DCS

MAR 1 1 1992

Docket No. 50-219

Mr. John J. Barton
Vice President and Director
GPU Nuclear Corporation
Oyster Creek Nuclear Generating Station
P.O. Box 388
Forked River, New Jersey 08731

Dear Mr. Barton:

Subject: Management Meeting to Discuss Oyster Creek Motor-Operated Valve Program

This letter documents the results of a meeting held on February 21, 1992, between members of your staff and NRC staff from Region I and Headquarters, at the Region I office in King of Prussia, Pennsylvania. A summary of the discussions and conclusions are enclosed.

In accordance with Section 2.790 of the NRC's "Rules of Practice," Part 2, Title 10, "Code of Federal Regulations," a copy of this letter will be placed in the Public Document Room.

The meeting was of mutual benefit in understanding issues related to your NRC Generic Letter 89-10 program and particularly your actions taken in response to Supplement 3 to the Generic Letter. If you have any questions, please contact Mr. Trapp of my staff at 215-337-5186.

Sincerely,

Original Signed By
Jacque P. Durr

Jacque P. Durr, Chief
Engineering Branch
Division of Reactor Safety

Enclosures:
1. GPUN (Oyster Creek) - NRC Region I Management Meeting, February 21, 1992
2. Attachments 1-3

IE01

MAR 1 1 1992

cc w/encl:
M. Laggart, Manager, Corporate Licensing
G. Busch, Licensing Manager, Oyster Creek
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector
State of New Jersey

bcc w/encl:
Region I Docket Room (with concurrences)
DRS SALP Coordinator
E. Wenzinger, DRP
W. Ruland, DRP
R. Lobel, OEDO
A. Dromerick, NRR/PD 1-4
F. Young, SRI, Three Mile Island
T. Sullivan, NRR

RI:DRS	RI:DRS	RI:DRS
Trapp	Eapen	Durr
2/ /92	3/ /92	3/11/92

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A:GPU.JT

MAR 11 1992

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T. Sullivan, ~~Chief~~ NRR

RI:DRS	RI:DRS	RI:DRS
Trapp	Eapen	Durr
JMT	for PKE	
2/26/92	3/5/92	3/ /92

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ENCLOSURE

General Public Utilities (Oyster Creek)
NRC Region I Management Meeting
February 21, 1992

1.0 Introduction

On February 21, 1992, beginning at 1:00 p.m., the Nuclear Regulatory Commission, Region I conducted a meeting with representatives from the corporate engineering and site (Oyster Creek) staff of the General Public Utilities Company. Attendees are listed in Attachment 1. The meeting was held at the NRC's request based on the findings of a NRC motor-operated valve inspection at Oyster Creek Generating Station (NRC Inspection Report No. 50-219/91-81). The purpose of the meeting was to discuss the licensee's Generic Letter 89-10, Supplement 3 Reassessment, which was provided to the NRC on February 19, 1992. Attachment 2 and 3 provide the meeting agenda and the licensee's handout, respectively.

2.0 Issues Identified for Action

Four issues were identified for action as follows:

1. The NRC staff will determine the acceptability of the following assumptions made in the licensee's reassessment of Supplement 3 valves.

    - The probability that the isolation condenser condensate return valves could be manually isolated by operator action during a high energy line break event, prior to the 35 second timer automatically isolating these valves.

    - The assumed 730 psid across the isolation condenser condensate return valves.

2. GPUN was requested to prioritize differential pressure testing of valves based on safety significance. The NRC also requested that GPUN review the possibility of partial differential pressure testing valves where full differential pressure testing is not practicable. As an example, the reactor water cleanup system isolation valves were given. The licensee agreed to develop a prioritization for differential pressure testing and review the possibility of partial differential pressure testing those valves which it is not practicable to full differential pressure test.

3. The NRC requested that GPUN develop plans to address the issue of MOVATS equipment inaccuracy. The licensee stated that these plans are in progress and will continue to be developed.

4. The NRC requested that GPUN verify the effective valve factors table in the attached handout and provide any changes to the NRC. The licensee stated that this table would be revised as necessary and the results would be provided to the NRC.

3.0 Conclusions

In general, the NRC staff determined the methodology used to reassess Supplement 3 valves was acceptable. However, the small margin between the required and available thrust for some of these valves may require future action when additional design data becomes available. The NRC staff will prepare a safety evaluation following completion of its consideration of the assumption that the control room operators will not take action to close the isolation condenser condensate return valves prior to the automatic closure signal. Attendees agreed that the meeting was of mutual benefit.

ATTACHMENT 1

OYSTER CREEK
MOV MANAGEMENT MEETING

GPU Nuclear Corporation

K. Bass, Manager, Plant Engineering
A. Cardillo, Supervisor of Valve Engineering
J. Charterina, Supervisor, Performance MOV
J. Correa, Engineer
J. Devine, Vice President, Technical Functions Director
D. Distel, Sr. Licensing Engineer
B. Elam. Mechanical Engineering Director
D. Hassler, TMI Site Licensing
M. Laggart, Manager, Corporate Licensing
G. Lehmann, Consulting Engineer, Engineering & Design
D. Nealon, Maintenance Assessment Engineer - OC
D. Ranft, Engineering Director - OC
H. Robinson, Electric Power Manager
J. Rogers, Sr. Licensing Engineer - OC
D. Slear, Director, Engineering & Design

U.S. Nuclear Regulatory Commission (USNRC)

M. Banerjee, Oyster Creek Resident Inspector
A. Dromerick, Sr. Project Manager
J. Durr, Chief, Engineering Branch
P. Eapen, Chief, Systems Section, DRS
M. Hodges, Director, DRS
W. Lanning, Deputy Director, DRS
W. Ruland, Section Chief, DRP
T. Scarbrough, Sr. Mechanical Engineer
T. Sullivan, Chief, Pumps & Valves Section
J. Trapp, Team Leader, DRS

ATTACHMENT 2

NRC Management Meeting
February 21, 199?

