GULF STATES UTILITIES COMPANY

RIVER BEND STATION POST OFFICE BOX 220 ST. FRANCISVILLE, LOUISIANA 70775

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May 6, 1991
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File Nos. G9.5, G9.25.1.3

U.S. Nuclear Regulatory Commission
Document Control Desk
Washington, D.C. 20555

Gentlemen:

River Bend Station - Unit 1
Docket No. 50-458

Please find enclosed Licensee Event Report No. 91-007 for River Bend Station - Unit 1. This report is submitted pursuant to 10CFR50.73.

Sincerely,

J. W. Leavines for

W. H. Odell
Manager - Oversight
River Bend Nuclear Group

LAE/PDG/GAB/DCH/AS/JLB/pj

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NRC FORM 366 (6-89)

U.S. NUCLEAR REGULATORY COMMISSION

LICENSEE EVENT REPORT (LER)

APPROVED OMB NO. 3150-0104
EXPIRES: 4/30/92
ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
RIVER BEND STATION	0 5 0 0 0 4 5 8	1 OF 0 7

TITLE (4): Indeterminate Equipment Qualification Status of Resistance Temperature Detectors in the Standby Gas Treatment System

EVENT DATE (5)			LER NUMBER (6)					REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR		SEQUENTIAL NUMBER		REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
												0 5 0 0 0
0 4	0 4	9 1	9 1	-	0 0 7	-	0 0	0 5	0 6	9 1		0 5 0 0 0

OPERATING MODE (9)		THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)			
	1	20.402(b)	20.405(c)	50.73(a)(2)(iv)	73.71(a)
POWER LEVEL (10)	1 0 0	20.405(a)(1)(i)	50.36(c)(1)	50.73(a)(2)(v)	73.71(c)
		20.405(a)(1)(ii)	50.36(c)(2)	50.73(a)(2)(vii)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
		20.405(a)(1)(iii)	X 50.73(a)(2)(i)	50.73(a)(2)(viii)(A)	
		20.405(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(viii)(B)	
		20.405(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER
	AREA CODE
L. A. England, Director - Nuclear Licensing	5 0 4 3 8 1 1 - 1 4 1 1 5

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	
B	B H	I 2 6	P 4 2 7	Y		B	B H	I 2 6	P 4 2 7	Y	
B	B H	I 2 6	P 4 2 7	Y		B	B H	I 2 6	P 4 2 7	Y	

SUPPLEMENTAL REPORT EXPECTED (14)		EXPECTED SUBMISSION DATE (15)	MONTH	DAY	YEAR
YES (If yes, complete EXPECTED SUBMISSION DATE)	X NO				

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

On 4/4/91, with the reactor in Operational Condition 1 (Power Operation), it was determined that the equipment qualification status of Pyco resistance temperature detectors (RTDs) installed in the standby gas treatment system (SGTS) was indeterminate. It was later confirmed that the installation configuration of the RTDs was not qualified. Since this condition existed from the time of initial installation, the SGTS was potentially inoperable for a period of time in excess of the action statement of Technical Specification 3.6.5.4. Therefore, this event is reportable pursuant to 10CFR50.73(a)(2)(i)(b) as operation prohibited by the Technical Specifications.

Inspection and replacement of SGTS RTDs was initiated under Modification Request (MR) 91-0035. This MR was initiated to replace Pyco RTD Model 122-4030 with Pyco RTD Model 122-3046 which is a sealed design not requiring a thermowell. These new RTDs are seismically and environmentally qualified.

To estimate the safety significance of SGTS operability, a probabilistic safety assessment (PSA) was performed using ambient relative humidity values as a calculation input. The probability that the SGTS would not adequately mitigate the effects of a core damage event was calculated to be 5.36E-6 per year. This result is judged to be acceptable in view of the associated consequences of the accident scenario. Therefore, this event did not adversely affect the health and safety of the public.

