

**Pacific Gas and Electric Company**

*Humboldt Bay Power Plant*

**TOM A. MOULIA**

*Plant Manager*

1000 King Salmon Avenue

Eureka, CA 95503

707/444-0700

May 29, 1997

PG&E Letter HBL-97-008



U.S. Nuclear Regulatory Commission

ATTN: Document Control Desk

Washington, D.C. 20555

Docket No. 50-133, OL-DPR-7

Humboldt Bay Power Plant, Unit 3

Licensee Event Report 3-97-002-00

Demineralized Water Tank

Dear Commissioners and Staff:

Pursuant to 10 CFR 50.73(a)(2)(i)(B), PG&E is submitting the enclosed Licensee Event Report regarding exceeding the low level limit on the demineralized water tank.

This condition did not affect the health and safety of the public.

Sincerely,

*Thomas K. Tyler for TAM*

TOM A. MOULIA

cc: Richard F. Dudley  
Kenneth E. Perkins  
Ellis W. Merschoff  
Humboldt Distribution  
INPO

Enclosure

HB3-97-QC-N004

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# LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) <b>Humboldt Bay Power Plant, Unit 3</b>	DOCKET NUMBER (2) <b>0 5 0 0 0 1 3 3</b>	PAGE (3) <b>1</b> OF <b>8</b>
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TITLE (4) **Demineralized Water Tank Level**

EVENT DATE (5)				LER NUMBER (6)				REPORT DATE (7)				OTHER FACILITIES INVOLVED (8)				
MON	DAY	YR	YR	SEQUENTIAL NUMBER				REVISION NUMBER		MON	DAY	YR	FACILITY NAMES			
4	25	97	97	0	0	2	0	0	5	29	97					

OPERATING MODE (9) **N** THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR (11)

POWER LEVEL (10) **0 0 0**

☒ 10 CFR 50.73(a)(2)(i)(B)  
 OTHER - \_\_\_\_\_  
 (Specify in Abstract below and in text, NRC Form 366A)

LICENSEE CONTACT FOR THIS LER (12)  
**David Sokolsky, Senior Licensing Engineer**

TELEPHONE NUMBER  
 AREA CODE **707** **444-0801**

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)									
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14) ☐ YES (If yes, complete EXPECTED SUBMISSION DATE) ☒ NO

EXPECTED SUBMISSION DATE (15) MONTH  DAY  YEAR

ABSTRACT (16)

On April 25, 1997, plant operators responded to a low level alarm in the spent fuel pool (SFP) by transferring water from the demineralized water tank (DWT) to fill the SFP to its normal level. Prior to the transfer, the operators calculated the amount of DWT water needed and determined that the DWT low level alarm would occur but that the DWT level would remain above the Technical Specification level of 2000 gallons upon completion of the transfer. The operators chose not to read an annunciator response guide (ARG) that requires the DWT to be refilled upon receipt of the DWT low level alarm. After completion of the water transfer, the operators observed that the DWT level dropped to 1900 gallons.

The root cause of the event was personnel error, cognitive, in that the operators did not review and follow the ARG upon receipt of the DWT low level alarm. Contributing causes were the operators did not take into account other DWT water usage, and did not account for limitations of the SFP level recorder when used as indication for a change in DWT volume. Corrective actions to prevent recurrence include positive discipline for the responsible employees and enhancing procedures to address the causes of this event.

# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (5)				PAGE (3)	
Humboldt Bay Power Plant, Unit 3	0   5   0   0   0   1   3   3	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		97	- 0 0 2	- 0 0	2	OF	8

TEXT (17)

I. Plant Conditions

Unit 3 was in a SAFSTOR decommissioning mode.

II. Description of Problem

A. Event Description:

On April 25, 1997, HBPP operators received a low level alarm (DA)(LA) in the spent fuel pool (SFP) (DA)(TK). The SFP low level alarm occurred due to normal evaporation and is set at a level of 10.67 feet. Equipment Description and Operating Instruction (EDOI) B-1, Spent Fuel Pool, requires filling the SFP to its normal level from the demineralized water tank (DWT) (KJ)(TK). Prior to filling the SFP, the operators held a tailboard to discuss how to perform the water transfer from the DWT to the SFP.

