005

SHAW, PITTMAN, POTTS & TROWBRIDGE

A PARTNERSHIP OF PROFESSIONAL CORPORATIONS

1800 M STREET, N. W.

WASHINGTON, D. C. 20036

(202) 822-1000

TELECOPIER

(202) 822-1099 & 822-1159

RAPIFAX 100

(202) 822-1072

TELEX

89-2693 (SHAWLAW WSH)

CABLE "SHAWLAW"

JOHN F. DEALY*

B. SCOTT CUSTER, JR.

COUNSEL

RAMSAY D. POTTS, P.C.
STEUART L. PITTMAN, P.C.
GEORGE F. TROWBRIDGE, P.C.
STEPHEN D. POTTS, P.C.
GERALD CHARNOFF, P.C.
PHILLIP D. BOSTWICK, P.C.
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DEAN O. AULICK, P.C.

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C. THOMAS HICKS III, P.C.
CHARLES B. TEMKIN, P.C.
STEPHEN B. HUTTLER, P.C.
WINTHROP N. BROWN, P.C.
JAMES B. HAMLIN, P.C.
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ROBERT B. ROBBINS, P.C.
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DAVID M. RUBENSTEIN, P.C.
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VICTORIA J. PERKINS, P.C.
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PAUL M. THOMAS
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DAVID J. CYNAMON
SETH H. HOOGASIAN
SHEILA McC. HARVEY
DELISSA A. RIDGWAY
KENNETH J. HAUTMAN
DAVID LAWRENCE MILLER
FREDERICK L. KLEIN
STEVEN P. PITLER
RICHARD J. PARRINO
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L. DUANE CHEEK
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ANDREW D. ELLIS
RICHARD A. SAMP
THOMAS E. CROCKER, JR.
VICKI R. HARDING
PETER J. FERRARA
HELEN TORELLI

MARTHA BOONE ROWAN*
KENNETH R. MILLER
WENDELIN A. WHITE
STANLEY M. BARG
LESLIE K. SMITH
VIRGINIA S. RUTLEDGE
KATHERINE P. CHEEK
TRAVIS T. BROWN, JR.
RICHARD H. KRONTHAL
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SANDRA E. BRUSCA
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PAMELA H. ANDERSON
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JEFFREY J. A. GIBBS
LAURENCE W. COHEN
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ELLEN SHERIFF
ANITA J. FINKELSTEIN
EILEEN M. GLEIMER
DAVID R. SAHR
C. BOWDOIN TRAIN
JEFFREY W. KAMPELMAN
KENNETH A. GALLO
KENNETH D. ALERBACH
ALAN D. WASSERMAN
DAVID K. RYAN
RICHARD K. A. BECKER
WILBERT WASHINGTON II

* NOT ADMITTED IN D.C.

DOCKETED
USNRC

'84 MAR 21 P1:03

March 20, 1984

WRITER'S DIRECT DIAL NUMBER
822-1090

Mr. Samuel J. Chilk
Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

In the Matter of
Metropolitan Edison Company
(Three Mile Island Nuclear Station, Unit No. 1)
Docket No. 50-289

Dear Mr. Chilk:

Please find enclosed copies of the following documents, which contain information potentially relevant and material to matters under adjudication in the plant design and procedures phase of this proceeding, which is now before the Commission:

1. Letter 5211-84-2032, February 22, 1984, H. D. Hukill, GPU Nuclear, to J. F. Stolz, NRC, EFW Flow Instrumentation.

2. Letter 5211-84-2045, February 27, 1984, H. D. Hukill, GPU Nuclear, to D. G. Eisenhut, NRC, NUREG 0737 Selective Item Status.

Respectfully submitted,

Thomas A. Baxter

Thomas A. Baxter
Counsel for Licensee

TAB:jah
Enclosures
cc: Service List

D503

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

In the Matter of	)	
	)	
METROPOLITAN EDISON COMPANY	)	Docket No. 50-289
	)	(Restart)
(Three Mile Island Nuclear Station, Unit No. 1)	)	
	)	

SERVICE LIST

Chairman Nunzio J. Palladino
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Commissioner Victor Gilinsky
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Commissioner Thomas M. Roberts
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Commissioner James K. Asselstine
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Commissioner Frederick M. Bernthal
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Docketing and Service Section
Office of the Secretary
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Gary J. Edles, Esquire
Chairman, Atomic Safety and Licensing Appeal Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. John H. Buck
Atomic Safety and Licensing Appeal Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dr. Reginald L. Gotchy
Atomic Safety and Licensing Appeal Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Ivan W. Smith, Esquire
Chairman, Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Sheldon J. Wolfe, Alternate Chairman
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Mr. Gustave A. Linenberger, Jr.
Atomic Safety and Licensing Board
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Richard J. Rawson, Esquire
Office of Executive Legal Director
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

John A. Levin, Esquire
Assistant Counsel
Pennsylvania Public Utility Commission
P. O. Box 3265
Harrisburg, PA 17120