OCNGS MOTOR OPERATED VALVE PROGRAM

A. OCNGS MOV Program History - D. Slear

- MOVATS Experience
- Valve Replacements

B. Overall Schedule/Milestones for GL 89-10 Program Completion - D. Slear

- Undervoltage Analyses
- 13R, 14R, 15R Valve Testing
- Design Basis Reviews
- D/P Calculations

C. GL 89-10, Supplement 3 Reassessment - B. Elam

- Initial Assessment Results
- Reassessment Results

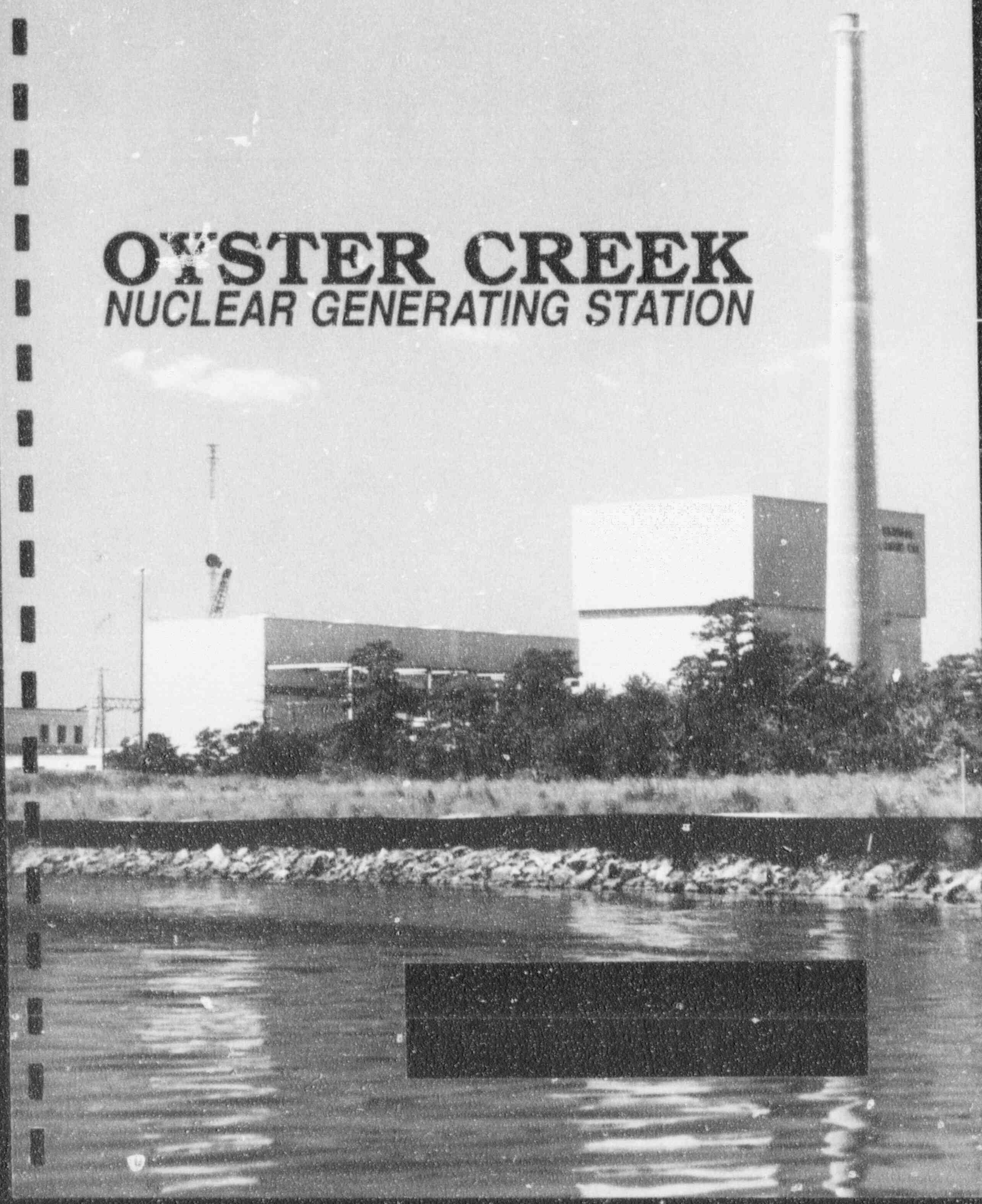
D. GL 89-10 Program Description - B. Elam

- Status
- Program Responsibilities
- Scope
- Design Basis Reviews
- Industry Programs
- Diagnostic Inaccuracies
- MOV Program Walkthrough - Example: Valve V-___-___

E. Plant Maintenance Activities - S. Levin

ATTACHMENT 3

OYSTER CREEK
NUCLEAR GENERATING STATION



[redacted]

OYSTER CREEK NUCLEAR GENERATING STATION
Forked River, New Jersey

The 650 MW plant is a single-unit, five-loop General Electric Boiling Water Reactor (BWR). The site, about 800 acres, is in Lacey and Ocean Townships of Ocean County. Located approximately nine miles south of Toms River, it is about 50 miles east of Philadelphia, and 60 miles south of Newark.

Construction began in December 1963. The station began commercial operation on December 23, 1969, and at that time was the largest nuclear facility in the United States solely financed by a private company.

The Reactor Building, Turbine Building and Ventilation Stack are the most prominent structures at the site. The Reactor Building stands approximately 150 feet high with 42 feet extending below grade. The Reactor Building serves as a secondary containment and houses the primary containment (drywell), the reactor vessel and its auxiliary systems which comprise the Nuclear Steam Supply System. The drywell, which houses the reactor vessel, is constructed of high-density reinforced concrete with an inner steel liner measuring 120 feet high and 70 feet in diameter.

The reactor vessel is 63 feet high and 18 feet in diameter. The 652-ton reactor contains 560 fuel assemblies, each with 62 fuel rods that are 12 feet long, and 137 control rods. The reactor operates at a nominal pressure of 1,020 pounds per square inch and an average temperature of 540 degrees Fahrenheit.

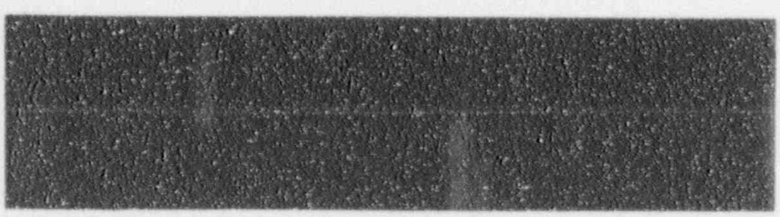
The Turbine Building houses the turbine-generator, control room, main condensers, power conversion equipment and auxiliary systems. The turbine-generator consists of one high-pressure turbine, three low-pressure turbines, a generator and an exciter. The turbines and generator turn at 1,800 revolutions per minute to generate three-phase, 60-cycle electricity at 24,000 volts. The electricity generated is provided to the grid by two transformers which boost the voltage to 230,000 volts.

Steam is supplied to the high pressure turbine from the reactor. After being used to drive the turbines and generator, the steam is condensed in the main condensers and returned to the reactor vessel in the form of water through the condensate and feedwater pumps.

The main condensers consist of three horizontal, single pass, divided water boxes containing 44,000 tubes having a total length of about 1,875,000 feet. Cooling water is provided from Barnegat Bay, through the South Branch of the Forked River and passes through the condensers and discharges into Oyster Creek for return to Barnegat Bay. The water is pumped by four 1,000-horsepower pumps, each of which moves about 115,000 gallons per minute through the 6-foot-diameter pipes that feed the condensers.

