



Entergy Operations, Inc.
P.O. Box 756
Port Gibson, Mississippi 39150

Jeffery A. Hardy
Manager Regulatory Assurance
Grand Gulf Nuclear Station
Tel: 802-380-5124

10 CFR 50.73

GNRO2022-00028

August 29, 2022

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555-0001

SUBJECT: Grand Gulf Nuclear Station, Unit 1 Licensee Event Report 2022-001-00,
Manual Reactor trip due to the loss of Balance of Plant Transformer 23

Grand Gulf Nuclear Station, Unit 1
Docket No. 50-416
Renewed License No. NPF-29

Attached is Licensee Event Report 2022-001-00, Manual Reactor trip due to the loss of Balance of Plant Transformer 23. This report is being submitted in accordance with 10 CFR 50.73(a)(2)(iv)(A) as an event or condition that resulted in manual or automatic actuation of the Reactor Protection System.

This letter contains no new Regulatory Commitments. Should you have any questions concerning the content of this letter, please contact Jeff Hardy, Regulatory Assurance Manager at 802-380-5124.

Sincerely,

A handwritten signature in black ink, appearing to read 'JAH' followed by a stylized flourish.

JAH/saw

Attachments: Licensee Event Report 2022-001-00

GNRO2022-00028

Page 2 of 3

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

U.S Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Attachment
Licensee Event Report 2022-001-00



LICENSEE EVENT REPORT (LER)

(See Page 3 for required number of digits/characters for each block)

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collection Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: oir_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. Facility Name Grand Gulf Nuclear Station, Unit 1	2. Docket Number 50-416	3. Page 1 OF 3
---	-----------------------------------	--------------------------

4. Title
Manual Reactor trip due to the loss of Balance of Plant Transformer 23

5. Event Date			6. LER Number			7. Report Date			8. Other Facilities Involved		
Month	Day	Year	Year	Sequential Number	Rev No.	Month	Day	Year	Facility Name	Docket Number	
06	30	2022	2022	001	00	08	29	2022	N/A	05000 N/A	
									N/A	05000 N/A	

9. Operating Mode 1	10. Power Level 100 Percent
-------------------------------	---------------------------------------

11. This Report is Submitted Pursuant to the Requirements of 10 CFR §: (Check all that apply)

<input checked="" type="checkbox"/> 10 CFR Part 20	<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.36(c)(2)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)
<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	10 CFR Part 73
<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.69(g)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(4)
<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> 73.71(a)(5)
<input type="checkbox"/> 20.2203(a)(2)(i)	10 CFR Part 21	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	<input type="checkbox"/> 73.77(a)(1)(i)
<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 21.2(c)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)	<input type="checkbox"/> 73.77(a)(2)(i)
<input type="checkbox"/> 20.2203(a)(2)(iii)	10 CFR Part 50	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)	<input type="checkbox"/> 73.77(a)(2)(ii)
<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)	
<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)	

Other (Specify here, in Abstract, or in NRC 366A).

12. Licensee Contact for this LER

Licensee Contact Jeffery A. Hardy	Phone Number (Include Area Code) 802-380-5124
--------------------------------------	--

13. Complete One Line for each Component Failure Described in this Report

Cause	System	Component	Manufacturer	Reportable To IRIS	Cause	System	Component	Manufacturer	Reportable To IRIS
C	N/A	N/A	N/A	Y	N/A	N/A	N/A	N/A	N/A

14. Supplemental Report Expected			15. Expected Submission Date		
<input checked="" type="checkbox"/> No	<input type="checkbox"/> Yes (If yes, complete 15. Expected Submission Date)		Month	Day	Year

16. Abstract (Limit to 1560 spaces, i.e., approximately 15 single-spaced typewritten lines)

On June 30, 2022, at 1445 hours, with the Grand Gulf Nuclear Station in MODE 1 and 100 percent power, the reactor was manually tripped due to the loss of balance of plant (BOP) transformer 23. All control rods fully inserted into the core and all systems responded appropriately. The plant was stabilized in MODE 3.

Standby Service Water A and B were manually initiated to supply cooling to the Control Room Air conditioning, Engineering Safety Feature (ESF) switchgear room coolers and plant auxiliary loads.

The direct cause of the BOP transformer 23 trip was an instantaneous ground overcurrent most likely caused by a lightning strike (environmental) flashover event.

There were no consequences to the safety of the public, nuclear safety, industrial safety, or radiological safety. No radiological releases occurred due to this event. This report is made in accordance with 10 CFR 50.73(a)(2)(iv)(A), for any event or condition that resulted in manual or automatic actuation of the Reactor Protection System (RPS).