During the tailboard, the operators determined that the DWT contained approximately 3400 gallons. The operators calculated that they would need 1200 gallons from the DWT to bring the SFP to an adequate level. The operators calculated that transferring 1200 gallons of water directly from the DWT would leave 2200 gallons in the DWT. The Senior Control Operator, a Certified Fuel Handler (CFH), knew that the Technical Specifications require at least 2000 gallons in the DWT, and he thought that ample margin would be provided by leaving 2200 gallons in the DWT.

The operators recognized during the tailboard that the DWT low level alarm would occur at 3070 gallons in the DWT. However, the operators did not recall that DWT annunciator response guide (ARG) D-22, Demin. Water Tank Lo, requires that operators begin to refill the DWT when the low level alarm occurs, and that ARG D-22 contains an administrative limit that prohibits reducing the DWT level below 2717 gallons. The operators did not believe they needed to read ARG D-22 because (1) they thought they knew the content of the ARG, and (2) they knew in advance that the low level alarm would occur during the filling of the SFP. The operators made a conscious decision to transfer water from the DWT to the SFP, allow the DWT low level alarm to occur, and continue the transfer of water from the DWT, knowing that the amount of water they planned to transfer would not reduce the DWT level below the Technical Specification limit of 2000 gallons. The operators intended to address the DWT low level alarm by refilling the DWT immediately after the water transfer to the SFP was complete.

Normally during the transfer of water from the DWT to the SFP, one operator is stationed in the control room to observe the SFP circular chart recorder for level indication, and one operator is stationed in the refueling building (RFB) to physically manipulate valves to transfer the water. The DWT water gage is located locally on the DWT which is in the yard outside of the RFB. The actual DWT gage level is not observed during the transfer because the operators believe

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)	
Humboldt Bay Power Plant, Unit 3	0   5   0   0   0   1   3   3	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	3   OF   8		
		97	- 0 0 2	- 0 0			

TEXT (17)

the SFP level indication, along with a conversion table, is reliable for estimating the change in DWT level.

During this event, the operators transferred DWT water to the SFP in accordance with the normal routine described above. As a result, the operator in the control room used the SFP level circular chart recorder (which reads in feet) along with a conversion table, to determine the quantity of water transferred (in gallons). When this assessment determined that 1200 gallons had been added to the SFP, the operators terminated the transfer.

Following the transfer of water from the DWT to the SFP, one of the operators went to the DWT and observed that the DWT level gage indicated 52.5 inches, which equates to approximately 1900 gallons. As originally intended, the operators began to refill the DWT within 20 minutes after the completion of the transfer of water to the SFP. Since their calculations determined 1200 gallons were transferred into the SFP, the operators questioned the validity of the DWT level gage indication. Shortly thereafter, the operators informed the Shift Foreman, and they began to investigate the DWT level gage accuracy. The next day, the operators confirmed DWT level gage accuracy.

Further investigation revealed that the 300 gallon decrease in DWT level below 2200 gallons was due to the following two factors: (1) use of the SFP level recorder, and (2) additional DWT usage by other plant personnel. Regarding the first factor, the SFP level recorder was used as a reference to determine the volume of water that could be removed from the DWT. The SFP level recorder has been determined to be accurate to within 0.6 inches, which equates to approximately 200 gallons of water in the SFP. Regarding the second factor, the operators failed to account for additional usage of demineralized water by other site personnel. The DWT is the only source of domestic water for HBPP Unit 3 other than the fire suppression system. There is no requirement for other personnel using demineralized water to inform the control room. It was later determined that approximately 100 gallons of water were taken from the DWT by other personnel while the operators were transferring water to the SFP. Thus, the 300 gallon difference in DWT level was due to 200 gallons from using the SFP level recorder and 100 gallons from other personnel using the DWT.

### B. Discovery:

On April 25, the CFH and the Shift Foreman had a discussion regarding the potential for the DWT level to have dropped below 2000 gallons. They determined that further investigation was warranted regarding the accuracy of gage indications. As a result, one of the operators reviewed the DWT tank level data on April 26. The operator verified the DWT gage was accurate, and confirmed that the DWT level did indeed go below the Technical Specification limit of 2000 gallons. He informed the Shift Foreman, who in turn informed the Supervisor of Operations. The Supervisor of Operations scheduled a technical

# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						PAGE (3)	
Humboldt Bay Power Plant, Unit 3	0   5   0   0   0   1   3   3	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER				OF	8
		97	- 0 0 2	- 0 0				4	

TEXT (17)

review group (TRG) meeting to review the event and determine reportability. The TRG meeting was necessary to determine the reportability because Technical Specification violations may or may not be reportable depending upon the circumstances, e.g., not exceeding a limiting condition of operation. A review of the guidance provided in NUREG-1022 was necessary to finalize reportability determination. On April 29, the TRG reviewed the event, in conjunction with NUREG-1022 guidance, and determined that the event was reportable.