The ventilation stack is 368 feet high with 26 feet extending below grade. The stack provides ventilation for the Reactor Building, Turbine Building and Radwaste Facilities.

Oyster Creek is owned by Jersey Central Power & Light (JCP&L) Company and operated by GPU Nuclear (GPUN) Corporation. JCP&L and GPUN are units of the GPU System.



MOTOR OPERATED VALVE PROGRAM
FEBRUARY 21, 1992

NRC MANAGEMENT MEETING AGENDA
FEBRUARY 21, 1992

OCNGS MOTOR OPERATED VALVE PROGRAM

A. OCNGS MOV History - D. G. Slear

B. GL 89-10 Program Description Status - D. G. Slear

C. GL 89-10, Supplement 3 Assessment - B. Elam

D. Schedule/Milestones for GL 89-10
Program Completion - B. Elam

E. Plant Maintenance Activities - K. Bass

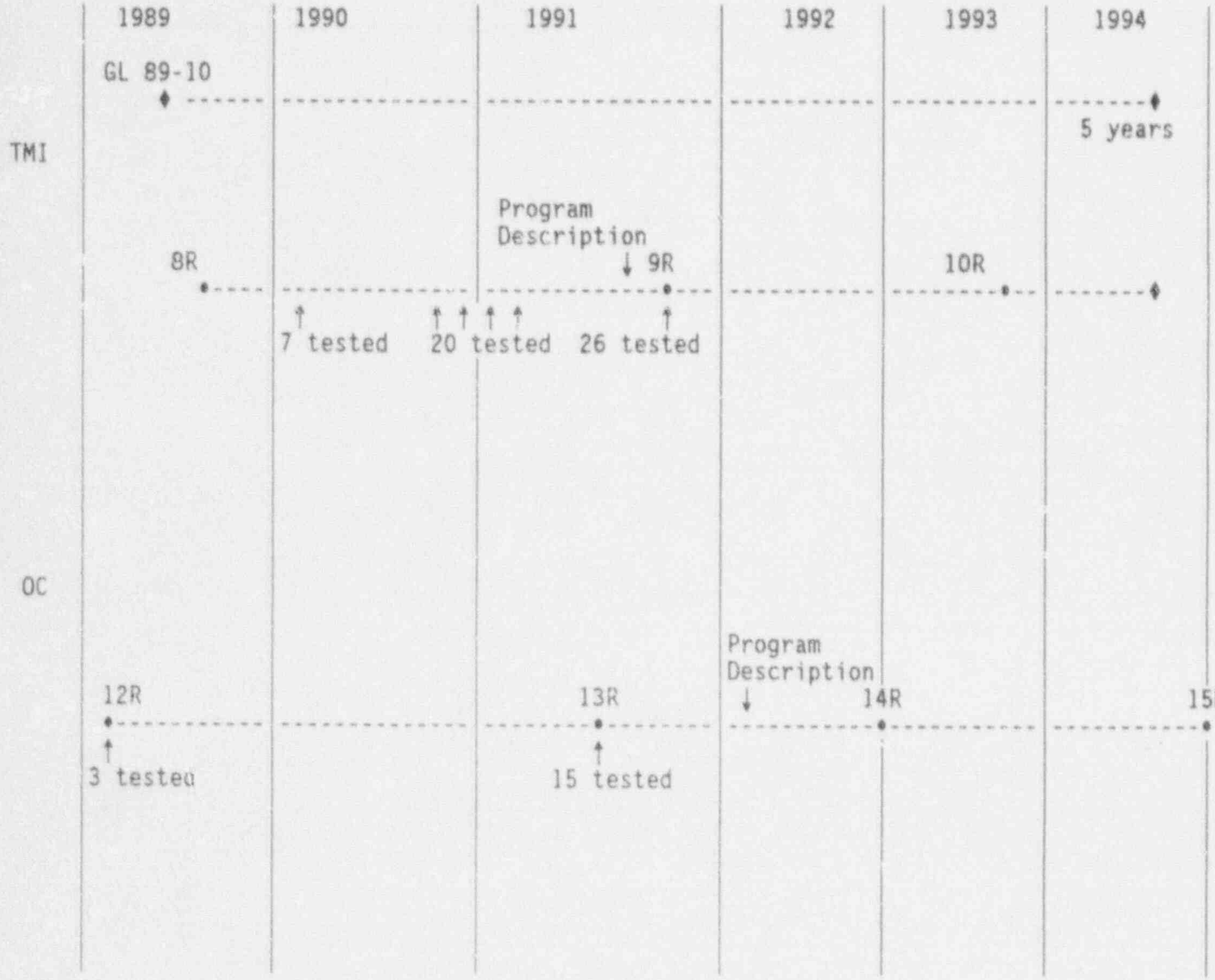
A. OC MOV HISTORY

• September, 1980	B&R Calculation 3431-40-2A - Degraded grid design basis confirmed acceptability of voltage at AC MOV's
• January, 1984	LER 83-24 Recognized deficiency in documentation of torque switch setting design basis. • Torrey Pines Technology - Established required MOV torque switch settings for 57 valves • Performed MOVATS testing to set required torque • TDR 623 - Documented basis for corrective actions taken on LER 83-24
• 1984 - 1992	OCNGS has performed MOVATS testing on 60 MOV's (366 signatures) - 27 valves in 13R.
• September, 1984	Testing identified potential low voltage at ICS DC powered MOV's, V-14-31, 33, 34. Cables were replaced in October, 1984.
• September, 1985	Training Department commenced MOV diagnostics training for mechanics and electricians. Currently 24 OCNGS personnel are active in the MOVATS training program.
• November, 1985	NRC IEB 85-03 Issued.
• February, 1987	Training Department commenced component training on MOV's. Currently 27 personnel active in program.

13R OUTAGE ACTIVITIES

- 6 ICS Outside Containment valves and motor operators replaced (V-14-30, 31, 32, 33, 34, 35)
    - Designed for horizontal stem orientation
    - Parallel disc design resolved thermal binding concerns
    - Improved Seat Tightness
- Structural weak link analysis performed on all Supplement 3 valves - Anchor Darling Calculations R91.038, R91.039, and R91.040.
- Thrust calculations performed for Supplement 3 valves based on valve factors suggested by EPRI NP-7065, and torque switches reset and verified by static testing.

