November 3, 1994

Docket Nos. 50-317
50-318

Mr. Robert E. Denton
Vice President - Nuclear Energy
Baltimore Gas and Electric Company
Calvert Cliffs Nuclear Power Plant
1650 Calvert Cliffs Parkway
Lusby, MD 20657 - 4702

SUBJECT: MOTOR-OPERATED VALVE MEETING

Dear Mr. Denton:

This refers to the public meeting conducted in King of Prussia, Pennsylvania on October 26, 1994. The meeting was held to discuss motor-operated valve (MOV) issues with Region I licensees. Special emphasis was placed on the expectations for completion and the process for closure of Generic Letter 89-10, "Safety-Related Motor-Operated Valve Testing and Surveillance."

The meeting was attended by 86 individuals, including those representing your organization. Copies of presentations are attached, as is a list of 21 questions that were submitted to the NRC prior to the meeting, and discussed during the panel session. 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 NRC's Public Document Room.

We appreciated the responsiveness and turnout for this meeting, and will continue to communicate our expectations regarding the verification of MOV design basis capability. Should you have any questions concerning any of the topics raised, we will be pleased to discuss them further with you.

Sincerely,

Eugene M. Kelly, Chief
Systems Section
Division of Reactor Safety

Attachments:
1. Attendees
2. Agenda
3. Licensee Presentations
4. NRC Presentations
5. Panel Session Questions

140154

IE45

cc w/encl:
G. Detter, Director, Nuclear Regulatory Matters (CCNPP)
R. McLean, Administrator, Nuclear Evaluations
J. Walter, Engineering Division, Public Service Commission of Maryland
K. Burger, Esquire, Maryland People's Counsel
R. Ochs, Maryland Safe Energy Coalition
State of Maryland (2)
K. Abraham, PAO (2)
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector

bcc w/encl:
Region I Docket Room (with concurrences)
W. Dean, OEDO (WMD)
P. Wilson - Calvert Cliffs
T. Marsh, NRR
D. McDonald, NRR
DRS File (2)

DOCUMENT NAME: A: MOVMTG.REP

To receive a copy of this document, indicate in the box: "C" = Copy without attachment/enclosure "E" = Copy with attachment/enclosure "N" = No copy

OFFICE	RI/DRS	A	RI/DRS	E	RI/		RI/		RI/	
NAME	Bower		Kelly							
DATE	11/02/94		11/ 3 /94		11/ /94		11/ /94		11/ /94	

OFFICIAL RECORD COPY

ATTACHMENT 1

ATTENDEES

New York Power Authority

K. Kinglsey	Licensing Engineer
F. Martsen	Corporate MOV Coordinator
R. Green	Indian Point 3
J. Cameron	JAF/Lead MOV Engineer
A. Halliday	JAF/Manager
A. Decker	Program Manager
K. Eslinger	Site MOV Coordinator

Maine Yankee Atomic Power Company

D. Whittier	
S. Nichols	
B. Moulton	
D. Hakkila	
S. Nichols	Manager - Corporate Engineer

Yankee Atomic Nuclear Power

A. Parker	Audit Supervisor
J. Callahan	Lead Systems Engineer

Duquesne Light Company

C. Cluster	DQE Director - Comp. Engineering
S. Loehlein	Engineering Supervisor
E. Coholich	Sr. Licensing Supervisor

Vermont Yankee Nuclear Power

T. Trask	MOV Coordinator

North Atlantic Energy Service Corporation

G. Sessler	Sr. Project Engineer
P. Searfoorce	MOV Project Manager
M. Makowicz	

GPU Nuclear

B. Elam	Maintenance Engineering Director
D. Distel	Corporate Licensing
D. Hassler	Licensing
R. Zimmerman	Plant Engineering
J. Tabone	
J. Roumes	Engineer
J. Correa	
E. Showalter	Lead Electrical Engineer
P. Walsh	Plant Engineering Director
T. Carroll	MOV Engineer
J. Chartorina	Mechanical Engineer

Boston Edison

B. Sullivan	
M. Lenhart	Sr. Licensing Engineer
T. White	Safety Analysis Engineer
J. Jerz	Project Manager

Public Service Electric & Gas

S. Gallegly	MOV Engineer
C. Manges	Licensing Engineer
R. Lewis	Sr. Staff Engineer
F. Higgins	Sr. Staff Engineer
S. Maginnis	Project Manager
R. Sandquist	MOV Engineer

PECO Energy

K. Graffe	Licensing
G. Stathes	Mechanical Engineering Branch Manager
D. Cronomiz	
S. Bobyack	
B. Carsky	
C. Sellers	Erin Engineering

Rochester Gas & Electric

K. Muller	MOV Program Coordinator

Consolidated Edison

D. Hinshaw	Engineer
T. DeDonato	Engineer
C. Laverde	System Engineer
J. Lamm	

Baltimore Gas & Electric

B. Rudell	G.S. Project Management
J. Riedel	MOV Project Manager
B. Nowicki	Maintenance Engineer
K. Cunningham	MOV Engineer
J. Osborne	

