UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

DEC 10 1981

Frederick R. Taylor, Esquire
Counsel, Mines and Energy Management Committee
House of Representatives
Commonwealth of Pennsylvania
Capitol Building
P. O. Box 217
Harrisburg, PA 17120

Dear Mr. Taylor:

Enclosed you will find information pertaining to the June 6, 1981 incident at Beaver Valley Power Station, Unit 1. This information is provided in response to the request of the Mines and Energy Management Committee, House of Representatives, Commonwealth of Pennsylvania, in accordance with House Resolution 82, as conveyed in your letters of October 21 and November 4, 1981.

The NRC is pleased to comply with your request for information regarding the response to a possible act of sabotage at the Beaver Valley facility that was detected and reported by Duquesne Light Company on June 6, 1981. As the NRC staff members indicated during the October 28, 1981 meeting in Harrisburg, certain details about that incident must be withheld because of the requirements of Section 147 of the Atomic Energy Act of 1954, as amended, and the requirements of the Code of Federal Regulations (10 CFR 73.21). A copy of 10 CFR 73.21, as published in the Federal Register, is enclosed for your convenience. Such safeguards information has been deleted from the NRC investigation report (Appendix to Enclosure 2). In addition, we are providing a special report (Enclosure 2) which ensures that the Committee has pertinent event information not covered in the investigation report. A copy of our correspondence transmitting the investigation report to Duquesne Light Company also is enclosed.

As indicated in the Enclosures, the licensee reported the matter promptly and initiated immediate response action, carried out an independent investigation, and maintained a heightened security and operational safety posture. The FBI, with technical assistance from the NRC, promptly initiated a thorough and detailed investigation. The NRC carried out investigative efforts within its jurisdiction aimed at assuring public safety and safeguards. We believe that the licensee's response to the events of June 6, 1981, was appropriate.

We are pleased to provide this information to your committee.

Sincerely,

William J. Dircks
Executive Director for Operations

Enclosures:
1. Letter to Duquesne Light Company, dtd. December 10 1981
2. Special Report
   Appendix: NRC Report of Investigation
3. 46 FR 51718

cc: Mr. J. J. Carey

KING OF PRUSSIA, PENNSYLVANIA 19406

DEC 10 1981

Docket No. 50-334

Duquesne Light Company
ATTN: Mr. J. J. Carey
Vice President
Nuclear Division
Post Office Box 4
Shippingport, Pennsyivania 15077

Gentlemen:

Subject: Investigation 50-334/81-16

This refers to an investigation conducted by Messrs. J. W. Devlin and D. A. Beckman and other members of the Region I staff between June 6 and July 10, 1981, at the Beaver Valley Power Station, Unit 1, concerning the discovery on June 5, 1981, of the unauthorized removal of chains and padlocks from three valves in the auxiliary feedwater system and the discovery on June 6, 1981 of the unauthorized removal of the chain and padlock and the mispositioning of a manually-operated valve on the high head safety injection system. Actions to be taken by Duquesne Light Company with respect to these matters were confirmed in a letter to you dated June 9, 1981, from Mr. B. H. Grier, then Director of the Region I office. The status of the NRC investigation was discussed in a meeting with you and members of your staff on June 17, 1981, as documented in our Management Meeting Report No. 50-334/81-17.

Our investigation determined that the two events did not cause an immediate danger to the health and safety of the public or your employees. However, the safety margin required for emergency core cooling systems was reduced below that required by your NRC license during the period the plant was operated before you detected that the high head safety injection system valve was closed. Further, we have concluded, based on the independent reviews performed by our Senior Resident Inspector and by the Investigation Team, that the prompt actions taken by Duquesne Light Company following discovery of this closed valve were effective in restoring the required safety margin and in providing continuing assurance of the integrity of plant systems vital to safe operation of the facility.

The Federal Bureau of Investigation, who has Federal responsibility for investigation of potential acts of sabotage against nuclear power plants, investigated the events of June 5 and 6. We understand that their findings revealed that the mispositioned valve and missing chains and padlocks were apparently acts of an individual who has since left your employment. Further, we concluded, based on our review of those corrective measures which you implemented on and after the June 6 event, that these actions provide adequate confidence that similar events will not recur.

The Investigation Team identified two areas which we believe may have contributed to the June 5 and 6 events. First, your procedures failed to ensure adequate access controls for individuals notified of pending employment termination under adverse circumstances. Second, your procedures failed to minimize the number of personnel authorized access to vital areas. We understand that you

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have taken action to correct the weaknesses described above. In your reply to this letter please describe your corrective program in each of the above areas.

As you are aware, personnel access to vital areas was one of the subjects addressed by the NRC Task Force which visited the Beaver Valley Power Station in August 1981. The results of the Task Force study will be forwarded to you in the near future.

Based on the results of this investigation, it appears that several of your activities were not conducted in full compliance with NRC requirements, as set forth in the Notice of Violation enclosed herewith as Appendix A. These violations have been categorized into the levels described in the Federal Register Notice (45 FR 66754) dated October 7, 1980. You are required to respond to this letter and in preparing your response, you should follow the instructions in Appendix A.