GL 89-10 SCHEDULES
TMI-1 AND OYSTER CREEK PLANTS



- TMI - 86 Total Valves/53 Tested/38 Dynamic
- OC - 35 Total Valves/18 Tested
- Working Both Plants in Parallel
- Corporate Engineering Done With In House Resources

B. G. L. 89-10 PROGRAM STATUS

- Design basis/differential pressure reviews complete and documented for all program valves

- Program Description Issued - Addresses NRC inspection findings

  - Defines scope of valves in program and describes criteria for selection

  - Detailed engineering guide for design basis reviews, thrust calculations, and degraded voltage evaluations includes:

    - Consideration of EOP's

    - Justification for ΔP assumptions

    - Effects of ambient temperature on cables and motors

    - Requirement to review valve factors after dynamic testing

- Open Items Remaining From Inspection

  - Need to Document Trending Program

  - Define Post-Maintenance Testing Requirements

  - Revise Maintenance Procedures To Assess Spring Pack Relaxation, Hydraulic Lock of Spring Pack, Stem Lube Interval, Periodic Overhaul Interval

  - Incorporate Seismic Considerations in Design Reviews

  - Incorporate Rate of Loading Effects

- Degraded voltage evaluation complete for Supplement 3 valves

OYSTER CREEK GL 89-10 MOV OPERATED VALVE PROGRAM								
VALVE NUMBER	SYSTEM	DESIGN BASIS dP (psi)	DYNAMIC TEST PRACTICABLE	DESIGN BASIS/dP REVIEW/COMPLETE	DEGRADED VOLTAGE REVIEW/ COMPLETE	THRUST CALC COMPLETE	SWITCHES SET & VERIFIED BY:	
							STATIC TEST	DYNAMIC TEST
V-5-147	RBCCW	98	YES	✓				
V-5-166	RBCCW	76	YES	✓				
V-5-167	RBCCW	76	YES	✓				
*V-14-30	Iso Cond	1020	NO	✓	✓	✓	✓	
*V-14-31	Iso Cond	1020	NO	✓	✓	✓	✓	
*V-14-32	Iso Cond	1020	NO	✓	✓	✓	✓	
*V-14-33	Iso Cond	1020	NO	✓	✓	✓	✓	
*V-14-34	Iso Cond	730	NO	✓	✓	✓	✓	
*V-14-35	Iso Cond	730	NO	✓	✓	✓	✓	
*V-14-36	Iso Cond	730	NO	✓	✓	✓	✓	
*V-14-37	Iso Cond	730	NO	✓	✓	✓	✓	
*V-16-1	RWCU	1030	NO	✓	✓	✓	✓	
V-16-2	RWCU	135	NO	✓				
*V-16-14	RWCU	1030	NO	✓	✓	✓	✓	
V-16-61	RWCU	800	NO	✓				
V-17-19	S.D. Cool.	120	YES	✓				
V-17-54	S.D. Cool.	120	YES	✓				

* Supplement 3 valve
✓ G. L. 89-10 activity

13R = Refueling Outage Spring 1991
14R = Planned Refueling Outage Winter 1993

OYSTER CREEK GL 89-10 MOV OPERATED VALVE PROGRAM								
VALVE NUMBER	SYSTEM	DESIGN BASIS dP (psi)	DYNAMIC TEST PRACTICABLE	DESIGN BASIS/dP REVIEW/COMPLETE	DEGRADED VOLTAGE REVIEW/ COMPLETE	THRUST CALC COMPLETE	SWITCHES SET & VERIFIED BY:	
							STATIC TEST	DYNAMIC TEST
V-20-3	Core Spray	33	NO	✓				
V-20-4	Core Spray	33	NO	✓				
V-20-15	Core Spray	320	NO	✓				
V-20-21	Core Spray	311	NO	✓				
V-20-32	Core Spray	33	NO	✓				
V-20-33	Core Spray	33	NO	✓				
V-20-40	Core Spray	320	NO	✓				
V-20-41	Core Spray	311	NO	✓				
V-20-12	Core Spray	319	NO	✓				
V-20-18	Core Spray	309	NO	✓				
V-20-26	Core Spray	280	YES	✓				
V-20-27	Core Spray	292	YES	✓				
V-21-5	Cont. Spray	150	NO	✓				
V-21-11	Cont. Spray	150	NO	✓				
V-21-13	Cont. Spray	150	YES	✓				
V-21-15	Cont. Spray	150	NO	✓				
V-21-17	Cont. Spray	150	YES	✓				
V-21-18	Cont. Spray	150	NO	✓				

* Supplement 3 valve
✓ G. L. 89-10 activity

C. SUPPLEMENT 3 VALVES ASSESSMENT

FEBRUARY, 1991

- As-is capability was assessed using valve factors based on the following:

    - Vendor test data for the new ICS valves installed in 13R outage.

    - Suggested values for blowdown flow in similar INEL test valves (EPRI NP-7065) for balance of valves.

- Valve differential pressure based on reactor operating pressure for all valves and required thrust calculated.

- Structural weak link analysis performed to establish 13R torque switch setting limits.

- Torque switches set and tested in 13R to achieve new calculated required thrust without exceeding structural limits. After testing, 6 of 8 ICS valves and 1 of 2 RWCU valves met these new thrust goals.

- Operability based on original design basis (0.3 valve factor).

SUPPLEMENT 3 ASSESSMENT CONTINUED

FEBRUARY, 1992

- Detail design basis review considering all license basis accident scenarios yielded maximum differential pressures and minimum voltage conditions.

- Valve factors selected using GPUN's statistical evaluation performed in April, 1991 of test data in NUREG CR 5406 Volume 2 as well as information provided later in INEL EGG-SSRE-9926, November 12, 1991

- Required thrust and motor torque were calculated.

- Detailed degraded voltage analysis

    - Based on 1980 study of voltage at MCC level, supplemented by calculations of cable voltage drops including consideration of maximum ambient temperatures.

- Evaluation of motor capability at degraded voltage and evaluation of as-left versus required torque.

