

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1) <b>McGUIRE NUCLEAR STATION, UNIT 1</b>	DOCKET NUMBER (2) <b>0 5 0 0 0 3 6 9</b>	PAGE (3) <b>1 OF 0 5</b>
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TITLE (4) **OPERATION ABOVE RATED THERMAL POWER BECAUSE THE NUMBER OF DECIMAL PLACES USED TO ADJUST PLANT OUTPUT WERE ROUNDED OFF**

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		
06	11	87	87	035	0001	05	08	88	DOCKET NUMBER(S) 0 5 0 0 0		

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §. (Check one or more of the following) (11)

OPERATING MODE (9) <b>1</b>	20.402(b)	20.405(e)	50.73(a)(2)(iv)	73.71(b)
POWER LEVEL (10) <b>100</b>	20.406(a)(1)(i)	50.38(c)(1)	50.73(a)(2)(v)	73.71(c)
	20.406(a)(1)(ii)	50.38(c)(2)	50.73(a)(2)(vi)	OTHER (Specify in Abstract below and in Text, NRC Form 366A)
20.406(a)(1)(iii)	<input checked="" type="checkbox"/> 50.73(a)(2)(i)	50.73(a)(2)(vii)(A)		
20.406(a)(1)(iv)	50.73(a)(2)(ii)	50.73(a)(2)(vii)(B)		
20.406(a)(1)(v)	50.73(a)(2)(iii)	50.73(a)(2)(ix)		

LICENSEE CONTACT FOR THIS LER (12)

NAME <b>STEVEN E. Le ROY, LICENSING</b>	TELEPHONE NUMBER AREA CODE <b>7 0 4 3 7 3 - 6 2 3 3</b>
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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 (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

Unit 1 computer logs for 05/20/87 - 06/11/87 indicate that Unit 1 may have operated slightly above 100% of rated thermal power as defined in Technical Specification Interpretation (TS) 1.25 - Definition of Rated Thermal Power. The discrepancy was discovered while computer printouts of Unit 1 power history were being reviewed. In each instance the average power over an eight hour shift was greater than 100% ; in the worst case the average was 100.1847%. A cause of Other has been assigned to this event because the number of decimal places to use in measuring or determining rated thermal power and/or a ruling on rounding off values had not been established. Also, the particular computer log used in the determination did not record a representative number of samples, was not intended for use in determining compliance with TS 1.25, and the statistical averaging of its data would neither prove nor disprove conclusively whether the unit actually exceeded 100% average power during particular eight hour periods. A computer program has been installed which maintains a continuous display of eight hour average power to preclude future problems of this type.

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

INTRODUCTION:

Unit 1 computer logs for May 20, 1987 through June 11, 1987, indicate that Unit 1 may have operated slightly above 100% of rated thermal power as defined in Technical Specification Interpretation 1.25 - Definition of Rated Thermal Power, on 20 separate occasions. The discrepancy was discovered while computer printouts of Unit 1 power history were being reviewed. In each instance the average power over an eight hour shift was greater than 100% ; in the worst case the average was 100.1847%. The average power is normally maintained at slightly below 100% power. Since plant processes fluctuate continuously, typically by one half a percent, the Control Room Operators found it necessary to round off the four decimal display to the closest one half percent. This rounded off value was the smallest increment that could be confirmed by instrument readings. A computer program has been installed which maintains a continuous display of the eight hour average power to preclude future problems with the number of decimal places used in computing the average power.

Unit 1 was in Mode 1, Power Operations, at 100% power, during the time of this event.

A cause of Other has been assigned to this event because the number of decimal places to use in measuring or determining rated thermal power and/or a ruling on rounding off values had not been established. Also, the particular computer log used in the determination did not record a representative number of samples, was not intended for use in determining compliance with Technical Specification 1.25, and the statistical averaging of its data would neither prove nor disprove conclusively whether the unit actually exceeded 100% average power during particular eight hour periods.

EVALUATION:

Background

Technical Specification Interpretation 1.25 - Definition of Rated Thermal Power, was prepared and approved to expand on the definition of rated thermal power. It was based on a memorandum by E. L. Jordan, Assistant Director for Technical Programs, DROI, OIE, dated August 22, 1980, titled Discussion of "Licensed Power Level". Included in the interpretation is the following definition:

The average power level as indicated by computer heat balance calculations over any eight hour shift should not exceed the "full steady state power level" of 3411 MWT. It is permissible to briefly exceed the "full steady state licensed power level" by as much as 2% for as long as 15 minutes. In no case should 102% full power be exceeded except for a nonrecurring transient situation.

This definition is used at McGuire Nuclear Station wherever "full power", "100% power", or "rated thermal power" are used in the Technical Specifications.

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TEXT (if more space is required, use additional NRC Form 308A's) (17)

The Thermal Outputs Program on the Operator Aid Computer (OAC) [EIAS:CPU] calculates a heat balance once each minute, and this value is normally displayed on a Control Room video display. The Control Room Operator may select the display format of his choice, i.e. in megawatts or percent, and where on the display the value is shown. It is used by Operations to monitor and control the unit power level. This value is also copied to the data logging programs once each hour.

There are several data logging programs on the OAC which record various plant parameters. The Performance Log is one of these programs which records 110 parameters once each hour, on the hour. These hourly "snap shots" record data on plant parameters which are of interest to the engineering staff for trending purposes. The majority of the data relates to plant efficiency, and includes the results of the heat balance calculations expressed both in megawatts and percent of rated thermal power. The data is read by the OAC once each hour, and stored in a two day write-over type of memory. A printout of the stored data is manually collected once each day by technical personnel. Since this program was designed primarily for plant staff which monitors efficiency, no provisions were made for routine monitoring by the Control Room Operators.