Item A in the attached Notice of Violation is classified as a Severity Level III Violation in accordance with the Interim Enforcement Policy contained in the Federal Register Notice referenced above. As stated in Section IV.B of the Policy, monetary civil penalties are normally assessed for Severity Level III violations. Careful consideration of this specific violation revealed that: the events of June 5-6, 1981, appear to have resulted from a deliberate act to embarrass Duquesne Light Company rather than operator error; you were in compliance with your security program approved by the NRC and the events which occurred were apparently not within your control; immediate action was taken, upon discovery of the more significant of the two events, to confirm that the plant was in a safe operating condition; the events were promptly reported to the NRC; and no adverse effect on the health and safety of the public resulted from the two events. Therefore, we have exercised our discretion and have determined that civil penalties are not appropriate in this instance.

Information within the enclosed investigation report was discussed with you by telephone on December 7, 1981. At that time, you concluded that the investigation report contained no information that you considered proprietary, except as described in the following paragraph. However, on December 9, 1981, after receiving the investigation report, you advised us of your concern regarding inclusion of the names of your employees in the report. We have since discussed this matter with our legal staff and informed you on December 10 that we have been advised that there is not a legal basis for withholding the names of your employees from the report. Therefore, a copy of this letter and the appropriate sections of the enclosures are being placed in the NRC's Public Document Room. In addition, as you are aware, a copy of this letter and the appropriate portions of the enclosures will be provided the Mines and Energy Management Committee of the Pennsylvania House of Representatives.

In accordance with 10 CFR 73.21 of the NRC's regulations, documentation of findings of your facility security measures for physical protection are deemed to be Safeguards Information. Each person who produces, receives or acquires Safeguards Information is required to ensure that it is protected against

unauthorized disclosure. Therefore, the appropriate portions of the enclosed investigation report will not be placed in the Public Document Room, or provided to the Pennsylvania House of Representatives, and will receive limited distribution.

The responses directed by this Notice are not subject to the clearance procedures of the Office of Management and Budget as required by the Paperwork Reduction Act of 1980, PL 96-511.

Should you have any questions concerning this investigation, we will be pleased to discuss them with you.

Sincerely,

Ronald C. Haynes
Regional Administrator

Enclosures:
1. Appendix A, Notice of Violation
2. Office of Inspection and Enforcement Investigation Report Number 50-334/81-16 (Contains Safeguards Information)

cc (w/o Safeguards Information on pages 3, 19 and 22 and Exhibits 1 and 8):
F. Bissert, Manager, Nuclear Support Services
R. Washabaugh, QA Manager
Station Superintendent
General Superintendent, Power Stations Department
R. Martin, Nuclear Engineer
J. Sieber, Manager, Nuclear Safety and Licensing
T. D. Jones, Manager, Nuclear Operations
R. M. Mafrice, Nuclear Engineer
N. R. Tonet, Manager, Nuclear Engineering
Public Document Room (PDR)
Local Public Document Room (LPDR)
Nuclear Safety Information Center (NSIC)
NRC Resident Inspector (w/cy of encls)
Commonwealth of Pennsylvania

bcc:
Region I Docket Room (with concurrences)
Chief, Operational Support Section (w/o encls)
R. T. Carlson (w/o Safeguards Information on pages 3, 19, 22 and Exhibits 1 and 8)

~~ENCLOSURES CONTAIN SAFEGUARDS INFORMATION.~~
~~UPON SEPARATION THIS PAGE IS DECONTROLLED.~~

APPENDIX A

NOTICE OF VIOLATION

Duquesne Light Company
Beaver Valley Power Station, Unit 1

Docket No. 50-334
License No. DPR-66

As a result of the investigation conducted on June 6 - July 10, 1981, and in accordance with the Interim Enforcement Policy, 45 FR 66754 (October 7, 1980), the following violations were identified:

A. Technical Specification 3.5.2 requires that two separate and independent Emergency Core Cooling System (ECCS) subsystems be operable with a flow path capable of taking suction from the refueling water storage tank (RWST) on a safety injection signal.

Contrary to the above, at approximately 1:00 a.m. on June 6, 1981, the high head safety injection pump suction line valve, SI-26, was discovered by the licensee to be in the shut position. This valve isolated the charging pump suction from the RWST, and thereby rendered the high head safety injection (HHSI) portion of both ECCS subsystems inoperable. The length of time valve SI-26 was in the shut position is not known. The valve was last reported as verified to be locked open at 4:30 p.m., June 5, 1981.

This is a Severity Level III Violation (Supplement I).

B. Technical Specifications 6.3.1 and 6.4.1 require that the retraining and replacement training program and minimum qualifications for the facility staff meet or exceed the requirements of ANSI N18.1-1971.

ANSI N18.1-1971, Section 5.5, requires that a means be provided in the training programs for an appropriate evaluation of its effectiveness. Section 5.6 requires that records of the qualifications, experiences, training and retraining of each member of the plant organization be maintained.

Station Training Manual, Section 2.3.4.2, Item 4, requires that inexperienced nuclear operators who participate in limited operational duties be accompanied and supervised by a qualified person.

Contrary to the above, the licensee failed to properly administer the training program for nuclear operators in that:

(1) The licensee failed to establish a means of assuring that personnel were qualified prior to being assigned to positions of responsibility.

(2) The training records for some qualified nuclear operators contained incomplete qualification documentation.

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(3) Certain nuclear operators were allowed to perform unsupervised duties affecting plant operation and safety for which they were not qualified.

This is a Severity Level IV Violation (Supplement I).

C. Technical Specification 6.8.1 requires the licensee to implement written locking and tagging procedures as required by Regulatory Guide 1.33, 1972.