- Key assumptions:

    - Motor at full speed when valve disc enters flow stream

    - Running efficiency applies during valve closure stroke

    - AC valve motor torque proportional to voltage squared

    - DC valve motor torque directly proportional to voltage

OCNGS GENERIC LETTER 89-10, SUPPLEMENT 3 MOTOR OPERATED VALVES

	V-14-30	V-14-31	V-14-32	V-14-33	V-14-34	V-14-35	V-14-36	V-14-37	V-16-1	V-16-14
SYSTEM	ICS "A" Steam Line	ICS "A" Steam Line	ICS "B" Steam Line	ICS "B" Steam Line	ICS "A" Condensate Return Line	ICS "B" Condensate Return Line	ICS "A" Condensate Return Line	ICS "B" Condensate Return Line	RWCU Supply Line	RWCU Supply Line
FUNCTION	Cont. Isol.	Cont. Isol.	Cont. Isol.	Cont. Isol.	Cont. Isol.	Cont. Isol.	Cont. Isol.	Cont. Isol.	Cont. Isol.	Cont. Isol.
LOCATION	Out. Cont.	Out. Cont.	Out. Cont.	Out. Cont.	Out Cont.	Out. Cont.	In Cont.	In. Cont.	In Cont.	Out. Cont.
POWER SUPPLY	A.C.	D.C.	A.C.	D.C.	D.C.	D.C.	A.C.	A.C.	A.C.	D.C.
NORMAL POSITION	Open	Open	Open	Open	Closed	Closed	Open	Open	Open	Open
ACTUATION	Close	Close	Close	Close	Close	Close	Close	Close	Close	Close
SIZE/TYPE	10" Gate	10" Gate	10" Gate	10" Gate	10" Gate	10" Gate	10" Gate	10" Gate	6" Gate	6" Gate

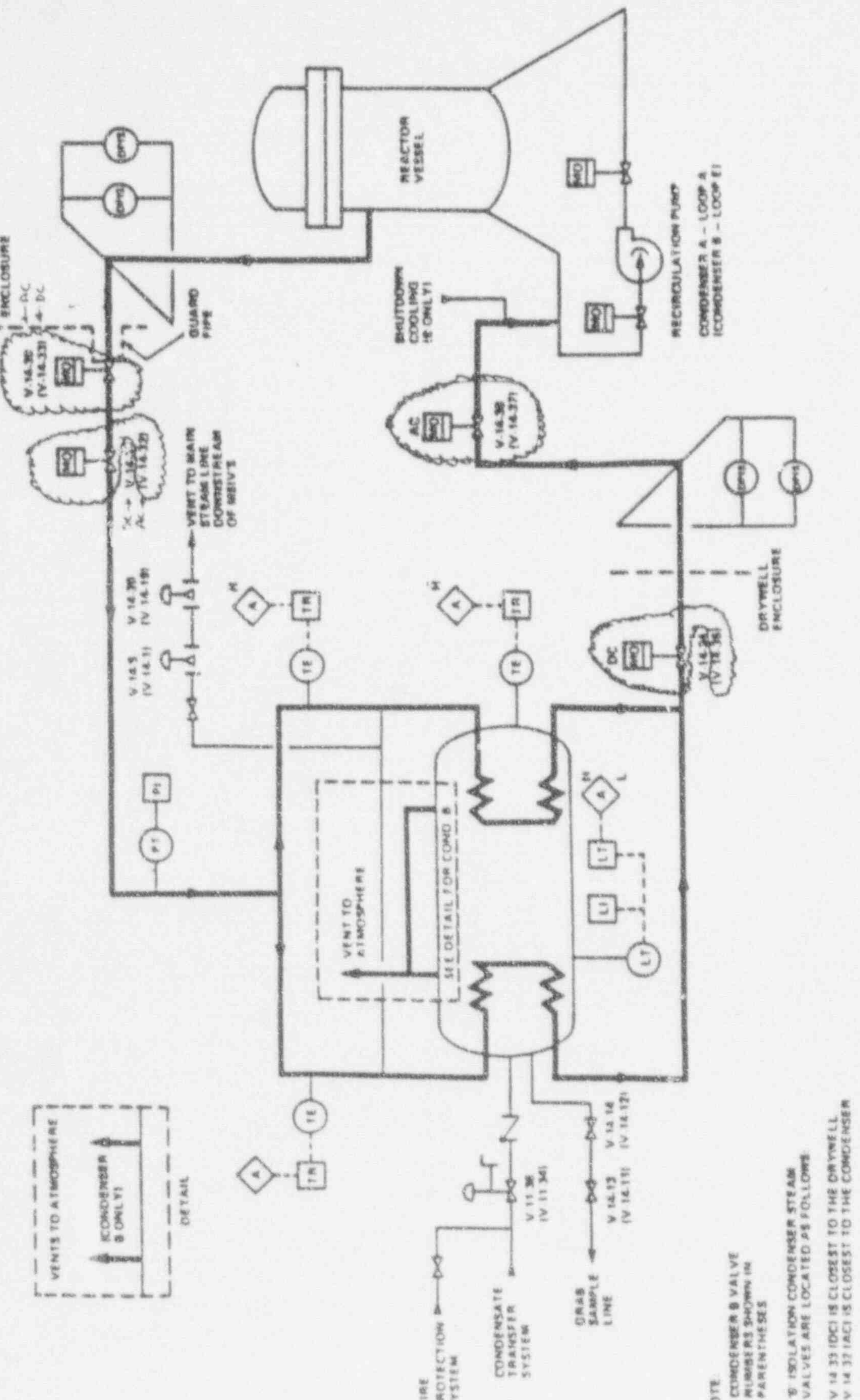


FIGURE 23-1: ISOLATION CONDENSER SYSTEM

WORST CASE SCENARIO EXAMPLE

- Licensing Basis (FSAR 6.2.4.5) - Two independent events/failures must be accommodated in addition to degraded voltage conditions.

- Example No. 1: ICS Steam Side Isolation Valve

  - Accident/event = HELB of ICS outside containment with or without loss of offsite power

↓

Single Failure

↙	↘
Failure of AC valve to close	Failure of DC valve to close
↓	↓
Nominal DC voltage Available from EDG or AC battery charger	Degraded AC voltage
↓	↓
Full ΔP on DC valve	Full ΔP on AC valve

- Example No. 2: ICS Condensate Return Side Isolation Valve

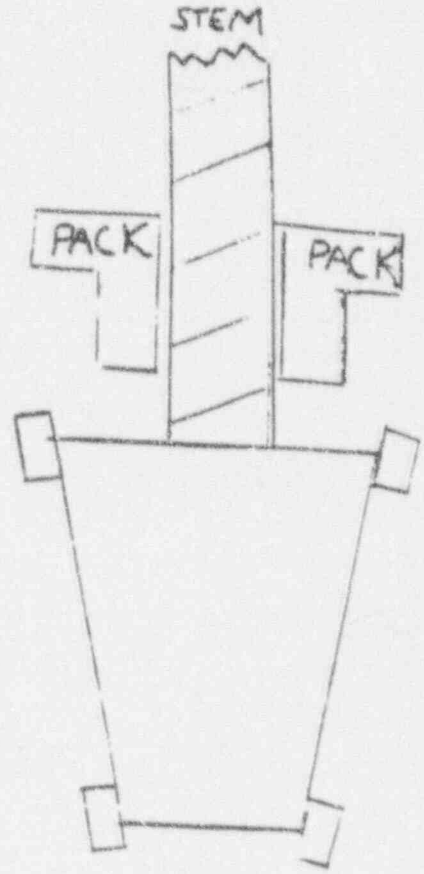
  - Accident/event = Event which initiates ICS (opens N.C. valves) with or without loss of offsite power