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collection Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to InfoCollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: oir_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Grand Gulf Nuclear Station, Unit 1	50-416	2022	001	- 00

NARRATIVE

PLANT CONDITIONS:

DESCRIPTION OF EVENT

Prior to this event, the plant was at 100 percent power and Radial Well 3 was out of service. No activities were in progress that would have initiated the event. A thunderstorm was in the area.

On June 30, 2022, at 1441 hours, balance of plant (BOP) transformer 23 feeder breaker tripped due to an instantaneous ground overcurrent lock out. This caused Radial Wells 4 and 5 to trip. Control Room received alarm indications on the instrument panel for 4.16kV BUS 28AG UNDERVOLTAGE and BOP XFMR 23 INCM FDR TRIP followed by several alarms on the Radial Well HMI and other control room panels as a result of feeder breaker tripping on ground overcurrent. After the loss of BOP transformer 23, the air release valves at Radial Well 6 lifted and diverted well output back to the caisson, resulting in the loss of all Plant Service Water (PSW) forward flow.

Standby Service Water A and B were manually initiated to supply cooling to the Control Room Air conditioning, Engineering Safety Feature (ESF) switchgear room coolers and plant auxiliary loads.

At 1443, Operations immediately entered loss of PSW procedure and lowered core flow to 70 Mlbm/hr in fast descent. At 1445, operators placed the reactor mode switch into shutdown due to Turbine Building Cooling Water trends being unable to be maintained less than 100 degrees (and rising). During radial well recovery, E radial well pump (Radial Well 5) was able to be started remotely but the valves would not operate remotely, and F radial well pump would not start remotely.

REPORTABILITY

This report is made in accordance with 10 CFR 50.73(a)(2)(iv)(A), for any event or condition that resulted in manual or automatic actuation of the Reactor Protection System (RPS).

CAUSE

The direct cause of the BOP transformer 23 trip was an instantaneous ground overcurrent most likely caused by a lightning strike (environmental) flashover event.

The direct cause was determined based on troubleshooting using the Failure Mode Analysis (FMA) and evaluation performed after the event in conjunction with a vendor and Entergy Distribution. It was found that there were several areas near the poles where lightning strikes had occurred, but that there was no evidence of a direct lightning strike on any of the poles or instrumentation.

CORRECTIVE ACTIONS

Completed actions to address the direct cause:

1. Initiated Operational Decision Making (ODM) to start plant up post-trip with all radial well loads powered from BOP 13 transformer.
2. Engineering performed post-event and post-maintenance walkdowns with a vendor and peer engineers to verify the readiness to re-energize the BOP 23 transformer.
3. Removed the wire mesh off all the BOP 23 Overhead Feeder Line poles and ensured that there were no stray ground wires running up above the neutral per Entergy Distribution recommendations.



**LICENSEE EVENT REPORT (LER)
CONTINUATION SHEET**

(See NUREG-1022, R.3 for instruction and guidance for completing this form
<https://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1022/r3/>)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Library, and Information Collection Branch (T-6 A10M), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by e-mail to Infocollects.Resource@nrc.gov, and the OMB reviewer at: OMB Office of Information and Regulatory Affairs, (3150-0104), Attn: Desk Officer for the Nuclear Regulatory Commission, 725 17th Street NW, Washington, DC 20503; e-mail: ofra_submission@omb.eop.gov. The NRC may not conduct or sponsor, and a person is not required to respond to, a collection of information unless the document requesting or requiring the collection displays a currently valid OMB control number.

1. FACILITY NAME	2. DOCKET NUMBER	3. LER NUMBER		
		YEAR	SEQUENTIAL NUMBER	REV NO.
Grand Gulf Nuclear Station, Unit 1	50-416	2022	001	- 00

Planned corrective actions:

1. Develop Engineering Change to bury the BOP 23 Overhead Feeder Lines.
2. Implement Engineering Change to bury the BOP 23 Overhead Feeder Lines.

SAFETY SIGNIFICANCE

There were no safety consequences impacting plant or public safety as a result of this event. The reactor trip system responded as expected due to the manual trip signal received. There was no failure of any function that would have prevented fulfillment of actions necessary to shutdown the reactor and maintain it in a safe shutdown condition, remove residual heat, control the release of radioactive material, or mitigate the consequences of an accident. All systems required to bring the plant to MODE 3 responded correctly.

There was no loss of safety function for this event.

PREVIOUS SIMILAR EVENTS

CR-GGN-2021-5484: BOP 23 lightning strike. On July 15, 2021, at 1833 hours breaker 552-2103 tripped. This deenergized BOP 23 Transformer which was supplying Radial Wells 4 and 5 causing a loss of 4 Radial Well Pumps. This resulted in a power reduction to 46 percent.

LER 2019-002: On May 12, 2019, at 10:39 hours the reactor was manually tripped due to a Significant Loss of PSW. Reactor trip was due to loss of BOP 23 on hawk strike while Radial Well 3 out of service.