF-29, License Condition 2.C(41), "Fire Protection Program," states, in part, that the plant shall implement and maintain in effect all provisions of the fire protection program as described in the Updated Final Safety Analysis Report. The fire protection program is described, in part, in Updated Final Safety Analysis Report, Section 9.5.1.2.2.9. UFSAR, Section 9.5.1.2.2.9, requires that fire-rated penetration seals are to be provided to maintain the integrity of fire walls.

Contrary to the above, on October 13, 2021, the licensee failed to ensure a fire-rated penetration seal maintained the integrity of its associated fire wall. Specifically, the inspectors identified that penetration seal, DE-8A, was partially dislodged in its penetration which affected the integrity of the 3-hour Division 2 diesel generator east fire wall.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Attend Diesel Control Panel Doors while they were Open and Unlatched			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Mitigating Systems	Green NCV 05000416/2021004-03 Open/Closed	[H.12] - Avoid Complacency	71111.22
The inspectors identified a Green finding and associated non-cited violation of Technical			

Specification 5.4, “Procedures,” when the licensee failed to follow Surveillance Procedure 06-OP-1P75-R-0003, “Standby Diesel Generator 11: Functional Test,” Revision 139, during the conduct of a 24-hour test of the Division 1 diesel generator. Specifically, the licensee failed to attend the diesel generator control panel doors while the diesel was operable with control panel doors open and unlatched during the conduct of the surveillance test.

Description: On October 20, 2021, the licensee conducted a 2-year surveillance on the Division 1 diesel generator which included running the diesel for 24 hours in accordance with Surveillance Procedure 06-OP-1P75-R-0003, “Standby Diesel Generator 11: Functional Test,” Revision 139. As part of this surveillance, the licensee connected measuring and test equipment (M&TE) to certain components inside the diesel engine and generator control panels to take high resolution measurements of certain system parameters. In doing so, the licensee left the engine and generator control panel doors open and unlatched so they would not interfere with the M&TE cables running to and from the components within the panel while the diesel was running.

Surveillance Procedure 06-OP-1P75-R-0003, “Standby Diesel Generator 11: Functional Test,” Revision 139, step 2.1.26, requires that if the diesel generator control cabinet doors are left open or unlatched, then they must not be left unattended, otherwise, the diesel generator is to be declared inoperable. Step 2.1.27 defines “attended” as “present at the panel close enough such that during a seismic event the required actions can be performed immediately.” One of the required actions per step 2.1.26.c.1 is to “maintain the door in a stable configuration.”

During the conduct of the October 20, 2021, 24-hour surveillance, the inspectors first confirmed with the licensed senior reactor operator on shift that they were declaring the diesel generator operable during the 24-hour run. This would mean that the open and unlatched control cabinet doors would require attendance per the procedure. During the run, the inspectors observed that the licensee did not attend the open and unlatched control cabinet doors at various points throughout the surveillance. For example, approximately 1 hour into the run, the inspectors observed one nonlicensed operator in the room who was not present at the panel close enough to immediately close the doors. Additionally, one person would not be able to immediately maintain all three doors in a stable configuration following the onset of a seismic event due to the physical distance separating the doors. Additionally, when the inspectors walked the diesel generator down the following morning, no one was in the room. The nonlicensed operator, at that time, was performing shiftly rounds outside of the room and would therefore not have been close enough to the control panels to meet the step in the procedure.

Corrective Actions: The licensee entered this issue into their corrective action program and initiated Operations Standing Order 21-021 to ensure that during subsequent surveillances where the diesel generator control panel doors are open or unlatched, one operator per open/unlatched door will be stationed at that door and briefed on procedural actions to be taken in the event of a seismic event.

Corrective Action References: Condition Report CR-GGN-2021-07867

Performance Assessment:

Performance Deficiency: The failure to follow Procedure 06-OP-1P75-R-0003, Revision 139, step 2.1.26, which requires that for open or unlatched diesel generator control cabinet doors, the doors must not be left unattended, or the diesel generator should be declared INOPERABLE was a performance deficiency. Specifically, during the conduct of the 24-hour

functional test, with the diesel generator control cabinet doors open and unlatched, and with the diesel generator declared as OPERABLE during the test, the licensee left the doors unattended and did not declare the diesel generator INOPERABLE.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Human Performance attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective to ensure the availability, reliability, and capability of systems that respond to initiating events to prevent undesirable consequences. Specifically, the failure to follow the procedure impacted the diesel generator's availability, reliability, and capability and could have caused the diesel to fail to respond to a seismic event/loss of offsite power.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Utilizing Exhibit 2, the inspectors screened the finding as Green because the finding did not, in part, represent a loss of the probabilistic risk assessment function of one train of diesel generator for greater than its technical specifications allowed outage time.

Cross-Cutting Aspect: H.12 - Avoid Complacency: Individuals recognize and plan for the possibility of mistakes, latent issues, and inherent risk, even while expecting successful outcomes. Individuals implement appropriate error reduction tools. Despite being clearly briefed on the procedural step, and on the sensitivity of the control panels to inadvertent bumps, the operators did not plan for latent issues (in this case, seismic qualification of panels with doors open and unlatched) and inherent risk (in this case, seismic risk) when conducting the test. They only expected successful outcomes (i.e. not having a seismic event).

Enforcement:

Violation: Technical Specification 5.4, "Procedures," Section 5.4.1 requires, in part, written procedures shall be implemented covering the applicable procedures recommended in Regulatory Guide 1.33, Revision 2, Appendix A, February 1978. Regulatory Guide 1.33, Revision 2, Appendix A, February 1978, Section 8.b recommends, in part, that specific procedures for surveillance tests should be written (implementing procedures are required for each surveillance test listed in the technical specifications). The licensee established Surveillance Procedure 06-OP-1P75-R-0003, "Standby Diesel Generator 11: Functional Test," Revision 139, to meet the Regulatory Guide 1.33 requirement. Step 2.1.26 of Procedure 06-OP-1P75-R-0003 requires that if the diesel generator control cabinet doors are left open or unlatched, then they must not be left unattended, otherwise, the diesel generator is to be declared inoperable.

Contrary to the above, from October 20, 2021, until October 21, 2021, the diesel generator control cabinet doors were left open and unlatched, and the licensee failed to ensure they were not left unattended, or otherwise that the diesel generator was declared inoperable. Specifically, on several occasions during a 24-hour diesel generator surveillance run, operations personnel were either not present in the room with the control cabinets, or not close enough to attend to the cabinet doors during a seismic event.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Failure to Ensure the Adequacy of Flood Protection Measures			
Cornerstone	Significance	Cross-Cutting Aspect	Report Section
Initiating Events	Green NCV 05000416/2021004-04 Open/Closed	None	71152

The inspectors identified a Green finding and associated non-cited violation of 10 CFR Part 50, Appendix B, Criterion III, "Design Control," when the licensee failed to ensure the adequacy of the design of installing sandbag berms as a compensatory measure for degraded door seals. Specifically, the licensee failed to maintain adequate triggers for installing the sandbag berms, failed to ensure that the sandbag berms could be constructed in accordance with the applicable engineering change, and failed to include adequate instructions for the periodic sandbag inspections.

Description: In response to multiple non-cited violations related to degraded probable maximum precipitation (PMP) door seals, the licensee initiated Condition Report CR-GGN-2011-07687 on October 28, 2011, and classified the condition report as a significant condition adverse to quality with an associated root cause evaluation. Specifically, the licensee initiated the condition report as a result of the issues described in NCV 05000416/2011005-01 (ADAMS Accession No. ML120330608) for the failure to perform adequate inspections of PMP door seals, which was identified by the NRC. The licensee determined that the design of 9 of the 11 PMP doors was inadequate to ensure a sufficiently leak tight seal to keep external flood waters from entering safety-related portions of the plant, specifically the emergency diesel generator building, both standby service water pump houses, and the control building.

As part of this condition report, the licensee developed a strategy, via Engineering Change (EC) 41518, to deploy sandbags. This EC revised Procedure 05-1-02-VI-2, "Off-Normal Event Procedure for Hurricanes, Tornados, and Severe Weather," to include instructions on constructing a sandbag berm at each of the nine susceptible doors. Additionally, the licensee determined that the trigger point to build the berms would be a forecasted rainfall of 12 inches within the next 24 hours and included this trigger in the procedure. To meet the new flood mitigation strategy, the licensee purchased four storage containers to be placed in the vicinity of where the berms would be placed. Each container was filled with enough sandbags and tarps to build the required berms.