C. Inoperable Structures, Components, or Systems that Contributed to the Event:

None.

D. Dates and Approximate Times for Major Occurrences:

April 25, 1997

Event Date: During the transfer of water from the DWT to the SFP, the water level in the DWT appeared to have dropped below Technical Specification limits.

April 26, 1997

Operators reviewed data, verified DWT gage accuracy, and confirmed that DWT level dropped below Technical Specification limits.

April 29, 1997

Discovery Date: Following confirmation of the DWT level readings, a TRG was convened and the TRG members determined that the event was reportable.

E. Other Systems or Secondary Functions Affected:

None.

F. Method of Discovery:

Shift Foreman review of operations logs and discussions with the CFH determined that the recorded data (approximately 1900 gallons in the DWT) required further evaluation to determine if the DWT level fell below 2000 gallons. This evaluation confirmed that the DWT level had in fact decreased to approximately 1900 gallons. Additional evaluation in the TRG process determined the event was reportable.

G. Operator Actions:

As intended, the operators began to refill the DWT within 20 minutes after the completion of the transfer of water to the SFP. Shortly thereafter, the DWT level was restored above the Technical Specification limit of 2000 gallons.



## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)		
Humboldt Bay Power Plant, Unit 3	0   5   0   0   0   1   3   3	YEAR		SEQUENTIAL NUMBER		REVISION NUMBER	
		97	-	0 0 2	-	0 0	5   OF   8

TEXT (17)

### H. Safety System Responses:

None.

### III. Cause of the Problem

#### A. Immediate Cause:

The immediate cause of this event was that the operators allowed the DWT level to drop below the Technical Specification limit while they transferred water from the DWT to the SFP.

#### B. Root Cause:

The root cause of this event was determined to be personnel error, cognitive, in that the operators acknowledged the low level alarm on the DWT, but did not follow the ARG and refill the DWT to avoid decreasing the DWT level below the administrative limit.

#### C. Contributory Cause:

1. A contributing cause of this event was that the SFP level recorder was used as an accurate indicator of volume for water being transferred from the DWT. The SFP level recorder is only accurate to within 0.6 inches of SFP level, which equates to an error of approximately 200 gallons.
2. A contributing cause of this event was identified to be personnel error in that the operators did not consider additional water usage from the DWT by other personnel during the transfer of water to the SFP. Approximately 100 gallons of water were taken from the DWT by other personnel while the operators were transferring water to the SFP
3. A contributing cause of this event is that the procedure used to fill the SFP could be enhanced to address the possibility of DWT low level alarm initiation during the course of filling the SFP, and to provide references for the operator to exercise the appropriate immediate response.

### IV. Analysis of the Event

The DWT is the primary water supply to fill the SFP. As backup, the fire suppression system is available to fill the SFP. At no time during this event did the SFP level drop below the Technical Specification limit of +10.5 feet. This event actually resulted in raising the SFP level from approximately 10.68 feet to 10.97 feet.

# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (5)			PAGE (3)	
Humboldt Bay Power Plant, Unit 3	0   5   0   0   0   1   3   3	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	6   OF   8	
		97	- 0 0 2	- 0 0		

TEXT (17)

The SFP water provides a radiation shield from the spent fuel. If the SFP level should drop significantly, the effectiveness of the shielding would be reduced considerably, causing the radiation level within the RFB to increase. Because the SFP level increased during the event, no margin of safety was affected.

Fire protection for the access shaft area is provided by the fire suppression system, portable fire extinguishers, and the DWT. If a fire occurred in the access shaft when the DWT level was at 1900 gallons, the DWT could have provided fire protection for approximately 25 minutes (assuming a demineralized water pump capacity of 75 gpm). This is more than sufficient time to implement additional fire fighting resources to suppress an access shaft fire.