Marjorie M. Aamodt
R. D. 5
Coatesville, PA 19320

Maxine Woelfling, Esquire
Assistant Counsel
Department of Environmental Resources
514 Executive House, P. O. Box 2357
Harrisburg, PA 17120

Ms. Louise Bradford
TMI ALERT
1011 Green Street
Harrisburg, PA 17102

Ellyn R. Weiss, Esquire
Harmon & Weiss
1725 Eye St., NW, Suite 506
Washington, D.C. 20006

Steven C. Sholly
Union of Concerned Scientists
1346 Connecticut Avenue, N.W., #1101
Washington, D.C. 20036

ANGRY/TMI PIRC
1037 Maclay Street
Harrisburg, PA 17103

Chauncey Kepford
Judith H. Johnsrud
Environmental Coalition on Nuclear Power
433 Orlando Avenue
State College, PA 16801

GPU Nuclear

GPU Nuclear Corporation
Post Office Box 480
Route 441 South
Middletown, Pennsylvania 17057-0191
717 944-7621
TELEX 84-2386
Writer's Direct Dial Number:

February 22,1984
5211-84-2032

Office of Nuclear Reactor Regulations
Attn: John F. Stolz, Chief
Operating Reactors Branch No. 4
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Sir:

Three Mile Island Nuclear Station, Unit I (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
EFW Flow Instrumentation

In response to your letter of January 18, 1984 on EFW Flow instrumentation oscillations at low flow condition, enclosed please find results of a recent test performed under test procedure (TP 233/4) dated January 12, 1984.

Sincerely,

H. D. Hukill
VP - TMI-1

HDH:mle

cc: R. Conte
J. Van Vliet

Item: 1. With regard to the Emergency Feedwater (EFW) flow indicators:

a. What is the full scale flowrate on the meter faces?

b. What is the magnitude of the oscillations at 50 gpm, 100 gpm, 200 gpm, and each 100 gpm increment thereafter up to full flow?

c. The preliminary evaluation concluded that cavitation on the outlet of the feedwater flow control valve during low flow conditions caused the oscillations. What are the conclusions of the final evaluation.

Response: a. Control room indication full scale is 800 gpm.

b. At 50 gpm Zero flow indication - 50 gpm is below cut off point of signal conditioning electronics.

At 100 gpm Establishing an oscillation free flow indication at anything below 120 gpm is not possible in our testing because of cavitation of the EFV-30 valves due to low flow against negligible backpressure. The magnitude of oscillation is variable. Also the signal conditioning electronics (square root extractor) low signal cut-off is 75 gpm.

at 120 gpm Meter movement is noticeable. However, with 25 gpm meter face graduations the oscillations are not readable. Recorder traces indicate the peak-to-peak oscillation is 12 gpm.

At 200 gpm As above for 120 gpm, except traces shows 15 gpm peak-to-peak

At 300 gpm As above for 120 gpm, except traces shows 20 gpm peak-to-peak

At 400 gpm As above for 120 gpm, except traces shows 20 gpm peak-to-peak

At 500 gpm As above for 120 gpm, except traces shows 25 gpm peak-to-peak

At 600 gpm As above for 120 gpm, except traces shows 25 gpm peak-to-peak

c. GPUN has reviewed the most recent test data and concluded that the oscillations at low flows (less than 120 gpm) in the EFW instrumentation are mainly due to cavitation in the vicinity of the EFV-30 valves. This effect has been substantiated analytically based on data from an earlier EFW System Test (600/3). The drop out of the square root extractor at about 75 gpm also contributes to indicated oscillations.

Item: 2. With regard to operator use of the indicators, do any abnormal transient procedures for TMI-1 (emergency operating procedures) direct the operators to EFW flow indication? If so, which procedures, under what circumstances, and over what range of indicated flow?

Response: Abnormal Transient Procedure 1210-10 "Abnormal Transients Rules, Guides and Graphs" directs operators to EFW flow indication in two instances.

1. Section 1.5, Emergency Feedwater Throttling Criteria, directs operators, upon incore TC's not decreasing, to increase EFW flow to at least 450 gpm (225 gpm per SG) until OTSG level setpoint is reached. This rule is to be followed whenever EFW is initiated.

2. Section 2.3, Emergency Feedwater Actuation Response (Step D), directs operators to verify EFW flow by flow indication if OTSG level is below it's setpoint. This guideline is for verification that an EFW flow path to the OTSG's is available. Operators are first directed to verify EF-P-1, 2A, 2B, start, and to verify discharge pressure greater than 1010 psig. If flow indication is greater than 120 gpm, this is sufficient to verify flow. As OTSG level approaches the setpoint the control valves are throttled to low flow conditions and flow is verified by OTSG level (per step E).

   At flows below 225 gpm EFW flow indication is not relied upon for flow control. The important aspect at low flow is the verification of adequate OTSG heat removal.