Northeast Utilities

T. Murray	Licensing
B. Harris	

Pennsylvania Power & Light

J. Gutshall	Valve Maintenance Supervisor
M. Rose	Sr. Project Engineer
K. Anderson	Project Engineer

Niagara Mohawk Power Corporation

C. Fischer	Technician
R. Main	MOV Coordinator
J. Halusic	Unit 2 Engineer
J. Banyan	
N. Kollengode	Project Manager

U.S. Nuclear Regulatory Commission

B. Kane	Deputy Regional Administrator
J. Wiggins	Deputy Director
G. Kelly	Chief - Systems Section
L. Prividy	Sr. Reactor Engineer
B. McDermott	Reactor Engineer
F. Bower	Reactor Engineer
M. Buckley	Reactor Engineer
P. Drysdale	Sr. Reactor Engineer
A. Wang	PM - Haddam Neck, NRR
H. Rathbun	Mechanical Engineer, NRR
C. Poslusny	NRR
D. Wessman	NRR
T. Scrabrough	NRR

PA Department of Environmental Services

R. Maiers	Bureau of Radiation Protection
D. Ney	Bureau of Radiation Protection

NUS Corporation

S. Katradis Mechanical Staff Engineer

State of New Jersey

D. Zannons Nuclear Engineering Program

AGENDA
MOTOR-OPERATED VALVE MEETING
26 OCTOBER 1994

8:00 A.M.	Welcome and Opening Remarks by William Kane, Deputy Regional Administrator, NRC Region I
8:15 A.M.	Keynote: "Expectations for Completion" by James Wiggins, Director, Division of Reactor Safety, NRC Region I
8:30 A.M.	"Utility Perspective" by James Riedel, MOV Project Manager, Baltimore, Gas & Electric Co. (BG&E)
9:00 A.M.	"Process for Closure" by Richard Wessman, Chief, NRR, Division of Engineering
9:30 - 9:45 A.M.	Break
9:45 - 10:15 A.M.	"Closure at Calloway" by Thomas Scarbrough
10:15 - 11:30 A.M.	Breakout Sessions
11:30 - 1:00 P.M.	Lunch
1:00 - 1:30 P.M.	"Utility Perspective" by Steven Maginnis, MOV Project Manager, Public Service Electric & Gas Co. (PSE&G)
1:30 - 2:30 P.M.	Feedback
2:30 - 2:45 P.M.	Break
2:45 - 4:15 P.M.	Questions and Answers Panel Session
4:15 - 4:30 P.M.	Closing Remarks by Eugene Kelly, Chief, Systems Section, Division of Reactor Safety

CALVERT CLIFFS MOV PROJECT

STRENGTHS:

MANAGEMENT ATTENTION:

- TOP LEVEL COMMITMENT
- COGNIZANT

  YET ALLOWED PROJECT MANAGER

  FLEXIBILITY AND AUTHORITY

PEOPLE:

- PROJECT TEAM METHODOLOGY
- KNOWLEDGEABLE & DEDICATED

  LONG TERM INVOLVEMENT BY KEY MEMBERS
- IN-HOUSE MAINTENANCE - OWNERSHIP
- QUALITY VERIFICATION

CALVERT CLIFFS MOV PROJECT

STRENGTHS:

COMMUNICATION WITH INDUSTRY

- MUG
- EPRI
- INPO
  - ASSIST VISIT

→ ALLOWED US TO

- STAY CURRENT ON TECHNICAL ISSUES, EFFORTS & PROGRESS
- REVIEW & ASSESS STRENGTHS & WEAKNESSES

- EVALUATE ALL INDUSTRY / NRC CONCERNS
  - OE, PART 21, INFO. NOTICES, INSPECTIONS
  - VENDOR TECHNICAL UPDATES

CALVERT CLIFFS MOV PROJECT

STRENGTHS:

RESPONSE TO " BEST AVAILABLE " / INDUSTRY DEVELOPMENTS

- ACKNOWLEDGED:
  - HIGHER VF
  - .20 COF
  - ACCURACIES / TSR
  - TORQUE LOSSES
  - ROL
  - SPRING PACK RELAXATION
  - LUBRICATION DEGRADATION

- INCORPORATED RESULTS INTO OUR SIZING / SETTING METHODS

- CAUTIOUS APPROACH ON TORQUE CONTROL
  - EXTENSIVE EFFORT IN DEVELOPING A DECISION TREE FOR LIMIT OR TORQUE CONTROL

CALVERT CLIFFS MOV PROJECT

STRENGTHS:

HARDWARE UPGRADE VS " PENCIL SHARPENING "

- MODIFIED EQUIPMENT TO IMPROVE DESIGN CAPABILITY
- OVERHAULED ALL PROGRAM MOVs
- TORQUE SWITCH / SPRING PACK TESTING
- NO HESITATION TO REPLACE UNDESIRABLE PERFORMANCE

MARGIN TO ABSORB " UNKNOWNS " AND INDUSTRY " SURPRISES "

CALVERT CLIFFS MOV PROJECT

PROJECT STRENGTHS

- MANAGEMENT SUPPORT
- PEOPLE
- COMMUNICATION WITH INDUSTRY
- RESPONSE TO "BEST AVAILABLE" / INDUSTRY DEVELOPMENTS
- HARDWARE UPGRADES VS "PENCIL SHARPENING"

CALVERT CLIFFS MOV PROJECT

CLOSURE ISSUES:

MAINTAIN STRONG PROGRAM

VALIDATE ASSUMPTIONS

RECONCILE TWO - STAGE APPROACH

PERIODIC VERIFICATION

CALVERT CLIFFS MOV PROJECT

CLOSURE ISSUES:

MAINTAIN STRONG PROGRAM

MANAGEMENT COMMITMENT

DESIGN BASES CONTROL

COMPREHENSIVE MAINTENANCE PROGRAM

"NORMAL PLANT PROCESS CONTROLS"

CALVERT CLIFFS MOV PROJECT

CLOSURE ISSUES:

VALIDATE ASSUMPTIONS

- VALVE FACTOR
- DIAGNOSTIC ACCURACY
- COF
- MOTOR TORQUE
- ROL
- TSR
- EXTRAPOLATION OF LESS THAN DESIGN TESTING
- LUBE DEGRADATION
- SPRING PACK RELAXATION

CALVERT CLIFFS MOV PROJECT

CLOSURE ISSUES:

VALIDATION METHODS

EVIDENCE EXISTS TODAY

VALVE FACTOR

DIAGNOSTIC ACCURACY

COF

MOTOR TORQUE

ROL

TSR

EXTRAPOLATION OF TEST DATA

→

- PLANT SPECIFIC TESTING
- INDUSTRY GROUPS TESTING
- VENDOR TESTING
- EPRI

JUDGEMENT NOW

LUBE DEGRADATION

SPRING PACK RELAXATION

→

- SUPPORTED BY MONITORING & EVALUATION

CALVERT CLIFFS MOV PROJECT

CLOSURE ISSUES:

RECONCILE TWO-STAGE APPROACH

- COMPARISON
  - APPLICABLE TEST RESULT
    - IN HOUSE
    - OUTSIDE (EPRI - UTILITIES)
- EPRI PPM
- STATIC ONLY (NO MATCH)
  - MARGIN
  - PRA

CALVERT CLIFFS MOV PROJECT

CLOSURE ISSUES:

PERIODIC VERIFICATION:

TESTING AT DESIGN CONDITIONS GIVES DIRECT INDICATION OF PERFORMANCE

. . . BUT AT WHAT COST ?

- IMPACT PLANT SAFETY
- ECONOMIC IMPACT

CALVERT CLIFFS MOV PROJECT

CLOSURE ISSUES:

PERIODIC VERIFICATION

- CONSIDERATIONS
  - MARGIN
  - PRA

RISK RANKING

MARGIN	HIGH	MED	LOW
LOW			
MED			
HIGH			

CALVERT CLIFFS MOV PROJECT

CLOSURE ISSUES:

CAN OTHER PRACTICES GIVE ADEQUATE INDICATION OF PERFORMANCE OR REASONABLE ASSURANCE OF PERFORMANCE ?

- AGGRESSIVE / COMPREHENSIVE MAINTENANCE PRACTICES

- TRENDING OF KEY PERFORMANCE PARAMETERS

- EPRI PPM

- ADVANCED DIAGNOSTIC TECHNIQUES
  - i.e. MCC - MTR PWR MONITORING

- DATA SHARING WITHIN THE INDUSTRY

CALVERT CLIFFS MOV PROJECT

OBSERVATIONS:

- UTILITIES SEEMED TO BE CHASING A MOVING TARGET.
  - RESEARCHING IN PARALLEL WITH COMPLYING.
- INDUSTRY USING PC BASED DIAGNOSTIC EQUIPMENT TO ANALYZE EQUIPMENT DESIGNED WITH A SLIDE RULE.
- ARE WE VICTIM OF "DIMINISHING RETURN"?
  - DID MARKED IMPROVEMENT IN SIZING / SETTING CONTROLS & DIAGNOSTICS ACHIEVE THE GOAL OF IMPROVED SAFETY?
- EXORBITANT NUMBER OF INDIVIDUAL R & D EFFORTS AND NUMEROUS EQUATIONS TO REACH "JUSTIFICATIONS".
- WHICH HAD LEAD . . .
  VENDOR TECHNOLOGY OR INDUSTRY NEED?

CALVERT CLIFFS MOV PROJECT

LESSONS LEARNED:

- INTER-INDUSTRY (UTILITIES & NRC) COMMUNICATION IS INFORMATIVE AND ESSENTIAL.

- USE OF " PRA " METHODOLOGIES CAN BE MORE FULLY UTILIZED.

- AS NEW ISSUES EMERGE....
  - MORE EMPHASIS ON UP-FRONT DETERMINATION AND AGREEMENT ON WHAT NEEDS TO BE DONE.

PROCESS FOR CLOSURE OF STAFF REVIEW OF GENERIC LETTER 89-10 PROGRAMS AND PERIODIC VERIFICATION OF MOV DESIGN-BASIS CAPABILITY

Richard H. Wessman
Chief, Mechanical Engineering Branch
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission

PROCESS FOR CLOSURE OF STAFF REVIEW OF GENERIC LETTER 89-10 PROGRAMS

PURSUANT TO 10 CFR 50.54(F), GL 89-10 STATES THAT LICENSEES SHALL NOTIFY NRC IN WRITING WITHIN 30 DAYS AFTER COMPLETION OF GL 89-10 DESIGN-BASIS VERIFICATION.

NRC STAFF MEMORANDUM DATED JULY 12, 1994, DESCRIBES THE PROCESS FOR CLOSURE OF THE STAFF'S REVIEW OF THE DESIGN-BASIS VERIFICATION PORTION OF LICENSEES' GL 89-10 PROGRAMS.

WHEN A LICENSEE NOTIFIES NRC OF COMPLETION OF ITS GL 89-10 PROGRAM, NRR PROJECT MANAGER WILL SET UP DISCUSSION BETWEEN NRR TECHNICAL STAFF AND REGION STAFF TO DISCUSS CLOSURE OF NRC STAFF REVIEW OF GL 89-10 PROGRAM.

FOLLOWING THOSE DISCUSSIONS, NRR PROJECT MANAGER WILL NOTIFY LICENSEE OF ANY NECESSARY INFORMATION TO CLOSE GL 89-10 OR SET UP TELEPHONE CONFERENCE TO DISCUSS CLOSURE OF STAFF REVIEW BY INSPECTION OR LICENSEE SUBMITTAL.