Beaver Valley Power Station (BVPS) Operating Manual, Chapter 48, Section 5.E.2, requires that certain manual valves in Engineered Safety Feature (ESF) systems be secured in position by padlock. Chapter 11 and Chapter 24 of this manual require valves SI-26, WT-225, WT-226 and WT-227 to be maintained locked open.

Contrary to the above, the licensee failed to maintain in a secured condition four ESF valves with padlocks, in that on June 5, 1981, an operator making routine surveillance tours discovered that the chains and padlocks used to lock valves WT-225, WT-226 and WT-227 in the open position were missing; and on June 6, 1981, an operator, also making routine surveillance tours, discovered that the chain and padlock used to lock valve SI-26 in the open position were missing.

This is a Severity Level V Violation (Supplement I).

D. 10 CFR 50, Appendix B, Criterion V, and BVPS Final Safety Analysis Report, Appendix 8.2, "Operations Quality Assurance Program," Section A.2.2.5, require that activities affecting quality be prescribed by documented procedures and accomplished in accordance with those procedures.

BVPS Operating Manual, Chapter 48, Section 5.E.2, requires that certain manual valves in ESF systems be tagged with permanently affixed red or green tags indicating the normal position of the valve and the fact that the valve is part of an ESF system. Valves SI-26, QS-9, RW-206 and CHV-CV-151-1 are among the valves identified as requiring these tags.

Contrary to the above, on July 1, 1981, valves SI-26, QS-9, RW-206, and CHV-CV-151-1 did not have the required special ESF identification tags installed. This condition was discovered by a member of the Investigation Team accompanied by a licensee representative.

This is a Severity Level V Violation (Supplement I).

Pursuant to the provisions of 10 CFR 2.201, Duquesne Light Company is hereby required to submit to this office within thirty days of the date of this Notice, a written statement or explanation in reply, including: (1) the corrective steps which have been taken and the results achieved; (2) corrective steps which will be taken to avoid further violations; and (3) the date when full compliance will be achieved. Under the authority of Section 182 of the

Atomic Energy Act of 1954, as amended, this response shall be submitted under oath or affirmation. Where good cause is shown, consideration will be given to extending your response time.

Dated DEC 10 1981

Ronald C. Haynes
Regional Administrator

U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT

Region I

Report No. 50-334/81-16

Docket No. 50-334

License No. DPR-66 Priority -- Category C

Licensee: Duquesne Light Company

435 Sixth Avenue

Pittsburgh, Pennsylvania

Facility Name: Beaver Valley Power Station, Unit 1

Investigation at: Shippingport, Pennsylvania

Investigation conducted: June 6-18, 30, July 1, 2, 9 and 10, 1981

Investigators: _____ 12/7/81
J. W. Devlin, Chief, Physical Protection Section date signed

for _____ 12/7/81
D. A. Beckman, Senior Resident Inspector, Beaver Valley date signd

_____ 12/7/81
W. A. Rekito, Reactor Inspector date signed

_____ 12/7/81
C. D. Petrone, Reactor Inspector date signed

_____ 12/7/81
J. W. Chung, Reactor Inspector date signed

~~WARNING~~
~~UNAUTHORIZED DISCLOSURE IS PROHIBITED~~
~~SECTION 147 ATOMIC ENERGY ACT 1954~~
~~AND 10 CFR 73.21. VIOLATIONS SUBJECT~~
~~TO CIVIL AND CRIMINAL SANCTIONS.~~

REVIEWED BY BUSH, BLACKMON, KASOW
NOT EXEMPT FROM DISCLOSURE
BY SECTION 10CFR 73.21 12.8.81
There Exhibit 22

8302250010

PUBLIC DOCUMENT

S-F1-81-138
Copy 3 of 5 Copies
67 Pages
(Safeguards Inf

for R. H. Smith, Investigator — 12-7-81 (date signed)

R. E. Shepherd, Investigator — 12-7-81 (date signed)

R. A. Matakas, Investigator — 12-7-81 (date signed)

for G. C. Smith, Physical Protection Inspector — 12-7-81 (date signed)

Approved by: T. T. Martin, Director, Division of Engineering and Technical Inspection — 12-7-81 (date signed)

Investigation Summary:
Investigation on June 6-18, 30, and July 1-2 and 9-10, 1981 (Report No. 50-334/81-16)
Areas Examined: Investigation of the circumstances involving the removal of chains and padlocks from three manually-operated valves in the auxiliary feedwater system on June 5, 1981; and the removal of a chain and padlock and the mispositioning of a manually-operated valve on the high head safety injection system on June 6, 1981. Also reviewed were the circumstances involving several other operational events, in an effort to determine if they were related to the events described above.

Results: Four violations were identified:

1. Failure to maintain an operable high pressure Emergency Core Cooling System during power operation.

2. Failure to properly administer the approved nuclear operator training program.

3. Two examples of failure to follow procedures: failure to maintain certain safety-related valves in a locked condition; failure to tag Engineered Safety Feature valves.

SUMMARY OF JUNE 5-6, 1981 EVENTS

Duquesne Light Company (DLC), Beaver Valley Power Station, Unit 1, reported to the NRC on June 6, 1981, that a manually-operated valve (SI-26) in the common suction line to the high head safety injection (HHSI) pumps was found shut during a routine nuclear operator tour on June 6, 1981. Valve SI-26 was immediately opened. The operator also discovered that the chain and padlock, attached to the valve handwheel to prevent accidental or inadvertent closure of the valve, were missing.

