Entergy

**Entergy Operations, Inc.**
River Bend Station
5485 U.S. Highway 61N
St. Francisville, LA 70775
Tel 225 381 4157
Fax 225 635 5068
dlorfin@entergy.com

**David N. Lorfing**
Manager-Licensing

RBG-47041

June 16, 2010

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

Subject: Licensee Event Report 50-458 / 10-001-00
River Bend Station – Unit 1
Docket No. 50-458
License No. NPF-47

File No. G9.5

RBF1-10-0099

Dear Sir or Madam:

In accordance with 10CFR50.73, enclosed is the subject Licensee Event Report. This document contains no commitments. If you have any questions, please contact me 225-381-4157.

Sincerely,

David N. Lorfing
Manager – Licensing

DNL/dhw
Enclosure

IE22
NRR

cc: U. S. Nuclear Regulatory Commission
Region IV
612 East Lamar Blvd., Suite 400
Arlington, TX 76011-4125

NRC Sr. Resident Inspector
P. O. Box 1050
St. Francisville, LA 70775

INPO Records Center
E-Mail (MS Word format)

Mr. Jim Calloway
Public Utility Commission of Texas
1701 N. Congress Ave.
Austin, TX 78711-3326

Mr. Jeffrey P. Meyers
Louisiana Department of Environmental Quality
Attn: OEC-ERSD
P.O. Box 4312
Baton Rouge, LA 70821-4312

NRC FORM 366 (9-2007) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 08/31/2010

Estimated burden per response to comply with this mandatory collection request: 50 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F52), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to infocollects@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

# LICENSEE EVENT REPORT (LER)

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

| 1. FACILITY NAME | 2. DOCKET NUMBER | 3. PAGE |
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**4. TITLE**
Control Building Chiller Inoperable Greater Than Allowable Outage Time

| 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 |
| | | | | | | | | | | 05000 |
| 04 | 22 | 2010 | 2010 | - 001 - | 00 | 06 | 16 | 2010 | FACILITY NAME | DOCKET NUMBER 05000 |

**9. OPERATING MODE**
1

**10. POWER LEVEL**
100

**11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§:** *(Check all that apply)*

| | | | |
|---|---|---|---|
| ☐ 20.2201(b) | ☐ 20.2203(a)(3)(i) | ☐ 50.73(a)(2)(i)(C) | ☐ 50.73(a)(2)(vii) |
| ☐ 20.2201(d) | ☐ 20.2203(a)(3)(ii) | ☐ 50.73(a)(2)(ii)(A) | ☐ 50.73(a)(2)(viii)(A) |
| ☐ 20.2203(a)(1) | ☐ 20.2203(a)(4) | ☐ 50.73(a)(2)(ii)(B) | ☐ 50.73(a)(2)(viii)(B) |
| ☐ 20.2203(a)(2)(i) | ☐ 50.36(c)(1)(i)(A) | ☐ 50.73(a)(2)(iii) | ☐ 50.73(a)(2)(ix)(A) |
| ☐ 20.2203(a)(2)(ii) | ☐ 50.36(c)(1)(ii)(A) | ☐ 50.73(a)(2)(iv)(A) | ☐ 50.73(a)(2)(x) |
| ☐ 20.2203(a)(2)(iii) | ☐ 50.36(c)(2) | ☐ 50.73(a)(2)(v)(A) | ☐ 73.71(a)(4) |
| ☐ 20.2203(a)(2)(iv) | ☐ 50.46(a)(3)(ii) | ☐ 50.73(a)(2)(v)(B) | ☐ 73.71(a)(5) |
| ☐ 20.2203(a)(2)(v) | ☐ 50.73(a)(2)(i)(A) | ☐ 50.73(a)(2)(v)(C) | ☐ OTHER |
| ☐ 20.2203(a)(2)(vi) | ☒ 50.73(a)(2)(i)(B) | ☐ 50.73(a)(2)(v)(D) | Specify in Abstract below or in NRC Form 366A |

**12. LICENSEE CONTACT FOR THIS LER**

| FACILITY NAME | TELEPHONE NUMBER (Include Area Code) |
|---|---|
| David N. Lorfing, Manager – Licensing | 225-381-4157 |

**13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT**

| CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX | CAUSE | SYSTEM | COMPONENT | MANU-FACTURER | REPORTABLE TO EPIX |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |

**14. SUPPLEMENTAL REPORT EXPECTED**

☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO

**15. EXPECTED SUBMISSION DATE**

| MONTH | DAY | YEAR |
|---|---|---|
| | | |


ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On April 22, 2010, an engineering evaluation determined that safety-related chillers serving the main control room envelope had been operated in a configuration outside design parameters, such that the chillers could not be assumed to be operable under all conditions. Specifically, that evaluation and review of operating logs concluded that there was a period beginning in November 2009 when one of the operating chillers was actually inoperable, and was in that condition for a time greater than the allowable outage time cited in the applicable Technical Specifications. Also during this time, a second chiller was inoperable for approximately ten days.

This condition was caused by an error in the design basis documentation of the chiller. Actions are being taken to correct this error, and operating procedures have been revised to incorporate the updated information. This condition is being reported in accordance with 10CFR50.73(a)(2)(i)(B) as operations prohibited by Technical Specifications.