To ensure that the sandbags remained in acceptable condition, the licensee developed preventive maintenance work instructions to inspect the sandbags and tarps every 6 months. In early June 2021, the inspectors reviewed the most recent such inspection as documented in WO 52938410. The inspectors noted that the work instructions failed to include specific inspection criteria of the sandbags and tarps, thereby leaving the criteria up to the judgement of the person performing the task. Additionally, the work instructions lacked any acceptance criteria of what constituted a satisfactory inspection. Further, although the workers did count the sandbags in each container, the work instructions did not include a step to count them, nor did it include the required number in each container. The licensee entered this work instruction deficiency concern into their corrective action program as Condition Report CR-GGN-2021-04399.

Procedure 05-1-02-VI-2 included requirements that each sandbag weigh between 35 and 40 pounds, be filled 1/2 to 2/3 full, and be 16-20 inches in length; however, these requirements were not included in the sandbag inspection work instructions. The inspectors

requested the licensee to open two storage containers to inspect and count the sandbags and found several sandbags with various deficiencies such as holes and sandbags filled substantially less than 1/2 full. The inspectors were also concerned that the sandbags did not appear thick enough such that four layers of sandbags, the design for each of the nine berms, would result in a berm that was 18 inches tall as required by EC 41518. The inspectors were concerned with the general condition of the sandbags, which was entered into the licensee's corrective action program as Condition Reports CR-GGN-2021-04400 and CR-GGN-2021-04560. As a result, the licensee purchased 150 new sandbags that met or exceeded the requirements in Procedure 05-1-02-VI-2.

On July 20, 2021, the inspectors observed a reperformance of the sandbag inspection under WO 52959020. During this inspection, approximately 10 sandbags were weighed with none exceeding 29 pounds and most weighing around 24-25 pounds and all the sandbags appearing to be very similar. The licensee stopped the work and later built a berm to demonstrate the ability to construct a berm in accordance with Procedure 05-1-02-VI-2. The highest point measured on the berm was 12.5 inches with the lowest measured at 11.5 inches. The licensee entered the inability to build the sandbag berm high enough as Condition Reports CR-GGN-2021-05572 and CR-GGN-2021-05663. Upon review, the inspectors learned that although the licensee had built the berms in the past to demonstrate the ability of the site to do so in a timely manner, the licensee never verified that the berms were at least 18 inches.

As described in UFSAR, Section 2.4, the design basis flood results from the PMP event which results in flooding to elevation 133-feet 3-inches. Because the finished ground floor level is at elevation 133-feet 0-inches, this results in a maximum flooding of 3 inches. In determining the trigger point to build the berms, the licensee only considered PMP flooding; however, with degraded door seals, any flooding over 133-feet 0-inches (consequential flooding) could result in unacceptable water entering safety-related areas. UFSAR, Figure 2.4-47, shows the maximum flood level is reached after 30 minutes of rain and 8.2 inches of accumulated rainfall. Therefore, a rainfall of less than 12 inches could, if it occurred in a short enough time frame, result in consequential flooding. The inspectors determined that the licensee had no evaluation on the rainfall amount that would cause consequential flooding and lacked reasonable assurance that the trigger point was adequate to ensure that the berms would be constructed prior to flooding.

The licensee entered this issue into their corrective action program as Condition Report CR-GGN-2021-06232, performed an operability evaluation, and reduced the trigger point to a forecasted rainfall of 6 inches in the next 24 hours. The licensee determined that even if the sandbags were not deployed in time, a combination of building design and the elevation of safety-related equipment would provide assurance that all potentially impacted components would remain functional in the event of a PMP. After performing walkdowns and reviewing documents, the inspectors concluded that the licensee had a reasonable basis for operability.

Corrective Actions: Licensee corrective actions included procuring additional sandbags, reducing the trigger point to 6 inches of rain within 24 hours, performing an operability evaluation, and testing the performance of applicable floor drains in the control building.

Corrective Action References: These issues were entered into the licensee's corrective action program as Condition Reports CR-GGN-2021-04399, CR-GGN-2021-04400, CR-GGN-2021-04560, CR-GGN-2021-05663, CR-GGN-2021-05572, and CR-GGN-2021-06232

Performance Assessment:

Performance Deficiency: The failure to ensure the adequacy of the design of installing sandbag berms as a compensatory measure for degraded door seals was contrary to 10 CFR Part 50, Appendix B, Criterion III, and a performance deficiency.

Screening: The inspectors determined the performance deficiency was more than minor because it was associated with the Protection Against External Factors attribute of the Initiating Events cornerstone and adversely affected the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, the performance deficiency contributed to the inability to perform the compensatory action, as designed, to build sandbag berms to prevent water intrusion into safety-related areas of the plant.

Significance: The inspectors assessed the significance of the finding using Appendix A, "The Significance Determination Process (SDP) for Findings At-Power." Utilizing Exhibit 4, the inspectors determined that the finding degraded multiple trains of multiple risk significant systems and therefore required a detailed risk evaluation. Using a multistep process, the senior reactor analyst developed a flood hazard curve for the Grand Gulf site indicating the frequency per year of exceedance for flood height above site grade. Using these frequencies and flood heights, the analyst performed a detailed risk evaluation for the failure of the licensee to properly protect safety-related equipment from precipitation-induced flooding. The detailed risk evaluation is documented in Attachment 1 and concludes that the incremental conditional core damage probability is significantly less than 4.27 x 10-7. Therefore, this finding is of very low safety significance (Green).

Cross-Cutting Aspect: None. Because all aspects of the performance deficiency resulted from actions taken more than 3 years ago, no cross-cutting aspect is applicable.

Enforcement:

Violation: Title 10 CFR Part 50, Appendix B, Criterion III requires, in part, that, "design control measures shall provide for verifying or checking the adequacy of design."

Contrary to the above, from on or about May 21, 2013, through August 19, 2021, the licensee failed to both verify and check the adequacy of the design for the construction of sandbag berms as a compensatory measure to degraded PMP door seals. Specifically, the measures failed to ensure that the berms would meet the height requirements of EC 41518, a safety-related engineering change, that periodic sandbag inspections had sufficient measures to ensure that the sandbags remained in compliance with the intended design, and that the trigger point contained in Procedure 05-1-02-VI-2 would ensure that the berms would be constructed prior to the onset of onsite flooding.

Enforcement Action: This violation is being treated as a non-cited violation, consistent with Section 2.3.2 of the Enforcement Policy.

Observation: Semiannual Trend Review	71152
Through a review of recent issues documented in the licensee's corrective action program, the inspectors were concerned that there may exist a trend of improperly screening conditions adverse to quality as non-adverse. Proper screening of issues was important to ensure that corrective actions are completed in a timeframe commensurate with the safety	

significance of the issue. The inspectors identified several condition reports that were screened as non-adverse, but which represented issues that were adverse to quality as they represented either nonconformances to technical or quality requirements or failures to meet regulatory requirements. In all cases, where the issues failed to meet regulatory requirements, the inspectors either screened the issues as minor violations or previously documented a more than minor violation in a previous inspection report.

As described in NCV 05000416/2021003-01, "Failure to Take Adequate Corrective Actions," (ADAMS Accession No. ML21312A172), the inspectors identified a deficiency in the preventive maintenance work instructions for the periodic inspection of sandbags. The licensee entered the inspectors' concerns as Condition Report CR-GGN-2021-04399, screened the issue as non-adverse, and closed the condition report to the preventive maintenance feedback process. Due, in part, to screening the issue as non-adverse, the corrective actions would not have been completed without inspector intervention prior to the next occurrence of the scheduled preventive maintenance task.

The inspectors identified and debriefed to the licensee a minor violation in the third quarter of 2021 related to the failure to specify appropriate post maintenance testing (PMT) requirements for the replacement of a high-pressure core spray minimum flow valve fuse/relay. The licensee entered the issue into their corrective action program as Condition Report CR-GGN-2021-07032 and screened the issue as non-adverse. This issue was minor because, after discussions with the craft that performed the work, the actual field work that was completed was appropriate. Therefore, the failure to specify an appropriate PMT and to fully document its completion did not require any rework. However, the licensee's screening of this issue as non-adverse may have been inappropriate considering the requirements associated with documentation of post maintenance testing for safety-related work.

As described earlier in this report in NCV 05000416/2021004-01, "Failure to Perform Timely Relief Valve Scope Expansion Testing," the licensee wrote Condition Report CR-GGN-2021-02255 describing the requirement to complete scope expansion testing within 3 months. This condition report was screened as non-adverse and closed with no action taken. The inspectors concluded that the failure to screen the condition report as adverse contributed to the failure of the licensee to recognize that they remained in violation of their procedural requirements for timely scope expansion testing of relief valve 1C41F029B.