REPORTED CONDITION

On 4/4/91, with the reactor in Operational Condition 1 (Power Operation), it was determined that the equipment qualification status of Pyco resistance temperature detectors (RTDs) (*26*) installed in the standby gas treatment system (SGTS) (*BH*) was indeterminate. It was later confirmed that the installation configuration of the RTDs (*26*) was not qualified. Since this condition existed from the time of initial installation, the SGTS was potentially inoperable for a period of time in excess of the action statement of Technical Specification 3.6.5.4. Therefore, this event is reportable pursuant to 10CFR50.73(a)(2)(i)(b) as operation prohibited by the Technical Specifications.

INVESTIGATION

A review of Pyco RTD documentation was performed by GSU as a result of a 10CFR21 notification issued by Niagara Mohawk Power Corporation regarding Pyco RTDs. The RTDs provided by Stone and Webster Engineering Corporation (SWEC) for River Bend Station (RBS) were not installed to Pyco's designed and qualified configuration. SWEC Design Specification 247.461, and Pyco RTD drawings were reviewed. SWEC redesigned the original qualified Pyco configuration for Model 122-4030 RTDs (*26*) to allow installation without a thermowell to improve response time. This specific Pyco RTD model requires a thermowell in order to provide a moisture-proof seal per Pyco Test Report 16436-82N, Rev. 5. This deficiency could cause moisture intrusion into the RTDs electronic components resulting in failure of the RTDs. SWEC performed an engineering analysis of this configuration (installed under E&DCR P-41,000), and determined it to be qualified. However, the available information supporting this position was inadequate. Therefore, the RTDs could not be considered qualified.

SGTS EVALUATION

The SGTS (*BH*) is designed to limit fission product airborne release from the primary containment and auxiliary building following accident conditions to assure that off-site exposure is within 10CFR100 limits. The system is also used as a backup to the containment/drywell air purge system during normal or refueling operations. The system is comprised of two, 100% capacity, redundant, parallel air filtration assemblies (1GTS*FLT1A and 1B). Each filter (*FLT*) train assembly consists of the following: demister, electric heater, rough prefilter, high efficiency particulate air (HEPA) prefilter, charcoal adsorber, (*ADS*) HEPA afterfilter, exhaust fan (1GTS*FN1A or 1B), decay heat removal fan (1GTS*FN2A or 2B), dampers, ductwork, and instrumentation. To maintain the effectiveness of the charcoal adsorber, (*ADS*) electric heating elements operate as necessary to maintain acceptable relative humidity

The RTDs in question use the inlet (1GTS*RTD18A & 18B) (*26*) and the outlet temperatures (1GTS*RTD27A & 27B) (*2?*) to provide input to the differential controller. The differential controller energizes a heating element as necessary to maintain an acceptable humidity level of air entering the charcoal adsorber. With questionable RTD operability, the next concern was the overall operability of SGTS charcoal adsorbers (i.e., could SGTS mitigate the offsite dose consequences of a LOCA inside containment?).

GSU evaluated SGTS operability with inoperable RTDs. The method used was as follows:

1. Determination of the charcoal adsorber efficiency required to meet offsite dose requirements (efficiency of 99 percent maintains the 2-hour exclusion area boundary (EAB) thyroid dose of 293 Rem vs. regulatory limit of 300 Rem).

2. Determination of the SGTS inlet relative humidity which corresponds to the required charcoal efficiency (95.7 percent relative humidity allows 99 percent efficiency).

3. Provide Operations with guidance on maintaining the required SGTS relative humidity for LOCA conditions pending replacement of non-conforming RTDs. This involved calculating relative humidity as a function of temperature within the auxiliary building. The calculation assumed a conservative maximum temperature and 100 percent relative humidity for the annulus, and mixing of the annulus and auxiliary building air streams. Curves were provided for two accident conditions, based on the number of residual heat removal (RHR) divisions operable. Operation within the "safe" zone on either chart ensured that following a LOCA, SGTS inlet humidity would be less than or equal to 95.7 percent. These curves are provided in Figures 1 and 2.