GPU Nuclear

GPU Nuclear Corporation
Post Office Box 480
Route 441 South
Middletown, Pennsylvania 17057
717 944-7621
TELEX 84-2386
Writer's Direct Dial Number:

February 27, 1984
5211-84-2045

Office of Nuclear Reactor Regulation
Attn: D. G. Eisenhut
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Sir:

Three Mile Island Nuclear Station, Unit 1 (TMI-1)
Operating License No. DPR-50
Docket No. 50-289
NUREG 0737 Selective Item Status

On January 30 and 31, 1984, members of our Staffs met to discuss the status of long term NUREG 0737 items. At the conclusion of those meetings and in your letter dated Feb. 22, 1984 you requested that GPUN formally provide status and justification for 9 NUREG 0737 items:

	I.C.1	Emergency Operating Procedures
*	I.D.1	Control Room Design Review
	I.D.2	Safety Parameter Display System
	I.E.1.1	Emergency Feedwater Long Term Upgrade
	II.B.1	High Point Vents
*	II.B.2	Plant Shielding Design Review
	II.F.2	Inadequate Core Cooling
	III.D.3.4	Control Room Habitability
	Suppl.	Reg. Guide 1.97, Rev. 2

Attached please find the information that you requested. This letter is also responsive to your letter of December 22, 1983 concerning the restart status meeting of December 16, 1983 as indicated by the items marked with an asterisk (*). Finally you should note that the schedules provided are ambitious but are achievable. We will keep you informed of any developments that result in major schedule changes.

Sincerely,

H. D. Hukill
Vice President - TMI-1

Sworn & Subscribed to Before me this 7th day of February, 1984.

Notary Public

NOTARIAL SEAL
DAUPHIN COUNTY
MY COMMISSION EXPIRES JUL 17, 1985
Member, Pennsylvania Association of Notaries

cc: R. Conte
J. Van Vliet

NUREG 0737 (Item I.C.1) Emergency Operating Procedures (ATOG)

I. INTRODUCTION

As part of the effort to improve operator response to abnormal or emergency conditions, NUREG 0737 requires the improvement of emergency operating procedures (EOPs). TMI-1 has currently in place EOPs developed from the B&W Owners Group generic procedure commonly known as ATOG (Abnormal Transient Operating Guidelines).

The TMI-1 EOPs called Abnormal Transient Procedures (ATPs), provide the operator with guidelines that take a symptom oriented approach in dealing with emergency conditions. These new ATPs improved upon the old event oriented emergency procedures.

The TMI-1 ATPs provides the operator with a road map that guides him in dealing with the symptoms of a transient. Furthermore, the ATPs place the operator in a position to properly followup on specified actions. The operator can move from procedure to procedure without having to start from the beginning each time. The experienced operator now has a defined sequence he uses with simplified rules committed to memory.

II. HISTORY

In August 1980, the B&W Owners provided a draft ATOG to the NRC. During 1981, GPUN and B&W began work on the TMI-1 plant specific ATOG procedures with some "hands on" experience on the B&W simulator. By the end of 1982, B&W resolved GPUN comments and issued the final TMI-1 ATOG in April 1983. In an attempt to proceed quickly with the full implementation of ATOG, GPUN formed an ATOG Implementation Committee that met weekly to assure the ATOG program would be in place in the 1st quarter of 1984.

After verification of the ATPs on the B&W simulator, GPUN trained all the licensed operators in the classroom and replaced the old procedures in the control room with the new ATPs. Finally, the ATOG Implementation Committee used the B&W simulator to develop the simulator training program in preparation for the simulator training of the operators.

III. STATUS AND SCHEDULE JUSTIFICATION

- Training of all the licensed operator crews will be complete by the end of March 1984.

- GPUN submitted a Procedures Generation Package (PGP) to the NRC at the end of January 1984. GPUN is now resolving NRC questions on the PGP.

IV. BIBLIOGRAPHY

GPUN

June 30, 1981 (L1L 020)
March 31, 1982 (B&W Owners)
June 15, 1982 (B&W Owners)
March 14, 1983
December 29, 1983
January 26, 1984

NRC

NUREG 0737 I.C.1
NUREG 0680

NUREG 0737 (Item I.D.1) Control Room Design Review

I. INTRODUCTION

As part of the Control Room Design Review (CRDR), GPUN established a multi-disciplinary team and review program employing accepted human engineering practices. The purpose of this review was to ensure that plant operators have the proper environment with readable and understandable controls to safely operate the plant.

II. HISTORY

Prior to the issue of the requirement in NUREG 0737, GPUN conducted a review of the control room design in 1980. The review indicated a number of modifications that were to be accomplished. All of these modifications are now complete. The NRC also reviewed the TMI-1 control room design and documented its results in NUREG 0752 and supplement.

III. STATUS AND SCHEDULE JUSTIFICATION

GPUN has completed and submitted the final Control Room Design Report to NRC. GPUN will complete by April 30, 1984, a supplementary review of the control room using the emergency procedures based on ATOG to validate the control room task analysis. GPUN will then submit a supplementary report completing the requirements of Item I.D.1, by May 31, 1984.

