NRC DISTRIBUTION FOR PART 50 DOCKET MATERIAL
(TEMPORARY FORM)

CONTROL NO: 4828

FILE: INCIDENT REPORT FILE

FROM:	DATE OF DOC	DATE REC'D	LTR	TWX	RPT	OTHER
Metropolitan Edison Co. Reading, Penna. R.C. Arnold	4-21-75	4-26-75	XX			

TO:	ORIG	CC	OTHER	SENT AEC PDR	SENT LOCAL PDR
NRC	1 Signed			XXX	XXXX

CLASS	UNCLASS	PROP INFO	INPUT	NO CYS REC'D	DOCKET NO:
	XXX			1	50-289

DESCRIPTION:

Ltr. reporting Abnorm. Occurr. # 75-10, on 4-10-75, concern. Reactor Criticality at 505° .....

ENCLOSURES:

F

PLANT NAME: Three Mile Island #1

POOR ORIGINAL

FOR ACTION/INFORMATION VCR 4-25-75

BUTLER (L) W/ Copies
CLARK (L) W/ Copies
GARR (L) W/ Copies
KNIEL (L) W/ Copies
SCHWENCER (L) W/ Copies
STOLZ (L) W/ Copies
VASSALLO (L) W/ Copies
PURPLE (L) W/ Copies
ZIEMANN (L) W/ Copies
DICKER (E) W/ Copies
KNIGHTON (E) W/ Copies
YOUNGBLOOD (E) W/ Copies
REGAN (E) W/ Copies
LEAR (L) W/ Copies
SPELS W/ Copies

INTERNAL DISTRIBUTION

REG FILE
NRC PDR
OGC, ROOM P-506A
GOSSICK/STAFF
CASE
GIAMBUSSO
BOYD
MOORE (L)
DEYOUNG (L)
SKOVHOLT (L)
GOLLER (L) (Ltr)
P. COLLINS
DENISE
REG OPR
FILE & REGION (2)
MIPC/PE (3)
STEELE

TECH REVIEW
SCHROEDER
MACCARY
KNIGHT
PAWLICKI
SHAO
** STELLO
** HOUSTON
** NOVAK
ROSS
IPPOLITO
TEDESCO
LONG
LAINAS
BENAROYA
VOLLMER

DENTON
** GRIMES
GAMMILL
KASTNER
BALLARD
SPANGLER

ENVIRO
MULLER
DICKER
KNIGHTON
YOUNGBLOOD
REGAN
PROJECT LDR

HARLESS

LIC ASST
R. DIGGS (L)
H. GEARIN (L)
E. GOULBOURNE (L)
P. KREUTZER (E)
J. LEE (L)
M. MAIGRET (L)
S. REED (E)
M. SERVICE (L)
S. SHEPPARD (L)
M. SLATER (E)
H. SMITH (L)
S. TEETS (L)
G. WILLIAMS (E)
V. WILSON (L)
R. INGRAM (L)

A/T IND
BRAITMAN
SALTZMAN
MELTZ

PLANS
MCDONALD
CHAPMAN
DUBE (Ltr)
E. COUPE
PETERSON
HARTFIELD (2)
KLECKER
EISENHUT
WIGGINTON
F. WILLIAMS
MANAUER

EXTERNAL DISTRIBUTION

1 – LOCAL PDR Harrisburg Penna.
1 – TIC (ABERNATHY) (1)(2)(10)
1 – NSIC (BUCHANAN)
1 – ASLB
1 – Newton Anderson
5 – ACRS SENT TO LIC ASST
** SEND ONLY TEN DAY REPORTS Teets

1 – NATIONAL LABS
1 – W. PENNINGTON, Rm E-201 GT
1 – CONSULTANTS
NEWMARK/BLUME/AGBABIAN

1 – PDR-SAN/LA/NY
1 – BROOKHAVEN NAT LAB
1 – G. ULRIKSON, ORNL
1 – AGMED (RUTH GUSSMAN) Rm B-127 GT
1 – J. D. RUNKLES, Rm E-201 GT

1482 281

7910260 562 S

METROPOLITAN EDISON COMPANY

POST OFFICE BOX 542 READING, PENNSYLVANIA 19603 TELEPHONE 215 – 929-3601

April 21, 1975
GQL 0952

Director
Directorate of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

Operating License DPR-50
Docket #50-289

In accordance with Technical Specifications for the Three Mile Island Nuclear Station Unit 1, we are herewith submitting abnormal occurrence report number AO 50-289/75-10. This submittal is being made one day after the required due date, as was dicussed by your office's Mr. D. Jaffe and our Mr. D. N. Grace.