Monitoring of auxiliary building temperature and relative humidity was initiated. SGTS operability was assured on the basis of monitoring, and use of the curves.

On 4/5/91, a concern was raised that the auxiliary building post-LOCA temperature and/or relative humidity could be increased by leakage (e.g., from ECCS pump seals). GSU reviewed this concern and determined that the post-LOCA increase in the auxiliary building humidity would be on the order of 1 percent. Therefore, the temperature/humidity curves were not affected.

Other RTD Applications

Field inspection of the SGTS RTDs on 4/5/91 indicated that their seismic qualifications were also questionable. This called into question six other Pyco RTDs (*26*) requiring evaluation:

1HVC*RTD44 A & B	-	Temperature signal for 1HVK*TV17A & B
1HVF*RTD1 A & B	-	Fuel building charcoal adsorber heater differential temperature
1HVF*RTD30 A & B	-	Fuel building charcoal adsorber heater differential temperature

The evaluation of the questionable RTDs proceeded in two directions.

1. Demonstrate operability of affected systems with inoperable RTDs.

2. Demonstrate the seismic adequacy of the questionable RTDs.

Fuel Building RTDs

Fuel Building RTDs do not need to meet either seismic or harsh environment qualifications. For the charcoal adsorbers in the fuel building HVAC filters, previous analyses (References 1 and 2) indicate that no heater circuit is needed. This is because the normal humidity levels in the fuel building will not degrade charcoal efficiency. Therefore, for continued safe operation at this time, no RTDs are required to be operable in the fuel building ventilation system (HVF) charcoal adsorber trains.

Control Building RTD Evaluation

1HVC*RTD44A & B provide the temperature signals for the automatic operation of 1HVK*TV17A & B, the chilled water valves for the standby switchgear room A and B ventilation system trains.

During a seismic event, loss of the RTDs could cause closure of the temperature control valves, isolating chilled water from the switchgear room HVAC. This could lead to overheating of the switchgear and failure of standby components. However, valves 1HVK*TV17A & B are now being regulated manually to provide the required control building chilled water flows.

Seismic Evaluation

An RTD was disassembled, and its constituent parts measured and weighed. Calculations revealed that the RTDs would remain structurally intact under seismic loads. Operability of the RTDs is assured since the stresses under seismic loading would not cause plastic deformation. Thus, the structural integrity of the internal components would be maintained under seismic loads. Therefore, seismic concerns do not affect the safety significance of Pyco RTDs.

CORRECTIVE ACTION

Inspection and replacement of SGTS RTDs was initiated under Modification Request (MR) 91-0035. This MR was initiated to replace Pyco RTD Model 122-4030 with Pyco RTD Model 122-3046 which is a sealed design not requiring a thermowell. These new RTDs are seismically and environmentally qualified.

MR 91-0035 had two objectives as follows:

1. To inspect the installed configuration of 1GTS*RTD1CA, 18B, 27A and 27B and determine if they were in the unqualified configuration.

2. Replace the RTDs with Pyco Model 122-3046 as required.

Work under MR 91-0035 began on Friday, April 5, 1990 at 0200. The inspection activity confirmed that the RTDs were in fact in the unqualified configuration and the RTDs were replaced.

The replacement of non-conforming RTDs under MR 91-0035 corrected the installed configurations. A review of all SWEC supplied Pyco drawings revealed that the Pyco Model 122-4030 RTDs were the only ones redesigned by SWEC.

SAFETY ASSESSMENT

Charcoal Adsorber Efficiency

Stone & Webster (SWEC) Calculation PR(c) 539-4 assumes a SGTS charcoal adsorber efficiency of 99 percent. This results in an exclusion area boundary (EAB) dose of 293 Rem at 2 hours following a LOCA (regulatory limit is 300 Rem). This is the limiting dose associated with this event. Based on data provided by the adsorber vendor (reference 3), GSU determined that 95 percent adsorber efficiency can be expected when relative humidity of the air entering the SGTS units is less than 95.7 percent (reference 4).