#### Description of Event

Operations shift personnel are responsible for maintaining the unit power level at the prescribed value. The power level is therefore monitored very closely on a continuous basis. The Operators are fully aware of the definition of rated thermal power, and the need to observe its limits. The OAC did not have any automatic averaging function, so the Operators monitored the eight hour shift average by performing manual calculations or making a mental note of the power history. The power level is recorded in a number of documents, but whole percent values such as 98% or 100% are used, without any decimal values.

The discrepancy was discovered on August 7, 1987 when a printout of the thermal power data in the Performance Log for May 20, 1987 through June 11, 1987 was made to use while evaluating the effects a feedwater flow constant had on the thermal power calculation. The eight hour averages of the power level were computed and the values that were above 100% were noted during a review of the evaluation. By this time, a new OAC program was being installed which continuously calculates the eight hour average power and displays the result on a Control Room video display. The new program includes alarms [EIAS:ALM] to alert the Operators when the average is exceeding the limit. Installation and shakedown of the program were completed by September 1, 1987.

As a result, no specific action was required to correct the discrepancy and the new program should preclude recurrence.

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TEXT: If more space is required, use additional NRC Form 366A (11/77)

Conclusion

The amount by which the twenty averages of the eight hourly readings exceeded rated thermal power was very small. All the averages were less than 100.1847%, thirteen of them were less than 100.1000%, and six were less than 100.0500%. Two factors must be considered when determining whether the unit was actually operating above 100%. The first is that the Performance Log only records an on the hour snap-shot and provides no information on what the power history was between the snap-shots. The second is that the thermal power calculation accuracy is +/- 2%, (note that the OAC program is not a precision heat balance) and that the amounts that the log shows that 100% was exceeded by are substantially smaller than this program accuracy.

All other instrumentation and recording devices, such as nuclear instrumentation and power meters, can be read essentially to the nearest whole percent or, at best, the nearest 0.5%. Therefore, there are no other references to substantiate the power levels to four decimal places.

The Operators use the output of the Thermal Outputs Program as their primary indication of unit power level, and confirm the indication with readings from other instrumentation. In their best judgement, evaluating to the nearest 0.5% was as close as could be reasonably considered, and generally to the nearest whole percent. While the Thermal Outputs Program could give four decimal places, these decimal places were not considered significant because the inputs to the program cannot be measured to that accuracy. When the 20 discrepant power averages are rounded to the nearest 0.5% , all readings round to 100.0% or less.

The eight data points from the Performance Log are insufficient to yield a conclusion. Although there are statistical methods which can be applied to situations with a small number of samples, these methods depend heavily on true random sampling. The hourly samples in the Performance Log do not meet the criteria for random samples. Therefore, statistical averages from the Performance Log must be used in an advisory sense only, until the sample size is sufficiently large for other statistical methods to apply. When the average is taken of all the hourly readings between May 20, 1987 and June 11, 1987, excluding those readings during a power reduction, it comes to 99.83897%.

Therefore, a cause of Other has been assigned because the required number of decimal places for thermal power readings and/or a ruling on rounding off values had not been established. Also, the particular computer log used in the determination did not record a representative number of samples, was not intended for use in determining compliance with Technical Specification 1.25, and the statistical averaging of its data would neither prove nor disprove whether the unit actually exceeded 100% average power during particular eight hour periods.

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TEXT (if more space is required, use additional NRC Form 366A (9-83))

A review of McGuire Licensee Event Reports (LER) indicates there have been no previous events of a similar nature; therefore, this event is considered an isolated event.

This event is not Nuclear Plant Reliability Data System (NPRDS) reportable.

CORRECTIVE ACTIONS:

Immediate: None

Subsequent: The Rated Thermal Power program was installed on the OAC on August 1, 1987, to provide a Control Room indication of the eight hour average power.

Planned: None

SAFETY ANALYSIS: The McGuire Safety Analysis includes a +/- 2% allowance for calorimetric error, and a 4% allowance for controller dead band and measurement error. The indicated overpower incidents in this report are substantially less than either of these two allowances. Therefore, this event does not represent a safety concern.

There were no personnel injuries, radiation overexposures, or releases of radioactive material as a result of this event.

This event is considered to be of no significance with respect to the health and safety of the public.

DUKE POWER COMPANY

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HAL B. TUCKER  
VICE PRESIDENT  
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January 5, 1988

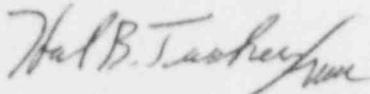
U.S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, D.C. 20555

Subject: McGuire Nuclear Station, Unit 1  
Docket No. 50-369  
Licensee Event Report 369/87-35

Gentlemen:

Pursuant to 10CFR 50.73 Sections (a)(1) and (d), attached is Licensee Event Report 369/87-35 concerning Unit 1 operating above rated thermal power. Be advised that at the time of the event, Duke determined the event not reportable. Subsequently, Duke has determined the event to be reportable. Therefore, this report is being submitted in accordance with 10CFR 50.73 (a)(2)(i)(B). This event is considered to be of no significance with respect to the health and safety of the public.

Very truly yours,



Hal B. Tucker

SEL/198/jgc

Attachment

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