EXIT MEETINGS AND DEBRIEFS

The inspectors verified no proprietary information was retained or documented in this report.

- On December 9, 2021, the inspectors presented the triennial heat exchanger/sink performance inspection results to Mr. B. Wertz, General Manager Plant Operations, and other members of the licensee staff.
- On January 13, 2022, the inspectors presented the integrated inspection results to Mr. R. Franssen, Site Vice President, and other members of the licensee staff.

DOCUMENTS REVIEWED

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.04	Corrective Action Documents	CR-GGN-	2020-11603, 2020-11730, 2020-11736, 2021-02255, 2021-08194, 2021-08321, 2021-08427, 2021-09396, 2021-09460, 2021-09463, 2021-09464, 2021-09487, 2021-09598	
71111.04	Drawings	M-0049	P & I Diagram Control Room HVAC System Unit 1	47
71111.04	Drawings	M-0198	HV&AC Control Bldg. El. 166'-0'' Area 25B	20
71111.04	Drawings	M-1070A	Piping and Instrumentation Diagram Standby Diesel Generator System	46
71111.04	Drawings	M-1070B	Piping and Instrumentation Diagram Standby Diesel Generator System	39
71111.04	Drawings	M-1070C	Piping and Instrumentation Diagram Standby Diesel Generator System	22
71111.04	Drawings	M-1070D	Piping and Instrumentation Diagram Standby Diesel Generator System	19
71111.04	Drawings	M-1093A	Piping and Instrumentation Diagram High Pressure Core Spray Diesel Generator System	11
71111.04	Drawings	M-1093B	Piping and Instrumentation Diagram High Pressure Core Spray Diesel Generator System	26
71111.04	Drawings	M-1093C	Piping and Instrumentation Diagram High Pressure Core Spray Diesel Generator System	26
71111.04	Drawings	M-1102A	Piping and Instrumentation Diagram Standby Gas Treatment System	25
71111.04	Drawings	M-1102B	Piping and Instrumentation Diagram Standby Gas Treatment System	6
71111.04	Procedures	04-1-01-C41-1	Standby Liquid Control System	128
71111.04	Procedures	04-1-01-P75-1	Standby Diesel Generator System	116
71111.04	Procedures	04-1-01-P81-1	High Pressure Core Spray Diesel Generator	83
71111.04	Procedures	04-1-01-T48-1	Standby Gas Treatment	40
71111.04	Procedures	04-S-01-Z51-1	Control Room HVAC System	60
71111.04	Procedures	17-S-06-10	HVAC Testing and Balancing	1
71111.04	Procedures	CEP-IST-4	Standard on Inservice Testing	309
71111.04	Procedures	EN-DC-136	Temporary Modifications	21
71111.04	Procedures	SFD-0049	System Flow Diagram Control Room HVAC System	8

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.05	Drawings	A-0630	Control Building Fire Protection Plan	012
71111.05	Drawings	A-0633	Unit 1 Auxiliary Bldg, Fire Protection Plan at El. 119’	026
71111.05	Drawings	M-0800D	Electrical Penetration Closure Notes and Details	18
71111.05	Fire Plans	A-28	Fire Pre-Plan	
71111.05	Fire Plans	A-48	Fire Pre-Plan	
71111.05	Fire Plans	DG-02	Fire Pre-Plan	
71111.05	Fire Plans	DG-04	Fire Pre-Plan	
71111.05	Fire Plans	FPP-VOL-02	Fire Pre Plans, Volume II	29
71111.05	Miscellaneous	UFSAR, Appendix 9A	Fire Hazard Analysis Report	2016-00
71111.05	Miscellaneous	Volume I	Fire Protection Program	28
71111.05	Miscellaneous	Volume II	Fire Protection Program	28, 29
71111.05	Procedures	06-OP-SP64-R-0049	Fire Rated Sealed Penetrations Visual Inspection	112
71111.07T	Calculations	2.2.7.c	Determine the Volume of SSW Basin	11/18/1977
71111.07T	Calculations	MC-Q1P41-97020	Determination of Minimum Allowable SSW Flows (LOCA Lineup) to Safety Related Heat Exchangers	15
71111.07T	Calculations	MC-Q1P81-97034	Division 3 Engine Heat Rejection Rate	1
71111.07T	Calculations	MC-Q1T46-95018	Auxiliary Building Room Temperatures During a LOCA with LOP	3
71111.07T	Corrective Action Documents	CR-GGN-	2003-00211, 2017-00710, 2017-09761, 2019-00096, 2019-02581, 2019-03335, 2019-09069, 2020-00119, 2020-00138, 2020-05070, 2021-00748, 2021-00842, 2021-01761, 2021-04667, 2021-05869, 2021-06476, 2021-07236	
71111.07T	Corrective Action Documents Resulting from Inspection	CR-GGN-	2021-09101, 2021-09104, 2021-09128, 2021-09165	
71111.07T	Drawings	M-1016B	Standby Service Water System	53
71111.07T	Drawings	M-1061A	P & I Diagram Standby Service Water System Unit 1	68
71111.07T	Engineering Changes	EC-3001	Determination of Degraded and Minimum Operable T51 Room Cooler Flows for EPI 04-1-03-T46-1 and 04-1-03-T46-2	0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.07T	Engineering Evaluations	GGNS-ME-09-00001	Gas Intrusion in Safety Systems	1
71111.07T	Miscellaneous		Maintenance Rule Functions Listing for P41 Standby Service Water System	12/06/2021
71111.07T	Miscellaneous	9645-M-611.0	Design Specification for Airhandling Units	16
71111.07T	Miscellaneous	AECM-90/0007	Response to Generic Letter 89-13: Service Water System Problems Affecting Safety-Related Equipment	01/29/1990
71111.07T	Miscellaneous	EN-EP-S-039-G	Testing Standard for Safety-Related Heat Exchangers Cooled by Standby Service Water	7
71111.07T	Miscellaneous	GGNS-SDC-P81	System Design Criteria HPCS Diesel Generator System	2
71111.07T	Miscellaneous	GIN-2014-00025	Strategic Plan for Open Loops	4
71111.07T	Miscellaneous	GNRO-92/00078	Final Response to Generic Letter 89-13: Service Water System Problems Affecting Safety-Related Equipment	07/02/1992
71111.07T	Miscellaneous	GTC 2017-00005	Conversation Record: Division III Jacket Water Cooler Heat Load	09/22/2017
71111.07T	Miscellaneous	LBDCR 2019-068	Licensing Basis Document Change Request for Engineering Change 82026	10/03/2019
71111.07T	Miscellaneous	SDC-P41	Standby Service Water System Design Criteria	6
71111.07T	Miscellaneous	SDC-T51	Emergency Pump Room Ventilation System Design Criteria	0
71111.07T	Procedures	04-1-03-T46-1	A ESF Switchgear Room Coolers Flow Test	34
71111.07T	Procedures	04-1-03-T46-2	B ESF Switchgear Room Coolers Flow Test	31
71111.07T	Procedures	05-1-02-III-12	SSW Basin Level Control Off-Normal Event Procedure	2
71111.07T	Procedures	06-OP-1P81-M-0002	HPCS Diesel Generator 13 Functional Test	140
71111.07T	Procedures	07-S-14-52	ESF Electrical Switchgear Room Cooler Inspection	9
71111.07T	Procedures	07-S-24-P75-B004-1	Jacket Water Heat Exchanger Maintenance	11
71111.07T	Procedures	08-S-04-120	Chemistry Evolutions at Standby Service Water	19
71111.07T	Procedures	17-S-03-29	GL-89-13 Thermal Performance Data Collection and Analysis	9
71111.07T	Procedures	17-S-06-10	HVAC Testing and Balancing	1
71111.07T	Procedures	17-S-06-22	SSW "A" Performance	18
71111.07T	Procedures	EN-DC-184	NRC Generic Letter 89-13 Service Water Program	6