Assessment of Humidity During Plant Operation

Auxiliary Building relative humidity is not a continuously monitored parameter. Therefore, GSU has been unable to determine how often during commercial operation SGTS inlet relative humidity may have exceeded 95.7 percent. Instead, to estimate the safety significance of SGTS operability, a probabilistic safety assessment (PSA) was performed. It was assumed that SGTS inlet relative humidity would be equal to ambient relative humidity. National Oceanographic and Atmospheric Administration (NOAA) data (reference 5) for March 1990 through February 1991 was reviewed to determine the total number of hours that ambient relative humidity exceeded 95 percent. This amounted to 11.3 hours or 13.4 percent of this 12-month period.

An estimated core damage frequency (CDF) for River Bend was calculated to be 4.0E-5 per year using NUREG/CR-4550 data for Grand Gulf (reference 6). The SGTS would be needed to mitigate the effects of such a core damage event. From the NOAA data, 13.4 percent of the time SGTS inlet relative humidity may exceed 95 percent, decreasing the charcoal adsorber efficiency below 99 percent. Therefore, SGTS may not adequately mitigate the effects of a core damage event with a probability of 4.0E-5 * 0.134 = 5.36 E-6 per year.

In order to place this probability in perspective, it will be compared to the NRC's safety goal for large releases of 1.0E-6 per year. The probability of having a core damage event while the relative humidity is greater than 95 percent is approximately a factor of five greater than the NRC's safety goal. However, NRC's safety goal is for "large releases", which implies containment failure. The consequences of a scenario of this type (core damage followed by containment failure) are much more severe than those associated with a core damage event in which the containment remains intact with SGTS degraded due to high humidity.

Based on the above considerations, the probability of this event, and the safety significance of its associated consequences are judged to be acceptable.

Other LOCAs

LOCAs outside containment were also examined, and were determined not to be a consideration in the safety assessment for SGTS. LOCAs inside the Auxiliary Building will increase the humidity reaching the SGTS charcoal adsorbers, and degrade their performance. However, for offsite dose consequences, the design basis LOCA outside containment is a main steam line break (MSLB) in the main steam tunnel. The MSLB is an unfiltered release. Therefore, MSLB dose consequences would be more severe than those created by degraded SGTS adsorber efficiency following an Auxiliary Building LOCA.

Based on these considerations, this event did not adversely affect the health and safety of the public.

FACILITY NAME (1)	DOCKET NUMBER (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
RIVER BEND STATION	0 5 0 0 0 4 5 8	9 1	— 0 0 7	— 0 0	0 7 OF 0 7

TEXT (If more space is required, use additional NRC Form 366A's) (17)

REFERENCES:

1) Memorandum ED-88-1023
2) Calculation G13.18.9,9*12-0
3) File No. 6225-220-115E,
Suppliers Documentation Package
4) Memorandum EA-PM-91-0444
5) Memorandum - "Local Climatological
Data, Monthly Summary," NOAA,
National Weather Service Office,
Ryan Airport, Baton Rouge, La
6) Calculation G13.18.12.0*5-0