UPON SATISFACTORY COMPLETION OF NRC STAFF REVIEW, STAFF WILL CLOSE GL 89-10 REVIEW THROUGH LETTER FROM NRR PROJECT MANAGER OR COVER LETTER OF INSPECTION REPORT.

SUPPLEMENTAL INSPECTION GUIDANCE FOR CLOSURE OF STAFF REVIEW OF GL 89-10 PROGRAMS

04.04 SELECT SAMPLE OF MOVs FOR DETAILED REVIEW FROM THE POPULATION OF MOVs IN THE GL 89-10 PROGRAM.

LICENSEE IS EXPECTED TO HAVE VERIFIED DESIGN-BASIS CAPABILITY OF EACH MOV IN ITS GL 89-10 PROGRAM. LICENSEE SHOULD HAVE AVAILABLE SPECIFIC STATUS FOR EACH GL 89-10 MOV.

PWR LICENSEE MAY DEFER CONSIDERATION OF VALVE MISPOSITIONING. STAFF REVIEW MAY BE CLOSED IF LICENSEE COMMITS TO CONSIDER MISPOSITIONING IN THE EVENT THAT STAFF DETERMINES THIS RECOMMENDATION REMAINS APPROPRIATE.

04.05 VERIFY THAT LICENSEE HAS PERFORMED DESIGN-BASIS REVIEWS OF SAMPLED MOVs.

INSPECTORS WILL ASSESS THE PROGRESS BEING MADE BY LICENSEES IN ADDRESSING PRESSURE LOCKING AND THERMAL BINDING OF GATE VALVES.

SUPPLEMENT 6 TO GL 89-10 PROVIDES INFORMATION ON PRESSURE LOCKING AND THERMAL BINDING OF GATE VALVES.

SUPPLEMENTAL INSPECTION GUIDANCE
(CONTINUED)

04.06 VERIFY THAT LICENSEE HAS ADEQUATELY SIZED SAMPLED MOVs.

INFORMATION ON SIZING AND SETTING PROVIDED IN APRIL 30, 1993, MEMORANDUM FROM NRR TO REGIONS AND IN SUPPLEMENT 6 TO GL 89-10.

04.07 VERIFY THAT LICENSEE HAS DEMONSTRATED DESIGN-BASIS CAPABILITY OF SAMPLED MOVs.

INSPECTORS WILL VERIFY IMPLEMENTATION OF LICENSEE ACTIONS IN RESPONSE TO SUPPLEMENT 5 TO GL 89-10 ON MOV DIAGNOSTIC EQUIPMENT ACCURACY. INSPECTORS WILL ASSESS ADEQUACY OF LICENSEE'S TREATMENT OF MEASUREMENT ERROR IN THE ANALYSIS OF TEST DATA AND TORQUE SWITCH SETPOINT ANALYSIS.

SUPPLEMENT 6 TO GL 89-10 PROVIDES INFORMATION ON DEMONSTRATION OF MOV DESIGN-BASIS CAPABILITY, INCLUDING GROUPING.

04.08 VERIFY THAT THE LICENSEE HAS ESTABLISHED A METHOD FOR PERIODIC VERIFICATION.

[DETAILS ON A FOLLOWING SLIDE]

SUPPLEMENTAL INSPECTION GUIDANCE
(CONTINUED)

04.09 VERIFY THAT LICENSEE HAS ANALYZED MOV FAILURES AND HAS EFFECTIVE CORRECTIVE ACTION PLAN, AND THAT LICENSEE TRENDS MOV FAILURES.

INSPECTORS WILL CONSIDER LICENSEE RESPONSE TO NRC INFORMATION NOTICES, INDUSTRY TECHNICAL AND MAINTENANCE UPDATES, AND 10 CFR PART 21 NOTICES.

04.10 VERIFY THAT THE LICENSEE IS MEETING PROGRAM SCHEDULE.

SUPPLEMENT 6 TO GL 89-10 PROVIDES GUIDANCE FOR LICENSEES THAT CANNOT MEET GL 89-10 SCHEDULE COMMITMENTS.

04.11 VERIFY QUALITY ASSURANCE PROGRAM IMPLEMENTATION IN DESIGN CONTROL AND TESTING.

PREVIOUS INSPECTION ISSUES

INSPECTORS WILL REVIEW RESOLUTION OF PREVIOUS INSPECTION ISSUES, SUCH AS JUSTIFICATION FOR THE GL 89-10 PROGRAM ASSUMPTIONS (VALVE FACTOR, STEM FRICTION COEFFICIENT, LOAD SENSITIVE BEHAVIOR, AND OTHERS)

PERIODIC VERIFICATION OF MOV DESIGN-BASIS CAPABILITY

FOR GL 89-10 CLOSURE, LICENSEES ARE EXPECTED TO HAVE A LONG-TERM PLAN FOR PERIODIC VERIFICATION THAT DEMONSTRATES THAT DEGRADATION OF MOV DESIGN-BASIS CAPABILITY WILL BE IDENTIFIED.

LICENSEES MAY USE PRA CONSIDERATIONS TO PRIORITIZE MOVs IN ESTABLISHING PERIODIC VERIFICATION FREQUENCY.

LICENSEES MUST HAVE CONFIDENCE THAT SAFETY-RELATED MOVs WILL REMAIN OPERABLE UNTIL NEXT SCHEDULED DESIGN-BASIS VERIFICATION TEST.