Based on the above information, the health and safety of the public were not affected by this event.

## V. Corrective Actions

### A. Immediate Corrective Actions:

1. Night orders were issued reminding all operators to stop draining water from the DWT if a low level alarm occurs under non-emergency conditions.

### B. Corrective Actions to Prevent Recurrence:

1. The event was discussed with the responsible employees. The positive discipline program will be applied to the two employees involved.
2. EDOI B-1 will be revised to provide enhanced instructions for adding water to the SFP, including as a minimum (1) filling the DWT prior to filling the SFP, if necessary, to prevent a DWT low level alarm when filling the SFP in non-emergency situations, (2) identifying actions associated with the DWT low level alarm setpoint when annunciated in the course of filling the SFP, and (3) clearly describing the limitations of the control room indication for SFP level.
3. ARG D-22 and EDOI D-1, Demineralized Water System, will be revised to align the DWT administrative limit with the requirement to stop draining the DWT when the low level alarm occurs.

## VI. Additional Information

### A. Failed Components:

None.

## LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)						PAGE (3)	
Humboldt Bay Power Plant, Unit 3	0   5   0   0   0   1   3   3	YEAR		SEQUENTIAL NUMBER		REVISION NUMBER			
		97	-	0	0	2	-	0	0

TEXT (17)

**B. Previous LERs on Similar Events:**

One of the many issues addressed in LER 3-95-003-00, dated November 27, 1995, (PG&E Letter HBL-95-059) involved improper operator response to plant alarms. While the current LER also involves improper operator response to a plant alarm, details of the two events point to significantly different causes and the need for different corrective actions.

The event in LER 3-95-003-00 pertained to an unsampled and unfiltered discharge of radioactive liquid waste. During that event, a liquid radioactive waste batch discharge was in progress when the liquid release pathway process monitor alarmed and tripped the radwaste pumps and the caisson sump pump. In an attempt to prevent caisson sump overflow, the operators flushed 10 gallons of unfiltered water into the plant discharge. The root cause was determined to be knowledge exceeded in that the operators did not understand the consequences of flushing contaminated water from the line through the process monitor to the canal. Contributory causes in LER 3-95-003-00 included lack of adequate written instructions, lack of operator knowledge and operators ignoring the alarm. Corrective actions associated with these issues included an extensive systems training class for all operators (80 hours), creation and application of Unit 3 qual cards for non-CFH operators, establishment of a CFH mentor program for all non-CFH operators, and development of ARGs.

The current LER is similar to LER 3-95-003-00 in that operators received an alarm and did not respond in an appropriate manner. When the operators received the alarm in the current LER, they should have read ARG D-22. The steps in ARG D-22 require filling the DWT before its level drops below 2717 gallons. The operators knew ahead of time that the DWT low level alarm would occur. They had discussed it at a tailboard held prior to the transfer of water to the SFP. The operators understood the systems involved and had been trained on the use of ARGs. Nevertheless, the operators made a conscious decision to begin the transfer of water from the DWT to the SFP, allow the DWT low level alarm to occur, and continue the transfer of water from the DWT without reading ARG D-22, believing there were no additional restrictions and that they could prevent the DWT level from going below the Technical Specification limit of 2000 gallons.

The major difference between this event and the event discussed in LER 3-95-003-00 pertains to the level of knowledge and training related to the systems involved. In the event discussed in LER 3-95-003-00, the operators did not have sufficient knowledge of the systems and therefore did not understand the consequences of their actions. The Senior Control Operator in the current event was a CFH and had the benefit of the systems training. The Control Operator in the current event had been qualified on Unit 3 systems. Both had received training on the ARGs. Thus, the operators in the current event had been provided with the tools needed to complete the water transfer without violating the Technical Specifications.



# LICENSEE EVENT REPORT (LER) TEXT CONTINUATION

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)				PAGE (3)	
		YEAR		SEQUENTIAL NUMBER		REVISION NUMBER	
Humboldt Bay Power Plant, Unit 3	0   5   0   0   0   1   3   3	97	-	0   0   2	-	0   0	8   OF   8

TEXT (17)

Based on plant operations since implementation of the corrective actions for LER 3-95-003-00, HBPP management has deemed that these corrective actions have been effective. Therefore, the problem in the current LER has been determined to be an isolated incident, not indicative of a failure in the implementation of the previous corrective actions.