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.07T	Procedures	EN-DC-316	Heat Exchanger Performance and Condition Monitoring	12
71111.07T	Procedures	EN-DC-340	Microbiologically Influenced Corrosion (MIC) Monitoring Program	5
71111.07T	Self-Assessments	LO-GLO-2020-00034	Pre-NRC Inspection Self-Assessment: Heat Sink Performance - Triennial IP 71111.07T	03/04/2020
71111.07T	Work Orders	WO	419009, 518584, 539744, 557193, 52593473, 52672425, 52674154, 52768155, 52790008, 52791443, 52814256, 52818952, 52831301, 52881689, 52882128, 52885049, 52886090, 52923654, 52926057 52956284, 52966436, 52976955,	
71111.12	Corrective Action Documents	CR-GGN-	2021-05085, 2021-05519	
71111.12	Procedures	EN-DC-203	Maintenance Rule Program	5
71111.12	Procedures	EN-DC-204	Maintenance Rule Scope and Basis	6
71111.12	Procedures	EN-DC-205	Maintenance Rule Monitoring	8
71111.13	Corrective Action Documents	CR-GGN-	2021-08435	
71111.13	Procedures	EN-OP-119	Protected Equipment Postings	15
71111.15	Corrective Action Documents	CR-GGN-	2021-06274, 2021-06710, 2021-07581	
71111.15	Drawings	M-018.0	Design Specification for Standby Diesel Generators	22
71111.15	Procedures	04-1-01-P75-1	Standby Diesel Generator System	116
71111.15	Procedures	06-OP-1P75-R-0004	Standby Diesel Generator 12 Functional Test	138
71111.15	Procedures	EN-OP-104	Operability Determination Process	17
71111.15	Work Orders	WO	52972412	
71111.18	Engineering Changes	EC-41518	New Strategy for Protecting PMP External Doors	0
71111.18	Engineering Changes	EC-72162	Leakage Water Return Valve Actuator Motor Replacement	0
71111.18	Engineering Changes	EC-79722	Design of Probable Maximum Precipitation Flood Doors	0
71111.18	Engineering Changes	EC-80451	Replace Flood Door SZ10OC313 - Parent EC 79722	0

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71111.18	Work Orders	WO	572266	
71111.19	Corrective Action Documents	CR-GGN-	2021-06825, 2021-07832, 2021-07878, 2021-09206, 2021-09208	
71111.19	Drawings	E-1271-035	Schematic Diagram Floor & Equipment Drain System Drywell Floor Drain Sump Pump Control	8
71111.19	Drawings	J-1356-008	Drywell Floor & Equipment Drain Sump Level Recorders	1
71111.19	Drawings	M-1094A	Piping & Instrumentation Diagram Floor & Equipment Drain System	27
71111.19	Procedures	06-OP-1P75-M-0002	Standby Diesel Generator 12 Functional Test	145
71111.19	Work Orders	WO	567113, 568095, 568991, 569533, 571835, 52904371, 52921671, 52980976	
71111.21N.05	Calculations	GGNS-EE-11-00001	GGNS Appendix R Safe Shutdown Analysis (FPP-1)	5
71111.21N.05	Corrective Action Documents	CR-GGN-	2020-09285, 2020-12046, LO-GLO-2020-00039	
71111.21N.05	Corrective Action Documents Resulting from Inspection	CR-GGN-	2021-09102, 2021-09103, 2021-09131	
71111.21N.05	Drawings	M-1348R	System Piping Isometric, RHR Pump "C" Suction Auxiliary Building and Containment - Unit 1	11
71111.21N.05	Drawings	M-KE1348B	System Piping Isometric, RHR "B" Pump Suction and Discharge, Auxiliary Building and Containment - Unit 1	B
71111.21N.05	Drawings	M-KJ1348A	System Piping Isometric, RHR "A" Pump Suction and Discharge, Auxiliary Building and Containment - Unit 1	A
71111.21N.05	Procedures	10-S-03-2	Response to Fires	30
71111.22	Corrective Action Documents	CR-GGN-	2017-12264, 2021-07536, 2021-07537, 2021-07538, 2021-07555, 2021-07581, 2021-07867, 2021-08194, 2021-09206	
71111.22	Miscellaneous	460000451	Transamerica Delaval Vendor Manual	303
71111.22	Miscellaneous	SEP-GGNS-IST-2	GGNS IST Plan	9
71111.22	Procedures	04-1-01-P45-1	Equipment Drain Sump System	21
71111.22	Procedures	04-1-01-P45-2	Floor Drain Sump System	26
71111.22	Procedures	04-1-02-1H13-	Alarm Response Instruction Panel No: 1H13-P601	173

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
		P601		
71111.22	Procedures	04-1-02-1H13-P680	Alarm Response Instruction Panel No: 1H13-P680	263
71111.22	Procedures	06-IC-1P45-M-0001	Drywell Floor Drain Sump Level Switch Functional Test	110
71111.22	Procedures	06-ME-1C41-R-0001-02	Standby Liquid Control System Relief Valve Functional Test	108
71111.22	Procedures	06-OP-1000-D-0001	Daily Operating Logs	173
71111.22	Procedures	06-OP-1P75-M-0002-03	Standby Diesel Generator 12 Functional Test	145
71111.22	Procedures	06-OP-1P75-R-0003-01	Standby Diesel Generator 11: Functional Test	139
71111.22	Procedures	06-OP-1P75-R-0004-01	Standby Diesel Generator 12: Functional Test	138
71111.22	Procedures	E-1111-28	Standby Diesel Generator Division 2 Diesel Governor Setting and Control	9
71111.22	Procedures	M-018.0-Q1P75E001A-1.5-00	Engine Pneumatic Schematic	12
71111.22	Procedures	M-018.0-Q1P75E001A-1.5-003	Control Panel Schematic	16
71111.22	Work Orders	WO	567683, 52905992, 52964795, 52978379, 52989633	
71114.06	Procedures	EN-EP-306	Drills and Exercises	10
71114.06	Procedures	EN-EP-603	Emergency Notifications	0
71114.06	Procedures	EN-LI-114	Performance Indicator Process	17
71151	Miscellaneous		MS10 Technique Data Sheet for Periods October 1, 2020 - September 30, 2021	
71151	Miscellaneous		MS09 Technique Data Sheet for Periods October 1, 2020 - September 30, 2021	
71152	Corrective Action Documents	CR-GGN-	2011-07687, 2016-07945, 2016-08294, 2016-08295, 2016-08329, 2016-09758, 2018-12990, 2018-13006, 2018-13062, 2021-04399, 2021-04400, 2021-04560, 2021-06911	

Inspection Procedure	Type	Designation	Description or Title	Revision or Date
71152	Engineering Changes	EC-41518	New Strategy from Protecting PMP Doors from PMP Flood	0
71152	Miscellaneous		Quality Assurance Program Manual	42
71152	Procedures	05-1-02-VI-1	Flooding	116
71152	Procedures	05-1-02-VI-2	Hurricanes, Tornados, and Severe Weather	140
71152	Procedures	EN-FAP-EP-010	Severe Weather Response	8
71152	Procedures	EN-LI-102	Corrective Action Program	46
71152	Procedures	EN-MA-107	Post Maintenance Testing	0
71152	Work Orders	WO	336989, 52696486, 52887428, 52938410-10, 52959020	

Attachment 1

Detailed Risk Evaluation

Grand Gulf Sandbag Berms as Compensation for Degraded Door Seals Assumptions:

1. The recurrence intervals provided by the United States Geological Survey (USGS) up to a 1000-year return are the best available information about rainfall at the Grand Gulf Nuclear Station.

2. An extrapolation of the 1000-year return rainfall data is the best available method of providing data for extreme rainfall events at Grand Gulf Nuclear Station. Although there are no standard techniques or consensus methods to extrapolate flood frequencies, the method employed to obtain the frequencies are based on judgment and the values are adequate for this quantitative assessment.

3. The extrapolation shown in Figure 1 is an appropriate evaluation of extreme rainfall events at Grand Gulf Nuclear Station for the subject assessment.

4. The curve provided in Figure 1 is appropriately approximated via regression analysis as:

$$y = 1.923x^{-0.174}$$

5. An incremental hyetograph developed using the information provided by Areva Document No 32-9195573-001, “Flood Hazard Re-evaluation – Local Intense Precipitation – Generated Flood Flow and Elevations at Grand Gulf Nuclear Station,” would represent the best available information on flood height above the surface over time during an extreme rainfall event.

6. The hyetograph developed from Assumption 5 and provided in Figure 2 is appropriate for the subject assessment.

7. Figure 1, Figure 2, and flood elevations developed from the probable maximum precipitation, the current design basis, and the local intense precipitation events are the best available information for use in developing a flood height hazard curve.

8. Using the data and information from Assumption 7, and comparing with other hydrological information for the area, the analyst developed a flood height hazard curve for Grand Gulf Nuclear Station that is presented in Figure 3. Although there are no standard techniques or consensus methods to develop an extreme hazard curve from extrapolated data, the method employed to obtain the frequencies are based on judgment and the values are adequate for this quantitative assessment.

9. Flooding of less than 10 inches above grade would not impact the standby service water cooling towers or pump rooms because all equipment that could be directly impacted by water is located above this elevation.