IV. BIBLIOGRAPHY

GPUN

July 14, 1980 (TLL 346) Control Room Engineering Review
November 7, 1980 (TLL 559) Human Factors Engineering
January 21, 1981 (L1L 019) Human Factors Engineering
January 23, 1981 (TLL 680) Response to NUREG 0737
January 16, 1984 Control Room Design Review

NRC

NUREG 0737 I.D.1
NUREG 0752 and Supplements
Generic Letter 82-33 December 17, 1983
ASLB Hearings
PID

NUREG 0737 (Item I.D.2) - Safety Parameter Display System - SPDS

I. INTRODUCTION

Basic SPDS

The 'basic' SPDS is that portion of the final SPDS that uses a subset of the approximately 2500 points currently available in the computer data base. The 'basic' SPDS will satisfy the major requirements of four of the five Critical Safety Functions (CSF's) including:

(i) Reactivity control
(ii) Reactor core cooling and primary system heat removal
(iii) Reactor coolant system integrity
(iv) Containment conditions.

GPUN currently monitors the fifth CSF, radioactivity control, through control room equipment and procedures that can quickly status the radioactivity of the entire plant. GPUN will incorporate this CSF as part of the final SPDS as described below.

A portion of the 'basic' SPDS has already been implemented at TMI-1 in the form of a post trip pressure-temperature plot. Trained personnel use this plot to evaluate core cooling and heat removal from the reactor coolant system following a reactor trip. This display supports the use of symptom-oriented emergency procedures developed from the ATOG program. Operators and Shift Technical Advisors are taught how to interpret this display by a computer aided instruction course.

o Final SPDS

The 'final' SPDS will include the 'basic' SPDS plus additional parameters that are available in the control room but not on the Plant Process Computer System, such as those parameters covering radioactivity control. The final SPDS will also include parameters from the Reactor Coolant Inventory Trending System (RITS). These include the hot leg and reactor vessel water level trending instrumentation.

The current list of defined parameters for both the "basic" and upgrades to the SPDS, constitute the TMI-1 'final' SPDS. As the safety analysis, user guidelines, CRT display development and operational experience continue, the system may need additional refinements. These enhancements to the "final" SPDS will proceed on separate and independent schedules from those in this SPDS discussion.

II. HISTORY

In its responses to Generic Letter 82-33, GPUN originally committed to have a basic SPDS operational prior to Cycle 6 and the upgrades to the 'basic' SPDS by Cycle 7. Current calendar estimates for those milestones would occur on or about July 1985 for Cycle 6 and December 1986 for Cycle 7.

Since then, GPUN has committed to have the TMI-1 'basic' SPDS available by January 1, 1985. In a letter dated February 1, 1984, GPUN also committed to upgrade the 'basic' SPDS by June 1985, or the first outage after this date, of sufficient length to allow the new instrumentation to be connected to the Plant Process Computer System. In any case, the final SPDS will be operable prior to Cycle 6. However, GPUN has initiated detailed planning and scheduling in an attempt to implement the final form concurrent with the 'basic' SPDS. See the discussion in the 'Hardware Implementation' section that follows.

The SPDS has evolved as a result of work done to define the objectives of the SPDS and the parameters required to meet these objectives. GPUN furnished the NRC on February 1, 1984 a complete list of the SPDS critical safety functions and the parameters associated with each function.

III. STATUS AND SCHEDULE JUSTIFICATION

The following is a brief description of those major milestones in the SPDS implementation schedule that require significant decisions. The outcome of the work conducted to reach these milestones plays a significant part in the subsequent work segments to accomplish SPDS implementation. In order to maintain the necessary controls to accomplish its goals, GPUN has committed the appropriate resources (manpower and time) to complete these work items in an orderly fashion. Thus, the following work segments require substantial completion prior to starting the next item. GPUN will initiate parallel efforts where practical to expedite implementation.

- o <u>SPDS Safety Analysis</u>

  GPUN is currently performing an SPDS safety analysis that identifies those Critical Safety Functions (CSFs) that describe the safety status of the plant. The selection process has also identified additional instrumentation/parameters that require inclusion into the existing plant computer data base.

  As part of the Verification/Validation (V/V) effort, GPUN is developing transient/accident scenarios to use in testing the adequacy of the SPDS parameter selection. Upon completion of the internal review and comment resolution of the parameter selection, GPUN will submit the safety analysis to the NRC (by April 30, 1984).

  This portion of the SPDS program will require approximately 2 months to complete.

- User Guidelines

GPUN has developed preliminary user guidelines in the form of flow charts for each CSF. These flow charts are also used in the parameter selection process. Once the safety analysis parameter selection is complete, GPUN will define a set of alarms for each CSF for both power operation and transient/accident conditions. These alarms will be assigned priorities and incorporated into the existing plant computer alarm processor. Finally, GPUN will update the user guidelines and convert them into both a flow chart and written format in order to develop not only the CRT displays but also the training program as well.