The closure of SI-26 resulted in the loss of high head (pressure) safety injection capability. With valve SI-26 shut, cooling water from the refueling water storage tank (RWST) would not have been automatically available under emergency conditions to the three HHSI pumps for high pressure injection of water into the reactor core. Manual action by an operator, responding to a system malfunction indication in the control room, would have been required to initiate operation of the HHSI system. However, the low pressure safety injection system was available at all times. The incident did not result in any adverse effects on the health and safety of employees and the general public, but the potential for creating an adverse safety condition did exist.

Concurrent with the report to the NRC of the mispositioning of SI-26, the licensee reported another occurrence of similiar circumstances that was discovered on June 5, 1981. That incident involved discovery of chains and padlocks missing from the manually-operated suction valves (WT-225, 226, 227) for three auxiliary feedwater pumps. However, in that case the valves were found to be in their normal (open) position. The licensee was unable to identify the cause for the two incidents. All of the equipment described above is in the Primary Auxiliary Building (PAB).

When informed of the abnormal status of SI-26, the Nuclear Shift Supervisor initiated valve alignment checks for all manually-operated valves outside the reactor containment building that were a part of either the Engineered Safety Feature (ESF) systems or the auxiliary feedwater system. The licensee immediately placed into effect temporary contingency measures to assure continued safe operation of the plant. The measures included: (i) [redacted] and (iv) verifying correct ESF valve positions on a sampling basis during each shift.

PUBLIC DOCUMENT

~~SAFEGUARDS INFORMATION~~

BACKGROUND

The events involving the removal of chains and padlocks from valves WT-225, 226, 227 and SI-26, and the closure of valve SI-26 at the Beaver Valley Power Station (BVPS), were reported to the NRC by the licensee, Duquesne Light Company, on June 6, 1981. The Director, Region I, ordered that an investigation of these events be conducted. The NRC Senior Resident Inspector for BVPS arrived on site early on June 6 and he was joined on June 7 by a Region I investigator. Additional members of the Investigation Team were dispatched to the site on June 8.

The contingency measures instituted by the licensee on June 6, 1981, upon discovery of the closure of SI-26, were confirmed in a letter from the Director, Region I, to J. J. Carey, Vice President, Nuclear Division, DLC, dated June 9, 1981 (Exhibit 1). The contingency measures were designed to further protect the integrity of equipment vital to safe operation of the plant.

INTRODUCTION

Certain equipment in the BVPS systems designed to prevent or mitigate the results of an accident are required by operating procedures to be chained and padlocked to prevent accidental or inadvertant mispositioning. In order to assure the continued proper alignment of this equipment, the licensee utilizes a system of administrative controls. The controls include: (i) written procedures for removing this equipment from, or returning it to, service, (ii) completion of documentation whenever the operational status of this equipment changes; (iii) inspection tours of this equipment by personnel trained to recognize the proper operational status of this equipment; and (iv) control of personnel access to areas of the plant which contain this equipment.

INVESTIGATION

The purposes of the NRC investigation were: (i) to assure that there were no additional undetected incidents of tampering with safety-related equipment that could impact on continued safe operation of the reactor or endanger the health and safety of plant employees or the public, and (ii) to determine the details and sequence of events surrounding the events of June 5 and 6, 1981.

Beginning early on June 6 the NRC Senior Resident Inspector for BVPS initiated the NRC investigation by conducting independent reviews and verifying licensee actions taken to assure that the plant was capable of continued safe operation. He performed a review of DLC's actions and verified completion of valve lineup checks, establishment of additional security tours, implementation of the two-man rule, lock-out of vital area doors and performance of supplemental operator tours. He independently verified that manually-operated Engineered Safety Feature valves were properly positioned and locked; confirmed that motor control centers associated with the emergency power system were properly aligned; performed a visual examination of containment isolation valves, containment electrical penetrations, and main control board instrumentation and equipment status lights; checked cable tunnels, switchgear rooms and the primary auxiliary building for abnormal conditions; and maintained general cognizance of the plant status and the status of the licensee's equipment checks. In no instance did he identify any conditions detrimental to continued safe operation of the plant.

Investigation Team members began arriving on June 7. Early activities included: verification of the proper alignment/normal condition of vital bus switchgear, process and protection instrumentation racks, main control board instrumentation, and valve alignment to the refueling water storage tank; and confirmation of implementation of the special security measures placed into effect by the licensee following discovery of the mispositioned valve. Throughout the investigation, ESF valve lineups were spot-checked to provide continued oversight of licensee activities and to provide assurance that plant operation could continue safely. In addition, the Investigation Team observed licensee personnel in the performance of their duties, reviewed records and procedures associated with the events, and reviewed training of operators assigned to perform system status checks, and conducted interviews of licensee and contractor personnel.

On June 6 the licensee informed the Pittsburgh office of the Federal Bureau of Investigation (FBI) of the two events of June 5 and 6. An FBI Special Agent arrived at the site that day, met with the NRC Senior Resident Inspector and the licensee, and began gathering information associated with the events. The FBI investigation was to determine if an act of sabotage had been committed and, if so, who had committed the act.

An investigation was also initiated by the licensee. The purposes of the licensee's investigation paralleled those of the NRC but included efforts to identify the individual(s) responsible for the events.

