

Mail Envelope Properties (3F8DA9CB.47F : 21 : 1151)

Subject: Alarm Response Drafts
Creation Date: 10/15/03 4:09PM
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BKV (Bhalchandra Vaidya)

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WBRICE CC (BRICE, WILLIAM B), Docket No. 50-416, TAC No. MB 8939

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Files	Size	Date & Time
MESSAGE	415	10/15/03 04:09PM
Part.001	2029	
Alarms.PDF	379842	
Visio-G41 Medium FPCCU Overview.pdf		41953
Visio-E12 Medium Shutdown Cooling.pdf		125231
Mime.822	656846	

Options

Expiration Date: None
Priority: Standard
Reply Requested: No
Return Notification: None

Concealed Subject: No
Security: Standard

From: "CRAWFORD, MATTHEW L" <MCRAWF1@entergy.com>
To: "bkv@nrc.gov" <bkv@nrc.gov>
Date: 10/15/03 4:11PM
Subject: Alarm Response Drafts

Bhalchandra,

The attached information is provided for your information only and has not been reviewed nor approved by GGNS management. The information contains a description of alarms that are encountered if there were a draindown path from the upper containment pools. Also two drawings are provided for your information.

Thanks,

Matt Crawford

Nuclear Safety and Licensing

Grand Gulf Nuclear Station

CC: "BRICE, WILLIAM B" <WBRICE@entergy.com>

Alarms During Potential Draindown

During a refueling outage when the water level in the upper containment reactor cavity is ≥ 22 ft 8 inches over the top of the reactor pressure vessel flange with the head off the reactor vessel, alarms will annunciate in the following order if a leak occurs in the reactor or associated piping:

1G41-L601 – This level alarm (Fuel Pool Drain Tank Level Low) is annunciated on the Main Control Room panel 1H13-P680, at location P680-4A2-D6. This is not a direct pool level monitoring alarm, but is a Fuel Pool Cooling and Cleanup system (FPCCU) drain tank level alarm. As such, it is more sensitive to level changes than a direct fuel pool level monitor. During refueling outages, the upper pool water levels are maintained by overflowing the skimmers around the periphery of the pools into the drain tank, where the FPCCU system pumps take suction. The water pulled from the drain tank is pumped through the filters and heat exchangers back to the upper pools. Any loss of water from the reactor or connected piping would lower the upper pool levels, which would in turn gradually reduce the amount of water overflowing the skimmers. As a result the drain tank level to drop due to the constant flow pulled from the tanks by the pump suction. A pool level drop of a few inches would completely halt return flow, causing the drain tank level alarm within minutes.

1G41-L602 - This level alarm (Fuel Pool Drain Tank Level Lo-Lo) is annunciated on the Main Control Room panel 1H13-P680, at location P680-4A2-C7. This alarm functions in the same manner as described above for the drain tank low level, but is set at a lower drain tank level to let operators know the FPCCU pumps tripped due to loss of suction from the drain tank.

1G41-L600 – This level alarm (Fuel Pool Level Trouble) is annunciated on Main Control Room panel 1H13-P680, at location P680-4A2-A6. This alarm annunciates when the upper pool level drops approximately 1.33 feet below normal operating level. This is a direct indication of Fuel Pool level, and indicates either a high or low level condition exists (it also alarms on high pool level).

No other level alarms are activated until the level drops below the reactor flange. However, other alarms may annunciate depending upon plant conditions:

Various sump alarms would annunciate for leaks into their respective areas. All the ECCS pump rooms are equipped with sumps, including both RHR Shutdown cooling rooms. These sumps are required to be in service if their respective system is required. Additionally, the Auxiliary Building (Reactor Building) sumps also would annunciate upon high levels, indicating a leak into their respective areas. All of the above mentioned sumps annunciate a high level alarm into the Main Control Room. If the leak were into

the Drywell or Undervessel area, sumps there also provide annunciation in the Main Control room.

If irradiated fuel is located in the Containment or Spent Fuel pools, lowering of pool level would cause elevated radiation levels, bringing in the Area Radiation Monitor alarm in the Main Control room. This would be an indirect indication of a reduction in pool level, resulting in reduced shielding and increased radiation levels.

Once level drops into the reactor vessel, the following actions/alarms will occur:

1C34-L604 – The Reactor Feed Pump/Main Turbine Level 9 Trip alarm P680-4A2-D1 would be sealed in at normal high water level in the pools. This annunciator, located on Main Control room panel 1H13-P680, would clear at reactor level 9 (+56"). When this annunciator clears, it will go from a sealed in state to a slow flashing state and an audible tone will sound (3 chimes of a bell).

1E22-L638 - The High Pressure Core Spray alarm P601-16A-B3 would be sealed in at normal high water level in the pools. This annunciator, located on Main Control room panel 1H13-P601, would clear at reactor level 8 (+53.5"). When this annunciator clears, it will go from a sealed in state to a slow flashing state and an audible tone will sound (3 chimes of a bell).

1C34-L600 – The Reactor Level 40"/32" High/Low alarm P680-3A-A3 would be sealed in at normal high water level in the pools. This annunciator, located on Main Control room panel 1H13-P680, would clear at a reactor level of 40.7". When this annunciator clears, it will go from a sealed in state to a slow flashing state and an audible tone will sound (3 chimes of a bell). If reactor water level continues to go down, this alarm will annunciate and seal in solid when reactor water level reaches 32.7", providing a positive indication to the operators of a level problem within the reactor.

If reactor water level were to continue falling, the following are some alarms that would annunciate in the Main Control room at reactor level 3 (11.4" reactor coolant level):

On the P601 panel, two annunciators would come in that indicate the Division 1 and 2 Post Accident Monitoring recorders have started in fast speed.

On the P601 panel, two annunciators would come in that indicate the Division 1 and 2 ADS reactor level low confirmatory level 3 (11.4") was reached.

On the P680 panel, the Reactor Scram Trip annunciator would alarm. One of the inputs to this alarm is reactor water level has decreased below 11.4".

The operators are trained to respond to each alarm when it annunciates. The Operations Department Expectations and Standards section 11.2.2.b states the expectation that all annunciators will be announced and the Alarm Response Instructions for the particular alarm will be referenced.

Water overflows from the pool into skimmers or scuppers around the periphery of the pools and is collected in the fuel pool rain tank. The fuel pool drain tank is sized to contain the volume of water above the skimmer weirs which drains from the pools following a temporary loss of circulation. To preclude tank overflow, the fuel pool drain tank vent extends to an elevation above the maximum possible water level in the pools.