NRC STAFF IS WORKING WITH THE OPERATIONS AND MAINTENANCE COMMITTEE OF THE ASME BOILER AND PRESSURE VESSEL CODE TO DEVELOP ACCEPTABLE METHODS TO VERIFY MOV DESIGN-BASIS CAPABILITY THROUGH PERIODIC TESTING.

EXAMPLES OF ACCEPTED PERIODIC VERIFICATION PLANS FOR GL 89-10 CLOSURE ARE (1) DYNAMIC DIAGNOSTIC TESTING, OR (2) STATIC DIAGNOSTIC TESTING WITH MARGIN BASED ON PLANT-SPECIFIC DYNAMIC TESTING.

AFTER CLOSURE OF THE STAFF'S REVIEW OF GL 89-10 PROGRAMS, LICENSEES MAY ADJUST THEIR COMMITMENTS TO PERIODIC VERIFICATION OF MOV DESIGN-BASIS CAPABILITY WITH ADEQUATE JUSTIFICATION.

CLOSURE OF NRC STAFF REVIEW

OF GENERIC LETTER 89-10 PROGRAMS

Thomas G. Scarbrough
Mechanical Engineering Branch
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission

STATUS OF GENERIC LETTER 89-10 CLOSURE

STAFF COMPLETED OUR REVIEW OF THE GL 89-10 PROGRAM AT THE CALLAWAY NUCLEAR POWER PLANT.

OTHER NUCLEAR PLANTS THAT HAVE NOTIFIED THE STAFF OF THE COMPLETION OF THE DESIGN-BASIS CAPABILITY VERIFICATION PORTION OF THEIR GL 89-10 PROGRAMS INCLUDE:

COMANCHE PEAK 1 and 2 CRYSTAL RIVER
FARLEY 1 and 2 FORT CALHOUN
HARRIS HATCH 1 and 2
HOPE CREEK PALO VERDE 3
POINT BEACH 1 and 2 PRAIRIE ISLAND 1 and 2
ROBINSON SOUTH TEXAS 1 and 2
TURKEY POINT 3 WATERFORD

BASED ON AGREEMENT BETWEEN THE LICENSEE AND NRC STAFF, FORT CALHOUN IS SUBMITTING INFORMATION TO JUSTIFY CLOSURE OF THE STAFF REVIEW OF ITS GL 89-10 PROGRAM.

SOUTH TEXAS AND WATERFORD HAVE UNDERGONE GL 89-10 CLOSE-OUT INSPECTIONS AND THE STAFF IS NEARING CLOSURE OF OUR GL 89-10 REVIEW.

TMI AND MAINE YANKEE INITIALLY NOTIFIED THE STAFF THAT THEY BELIEVED THAT THEIR GL 89-10 PROGRAMS WERE COMPLETE, BUT SUBSEQUENT INSPECTIONS REVEALED THAT ADDITIONAL WORK WAS NECESSARY.

THESE LICENSEES ARE SUBMITTING SCHEDULE EXTENSION JUSTIFICATIONS.

PRINCIPAL LICENSEE ACTIONS FOR CLOSURE OF STAFF REVIEW OF GL 89-10 PROGRAMS

MOV DESIGN-BASIS CAPABILITY

LICENSEE JUSTIFIES DESIGN-BASIS CAPABILITY FOR EACH MOV IN GL 89-10 PROGRAM AND HAS ESTABLISHED A PROCESS FOR OBTAINING FURTHER INFORMATION WHERE NOT SATISFIED WITH JUSTIFICATION FOR CERTAIN MOVs.

PRESSURE LOCKING AND THERMAL BINDING

LICENSEE DEMONSTRATES PROGRESS BEING MADE TO RESOLVE CONCERN ABOUT POTENTIAL PRESSURE LOCKING AND THERMAL BINDING OF GATE VALVES.

PWR VALVE MISPOSITIONING

PWR LICENSEE CONSIDERS VALVE MISPOSITIONING, OR COMMITS TO CONSIDER VALVE MISPOSITIONING IF STAFF DETERMINES THAT THIS RECOMMENDATION REMAINS APPROPRIATE.

. . . . PERIODIC VERIFICATION OF MOV DESIGN-BASIS CAPABILITY

LICENSEE ESTABLISHES LONG-TERM PLAN FOR PERIODIC VERIFICATION THAT DEMONSTRATES THAT DEGRADATION OF DESIGN-BASIS CAPABILITY WILL BE IDENTIFIED.

EXAMPLES OF ACCEPTABLE PERIODIC VERIFICATION PLANS FOR GL 89-10 CLOSURE ARE (1) DYNAMIC

DIAGNOSTIC TESTING, OR (2) STATIC DIAGNOSTIC TESTING WITH MARGIN BASED ON PLANT-SPECIFIC DYNAMIC TESTING.

LICENSEE ACTIONS
(continued)

JUSTIFICATION OF PROGRAM ASSUMPTIONS

LICENSEE JUSTIFIES ASSUMPTIONS USED IN THE GL 89-10 PROGRAM, SUCH AS

A. VALVE FACTOR (INCLUDING AREA ASSUMPTION)
B. STEM FRICTION COEFFICIENT
C. LOAD SENSITIVE BEHAVIOR
D. MARGINS FOR STEM LUBRICATION DEGRADATION AND SPRINGPACK RELAXATION
E. MOTOR PERFORMANCE FACTORS
   (1) MOTOR RATING
   (2) EFFICIENCIES USED IN OPEN AND CLOSE DIRECTIONS
   (3) APPLICATION FACTOR
   (4) POWER FACTOR USED IN DEGRADED VOLTAGE CALCULATIONS
F. BASIS FOR EXTRAPOLATION METHOD OF PARTIAL D/P THRUST MEASUREMENTS
G. TORQUE SWITCH REPEATABILITY
H. USE OF LIMITORQUE, KALSI, OR OTHER SOURCES FOR INCREASING THRUST AND TORQUE ALLOWABLE LIMITS
I. EQUIPMENT ERROR
J. POST-MAINTENANCE TESTING, ESPECIALLY VALVE PACKING ADJUSTMENTS
K. GROUPING OF MOVs
L. TRENDING OF MOV PROBLEMS.