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REPORTED CONDITION

On April 22, 2010, an engineering evaluation determined that safety-related chillers (**CHU**) serving the main control room envelope had been operated in a configuration outside design parameters, such that the chillers could not be assumed to be operable under all conditions. Specifically, that evaluation and review of operating logs concluded that there was a period beginning in November 2009 when one of the operating chillers was actually inoperable, and was in that condition for a time greater than the allowable outage time cited in the applicable Technical Specifications. Also during this time, a second chiller was inoperable for approximately ten days. This condition is being reported in accordance with 10CFR50.73(a)(2)(i)(B) as operations prohibited by Technical Specification 3.7.3 Conditions A and B.

BACKGROUND

The control building chilled water system (VI) is designed to remove heat to maintain the required environmental conditions. The control building chilled water system is a closed loop cooling water system and provides continuous flow of chilled water to the building air conditioning units. The chilled water is supplied by two independent trains. Each chilled water train consists of two 100-percent capacity electric driven centrifugal liquid chillers (HVK-CHL1A through D), two 100-percent capacity chilled water pumps, two 100-percent capacity service water pumps, one chilled water compression tank, associated piping, valves, instrumentation, and controls. The service water pumps provide cooling water to the chiller condensers and the safety-related standby service water system acts as the ultimate heat sink.

Each HVK chiller is served by a service water recirculation pressure control valve (PCV) that is automatically modulated by chiller condenser pressure, which maintains condenser pressure in the acceptable range. With the PCV is gagged open (allowing full service water flow), and the service water temperature is lower than design values, the overall pressure differential from saturated evaporator to saturated condenser decreases. Each of the two chiller internal refrigerant flow control valves will experience a lower differential pressure and will not be able to accommodate refrigerant full flow at extremely low differential pressures. Subsequently, the chiller is susceptible to an automatic trip due to low evaporator pressure.

CAUSAL ANALYSIS

In 1988, an equipment modification (M87-0719) uprated the HVK chillers from 50% capacity to 100%. Prior to this modification, the minimum required condensing water temperature supplied by normal service water (SWP) and the safety-related standby service water (SSW) to the HVK chillers was 55 degrees F. M87-0719 changed the following:

- Service water flow rate from 530 gpm to 630 gpm
- Leaving chilled water temperature from 45 deg. F to 52.5 deg. F
- Entering chilled water temperature from 58.9 deg. F deg. F to 67.5 deg. F
- Chiller evaporator temperature from 41.3 deg. F to 48.6 deg. F
- Return chilled water temperature switch set-point to operate the hot gas bypass valve from 46 deg. F to 53.5 deg. F.

M87-0719 did not address the required minimum condenser cooling water temperature. No request was made to the chiller's manufacturer to determine whether the minimum required condensing water temperature of 55 deg. F was affected by the modification. Hence, the minimum condensing water temperature listed in the vendor manual was not changed by M87-0719.

In 1993, an engineering evaluation was performed to determine the effects of operating the HVK chillers with low service water temperature with the PCV gagged open. Based on input from the vendor, this evaluation erroneously determined that full service water flow through the chiller was acceptable with standby service water temperature above 55 deg. F.

In 1995, another evaluation was performed concerning operation of the HVK chillers with the PCV gagged open. As a result of not using the updated information developed in M87-0719, it was again concluded that operation of the chillers in this configuration was acceptable provided that standby service water temperature was above 55 deg. F.

On February 10, 2010, the PCV on HVK chiller "C" failed in the full open position. On March 2, 2010, a Condition Report was initiated to provide a documented evaluation of chiller availability with a standby service water temperature of 53.5 deg. F. The chiller vendor was contacted for assistance. The vendor subsequently provided an analysis which concludes that the revised chiller design parameters implemented by M87-0719 limited the control building chiller's ability to operate at lower entering condensing water temperatures. The analysis determined that the minimum required condensing water temperature for a chiller operating at full load and the PCV gagged in the full open position was 70 deg. F.

A review of operating logs was performed to determine whether there were periods in the past during which a chiller was operated with its PCV gagged open while it was being considered operable. Also, daily recorded values for standby cooling tower basin temperature were retrieved and compared to the chiller data. This review determined that for a period beginning on November 17, 2009, chiller "D" was operated with its PCV gagged open while standby service water temperature was less than 70 deg. F. There were other periods in 2009 during which the "D" chiller was operated in this condition, but none of those other periods exceeded the allowable outage time.

The investigation of this event determined that it was caused by the failure of the equipment modification performed in 1985 to identify the need for increased service water temperature requirements resulting from the chiller design change. The subsequent evaluations performed in 1993 and 1995 represent missed opportunities to correct this error.

## IMMEDIATE CORRECTIVE ACTIONS

Operations procedures have been revised to require that chillers be declared inoperable and unavailable when their PCVs are gagged open.

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CORRECTIVE ACTIONS TO PREVENT RECURRENCE

An engineering design change is being processed to incorporate the new minimum service water temperature requirements into the design basis for the HVK chillers.

PREVIOUS OCCURRENCE EVALUATION

A review of reportable events at River Bend Station since 2005 found no previous occurrences of a similar nature.

SAFETY SIGNIFICANCE

During the times when the PCV for chiller "D" was gagged, the chiller continued to operate and provide cooling to the main control room envelope using the normal service water system. While the allowable outage time for chiller "D" was exceeded, the redundant "B" chiller in that division was available to be returned to service to provide the safety function should that have been necessary. The availability of the redundant "B" chiller ensured that there was no loss of safety function. This event was of minimal significance with regard to the health and safety of the public.

(NOTE: Energy Industry Component Identification codes are annotated as (**XX**).)