Figure 1

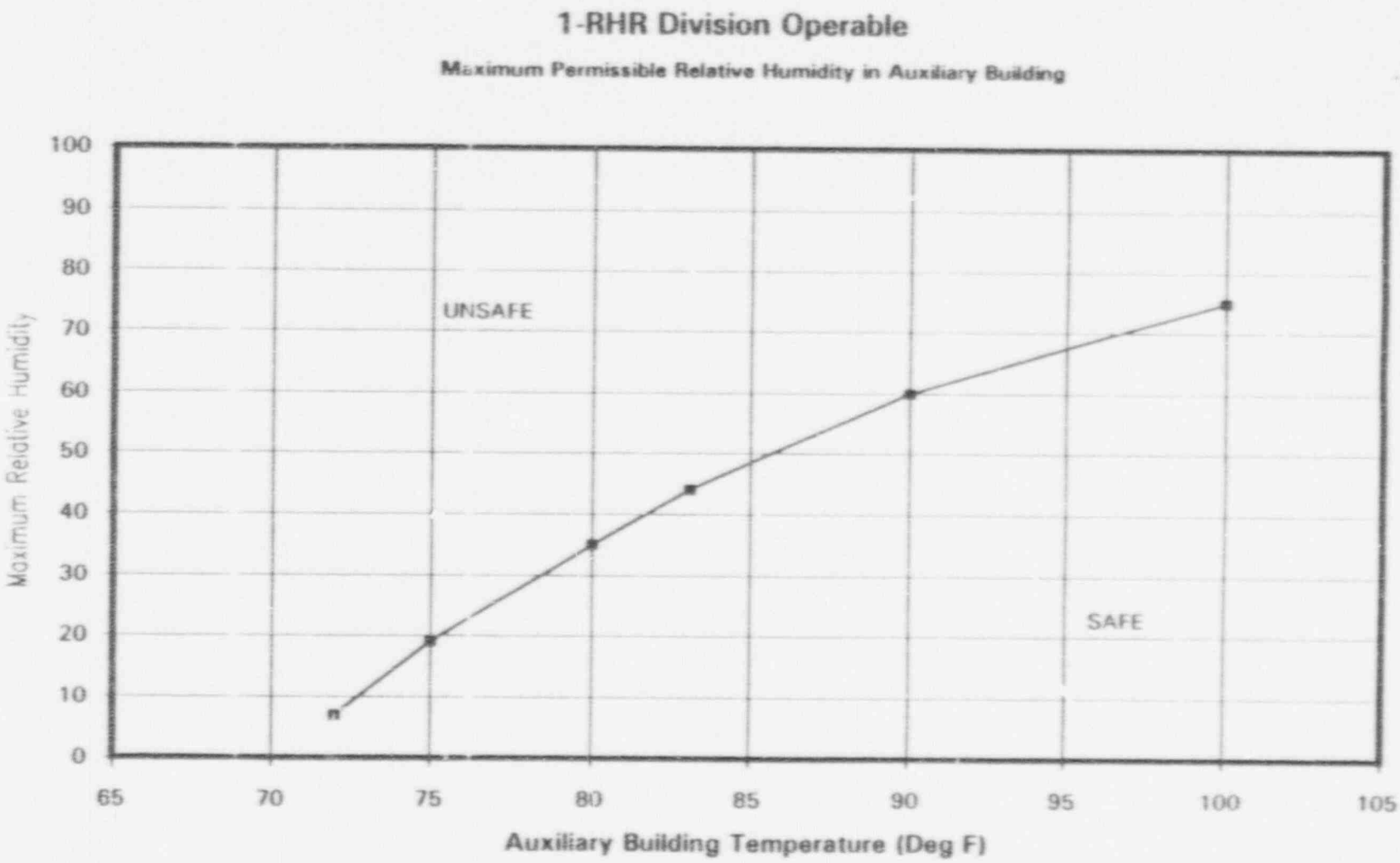
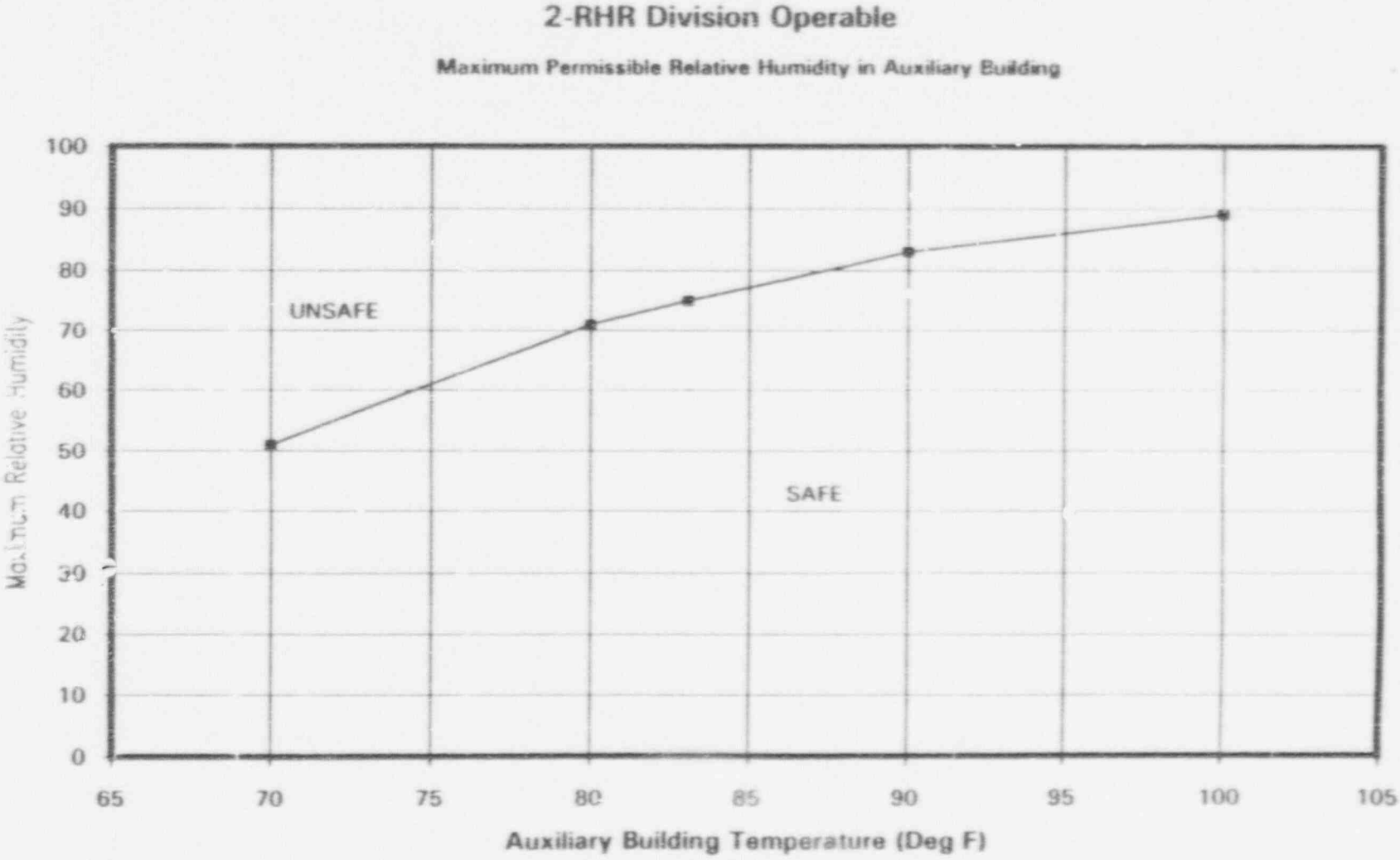

1-RHR Division Operable
Maximum Permissible Relative Humidity in Auxiliary Building
Maximum Relative Humidity
100
90
80
70
60
50
40
30
20
10
0
UNSAFE
SAFE
65
70
75
80
85
90
95
100
105
Auxiliary Building Temperature (Deg F)

Figure 2


2-RHR Division Operable
Maximum Permissible Relative Humidity in Auxiliary Building
Maximum Relative Humidity
100
90
80
70
60
50
40
30
20
10
0
UNSAFE
SAFE
65
70
75
80
85
90
95
100
105
Auxiliary Building Temperature (Deg F)