This portion of the SPDS program will require approximately 3 months to complete.

- Displays Developed

GPUN will develop the CRT displays to provide concise and unambiguous information to the user so that trained personnel will have access to these displays via the CRTs presently available in the control room. The display development will employ the safety analysis and the user guidelines to group the parameters into display information categories. The comments and suggestions from a preliminary review will produce draft CRT displays subject to final review by Plant Operations, Plant Engineering and Human Factors Engineers. Potential users will perform walkthroughs of the draft displays to determine the displays' final form. Upon completion of the walkthroughs, GPUN will release the final CRT display design for implementation.

This portion of the SPDS program will require approximately 2 months to complete.

- Users Trained

The SPDS users will receive proper training on the SPDS philosophy, design and use. GPUN will develop lesson plans using the safety analysis and user guidelines as well as the transient/accident scenarios to show the users how the SPDS will function. The training itself will span 6 weeks to cover all shifts during the normal operator training cycle.

The lesson plan and transient/accident scenario development portion will require approximately 2 months to complete. The actual training will be performed over a normal 6 week operator training cycle.

- Hardware Implementation

GPUN finalized on 2/1/84 the project scope for connecting the additional parameters to the Plant Process Computer. By 3/1/84, GPUN will award the contract for engineering. Since the duration for a standard project of comparable scope would result in engineering release for construction in

11/84, GPUN is currently expediting the design engineering and review process. As a result, the engineering release for construction will occur in 7/84.

The engineering design process consists of the following:

- o Systems Design Descriptions (criteria and final description)
- o Preliminary Engineering Design Review
- o Safety Evaluation
- o Material Purchase Requisitions
- o Fire Hazards Analysis
- o Detailed Drawings (approx. 150 drawings)
- o Installation Specification
- o Operability, Maintainability, Constructability Review

The majority of the construction is in the Control Room and cannot proceed when the plant is operating. The release of engineering in 7/84 will support completion of construction by 1/1/85 assuming plant availability. If not, GPUN will complete implementation of the 'final' SPDS during the first outage of sufficient length prior to Cycle 6.

IV. BIBLIOGRAPHY

GPUN

August 4, 1983 Gilinsky Response
November 28, 1983 Gilinsky Response Update
April 15, 1983 Response to GL 82-33
February 1, 1984 SPDS Status

NRC

NUREG 0737 I.D.2
NUREG 0737 Supplement 1 (GL 82-33) 12/17/82
NUREG 0696

NUREG 0737 (Item I.E.1.1) Emergency Feedwater Long Term Upgrade

I. INTRODUCTION

In accordance with the requirements in NUREG-0578 and 0737, the commitments outlined in the TMI-1 Restart Report, the seismic concerns identified in Generic Letter #81-14, and the supplemental requirements addressed in the Atomic Safety and Licensing Board Partial Initial Decision, GPUN will upgrade the Emergency Feedwater System to a safety grade system. The modifications implemented as part of this upgrade include mechanical system configuration changes, mechanical and electrical equipment qualifications (seismic and environmental), changes to the initiation and control system for EFW components, and seismic upgrade of piping sections in the Main Steam and Emergency Feedwater systems.

II. HISTORY

The EFW System upgrade to safety grade included a review of Intermediate Building flooding, overfilling and overcooling of the OTSG's, pipe whip, seismic, water inventory, environmental qualification and single failure proof. As a result of this review, GPUN identified the following modifications to be completed in the long term.

(1) Safety grade EFW control and block valves.

(2) Upgrade EFW pump recirc-line from control valves EFV-8 to condensate storage tank to seismic.

(3) Modify the vent stacks for MSV-22 and MSV-4 to seismic.

(4) Expand flooding capacity in the event of a MFWLB by removing some walls in the alligator pit and tendon access gallery.

(5) Provide safety grade power to COV-111s and upgrade-cable-routing to COV-14 to seismic.

(6) Provide safety grade EFW initiation and MFW isolation on high main steam/feedwater differential pressure.

(7) Provide safety grade OTSG level instrumentation and signals for MFW OTSG high level isolation and low level initiation of EFW.

(8) Provide dual setpoints for OTSG level control using EFV-30's.

(9) Provide safety grade automatic control of EFW independent of ICS.

(10) Provide safety grade MSLRD system for MFW system.

(11) Provide overspeed trip in the control room for the turbine driven EFW pump.

(12) Provide a safety grade flood protection alarm in the alligator pit.

(13) Upgrade the water level indication and low-low water level alarm in the control room for each condensate storage tank to safety grade.