Throughout the course of the investigation the NRC, the FBI and the licensee maintained close liaison and exchanged information obtained during their respective investigative efforts. In addition, NRC personnel provided technical assistance to the FBI upon request.

DETAILS

SEQUENCE OF EVENTS

A. Auxiliary Feedwater Pumps' Isolation Valves (WT-225, 226, 227)

At approximately 9:00 a.m. on June 5, 1981, while performing a routine surveillance tour, a nuclear operator (Dennis Morgan - see Interview Summary, p. 11, and Interview, Exhibit 2) discovered that the chains and padlocks normally attached to manually-operated suction valves (WT-225, 226 and 227) for the three auxiliary feedwater pumps were missing. The valves were found in the normal (open) position. This condition was reported to a licensed operator (Scott Lindsey). New chains and padlocks were provided by Lindsey and were installed by Morgan and nuclear operator Pat Cilli (see Interview Summary, p. 12, and Interview, Exhibit 3) at approximately 9:15 a.m., June 5. These valves are required to be locked open in accordance with Steam Generator Feedwater System Operating Procedure, Section 3, "Normal System Arrangement." Verification of this condition is part of the nuclear operator equipment checks conducted each shift. Morgan later discussed the missing chains and padlocks with the Shift Foreman (Joseph Maley) who discussed it with the Shift Supervisor (Frederick Nelson - see Interview Summary, page 13, and Interview, Exhibit 4). Nelson explained that no entry about the event was made in facility logs because he was still looking into the matter and because he felt it was not a big problem since the valves were found in their proper position.

The last verification that valves WT-225, 226 and 227 were locked in the open position was during a nuclear operator's (Leonard Kabana - see Interview Summary, page 14, and Interview, Exhibit 5) routine surveillance tour and equipment check on the previous shift at approximately 11:35 p.m. on June 4, 1981, as documented on station records.

A review of station records by the Investigation Team revealed the last time valves WT-225, 226 and 227 were closed was on May 4, 1981, while the plant was in Mode 4 (hot shutdown, 0% power). The valves were returned to their normal locked open position on May 5, 1981, prior to entering Mode 3 (hot standby, 0% power). The most recent Equipment Clearance Permit (ECP - a form used to document approval to remove equipment from or return equipment to service) on file for valve WT-226 was ECP #413570 (Exhibit 6), which indicated the valve was closed December 13, 1979 and reopened on July 11, 1980. (BVPS was in an extended shutdown during the period November 1979 - November 1980 and these valves were not required to be in service). ECP #459986 (Exhibit 7), dated July 17, 1980, indicates that WT-227 was closed on that date and reopened on September 30, 1980. No ECP was found involving the closing of WT-225.

Following discovery of a mispositioned valve in the ESF system at 1:00 a.m. on June 6, the licensee began a check of valve alignments for all manually-operated valves in the ESF systems and in the auxiliary feedwater system. By 4:30 a.m., June 6, 1981, the Shift Supervisor and plant operators had verified that all valves in the auxiliary feedwater system were in the proper position (Exhibit 8). The licensee was unable to explain the missing chains and padlocks.

B. High Head Safety Injection Pumps' Suction Line Valve (SI-26)

At approximately 12:40 a.m. on June 6, 1981, while performing a routine surveillance tour, a nuclear operator (Martha Hulings -see Interview Summary, p. 15, and Interview, Exhibit 9) discovered that valve SI-26 was shut and that the chain and padlock used to secure it in the open position were missing. Closure of valve SI-26 isolated the HHSI pumps' suction from the refueling water storage tank and rendered the HHSI portion of two separate and independent emergency core cooling subsystems inoperable. This condition was immediately reported to a nuclear operator in the control room (Ted Antonacci) and then to the Nuclear Shift Supervisor (R. J. Druga - see Interview Summary, p. 16, and Interview, Exhibit 10), who instructed the nuclear operator (Hulings) to open SI-26. The Nuclear Shift Operations Foreman (Terry McGee) arrived shortly after Hulings opened SI-26 and installed a new chain and padlock to secure the valve in the open position (Exhibit 11) in accordance with Safety Injection System Operating Procedure, Section 3, "Normal System Arrangement." Verification of the proper position (and presence of the chain and padlock) is part of the nuclear operator equipment checks conducted each shift. The last verification that valve SI-26 was in the locked open position was on the previous shift at approximately 4:30 p.m. on June 5, 1981, during a nuclear operator's (Michael Skiba - see Interview Summary, p. 17, and Interview, Exhibit 12) routine surveillance tour and equipment check as documented on Nuclear Operator No. 1 Log L3-1 (Exhibit 13). A review of station records revealed the last time valve SI-26 was closed was August 7, 1980, for routine maintenance, in accordance with Equipment Clearance Permit #458458 (Exhibit 14). It was returned to the normal locked open position on September 25, 1980.

Between 1:15 a.m. and 3:00 a.m. on June 6, the Shift Supervisor and the plant operators conducted a special valve alignment check of all ESF manually-operated valves outside the reactor containment building (RCB). Remote monitoring capability was available for critical valves inside the RCB. Non-indicating valve positions were verified during a subsequent RCB entry. No additional valves were found to be mispositioned. At 2:20 a.m. on June 6, all main control board valve position indication and status lights were verified to be in the "Normal System Arrangement." The licensee was unable to determine why valve SI-26 was out of its normal position.