10. Flooding causing less than 7 inches of water in the diesel generator rooms would not impact the function of the onsite emergency power systems because all equipment that could be directly impacted by water is located above this elevation.

11. Based on inspection and observations of the resident inspectors, door seals on doors that are not used for normal ingress and egress were in sufficient shape to prevent large amounts of water from passing through the door during a postulated flood.

12. The primary door of concern for this analysis was Control Building Main Entrance Door OC313 because this door contained the most degradation of seals identified.

13. Based on Assumption 12, the analyst used Door OC313 leakage as the bounding leakage in all other calculations.

14. Door OC313 is a double door. At the time of the inspection, the door to the right (looking from outside the Control Building) was secured in position by the licensee and mostly sealed. The door to the left was usable for normal ingress and egress.

15. The best estimate of the door openings was obtained using a combination of drawings and hand measurements conducted by the resident inspectors.

16. Door OC313 (see Figure 5), when closed and unperturbed, the left door sits on the outer portion of its latch with openings of the following dimensions:

    a. The height of the threshold is 0.709 inches
    b. The length of the opening under the left door is 48 inches
    c. The length of the unsealed portion under the right door is 10 inches
    d. The gap between the left side door and the threshold is 0.533 inches
    e. The gap between the door and the center plate is 0.787 inches
    f. The gap between the left door hinge side and the wall is 0.02 inches

17. Once pressure is applied against the left door of Door OC313, it closes slightly to the limit of the center plate. The analyst and resident inspectors estimated this pressure to be about 5 pounds-force.

18. Door OC313, when closed and pushed to rest on the center plate the openings have the following dimensions:

    a. The height of the threshold is 0.709 inches
    b. The length of the opening under the left door is 48 inches
    c. The length of the unsealed portion under the right door is 10 inches
    d. The gap between the left side door and the threshold is 0.118 inches
    e. The gap between the door and the center plate is 0.1 inches
    f. The gap between the left door hinge side and the wall is 0.02 inches

19. Flood water flow into the control building was estimated using the following equation:

    a. $F = Cv * ((2gH)^{0.5}) * A$, where:

        i. F is the flow in gallons per minute (gpm)
        ii. Cv is the Coefficient of Velocity (conservatively set to 1)
        iii. g is the gravitational constant (32.2 ft/sec^2)
        iv. H is the height of the flood water above the bottom of the door (ft)
        v. A is the total area of the opening exposed to water (ft^2)

20. The total calculated flow through Door OC313 at various flood heights is provided in Table 1.

21. The calculated inflow through Door OC313 for a local intense precipitation is shown in Figure 4, which has a frequency of approximately a 1.4 x 10^{-6}/year event.

22. As a bounding assumption, the analyst assumed that sandbag berms would not be built before flooding onsite because of the inadequate trigger point.

23. As a bounding assumption, the analyst assumed that Division 2 would always fail once water began to fall into the motor-control centers.

24. The Grand Gulf site-specific SPAR model, Version 8.59, is an appropriate tool for determining the conditional core damage probability of the postulated flooding events.

25. A weather-related loss of offsite power is the best surrogate for modeling the response of Grand Gulf to an extreme rainfall-induced flood.

26. Setting Basic Event ACP-BAC-LP-16AB, “4160 V Bus 16AB Hardware Failures,” to the House Event “TRUE” is an appropriate surrogate for the flood-induced failure of Division 2 equipment.

27. The independent spent fuel storage installation is designed to continue to remain safe following inundation by floodwaters.

Assessment

The analyst reviewed each of the doors at the site that was designed to protect against extreme precipitation floods.

Door	Nomenclature
OC313	Control Building Main Entrance
OCT5	Control Building - Locked
1D301	Diesel Southern Breezeway
1D308	Diesel Div 1 West Entrance - Not Normal Access
1D309	Diesel Main Entrance
1D310	Diesel Div 2 West Entrance - Not Normal Access
1D312	Diesel Div 3 West Entrance - Not Normal Access
1M110	Main Div 1 SSW Entrance
1M111	Div 1 SSW Alternate Entrance
2M110	Main Div 2 SSW Entrance
2M111	Div 2 SSW Alternate Entrance
SSW A	Standby Service Water Pump Room
SSW B	Standby Service Water Pump Room
ISFSI	Independent Fuel Storage

Limited Access

Based on Assumption 11, Doors OCT5, 1D308, 1D310 and 1D312 were screened from further review.

Independent Fuel Storage

Based on Assumption 27, the door to the ISFSI was screened from further review.

Standby Service Water

Based on Assumption 9, the analyst screened out further evaluation of the standby service water buildings (Doors 1M110, 1M111, 2M110, 2M111, SSW A and SSW B) because the frequency of a flood causing water levels at 10 inches or more above grade would be at or below 1×10^{-6}/year and the ability of the atmosphere to provide that amount of water over the short periods necessary appeared to be limiting. Additionally, the delay from the doors and the degraded seals would prevent inundating standby service water equipment during the short duration of the peak flooding at these water levels.

Diesel Generator Building

Using Assumption 11, the analyst determined that the only doors of concern to the emergency diesel generators were Doors 1D301 and 1D309. Based on Assumption 13, the analyst used the leakage rates shown in Figure 4 to assess the impact to the emergency diesel generators. Calculation MC-Q1X77-98025, Revision 1, provided free floor space in the diesel generator rooms and curbs provided outside of each diesel room. Comparing the inflow rates in Figure 4 over time to the free floor space, the analyst calculated a maximum water level in the diesel generator rooms of 5.7 inches, before it would start to recede. Therefore, none of the divisional diesel generators would be affected by the most severe postulated flood.

Control Building

Figure 4 shows the analyst calculated inflow into the control building over the approximately 8-hour rainfall from a local intense precipitation during a regional probable maximum precipitation. The total flow into the control building over this time was estimated to be approximately 112,000 gallons. Using drawings, measurements, and observations from the resident inspectors, the analyst determined that the vast amount of this water would flow to the basement and/or drain system. However, some amount of water would have made its way into the Division 2 heating, ventilation, and air conditioning (HVAC) room and down onto the motor control centers for Division 2. The analyst and inspectors could not rule out failure of Division 2.

The frequency of the lowest flood of concern for the control building was 1.89×10^{-5}/year from Figure 3. Using the plant-specific SPAR model, the analyst quantified the conditional core damage probability for the loss of Division 2 following a flood that caused a loss of offsite power. The value was 2.26×10^{-2}. The resulting incremental conditional core damage probability was 4.27×10^{-7}. Assumptions 19, 22 and 23 document bounding assumptions that were material to this final risk value. Therefore, the analyst determined that the incremental conditional core damage probability was something less than 4.27×10^{-7}. This finding is of very low safety significance (Green).

Table 1

Flood Water Flow into Control Building

Flood Water		Area of Opening	Threshold	Sides	Inches on Door	Pressure at		Flow (gpm)		
feet	inches	inches^2	Feet^2	Feet^2		Threshold	Sides	Threshold	Sides	Total
-0.05	0.125	0.00	0.00	0.00	0.000	0	0	0	0	0
-0.04	0.25	0.00	0.00	0.00	0.000	0	0	0	0	0
-0.03	0.375	0.00	0.00	0.00	0.000	0	0	0	0	0
-0.02	0.5	0.00	0.00	0.00	0.000	0	0	0	0	0
-0.01	0.625	0.00	0.00	0.00	0.000	0	0	0	0	0
0.00	0.75	2.41	0.02	0.00	0.125	0.0015	0.0007	3.5	0.03	3.51
0.01	0.875	9.20	0.06	0.00	0.250	0.0060	0.0030	26.7	0.28	26.96
0.02	1	15.30	0.10	0.00	0.375	0.0105	0.0053	58.7	0.65	59.34
0.03	1.125	21.40	0.15	0.00	0.500	0.0150	0.0075	98.1	1.11	99.22
0.05	1.25	27.13	0.19	0.00	0.625	0.0195	0.0098	141.8	1.64	143.43
0.06	1.375	27.24	0.19	0.00	0.750	0.0240	0.0120	157.3	2.24	159.56
0.07	1.5	27.34	0.19	0.00	0.875	0.0285	0.0143	171.5	2.90	174.35
0.08	1.625	27.44	0.19	0.01	1.000	0.0331	0.0165	184.5	3.61	188.12
0.09	1.75	27.54	0.19	0.01	1.125	0.0376	0.0188	196.7	4.38	201.07
0.10	1.875	27.64	0.19	0.01	1.250	0.0421	0.0210	208.2	5.19	213.35
0.11	2	27.74	0.19	0.01	1.375	0.0466	0.0233	219.0	6.04	225.08
0.12	2.125	27.84	0.19	0.01	1.500	0.0511	0.0256	229.4	6.94	236.34
0.13	2.25	27.94	0.19	0.01	1.625	0.0556	0.0278	239.3	7.88	247.19
0.14	2.375	28.04	0.19	0.01	1.750	0.0601	0.0301	248.8	8.86	257.69
0.15	2.5	28.14	0.19	0.01	1.875	0.0646	0.0323	258.0	9.88	267.87
0.16	2.625	28.24	0.19	0.01	2.000	0.0692	0.0346	266.8	10.93	277.77
0.17	2.75	28.35	0.19	0.01	2.125	0.0737	0.0368	275.4	12.01	287.42
0.18	2.875	28.45	0.19	0.01	2.250	0.0782	0.0391	283.7	13.13	296.85
0.19	3	28.55	0.19	0.01	2.375	0.0827	0.0413	291.8	14.29	306.08
0.20	3.125	28.65	0.19	0.01	2.500	0.0872	0.0436	299.6	15.47	315.12
0.21	3.25	28.75	0.19	0.01	2.625	0.0917	0.0459	307.3	16.69	323.99
0.22	3.375	28.85	0.19	0.01	2.750	0.0962	0.0481	314.8	17.94	332.70
0.23	3.5	28.95	0.19	0.02	2.875	0.1007	0.0504	322.1	19.21	341.27