LICENSEE ACTIONS
(continued)

RESOLVE GL 89-10 INSPECTION FINDINGS

LICENSEE RESOLVES FINDINGS FROM PREVIOUS GL 89-10 INSPECTIONS.

IN GENERAL, MOST SIGNIFICANT GL 89-10 INSPECTION CONCERNS HAVE BEEN:

(1) STATUS OF DYNAMIC TESTING;
(2) TEST ACCEPTANCE CRITERIA;
(3) OPERABILITY/REPORTABILITY DETERMINATIONS;
(4) FEEDBACK OF TEST RESULTS; AND
(5) EVALUATION OF POTENTIAL FOR PRESSURE LOCKING
AND THERMAL BINDING OF GATE VALVES.

OTHER LICENSEE ACTIVITIES FOUND TO NEED IMPROVEMENT:

(1) VALIDATION OF ASSUMPTIONS IN MOV SIZING AND
SETTING CALCULATIONS;
(2) JUSTIFICATION OF MOV GROUPING FOR TESTING PURPOSES;
(3) VERIFICATION OF EXTRAPOLATION METHODS FOR TEST DATA;
(4) EVALUATION OF DIAGNOSTIC TRACE ANOMALIES;
(5) INVOLVEMENT OF QA IN VERIFYING TEST DATA AND
ANALYSES ACCURACY;
(6) JUSTIFICATION FOR METHOD TO PERIODICALLY VERIFY DESIGN-BASIS CAPABILITY;
(7) CORRECTIVE ACTION IN RESPONSE TO MOV

PROBLEMS; AND
(8) POST-MAINTENANCE TESTING FOLLOWING ACTIVITIES THAT MIGHT AFFECT MOV PERFORMANCE
UNDER DYNAMIC CONDITIONS.

LICENSEE ACTIONS
(continued)

ADDRESS CURRENT MOV ISSUES AND CONCERNS

LICENSEE RECOGNIZES AND HAS PLAN TO ADDRESS CURRENT MOV ISSUES AND CONCERNS, SUCH AS

* ACTUAL TORQUE OUTPUT OF LIMITORQUE ACTUATORS LOWER THAN ANTICIPATED.

* REDUCTION IN DC AND AC MOTOR SPEED DURING OPERATION UNDER DEGRADED VOLTAGE, DIFFERENTIAL PRESSURE, AND HIGH AMBIENT TEMPERATURE CONDITIONS.

* ENSURING THE CAPABILITY OF MOV TO RETURN TO SAFETY POSITION FOLLOWING TESTING IF MOV IS ASSUMED TO BE OPERABLE DURING TESTING.

* EVALUATION OF POTENTIAL ADVERSE EFFECTS OF MOTOR STALL AND THERMAL OVERLOAD TRIP, INCLUDING STRUCTURAL AND MOTOR DAMAGE.

* CHAFING OF WIRES INSIDE LIMIT SWITCH COMPARTMENT CAN CAUSE LOSS OF FUNCTION.

* GLOBE VALVE THRUST REQUIREMENTS FOR PUMPED FLOW APPARENTLY CONTROLLED BY SEAT OR GUIDE AREAS.

* INDUSTRY GLOBE VALVE BLOWDOWN TESTING SHOWED SIGNIFICANTLY HIGHER THRUST REQUIREMENTS THAN PREDICTED.

* INDUSTRY AND NRC-SPONSORED GATE VALVE BLOWDOWN TESTING SHOWED SOME VALVES TO HAVE UNPREDICTABLE BEHAVIOR.

CALLAWAY
GL 89-10 PROGRAM

GL 89-10 PROGRAM SCOPE: 150 MOVs

DYNAMICALLY TESTED: 103 MOVs

DESIGN-BASIS CAPABILITY OF MOVs NOT DYNAMICALLY TESTED BASED ON GROUPING WITH OTHER TESTED MOVs AT CALLAWAY AND OTHER SOURCES.

PERIODIC VERIFICATION:

MOVs STATIC DIAGNOSTIC TESTED USING DIAGNOSTICS EVERY 5 YEARS.

STATIC MARGIN FOR VALVE FACTOR DEGRADATION (SEPARATE AND DISTINCT FROM OTHER UNCERTAINTIES) FOR RISING-STEM MOVs INITIALLY SET AT 25% WITH SAMPLE DYNAMIC TESTING TO JUSTIFY AT NEXT REFUELING OUTAGE.

STATIC MARGIN FOR AGE-RELATED DEGRADATION FOR QUARTER-TURN MOVs TO BE DETERMINED BASED ON SAMPLE DYNAMIC TESTING AT NEXT REFUELING OUTAGE.

DYNAMIC TESTING PERFORMED IF STATIC MARGIN FALLS BELOW ESTABLISHED CRITERIA.

PRESSURE LOCKING AND THERMAL BINDING OF GATE

VALVES:

LICENSEE PERFORMED INITIAL EVALUATION OF ALL SAFETY-RELATED MOTOR-OPERATED GATE VALVES. ADDITIONAL EVALUATION WILL BE NECESSARY.