III. STATUS AND SCHEDULE JUSTIFICATION

GPUN has awarded all architectural engineer service contracts for the EFW long term modifications (except for cable and conduit which is on an expedited schedule). GPUN is accelerating modification (2) above for targeted completion in June 1984. The remaining long term items will have basic engineering packages released to the field in mid July 1984. The remaining major component for procurement is an electronic cabinet for item (1) to be delivered in September 1984. GPUN will complete all modifications prior to Cycle 6. However, if TMI-1 remains in the current shutdown mode, GPUN will complete all modifications in the 4th quarter of 1984. (Note: GPUN learned on Feb. 17, 1984 from the valve manufacturer that 2 of the ordered valves had defective forgings. GPU is attempting to resolve the problem in order to maintain current schedule commitments.)

IV. BIBLIOGRAPHY

GPUN

Restart Report Section 2.1.2.6
August 23, 1983 (83-232) Long Term EFW Mods

NRC

NUREG 0737 II.E.1 1&2
NUREG 0680
PID 12/14/81

NUREG 0737 (Item II.B.1) High Point Vents

I. INTRODUCTION

In response to NUREG 0737 Item II.B.1 and 10CFR50.44, GPUN has installed high point vents in the hot legs, and pressurizer. GPUN will install the reactor vessel head vent in the first quarter of 1984. The design of these vents allows the release of non condensible gas from the reactor coolant system following an inadequate core cooling event. These valves are remotely operated from the control room and have instrumentation to indicate flow/no flow.

II. HISTORY

Following the accident at TMI-2, the NRC in NUREG 0660 and later in NUREG 0737, recognized the need for remotely operated high point vents. In response to these requirements GPUN developed an RCS venting system described in the TMI-1 Restart Report. Later the NRC issued 10CFR50.44 requiring installation of these vents.

III. STATUS AND JUSTIFICATION

GPUN has installed the pressurizer vent and hot leg vents. The engineering is complete for the head vent and the RCS pressure boundary for the head vent has been modified. GPUN will complete the remaining electrical and piping portions in the first quarter of 1984. ATOG procedure covering operation of the vents under accident conditions has been issued and GPUN will complete the training on these procedures by the end of February 1984.

IV. BIBLIOGRAPHY

GPUN

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September 3, 1981 (L11 239)
August 23, 1982 (82-180)

NRC

NUREG 0737 II.B.1
NUREG 0680 Add Item 4
10CFR50.44
March 16, 1982
October 17, 1983

NUREG 0737 (Item II.B.2) Plant Shielding Design Review

I. INTRODUCTION

In accordance with the requirements of NUREG 0578 and 0737, GPUN conducted a Plant Shielding Design Review (PSDR). The purpose of the PSDR was to determine if post accident radiation fields limit personnel access to vital areas necessary for recovery operations or whether the radiation fields degrade safety related equipment. The design review concluded that modifications were required to

a. control post-LOCA boron precipitation
b. allow operation of MCC 1A & B (a wall has been added and this modification is complete).

The present project scope includes the installation of:

(1) A new post-accident boron precipitation control bypass line and valve in the Decay Heat Removal System (DHRS).
(2) A reach rod extension on the new bypass valve
(3) Relocation of an existing reach rod extension on the DHRS.

II. HISTORY

TMI-1 Restart Report, Amendment #25 (5/13/81) identified the original project scope that included the installation of remote valve operators on the DHRS as well as the relocation of an existing reach rod extension. During the last half of 1981, GPUN experienced several procurement difficulties related to improper proposals from vendors. In January 1982, GPUN management, due to the OTSG repairs, placed the engineering and design effort of the PSDR on hold.

When the project was reactivated in May 1982, GPUN experienced continued procurement problems throughout the remainder of the year. Thus, in order to circumvent the continued procurement difficulties, GPUN reexamined the original design and proposed an alternate project scope. By mid 1983, GPUN decided on an acceptable alternate and notified the NRC in October 1983. By the end of 1983, GPUN awarded the A/E design contract and completed the evaluation of valve vendor proposals.

III. STATUS AND SCHEDULE JUSTIFICATION

The final milestones:

o Resolution of various exceptions contained in the valve vendor proposals.

- o Award of DHRS bypass valve order by the end of February 1984.
- o "Release for Construction" installation package by mid-April 1984.
- o Delivery of bypass valve in August, 1984.
- o Completion of installation and modifications in the fourth quarter of 1984 subject to plant availability.

IV. BIBLIOGRAPHY

GPUN

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January 23, 1981 (TLL 680) Resp to NUREG 0737
June 15, 1982 Response to Generic Letter 82-05
May 21, 1982 Reseponse to Generic Letter 82-05
September 20, 1982 (82-221) Schedule
October 21, 1983 (83-280) Alternate Solution

NRC

NUREG 0737 II.B.2
NUREG 0680 2.1.6.b
January 1, 1983
SECY 82-384/A

NUREG 0737 (Item II.F.2) Instrumentation for Detection of Inadequate Core Cooling

I. INTRODUCTION

NUREG 0737 requires the installation of instrumentation for the unambiguous detection of Inadequate Core Cooling (ICC). Therefore, in accordance with these NUREG 0737 requirements, GPUN has or will install the following new instrumentation:

- o Saturation Margin Monitors

  GPUN has installed redundant saturation margin monitors using qualified safety grade signal conditioning equipment and existing control grade input signals. The system, as installed, satisfies the functional intent of NUREG 0737. As a further enhancement of the existing system, GPUN will provide safety grade temperature input signals as well as replace the present digital indicators with seismically qualified units.