0.24	3.625	29.05	0.19	0.02	3.000	0.1052	0.0526	329.2	20.52	349.71
0.25	3.75	7.13	0.05	0.00	3.125	0.1098	0.0549	85.2	3.25	88.42
0.26	3.875	7.14	0.05	0.00	3.250	0.1143	0.0571	86.9	3.45	90.35
0.27	4	7.16	0.05	0.00	3.375	0.1188	0.0594	88.6	3.66	92.26
0.28	4.125	7.17	0.05	0.00	3.500	0.1233	0.0616	90.3	3.87	94.14
0.30	4.25	7.19	0.05	0.00	3.625	0.1278	0.0639	91.9	4.08	95.99
0.31	4.375	7.20	0.05	0.00	3.750	0.1323	0.0662	93.5	4.30	97.81
0.32	4.5	7.22	0.05	0.00	3.875	0.1368	0.0684	95.1	4.52	99.62
0.33	4.625	7.23	0.05	0.00	4.000	0.1413	0.0707	96.6	4.75	101.40
0.34	4.75	7.25	0.05	0.00	4.125	0.1458	0.0729	98.2	4.98	103.16
0.35	4.875	7.26	0.05	0.00	4.250	0.1504	0.0752	99.7	5.21	104.90
0.36	5	7.28	0.05	0.00	4.375	0.1549	0.0774	101.2	5.45	106.62
0.37	5.125	7.29	0.05	0.00	4.500	0.1594	0.0797	102.6	5.69	108.32
0.38	5.25	7.31	0.05	0.00	4.625	0.1639	0.0819	104.1	5.93	110.00
0.39	5.375	7.32	0.05	0.00	4.750	0.1684	0.0842	105.5	6.18	111.67
0.40	5.5	7.34	0.05	0.00	4.875	0.1729	0.0865	106.9	6.43	113.33
0.41	5.625	7.35	0.05	0.00	5.000	0.1774	0.0887	108.3	6.68	114.97
0.42	5.75	7.37	0.05	0.00	5.125	0.1819	0.0910	109.7	6.93	116.59
0.43	5.875	7.38	0.05	0.00	5.250	0.1864	0.0932	111.0	7.19	118.20
0.44	6	7.40	0.05	0.00	5.375	0.1910	0.0955	112.3	7.46	119.80
0.45	6.125	7.41	0.05	0.00	5.500	0.1955	0.0977	113.7	7.72	121.38
0.46	6.25	7.43	0.05	0.00	5.625	0.2000	0.1000	115.0	7.99	122.96
0.47	6.375	7.44	0.05	0.00	5.750	0.2045	0.1022	116.3	8.26	124.52
0.48	6.5	7.46	0.05	0.00	5.875	0.2090	0.1045	117.5	8.54	126.07
0.49	6.625	7.47	0.05	0.00	6.000	0.2135	0.1068	118.8	8.82	127.61
0.50	6.75	7.49	0.05	0.01	6.125	0.2180	0.1090	120.0	9.10	129.14
0.51	6.875	7.50	0.05	0.01	6.250	0.2225	0.1113	121.3	9.38	130.66
0.52	7	7.52	0.05	0.01	6.375	0.2270	0.1135	122.5	9.67	132.17
0.53	7.125	7.53	0.05	0.01	6.500	0.2316	0.1158	123.7	9.96	133.67
0.55	7.25	7.55	0.05	0.01	6.625	0.2361	0.1180	124.9	10.25	135.16
0.56	7.375	7.56	0.05	0.01	6.750	0.2406	0.1203	126.1	10.54	136.64
0.57	7.5	7.58	0.05	0.01	6.875	0.2451	0.1225	127.3	10.84	138.12
0.58	7.625	7.59	0.05	0.01	7.000	0.2496	0.1248	128.4	11.14	139.58
0.59	7.75	7.61	0.05	0.01	7.125	0.2541	0.1271	129.6	11.45	141.04

0.60	7.875	7.62	0.05	0.01	7.250	0.2586	0.1293	130.7	11.75	142.49
0.61	8	7.64	0.05	0.01	7.375	0.2631	0.1316	131.9	12.06	143.94
0.62	8.125	7.65	0.05	0.01	7.500	0.2677	0.1338	133.0	12.37	145.38
0.63	8.25	7.67	0.05	0.01	7.625	0.2722	0.1361	134.1	12.69	146.81
0.64	8.375	7.68	0.05	0.01	7.750	0.2767	0.1383	135.2	13.00	148.23
0.65	8.5	7.70	0.05	0.01	7.875	0.2812	0.1406	136.3	13.32	149.65
0.66	8.625	7.71	0.05	0.01	8.000	0.2857	0.1428	137.4	13.65	151.06
0.67	8.75	7.73	0.05	0.01	8.125	0.2902	0.1451	138.5	13.97	152.46
0.68	8.875	7.74	0.05	0.01	8.250	0.2947	0.1474	139.6	14.30	153.86
0.69	9	7.76	0.05	0.01	8.375	0.2992	0.1496	140.6	14.63	155.26