At the time valve SI-26 was discovered mispositioned on June 6, the plant was operating at 99% of full power. The NRC permitted the plant to remain in operation because the immediate contingency actions taken by the licensee on June 6, and continued thereafter were determined to be appropriate and adequate. In addition, the verifications performed by the Senior Resident Inspector on June 6 and the Investigation Team beginning on June 7 identified no additional problems.

INTERVIEW SUMMARIES

The following individuals were interviewed in connection with the events of June 5 and 6, 1981. Summaries of their interviews are contained on the following pages.

Dennis Morgan

Patrick Cilli

Frederick Nelson

Leonard Kabana

Martha Hulings

Robert Druga

Michael Skiba

Dennis Morgan, Nuclear Operator was interviewed on June 11, 1981. He can testify that on June 5, 1981, at approximately 9:00 a.m., he saw that the chain and lock on valve WT-225 to auxiliary feedwater pump FWP-2 was missing. He then looked at the other two auxiliary feedwater pump's (FWP-3A and FWP-3B) isolation valves (WT-226 and WT-227) and found that the chains and locks were also missing. He took a few minutes to look for the missing chains and locks by looking around the quench spray room, which adjoins the auxiliary feedwater pump room. He could not find the missing chains and locks. Following the search, he called the Control Room, spoke with Scott Lindsey and told him that chains and locks were missing from three auxiliary feedwater pump isolation valves. He said that their surveillance logs have an entry which is a check to see that the auxiliary feed pumps are locked open. He did not make an entry in the log at that time because he did not know if three pumps should have been locked open at that time, possibly because of work that may have been done or that may have been in progress. Lindsey told Morgan that he did not know anything about it but to stand by and he would get an answer. Shortly, Lindsey told Morgan to meet another operator at the "golden gate," the name for the manned and controlled entrance into the PAB, and he would be given new locks and chains that he was directed to install on WT-225, 226 and 227. After obtaining the locks and chains, Morgan met Pat Cilli, his partner, who helped Morgan install the new chains and locks.

Morgan stated that he had occasion to enter the PAB during the 7:00 a.m. to 3:00 p.m. shift on June 5, 1981 at least ten times which included work on the 722'level and in the general vicinity of the SI-26 valve. None of the trips to the 722'level involved checking the SI-26 valve, therefore, he does not recall looking at that valve on June 5, 1981. Morgan recalls seeing a number of individuals in the PAB during his trips including contractor personnel, security force personnel and rad tech personnel but does not know any of them by name.

Morgan related that he did not make an entry in the log regarding the missing chains and locks because he understood that the Shift Supervisor, "Rick" Nelson, and the Shift Foreman, Joe Maley, were going to look into it, according to the discussion which Morgan had with Maley.[1]

[1] Interview, D. Morgan, Exhibit Number 2

Patrick Cilli, Nuclear Operator was interviewed on June 16, 1981. He can testify that on June 5, 1981, at 8:49 a.m., he checked valve SI-26 and that it was locked and in the open position. He made a reading on the pump integrator which is located about 20 to 30 feet away from SI-26. He logged the pump integrator reading on the L3-1 log at 8:49 a.m. He is positive that SI-26 valve was open at that time, because he saw the valve stem sticking up about 8 inches and he was standing approximately two feet away from SI-26 on the 722' level of the PAB when he visually observed the valve stem and the chain and lock on the valve. The padlock was closed. This was a visual check only.

Mr. Cilli also stated that on June 5, around 9:30 a.m. or 10:00 a.m., he helped Dennis Morgan put the chains and locks on the three auxiliary feedwater pump valves that were discovered by Morgan to be missing chains and locks.[1]

[1] Interview, P. Cilli, Exhibit Number 3

Frecerick G. ("RicK") Nelson, III, Nuclear Shift Supervisor, was interviewed on June 12, 1981. He can testify that on June 5, 1981 he worked the 7:00 a.m. to 3:00 p.m. shift, and around 9:30 a.m. - 9:45 a.m., the Shift Foreman, Joseph Maley informed him in person, while Nelson was in the Control Room, that Dennis Morgan, Nuclear Operator found that the chains and locks had been removed from the three auxiliary feedwater pump valves. To the best of Nelson's knowledge, no record of this information was made. He said that they were still looking into the matter and therefore, no record was made at the time of the incident. Nelson informed Larry Schad about the incident around 2:30 p.m. At the end of the shift, Nelson does not recall telling his relief (Schultz) about the missing chains and locks because he did not consider the incident as a big problem because the valves were found to be in their proper (open) position, open.[1]

With regard to the main feedwater pump trip, Nelson can testify that at about 2:20 p.m. on or about June 2, 1981, the WP1A feedwater pump tripped. Nelson sent Sam Checketts, a Nuclear Operator, down to the main feed pump in the Turbine Building to see if he could find anything wrong there. Checketts called up to the Control Room and said that the main feed pump looked o.k. Nelson then sent Jim Daugherty down to the switchgear room to investigate the problem. Daugherty told Nelson that there were three electricians (employed by Sergent Electric) in the switchgear room. Nelson then went to the switchgear room and the electrician told him that they had been working in the 1A-2 cubicle on the B4KV bus. Nelson asked them if they had been in the 1A-2 cubicle and they said that they had been there. Nelson said that they were pulling a cable for DCP-229 (a design change package). The electricians assumed that they had bumped a relay which caused the breaker trip. This concluded Nelson's investigation of that incident at that time. The above design change package related in someway to the aux feed pumps, according to Nelson. At about 2:25 p.m. on June 6, Nelson was back in the Control Room.