- o Incore Thermocouples

  At TMI-1, all 52 incore thermocouples are connected to the plant computer as the primary display system. However, GPUN has installed and connected sixteen thermocouples (four from each quadrant) to a safety grade backup display system (BIRO). Except for the commercial grade digital indicator, the design and installation conforms to the requirements of NUREG 0737 (Item II.F.2). GPUN will replace the present digital indicator with a seismically qualified unit following testing.

- o Reactor Coolant Inventory Trending System (RITS)

  The RCITS will allow the control room operator to trend Reactor Coolant System (RCS) inventory under static and dynamic conditions. The operator can monitor water level in the Reactor Vessel (RV) and hot legs when the RC pumps are not running. When the RC pumps are operating, the operator will be able to trend void fraction in the RCS.

  To measure water level, GPUN will connect differential pressure transmitters from the vent connections at the top of each hot leg and the RV head to a common tap in the Decay Heat Drop Line (DHDL). The design also provides for process instrumentation and signal conditioning electronics to correct for changes in water density.

  In order to monitor RCS void fraction, GPUN has developed a computer algorithm to convert RCP motor power data into RCS void fraction. The

RITS will display in the control room, via the plant computer, both the trending of void fraction and water inventory.

- Other Instrumentation

Additional instrumentation GPUN has already installed that aids the operator in determining ICC include:

Wide Range RC Pressure
Pzr, Pressure and Level
EFW Flow
Wide Range T_{hot}
Secondary Side Steam Pressure and OTSG Water Level

II. HISTORY

After considerable studies and interaction between the NRC and B&W Owners Group, the NRC issued an order on December 10, 1982, directing the B&W Owners to install a Reactor Coolant Inventory Trending System. Following a submittal of a response to this order on March 10, 1983, GPUN continued to investigate the optimum location for the lower d/p tap and the method of compensation of the water level signal for changes in RCS fluid density. GPUN expedited the detailed design of the DHDL tap to permit installation prior to restart. The actual installation occurred in December 1983.

III. STATUS AND SCHEDULE JUSTIFICATION

- Saturation Margin Monitor

GPUN has installed a qualified safety grade temperature sensor in each RCS hot leg. The addition of these input signals requires termination of the safety grade T_{hot} leads within the Foxboro signal conditioning cabinets. GPUN will accomplish this by June, 1984.

Since the existing digital indicators require replacement with seismically qualified units, GPUN will purchase new commercial grade Weston digital indicators. GPUN will then under its own funding, seismically test and qualify a sample of these new Weston indicators. GPUN has decided to proceed in this manner due to the absence of traceability between the meters installed several years ago and those purchased for testing.

Upon successful completion of the test program, GPUN plans to replace the currently installed meters at the first available outage of sufficient duration.

- Incore Thermocouples

GPUN will replace the present commercial grade digital indicator with a seismically qualified unit during the first available outage of sufficient duration. (See discussion above.)

o Reactor Coolant Inventory Trending Systems

In December 1983, GPUN installed the DHDL d/p tap and developed the void fraction algorithm. GPUN has ordered all long lead items and expects this equipment onsite by June 1984. By the end of February 1984, the schedule calls for the completion of the engineering for a majority of the items inside the Reactor Building. GPUN intends to finish the remaining engineering (primarily electrical) by the end of April with completion of the control room CRT displays by mid-May. The remaining scheduled items include GPUN submitting to the NRC in April, the operator guidelines for use of the displays and the submittal in July of the modified operating and emergency procedures. The entire modification is scheduled for completion in the 4th quarter of 1984 subject to plant available.

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September 14, 1981 (L1L 261) RV Water Level
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March 10, 1983 (83-071) RV Water Level
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February 2, 1982 (82-007) Backup Incore T/C
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May 13, 1983 (83-148) SMM
January 31, 1984 (84-20) Inadequate Core Cooling

NRC

NUREG 0737 II.F.2
NUREG 0680 2.1.3.b
Order dated December 10, 1982
January 6, 1982 Reject HLLIS as not complete
June 14, 1983 Proceed with Design RITS
PID - Technical December 14, 1981
SECY 81-582 and 82-407
ASLB Hearings

NUREG 0737 (Item III.D.3.4) - Control Room Habitability

I. INTRODUCTION

NUREG 0737 (Item III.D.3.4) requires provision of adequate protection for control room operators against accidental release of Toxic and Radioactive gases. The installation of redundant isolation dampers and radiation/toxic gas detection systems within the Control Building Ventilation System (CBVS) can provide this protection.