Figure 1
Grand Gulf 1 Hour Rainfall Recurrence

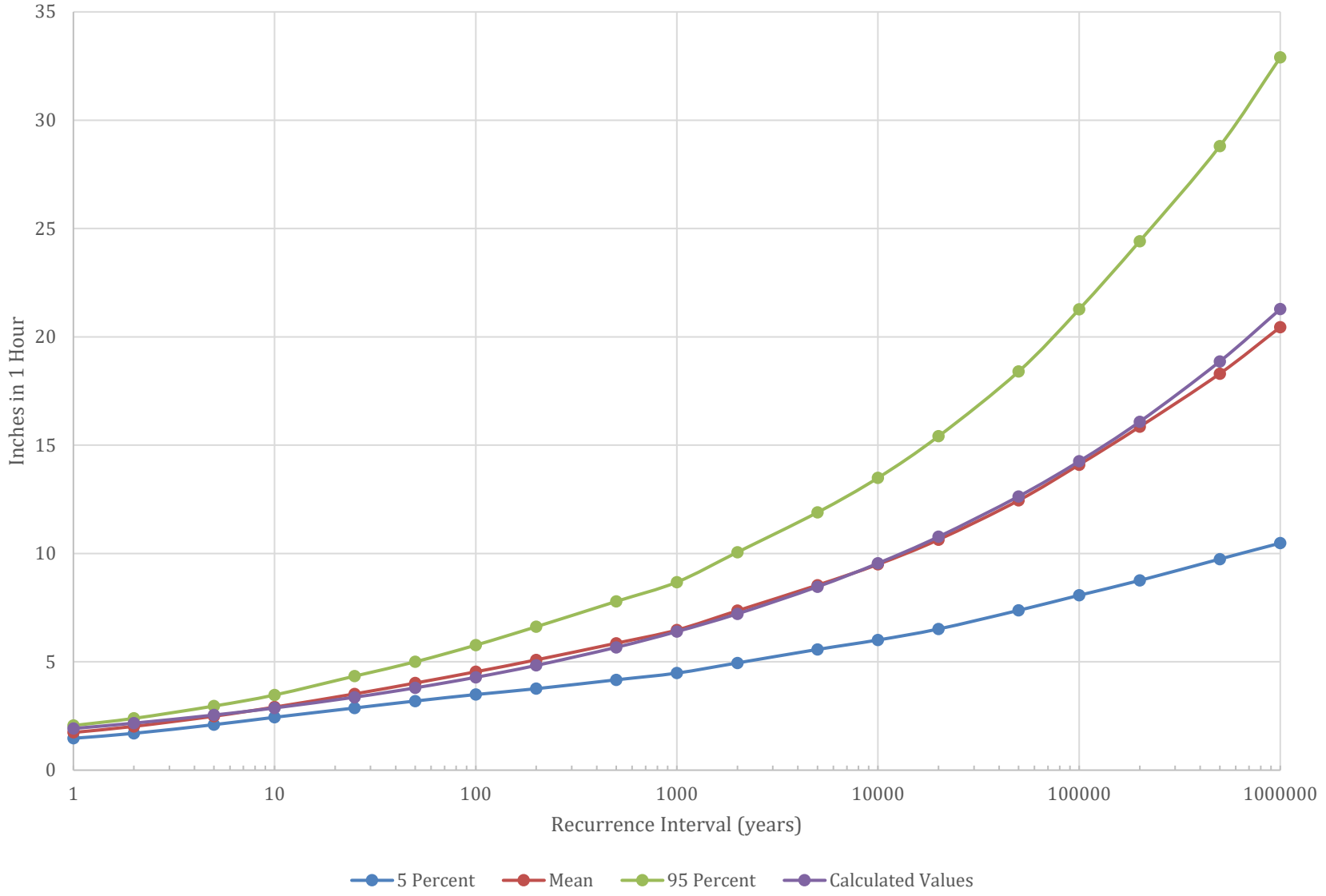


Figure 2
Flooding Over Time
At Door OC313

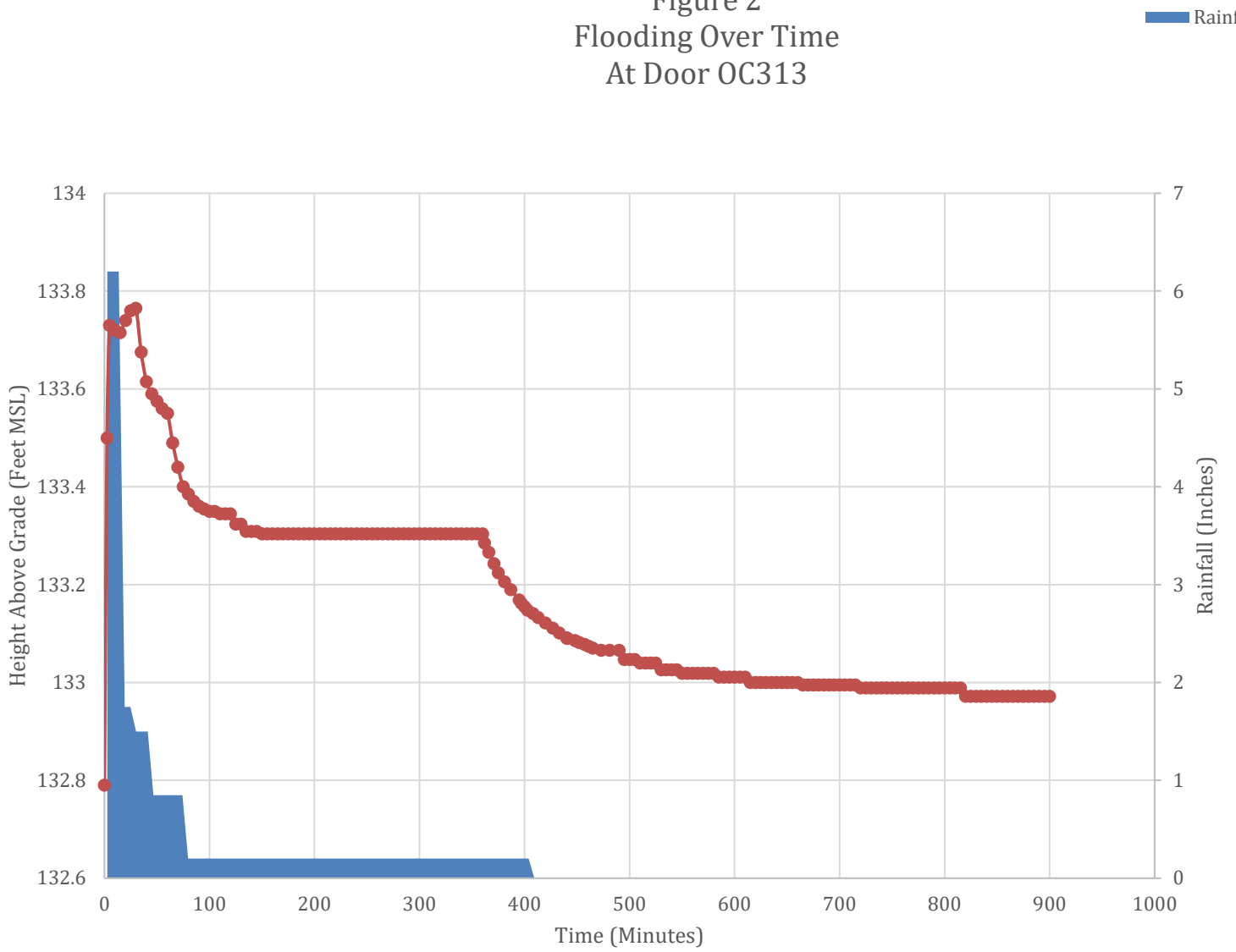


Figure 3
Flood Level Frequency of Exceedance

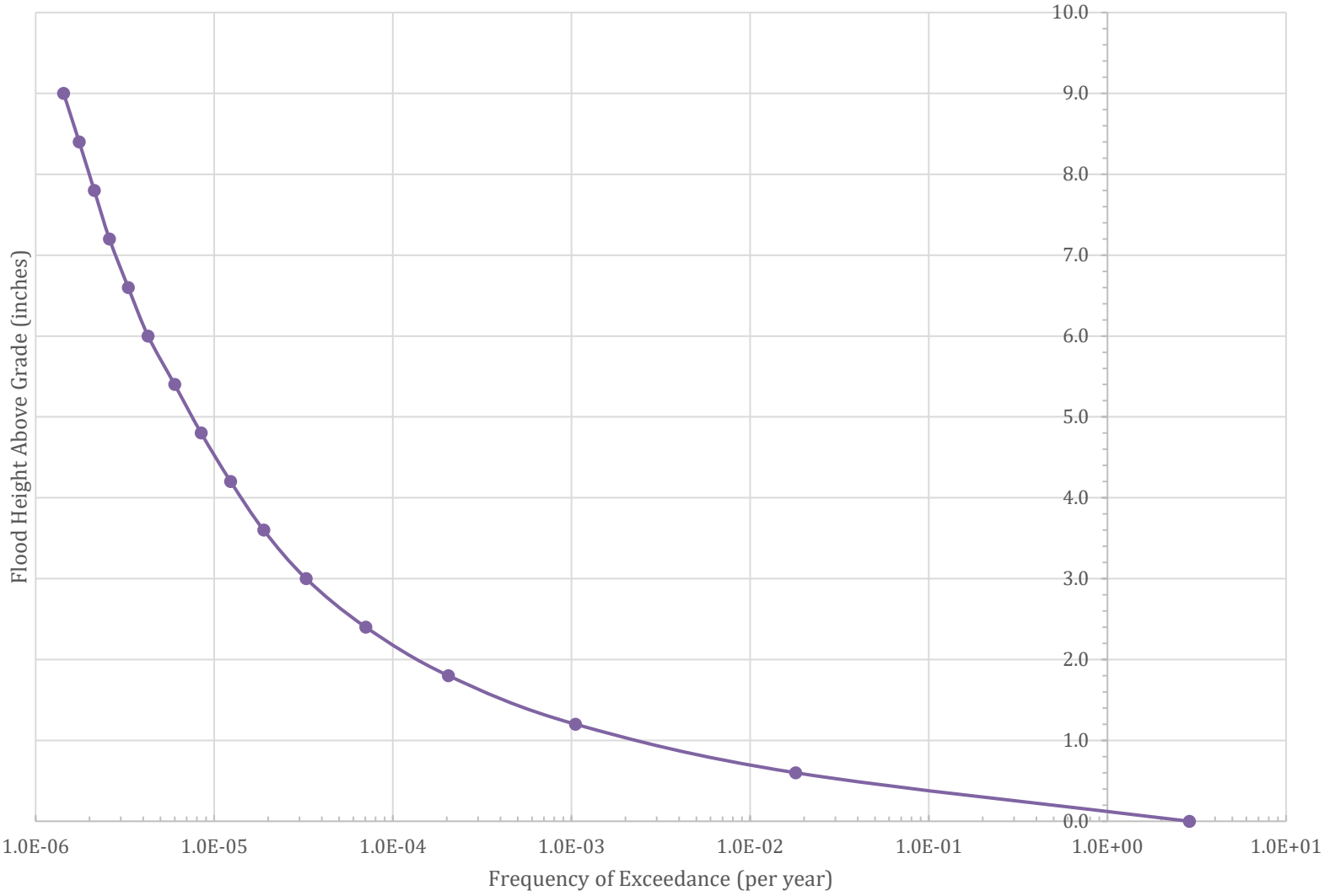