(1) Report Number: AO 50-289/75-10

(2a) Report Date: April 21, 1975

(2b) Occurrence Date: April 10, 1975

(3) Facility: Three Mile Island Nuclear Generating Station Unit 1

(4) Identification of Occurrence:

Title: Reactor Criticality at 505°F

Type: An abnormal occurrence as defined by the Technical Specifications, paragraph 1.8b, in that Reactor Criticality at 505°F constitutes exceeding a Limiting Condition for Operating as contained in Specification 3.1.3.1.

(5) Conditions Prior to Occurrence:

A plant heatup was in progress, in preparation for a routine reactor startup, with major plant parameters as follows:

Power: Core: 0%

Elec.: 0 (Gross)

RC Flow: 105 x 10^6 lb/hr

RC Pressure: 2155 psig

RC Temp.: 505°F

1482 282

4028

PRZR Level: 100 in.

PRZR Temp.: 650°F

(6) Description of Occurrence:

While in the process of heating-up, prior to commencing a routine reactor start-up, the reactor went critical at 505°F, which is in violation of Technical Specification 3.1.3.1, wherein it is required that the reactor coolant temperature be greater then 525°F before going critical. Upon making the determination that the reactor was critical, the group 4 control rods were inserted from 100% withdrawn to 68% withdrawn, which served to shutdown the reactor. A reactivity balance was then conducted which showed the reactor to be shutdown by greater than 1% $\Delta K/K$.

(7) Designation of Apparent Cause of Occurrence:

The apparent cause of the occurrence is procedure, for reasons as follows:

a. Initial calculations had predicted that the reactor would go critical when both the Reactor Coolant System (RCS) temperature reached 532°F, and the RCS boron concentration had been decreased to 960 ppm. Further, for a RCS temperature of 532°F, it had been calculated that 21,000 gallons of demineralized water needed to be added to the RCS to achieve a boron concentration reduction from 1260 ppm to 960 ppm. Due to procedural inadequacies, however, while in the process of heating up addition of the 21,000 gallons of demineralized was completed when the RCS temperature was only 505°F, vice 532°F. This then resulted in excess positive reactivity being present due to the negative moderator temperature coefficient of reactivity.

b. An additional procedural inadequacy, (which was not discovered until the next reactor startup on April 14, 1975) was that the fuel reactivity versus EFPD curve, which is used in the procedure for calculating at what rod index the reactor will go critical, had not been up-dated to reflect the most current boron concentration versus fuel burn-up reactivity data (note: this data had been derived after about 10% of the total core burnup, as suggested by Technical Specification 4.10 "Bases"). Further, the failure to up-date the curve was such that there resulted a second component of excess positive reactivity in addition to that in a. above.

(8) Analysis of Occurrence:

The maximum power attained was 2×10^{-10} amps on the intermediate range neutron detectors. The power rise was terminated by operator action. In the event that no operator action was taken, the reactor would have been protected and the reactor power rise would have been terminated by negative Doppler effect, high reactor coolant system pressure trip or high neutron flux level trip. TMI-1 Safety Analysis, Chapter 14 of the FSAR, states that the thermal power would not have approached the design overpower condition and the peak pressure would not have exceeded the

allowable code limits. Based on the above, this event is not considered to have threatened the health and safety of the public.

(9) Corrective Action:

Prior to the next reactor startup, immediate corrective action was taken to prevent simultaneous heatup and deboration prior to 525°F, until proper procedural guidance is obtained.

The Plant Operations Review Committee (PORC) met shortly after the incident, approved the immediate corrective action, and in addition recommended to the Station Superintendent that the additional long term corrective actions be taken

a. update the Fuel Reactivity versus Core Burnup curve

b. all licensed operators review this occurrence prior to conducting a plant heatup

c. when decreasing the RCS boron concentration by more than 50 ppm while shutdown, plot 1/M (a measure of the neutron level count rate) versus the amount of water added to the RCS

d. when shutdown, record Source Range counts per second on a continuous recorder when decreasing RCS boron concentration.

The Station Superintendent reviewed and approved PORC's findings and has taken steps to ensure that item a. above is accomplished prior to the next reactor startup, and that items b, c, and d are also implemented.

(10) Failure Data:

Not Applicable.

Sincerely,

R. C. Arnold
Vice President

RCA:DNG:tas

cc: Directorate of Regulatory Operations, Region 1
U.S. Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

File: 20.1.1 / 7.7.3.5.1

1482 284