CALLAWAY GL 89-10 PROGRAM
(continued)

NRC LETTER NOTIFYING LICENSEE OF CLOSURE OF STAFF REVIEW OF CALLAWAY GL 89-10 PROGRAM FORWARDED ON JUNE 8, 1994.

LETTER INDICATES LICENSEE'S PLANS TO CONDUCT THE FOLLOWING ACTIVITIES TO ENSURE THAT ASSUMPTIONS USED IN VERIFYING GL 89-10 MOV DESIGN-BASIS CAPABILITIES REMAIN VALID:

1. EVALUATE JUSTIFICATION FOR DESIGN-BASIS CAPABILITY OF 18 MOVs AS ADDITIONAL INDUSTRY INFORMATION BECOMES AVAILABLE.

2. CONTINUE TO ASSESS USE OF LINEAR EXTRAPOLATION OF MOV PERFORMANCE DATA.

3. CONTINUE TO EVALUATE PRESSURE LOCKING AND THERMAL BINDING OF GATE VALVES.

4. PERFORM PERIODIC MOV PERFORMANCE VERIFICATION BY DYNAMIC TESTING GATE AND GLOBE MOVs WHEN MARGIN IS LESS THAN 25 PERCENT AFTER REQUIRED THRUST ADJUSTED FOR UNCERTAINTIES. FOLLOWING NEXT REFUELING OUTAGE, PROVIDE STAFF WITH DYNAMIC TEST-BASED INFORMATION CONFIRMING 25% STATIC MARGIN FOR GATE AND GLOBE VALVES AND ESTABLISHING MARGIN FOR AGE-RELATED DEGRADATION FOR BUTTERFLY VALVES.

FORT CALHOUN
GENERIC LETTER 89-10 PROGRAM

GL 89-10 PROGRAM SCOPE: 29 MOVs

DYNAMICALLY TESTED: 20 MOVs

DESIGN-BASIS CAPABILITY OF MOVs NOT DYNAMICALLY TESTED BASED ON GROUPING WITH OTHER TESTED MOVs AT FORT CALHOUN AND OTHER SOURCES.

PERIODIC VERIFICATION:

INSPECTION REPORT 94-05 STATES THAT LICENSEE'S PLAN FOR PERIODIC VERIFICATION INCLUDES DYNAMIC TESTING.

PRESSURE LOCKING AND THERMAL BINDING OF GATE VALVES:

LICENSEE EVALUATED GL 89-10 MOVs AND FOUND NONE SUSCEPTIBLE TO PRESSURE LOCKING. ADDITIONAL EVALUATION WILL BE NECESSARY.

LICENSEE PREPARING SUBMITTAL TO SUPPORT CLOSURE OF STAFF REVIEW OF FORT CALHOUN GL 89-10 PROGRAM

WATERFORD
GENERIC LETTER 89-10 PROGRAM

GL 89-10 PROGRAM SCOPE: 56 MOVs

DYNAMICALLY TESTED: 44 MOVs

DESIGN-BASIS CAPABILITY OF MOVs NOT DYNAMICALLY TESTED BASED ON GROUPING WITH OTHER TESTED MOVs AT WATERFORD AND OTHER SOURCES.

PERIODIC VERIFICATION:

MOVs STATIC DIAGNOSTIC TESTED USING DIAGNOSTICS EVERY 5 YEARS.

STATIC MARGIN FOR VALVE FACTOR DEGRADATION (SEPARATE AND DISTINCT FROM OTHER UNCERTAINTIES) FOR GATE MOVs INITIALLY SET AT 25% WITH SAMPLE DYNAMIC TESTING TO JUSTIFY AT NEXT REFUELING OUTAGE.

DYNAMIC TESTING PERFORMED IF STATIC MARGIN FALLS BELOW ESTABLISHED CRITERIA.

LICENSEE PREPARING RESPONSE TO CLOSE-OUT INSPECTION REPORT ON PERIODIC VERIFICATION (INCLUDING GLOBE AND BUTTERFLY VALVES) AND POST-MAINTENANCE TESTING.

PRESSURE LOCKING AND THERMAL BINDING OF GATE VALVES:

LICENSEE DETERMINED THAT 8 GATE VALVES WERE POTENTIAL SUSCEPTIBLE TO PRESSURE LOCKING AND

EVALUATED THEIR CAPABILITY TO OVERCOME THIS CONDITION. STAFF DID NOT REVIEW CALCULATIONS FOR TECHNICAL MERIT. LICENSEE PERFORMED PRELIMINARY EVALUATION OF THERMAL BINDING. ADDITIONAL EVALUATION WILL BE NECESSARY.

QUESTIONS FOR REGION I MOV MEETING

1. With respect to Supplement 5, how would an accuracy related Part 21 issued today affect completion schedules for GL 89-10?

   Liberty CSB 031 Addendum came late in the game -- why can't this be tracked as part of our continuing program?

2. How are technical disagreements to be handled?

   If the NRC disagrees with a technical utility position and call them "not done" after they have closed their program by letter, what happens?

   What if the NRC/Utility agree to disagree on a technical issue?

3. Is the NRC more interested in whether a utility has addressed all operability concerns (ex: diagnostic equipment error), or are they more interested in the completion of documentation called "MOV Program." Does the NRC intend on applying a performance based regulatory philosophy toward the MOV Program? Or does the NRC intend on applying the more traditional approach, which focused more on documentation than performance?