↓

Single Failure = HELB outside containment

↙	↘
Degraded Ac Voltage	Nominal DC Voltage available from EDG or AC battery chargers
↓	↓
Full Δ P on AC valve	Full Δ P on DC valve

VALVE THRUST



3 FORCES IN VALVE OPERATION

1. STEM PISTON EFFECT

   $P_{Line} \times A_{Stem}$

2. STEM PACKING

   CONSTANT (FUNCTION OF STEM DIAMETER)

3. DIFFERENTIAL PRESSURE

   DIFFERENTIAL PRESSURE X A_{Seat} X VALVE FACTOR

Table 2. Reassessment of the design basis tests

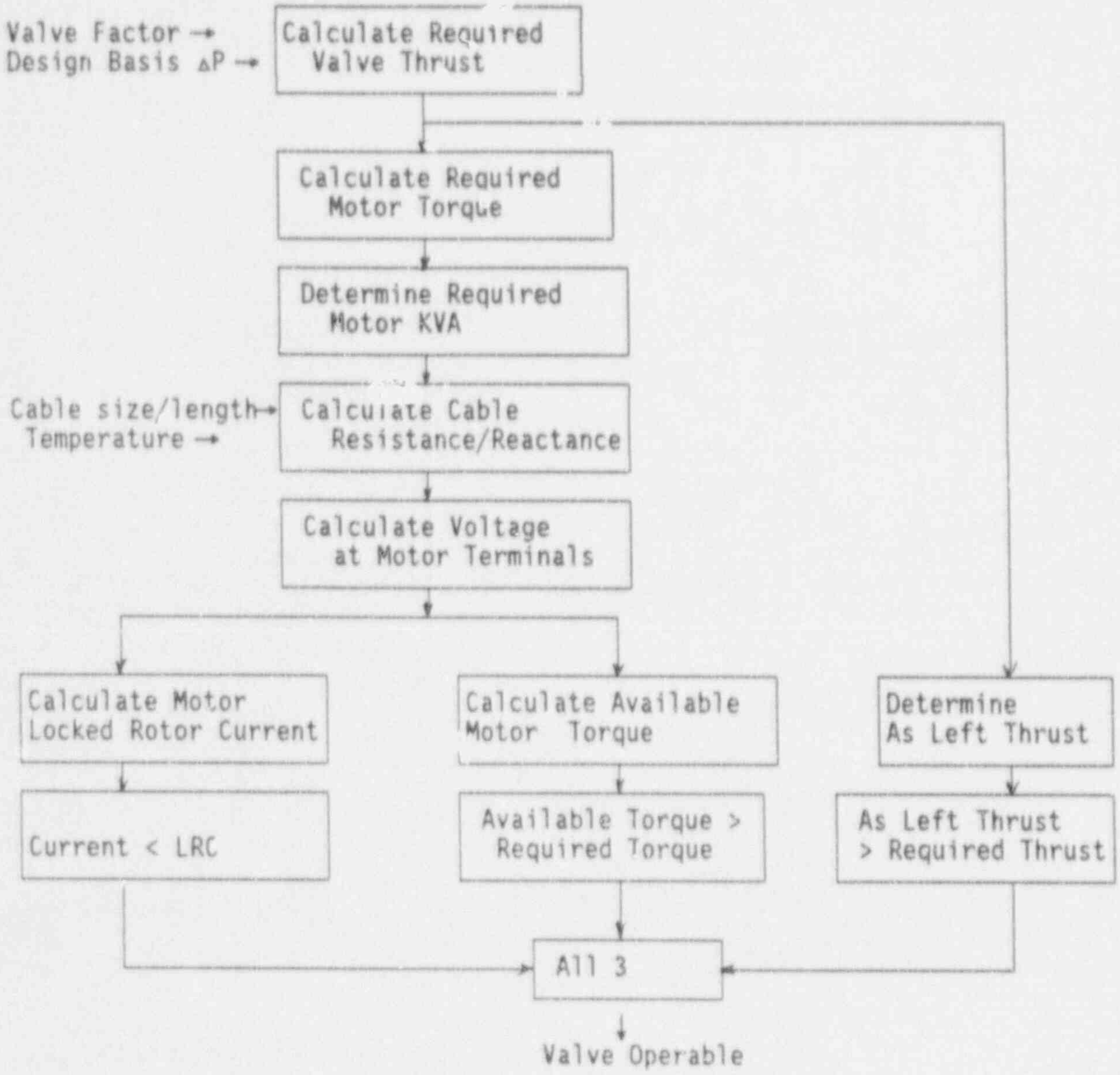
	Isolation Stem Force		Apparent Disc Factor		
Test Number	EPRI Tbl. 6-1	Actual Isolation	EPRI Tbl. 6-1	Actual Isolation	Notes
A-3-5	9000	5347	0.63	0.36	Nonpredictable
1-2-25	19500	22900	0.86	1.05	Nonpredictable[1]
B-2-5	12500	13833	0.35	0.43	
2-1-25	10400	12929	0.33	0.45	
2-2-25	9000	13096	0.23	0.40	
2-3-25	5200	12751	0.15	0.59	
2-6A-25	5300	7859	0.29	0.50	
2-6A1-25	6000	8688	0.29	0.50	
2-6B-25	8800	12173	0.31	0.48	
2-6B1-25	9200	13700	0.29	0.48	
2-6C-25	12200	15798	0.28	0.40	
3-1-25	5900	4355	0.19	0.48	
3-1A-25	7000	10804	0.23	0.43	
3-5-25	9100	12235	0.26	0.40	
4-1-25	23800	16100	0.49	0.30	Nonpredictable
5-1-25	28000	24756	0.44	0.39	Nonpredictable
5-1A-25	26500	30474	0.34	0.42	
6-1-25	28000	28200	0.42	0.41	Nonpredictable
6-1A-25	32000	29366	0.40	0.35	Nonpredictable
6-1B-25	19000	25233	0.26	0.36	Nonpredictable

Similar to V-16-1 & 14

Similar to V-14-36 & 37

1. Valve failed to close during the test.

FLOW CHART
SUPPLEMENT 3 CALCULATION



SUPPLEMENT 3 RESULTS

- ALL VALVES ARE FULLY OPERABLE, WITH SUFFICIENT TORQUE AND THRUST AT CURRENT TORQUE SWITCH SETTINGS TO SATISFY DESIGN BASIS SAFETY FUNCTION.
- ONGOING 89-10 PROGRAM WILL CONTINUE TO ASSESS MARGINS.