Nelson said that he thinks that it was the next morning when Druga told him that he had found the three switches (associated with the main feedwater pump in the Turbine Building) isolated. Nelson does not know what is being done now to determine why the three pressure switches were isolated.[1]

[1] Interview, F. G. Nelson, III, Exhibit Number 4

Leonard A. Kabana, Nuclear Operator, was interviewed on June 16, 1981. He can testify that on June 4, 1981, at approximately 11:40 p.m., he visually checked SI-26 from about 15 feet away while he was standing by the "telltale drain". He saw the chain going through the bonnet and the handwheel of SI-26. He did not check to see if the lock was on the chain and he does not recall seeing the lock. He determined that the valve was open because the valve stem was showing about 12 to 14 inches above the handwheel. It looked full open to him that night. He is fairly positive that the chain he saw on SI-26 the night of June 4 was the same chain he saw on SI-26 during the week of May 24-30, 1981, the last time he was assigned to check SI-26.

In regard to the auxiliary feedwater pump isolation valves, WT-225, 226 and 227, Kabana stated that also on June 4, 1981, at approximately 11:30 a.m. he checked the position of the three auxiliary feedwater pump isolation valves and found them to be full open and the chains were wrapped around the pipe and around each valve. He did not actually look for the lock on each chain, therefore, he cannot be 100% certain that there was a lock on each chain. L. Kabana stated that he had to return to the vicinity of valves SI-26 and WT-225, 226 and 227 at least twice during the work shift but did not take any notice of the condition of SI-26, WT-225, 226 or 227.[1]

[1] Interview, L. Kabana, Exhibit Number 5

Martha M. Hulings, Nuclear Operator, was interviewed on June 11, 1981. Hulings has worked at the BVPS since October 1980. She stated that while working on the 11:00 p.m. (June 5, 1981) to 7:00 a.m. (June 6, 1981) shift she was performing a scheduled valve check tour which was documented on the L3-1 log she was carrying on a clipboard. She checked SI-26 by walking to within one foot of it and saw that the chain and padlock were missing from the valve wheel and that the valve was closed. Only about 1 thread or about 1/8 of an inch of the stem was showing. The stem was not flush down with the handwheel on the valve. She had seen the chain in place on previous occasions when she checked SI-26 and she described it as a non-shiny silver-colored chain and it was not rusty. Normally, she checks SI-26 by visual observation from a distance of approximately three feet from the valve, although she has checked it by tugging on the chain. When she saw that SI-26 was shut, she examined it more closely and then immediately proceeded to the Control Room and asked someone, whom she believes was Ted Antonacci, why SI-26 was shut. She was told to go and open the valve and someone would bring her a lock and chain. When she opened SI-26 she saw a rusty chain on the support on the left side of the valve. She does not recall having seen the rusty chain before. Terry McGee, Foreman, arrived at the SI-26 valve with a chain and lock. M. Hulings had opened the valve full open by the time McGee arrived with the lock and chain, which McGee then installed on the valve. M. Hurlings said she does not know who removed the locks and chains from SI-26 or the auxiliary feed pump valves and she does not know who shut valve SI-26.[1]

[1] Interview M. Hulings, Exhibit Number 9

Robert J. Druga, Nuclear Shift Supervisor, was interviewed on June 10, 1981. He stated that he was the supervisor on duty when valve SI-26 was found in the closed position by M. Hulings. He said that the foreman informed him that M. Hulings had found SI-26 shut. He told the foreman (Antonacci) to go and check the valve because he (Druga) could not believe that it was shut.[1]

[1] Interview, R. Druga, Exhibit Number 10

Michael Robert Skiba, Nuclear Operator was interviewed on June 10, 1981. He can testify that on June 5, 1981, at approximately 4:30 p.m., he checked valve SI-26 and did not see anything unusual. He stated that he was about five feet away from SI-26 when he checked it to see that it was locked open. He said that he was positive that the valve was open but he cannot be sure that the valve handwheel was chained and locked. He knows that the valve was open because he saw that the length of the valve stem was about 8 to 10 inches, which is the length that he has seen it when it was chained and locked open. The handwheel was about eye level. He did not see any discarded chain or lock in the vicinity of SI-26. Skiba said that his valve checks are "eye-balling" of the stem and observing indicators of butterfly valves.

Skiba also can testify that at approximately 4:30 p.m. he filled the accumulator for approximately 5 to 10 minutes which is done at valve SI-41. This valve is in close proximity to valve SI-26.[1]

[1] Interview, M. Skiba, Exhibit Number 12

REVIEW OF LICENSEE ACTIONS TO ASSURE CONTINUED SAFE OPERATION

The Investigation Team reviewed the actions taken by the licensee to assure that no additional undetected incidents of tampering with safety-related equipment had occurred that could impact on continued safe operation of the plant. The results of the investigation were obtained through independent verification of safety-related equipment status, interviews of licensee and contractor personnel, review of procedures and various logs and records used to document licensee system status checks, and review of the training of the operators who performed system status checks.