4. Is the NRC requiring "dynamic testing" for post maintenance testing of MOVs when valve repair is performed? Please identify where the requirement is specified.

5. Is performance trending required for completion and closure of GL 89-10? If so, then please indicate where the requirement is specified.

6. Concerning LSB assumptions, since LSB is not generic to every MOV, does it make sense to account for even when it is not seen on a DP test, or - should we assume more than is seen on a DP to static test comparison.

7. Concerning MOVs where Stellite 6 disk to seat facets are involved -- If DP effect is obvious and can be quantified on a less than max expected DP test, what if any is the minimum percentage that an extrapolation can be performed from the MEDP, considering that Stellite U, in many cases gets better with pressure increase.

8. Since most utilities have already undergone two inspections (i.e., Phase I, Phase I followup, Phase II) of their 89-10 Program, is it expected that a "closure" inspection will again cover test program implementation issues, or will the focus be on post-testing design basis capability of valves.

9. The BWR experience has been that a relatively small percentage of their 89-10 valve population can be tested at near (>80%) design basis pressures. What is the NRC's point of view on conservative boundary valve factors for valves in which credible DP testing could not be performed.

10. What is the NRC's point of view on new information (i.e., vendor service bulletins) and industry issues as it pertains to 89-10 Program testing completion and program closure.

11. In the enclosure to J. E. Richardson's memorandum of April 30, 1993 (Guidance for Inspections of Programs in Response to Generic Letter 89-10), the staff noted the Limitorque position (from their September 17, 1992 letter to Cleveland Electric) that:

> Run efficiency can be substituted for pull-out efficiency where the application involves a close safety function with no potential of the actuator stopping at any point during the close stroke.

Testing performed by TU Electric (as presented by Mr. Bill Black at the 3rd Pump and Valve Testing Symposium) seemed to confirm that the combination of motor stall at 80% voltage and run efficiency resulted in an actuator stall torque output which was reasonably well predicted by the standard Limitorque equation. However, this may have been due to lower gear train efficiency combined with greater than nameplate torque capability. Is the staff working with INEL and Limitorque to verify the assumed gear train efficiencies? Is it the staff's position that if a licensee proposes to take credit for greater than nameplate motor torque capability based on industry test programs (such as the current Commonwealth Edison program) then lower gear train efficiencies must also be applied?

12. In his March 31, 1993 memorandum, Mr. Carl H. Berlinger (Chief of the NRR Electrical Engineering Branch) replied to questions from the Mechanical Engineering Branch concerning degraded voltage capability of MOVs. Question 2 concerned whether less than locked rotor current could be used to evaluate voltage drop and available motor terminal voltage at degraded voltage conditions. In his reply Mr. Berlinger stated:

> The locked rotor current shall be used to calculate the motor impedance at standstill condition (emphasis added). The AC motor terminal voltage (bus voltage minus voltage drop due to cable impedance and over load heater resistance) is calculated as shown below:

$$V_m = V_b \times Z_m / (Z_m + Z_c + R_h)$$

Where:
- V_m = Motor terminal voltage
- V_b = Bus voltage
- Z_m = Motor impedance at standstill (emphasis added)
  = Rated voltage / $\sqrt{3}$ x locked rotor current
- Z_c = Cable impedance
- R_h = Over load heater resistance

My question concerns the standstill condition noted above. If we are concerned with an MOV with a closed safety function with no potential of the actuator stopping (such as the case for run efficiency) do licensees need to consider locked rotor current? If a licensee does not need to demonstrate standstill motor capability, it should be reasonable and justifiable to demonstrate motor capability at rated start torque current and calculate available motor terminal voltage based on start torque current.

13. In the enclosure to J. E. Richardson's memorandum of April 30, 1993, the staff also noted the example calculation for DC motor torque shown in the Limitorque Maintenance Update (LMU) of August 17, 1988 (also known as LMU 88-1). Similar text is included in Enclosure 1 to Supplement 6, however, the specific reference to the example calculation in LMU 88-1 was deleted. Does this represent a change in the staff position concerning the analysis of DC MOVs? I believe that a new Maintenance or Technical Update from Limitorque may clarify the analysis of the torque capability for DC motors. I have attached an endorsement (provided to Pennsylvania Power & Light) by Mr. P. McQuillan, Limitorque Corporation representative, of the LMU 88-1 method (item 2). This endorsement is qualified by the fact that the uncertainties of the generic motor curves must be considered and that no credit can be taken for more than rated motor start torque. Can licensees use the LMU 88-1 method with the above qualifications? Do you know if Limitorque's pending update concerning DC motors will change their position?

14. Does the NRC intend to impose on the industry the EPRI conclusions and/or recommendations relative to performance prediction, load sensitive behavior, valve factors, etc. or will utilities be expected to review EPRI's work and apply it as the utility evaluates it to be appropriate?

15. What role will Probabilistic Safety Assessment have in closure determination?

16. What "lessons learned" in the GL 89-10 issue by NRC will be transferred to other NRC issues?

17. Based on the results of the significant amount of testing that has been performed, we believe there is adequate justification to accept linear extrapolation to design condition. Does the NRC agree? Why or why not? If not, what plausible scenarios exist to justify linear extrapolation?

18. Supplement 6 identifies similarities that should be considered when assessing "grouping." Have additional characteristics or parameters been identified since Supplement 6 was issued?

19. What activity from the licensee constitutes completion of GL 89-10 program: When testing is completed? When analysis/calculations are revised?

20. What is the frequency of repeat dynamic test? Would static tests suffice?

21. What is NRC's position regarding removal of valves from the program based on the Saul Levy study?