VALVE	ΔP (PSI)	VALVE FACTOR	REQ'D THRUST (lbs) (a)	u	STEM TORQUE REQ'D (ft-lbs)	RUN. EFFY.	MOTOR TORQUE REQ'D (ft-lbs)	UNDER VOLTAGE (Volts)	UV FACTOR	MOTOR TORQUE AVAIL. (ft-lbs)	AS-IS TORQUE SWITCH SETTING	SPRING PACK TORQUE (ft-lbs)	STEM TORQUE @ UV (ft-lbs)	13R AS-LEFT THRUST (lbs) (b)
V-14-31	1020	.40	33268 32737	.2	935	.5	37.2	118.2	.94	56.4	1.0	874	1575	43,332
V-14-33	1020	.40	33268 32737	.2	935	.5	37.2	100.6	[illegible]	48.0	1.75	1213	1340	50,784
V-14-30	1020	.40	33268 32737	.2	768	.55	24.5	377.9	.82	26.9	2.5	525	913	37,080
V-14-32	1020	.40	33268 32737	.2	768	.55	24.5	380.9	.82	26.9	2.0	413	936	34,039
V-14-34	730	.40	24520 23429	.2	689	.5	27.4	119.4	.95	57.0	1.0	874	1591	47,645
V-14-35	730	.40	24520 23429	.2	689	.5	27.4	79.6	.63	37.8	1.0	874	1055	40,142
V-14-36	730	.40	24351 23249	.2	538	.55	20.7	383.1	.83	27.6	2.75	580	759	25,296
V-14-37	730	.40	24351 23249	.2	538	.55	20.7	359.7	.81	26.2	2.75	580	722	29,305
V-16-1	1030	.38	14021 13360	.2	265	.5	16.1	382.6	.87	11.3	2.0	300	330	15,963
V-16-14	1030	.38	14021 13360	.2	265	.55	17.1	118.0	.94	23.5	2.25	350	396	14,224

a) The upper number is the calculated required thrust and is used in the operator sizing calculations. The lower number is the calculated thrust minus packing load and then adjusted upward by the MOVATS inaccuracies in Table 3 of ER-5.0. The lower number is the target thrust above pre-load/running load for MOVATS testing.

b) 13R as-left thrust is the thrust above pre-load/running load on the MOVATS trace. This is to be compared to the lower number in the Required Thrust column.

CONVERSION
MOTOR TORQUE AVAILABLE TO STEM TORQUE @ UV

MOTOR TORQUE AVAILABLE X GEARING X EFFICIENCY = STEM TORQUE @ UV

Valve	Motor Torque Available	Gearing	Efficiency	Stem Torque @ UV
V-14-30	26.9	63.26	.55	936
V-14-31	56.4	55.84	.5	1575
V-14-32	26.9	63.26	.55	936
V-14-33	48	55.84	.5	1340
V-14-34	57	55.84	.5	1591
V-14-35	37.8	55.84	.5	1055
V-14-36	27.6	52.57	.55	798
V-14-37	26.2	52.57	.55	759
V-16-1	11.4	58.13	.5	331
V-16-14	23.5	31.3	.55	406

EFFECTIVE VALVE FACTORS

Valve	DP	Effective Valve Factor	
		Based on Mechanical Limit	Based on Electrical Limit
V-14-30	1020	.76	.50
V-14-31	1020	.76	.72
V-14-32	1020	.76	.50
V-14-33	1020	.76	.60
V-14-34	730	1.08	1.03
V-14-35	730	1.08	.65
V-14-36	730	.70	.63
V-14-37	730	.70	.60
V-16-1	1030	.73	~~.50~~ 44
V-16-14	1030	.73	.64

D. G. L. 89-10 SCHEDULE MILESTONES

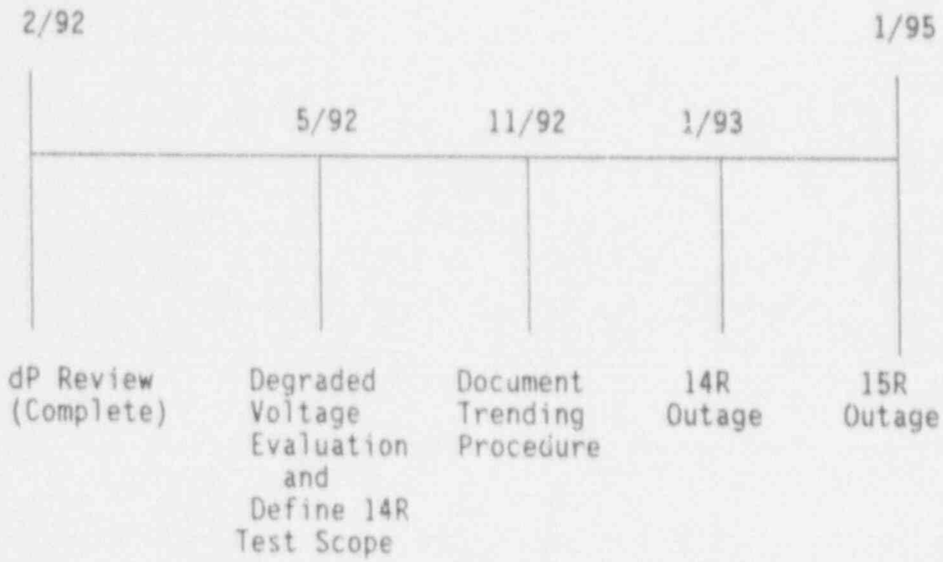
- Future Milestones

    - Degraded voltage evaluation for balance of valves

    - Dynamic Test Procedures

    - Testing - As many valves as possible in 14R outage. Balance in 15R. Considering testing in operating cycle if feasible.

    - Document Trending Procedure



OYSTER CREEK GL 89-10 MOV OPERATED VALVE PROGRAM								
VALVE NUMBER	SYSTEM	DESIGN BASIS dP (psi)	DYNAMIC TEST PRACTICABLE	DESIGN BASIS/dP REVIEW/COMPLETE	DEGRADED VOLTAGE REVIEW/ COMPLETE	THRUST CALC COMPLETE	SWITCHES SET & VERIFIED BY:	
							STATIC TEST	DYNAMIC TEST
V-5-147	RBCCW	98	YES	2/3/92	5/31/92	7/31/92		
V-5-166	RBCCW	76	YES	2/3/92	5/31/92	7/31/92		
V-5-167	RBCCW	76	YES	2/3/92	5/31/92	7/31/92		
*V-14-30	Iso Cond	1020	NO	2/3/92	2/14/92	2/14/92	13R	
*V-14-31	Iso Cond	1020	NO	2/3/92	2/14/92	2/14/92	13R	
*V-14-32	Iso Cond	1020	NO	2/3/92	2/14/92	2/14/92	13R	
*V-14-33	Iso Cond	1020	NO	2/3/92	[illegible]14/9[illegible]	2/14/92	13R	
*V-14-34	Iso Cond	730	NO	2/3/92	[illegible]	2/14/92	13R	
*V-14-35	Iso Cond	730	NO	2/3/92	[illegible]2	2/14/92	13R	
*V-14-36	Iso Cond	730	NO	2/3/92	[illegible]2	2/14/92	13R	
*V-14-37	Iso Cond	730	NO	2/3/92	[illegible] 92	2/14/92	13R	
*V-16-1	RWCU	1030	NO	2/3/92	[illegible]/92	2/14/92	13R	
V-16-2	RWCU	135	NO	2/3/92	5/31/92	7/31/92		
*V-16-14	RWCU	1030	NO	2/3/92	2/14/92	2/14/92	13R	
V-16-61	RWCU	800	NO	2/3/92	5/31/92	7/31/92		
V-17-19	S.D. Cool.	120	YES	2/3/92	5/31/92	7/31/92		
V-17-54	S.D. Cool.	120	YES	2/3/92	5/31/92	7/31/92		