Figure 4
Inflow to Door OC313

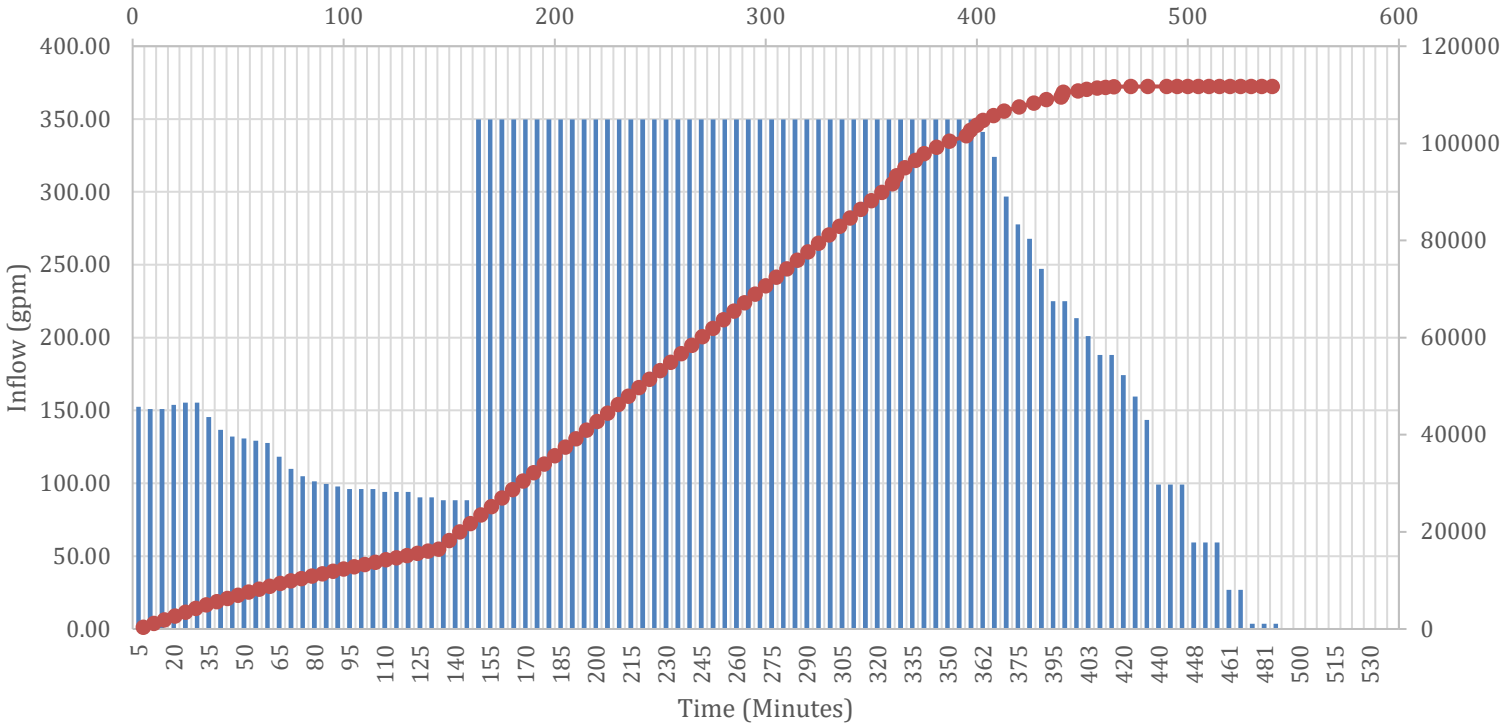
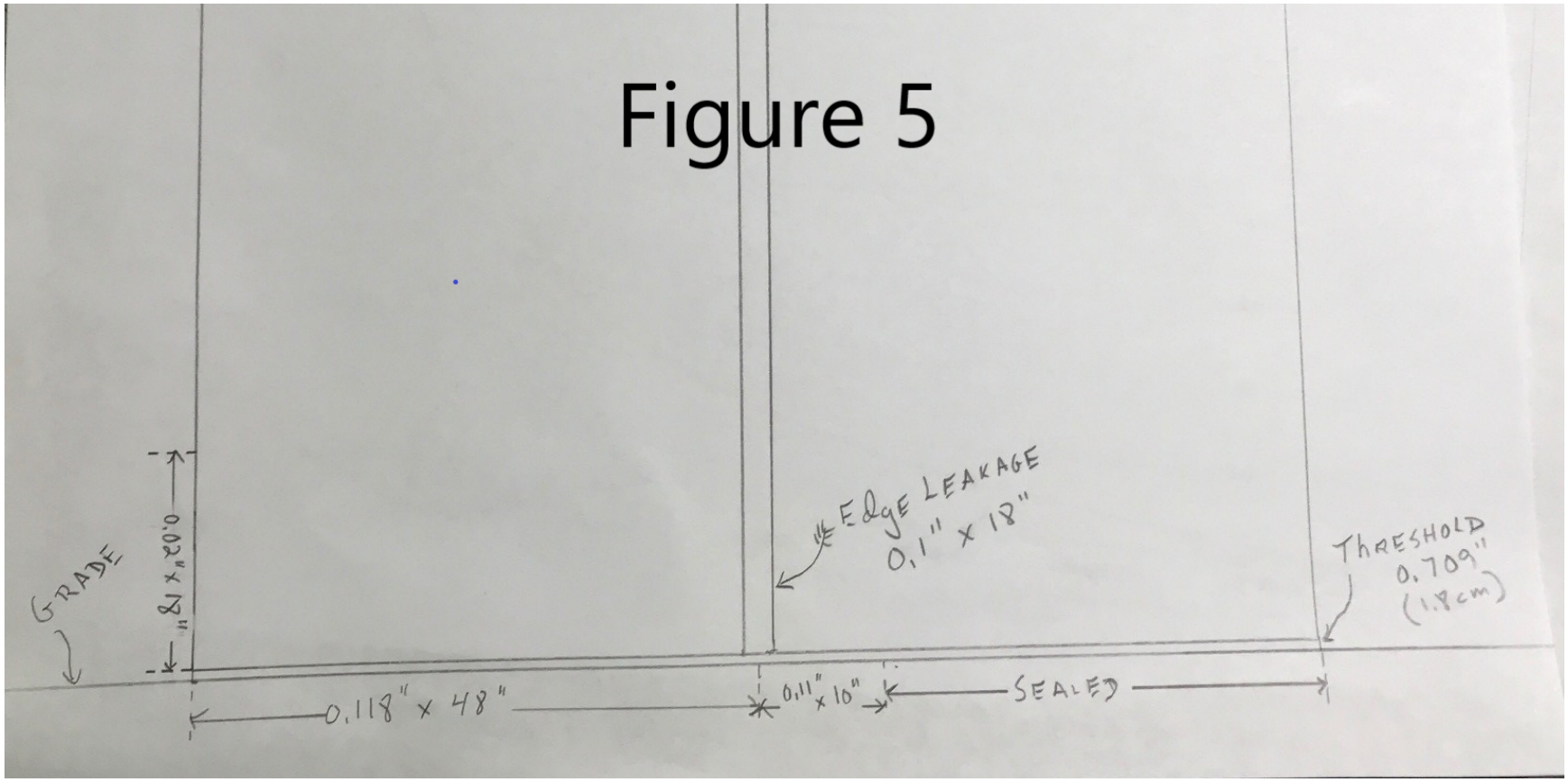


Figure 5


GRADE
0.03" x 20'0
EDGE LEAKAGE
0.1" x 18"
THRESHOLD
0.709"
(1.8cm)
0.118" x 48"
0.11" x 10"
SEALED