II. HISTORY

Pickard, Lowe and Garrick, Inc. (PLG) completed a "Control Room Habitability Analysis Report" for GPUN on June 29, 1982. This report identified no offsite and three onsite potentially hazardous gases, (carbon dioxide, ammonium hydroxide and cholrine gas) that could, after an accidental on site release, migrate to the Control Room through the CBVS. Using Probabilistic Risk Assessment (PRA) techniques, GPUN submitted a report to the NRC on July 16, 1982, inferring that due to the low probability of occurrence, no detection syste[illegible] ammonium hydroxide and chlorine were required for the protection of Control Room operators. This submittal committed to providing low leakage isolation dampers in the CBVS actuated by high radiation signals. GPUN committed to complete the modification prior to Cycle 7. On December 28, 1983, the NRC responded to GPUN's July 16, 1982 submittal, taking exception to GPUN's PRA dispositioning of ammmonium hydroxide and chlorine gas hazards. The NRC required that GPUN provide design basis protection against these hazards.

III. STATUS AND SCHEDULE JUSTIFICATION

- GPUN intends to respond to NRC's inquiries on the Control Room Habitability System for TMI-1 at the end of February, 1984.

- GPUN is planning to use the services of a contractor to reassess the ammonium hydroxide hazard through recalculations using a limited source dose of ammonium hydroxide. GPUN could limit the source dose by providing spill protection or by limiting the total quantity of ammonium hydroxide stored on site. In order to eliminate chlorine gas as a hazard, GPUN will evaluate the use of alternative biocides in place of chlorine gas for the water treatment system. Schedule and other considerations may dictate installation of a chlorine detection system as a more viable option. At the present time, GPUN is evaluating the need for leak tight dampers for radiation protection.

- In parallel with the contractors evaluation, GPUN is funding an effort with an Architect/Engineer to provide an estimate and schedule for the engineering, design, and installation of isolation dampers and Toxic gas Detection System in the CBVS. GPUN will authorize the toxic gas detection systems at a later date if the contractors evaluation concludes that ammonium hydroxide and/or chlorine gas cannot be eliminated as hazards. An accelerated implementation schedule would be as follows:

o	Determine Modification scope	April 1984
o	Receive NRC Concurrence	June 1984
o	Award Contracts for detailed Engineering to an Architect Engineer	July 1984
o	Complete Prelim. Eng. Design Review	Oct. 1984
o	Order Long Lead Items	Dec. 1984
o	Delivery Long Lead Items	Aug. 1985
o	Issue Engineering package for installation	July 1985
o	Complete Installation	*Dec. 1985
o	Complete testing and turnover to Plant	*Feb. 1986

*Outage required with schedule dependent on plant availability.

GPUN will revise the above implementation plan depending on the results of PLG Inc.'s evaluation of toxic gas hazards.

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November 9, 1981 (L1L 323)
March 4, 1982 (82-051)
July 16, 1982 (82-167)

NRC

NUREG 0737 III.D.3.4
December 28, 1983

NUREG 0737 - Supplement 1 - Reg. Guide 1.97

I. INTRODUCTION

Reg. Guide 1.97 - "Instrumentation for Light-Water-Cooled Nuclear Power Plants to Assess Plant and Environs Conditions During and Following an Accident" describes a method for complying with the Commission's regulations to provide instrumentation to monitor plant variables and systems during and following an accident. The Reg. Guide prescribes a minimum set of variables to be measured as well as the design and qualification criteria for the instrumentation.

II. HISTORY

The B&W Owners Group established a Reg. Guide 1.97 Task Force to formulate and fully justify a generic position on Reg. Guide 1.97 for B&W NSSS plants. In the course of its efforts to develop a generic position, the Task Force identified a need for the evaluation of certain variables. The Task Force is currently preparing an evaluation and technical justification for selected Reg. Guide 1.97 variables that will:

a) Determine the significance of the variable to the monitoring and management of design basis accidents for a B&W NSSS plant.

b) Define the qualilfication criteria considered necessary to support the accident monitoring function.

c) Assess whether the typically supplied instrumentation is adequate for the required monitoring function.

III. STATUS SCHEDULE JUSTIFICATION

B&W is preparing data sheets for each variable providing the variable name, type, category, and range prescribed by the NRC in Regulatory Guide 1.97 compared to the recommendations based on the evaluation effort. Details will be provided in the data sheets to support each utility to determine its plant specific application of the generic recommendations. The data sheets will also provide details to help justify recommended deviation from or acceptance of the requirements in Regulatory Guide 1.97.

B&W will transmit the description of the evaluation process and completed data sheets for variables to the B&W Owners Group Regulatory Guide 1.97 Task Force as a draft report for review and comment in March 1984. B&W will then issue a final report for use by the Task Force in establishing a generic position on Regulatory Guide 1.97 in April 1984.

GPUN will submit to the NRC a final Reg. Guide 1.97 report and implementation schedule no later than September 1984.

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NRC

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