* Supplement 3 valve

OYSTER CREEK GL 89-10 MOV OPERATED VALVE PROGRAM								
VALVE NUMBER	SYSTEM	DESIGN BASIS dP (psi)	DYNAMIC TEST PRACTICABLE	DESIGN BASIS/dP REVIEW/ COMPLETE	DEGRADED VOLTAGE REVIEW/ COMPLETE	THRUST CALC COMPLETE	SWITCHES SET & VERIFIED BY:	
							STATIC TEST	DYNAMIC TEST
V-20-3	Core Spray	33	NO	2/3/92	5/31/92	7/31/92		
V-20-4	Core Spray	33	NO	2/3/92	5/31/92	7/31/92		
V-20-15	Core Spray	320	NO	2/3/92	5/31/92	7/31/92		
V-20-21	Core Spray	311	NO	2/3/92	5/31/92	7/31/92		
V-20-32	Core Spray	33	NO	2/3/92	5/31/92	7/31/92		
V-20-33	Core Spray	33	NO	2/3/92	5/31/92	7/31/92		
V-20-40	Core Spray	320	NO	2/3/92	5/31/92	7/31/92		
V-20-41	Core Spray	311	NO	2/3/92	5/31/92	7/31/92		
V-20-12	Core Spray	319	NO	2/3/92	5/31/92	7/31/92		
V-20-18	Core Spray	309	NO	2/3/92	5/31/92	7/31/92		
V-20-26	Core Spray	280	YES	2/3/92	5/31/92	7/31/92		
V-20-27	Core Spray	292	YES	2/3/92	5/31/92	7/31/92		
V-21-5	Cont. Spray	150	NO	2/3/92	5/31/92	7/31/92		
V-21-11	Cont. Spray	150	NO	2/3/92	5/31/92	7/31/92		
V-21-13	Cont. Spray	150	YES	2/3/92	5/31/92	7/31/92		
V-21-15	Cont. Spray	150	NO	2/3/92	5/31/92	7/31/92		
V-21-17	Cont. Spray	150	YES	2/3/92	5/31/92	7/31/92		
V-21-18	Cont. Spray	150	NO	2/3/92	5/31/92	7/31/92		

OPEN TECHNICAL ISSUES

- Valve Disc Factors

  - Factors for blowdown flow still in question industry-wide. GPUN subscribes to and is following EPRI MOV Performance Prediction Program, will employ "two-stage" approach with predicted valve factors for blowdown flow based on available industry data.

  - GPUN will employ valve factor of 0.3 for gate valves in "pumped flow" and low dP applications, unless specific industry data is available (EPRI or utility tests).

- Rate of Loading Effects

  - GPUN following EPRI MOV Performance Predication Program, particularly the "Operator Test Program", plus other industry efforts.

- Diagnostic Inaccuracies

  - GPUN employs MOVATS at Oyster Creek and TMI-1 and currently using MOVATS defined accuracy in valve calculations

  - GPUN monitoring MUG and MOVATS testing and evaluation efforts. March 5/6 meeting with MOVATS.

- Limitorque Application Factor

  - GPUN position is to apply factor when sizing and procuring new operators and to not include factor when evaluating performance of existing valves.

OPEN TECHNICAL ISSUES Cont'd

- Temperature Effect on Motors

  - Limitorque issued Part 21 on DC motors with RH insulation in November, 1988. GPUN has 60 ft.-lb. operators in this category. Limiting ambient temperature for full rated torque is 250°F. Supplement 3 valves will perform their function before temperature exceeds this value.

- Rotating Rising Stem Globe Valves

  - GPUN reviewing capability of diagnostic equipment to measure seating thrust accurately - affect of packing load on required motor output.

GPUN PARTICIPATION IN INDUSTRY ACTIVITIES

- EPRI MOV Program (Subscriber)

- MUG

- BWR Owners Group - Valve TRG

- B&W Owners Group - Valve Working Group

- IEEE Committee on MOV selection, Application, Protection and Testing

Oyster Creek MOV Program

Current Program Overview

basic program established in 1984

PROGRAM RESPONSIBILITIES

- Establish and execute PM tasks FOR MOV's
- Root cause analysis of MOV deficiencies and failures
- Data acquisition, analysis, and trending of troubleshooting/diagnostic testing
- Failure trending
- Establish correct torque, limit, and bypass switch settings
- Recommend appropriate post maintenance tests
- Evaluate industry issues, manufacturer notices and bulletins for applicability to OC.

Oyster Creek MOV Program
Trending

- COMPONENT FAILURE TRENDING

  * Database captures failures of

    - Operators
    - Valves
    - Breakers

  * Format follows NPRDS failure determination guidelines
  * Format allows for capture of Maintenance/Failure history
  * Updated quarterly

- SIGNATURE ANALYSIS DATABASE

  * Database trends diagnostic test parameters, including:

    - Switch settings
    - Thrust loads
    - Inertia
    - Currents
    - Stroke times

  * Format allows for categories in Attachment 'A' of GL 89-10. Some of the conditions trended include:

    - Incorrect switch settings
    - Spring pack gap or incorrect preload
    - Loose stem nut
    - Grease in spring pack
    - Hydraulic lockup
    - Missing torque switch limiter plate

Oyster Creek MOV Program
Other Issues

- <u>HYDRAULIC LOCK ISSUE</u>

  - Existing database has been reviewed for evidence of reoccurring hydraulic lock

  - Signature analysis forms basis for determining hydraulic lock

  - Once identified spring pack modifications per vendor recommendations will be implemented.

- <u>TRAINING</u>

  - Operator disassembly and reassembly

  - Valve maintenance training

    * Disk resurfacing
    * Chesterton repack

  - MOVATS signature data acquisition