A. Operational Safety Verifications

The Investigation Team determined that, following discovery of mispositioned valve SI-26 on June 6, 1981, plant operators conducted special checks of vital bus switchgear, safety-related motor control center breaker positions, as well as selected containment isolation valve positions, and safety-related instrumentation valves for proper alignment. No abnormal conditions were identified during these equipment checks.

Beginning June 7, 1981, plant operators and shift supervisors periodically re-verified the correct alignment of system valves, electrical power supplies, and instrumentation and controls for ESF systems. This re-verification was conducted on a rotating sample basis and was in addition to the normal ESF equipment position checks done each shift, thereby assuring two independent inspections each shift. Until June 10, 1981, the re-verification was limited to equipment located outside of the reactor containment building. During a reactor containment building entry on June 10, the ESF system components in the RCB were examined to assure correct alignment of system valves and to detect evidence of any unusual conditions. No mispositioned valves or abnormal conditions were identified.

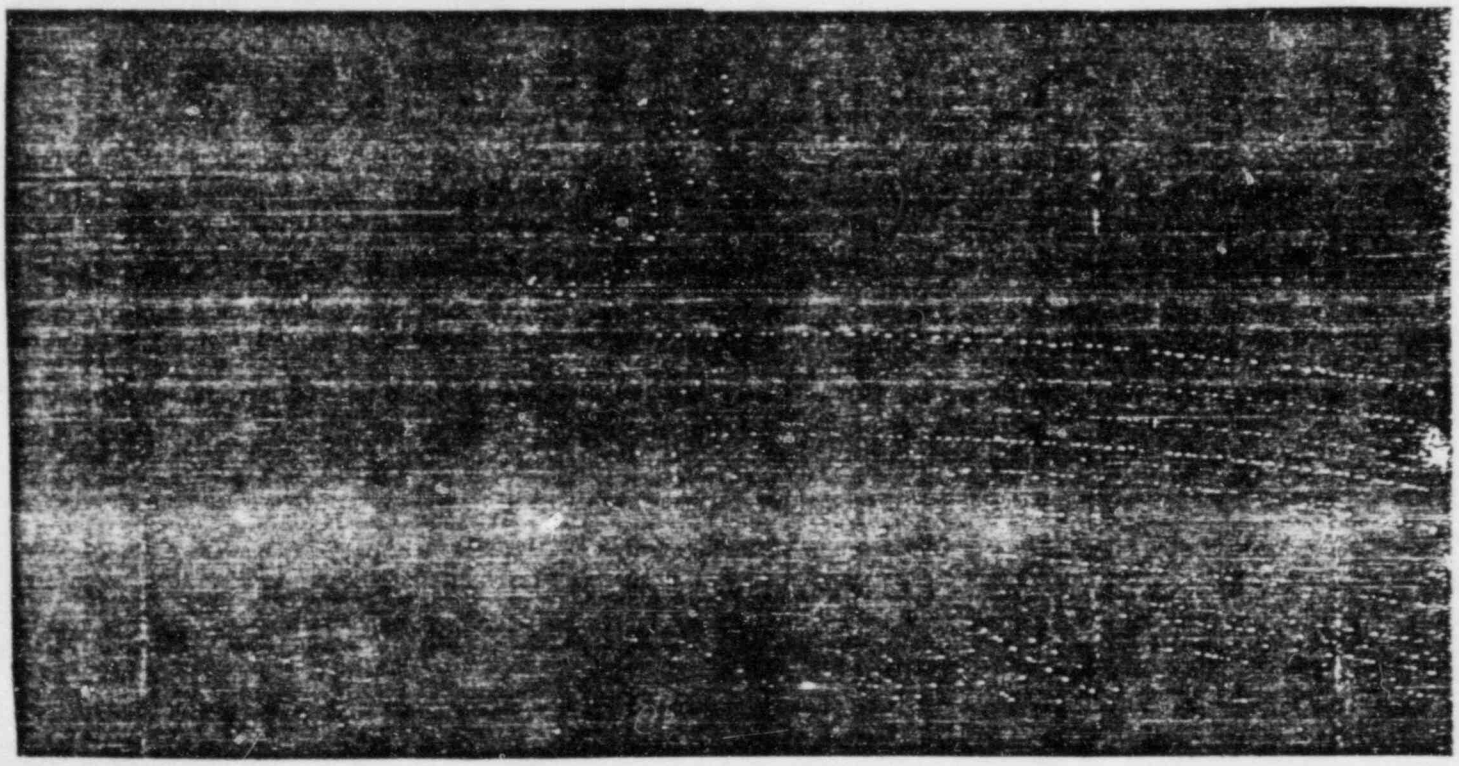
The licensee, to assure functional capability of ESF systems, accelerated the schedule for selected ESF component tests and system operability surveillance tests. These tests are normally performed once a month but were performed during the week ending June 13, 1981, regardless of the date of the previous test. To protect against a possibly more sophisticated deliberate interference with plant operations, special inspections were performed on all safety-related electrical and instrumentation and control equipment during the week ending June 13, 1981. These inspections included verification of locks on, and internal examination of, racks and cabinets for evidence of tampered wiring, such as unmarked lifted (disconnected) leads or loose terminal connections. All lifted-lead tags were verified against the control log. No abnormal conditions were detected as a result of these inspections.

During a tour of the PAB on July 1, 1981, a member of the Investigation Team, accompanied by the Shift Operating Foreman, checked twenty-five manual ESF valves listed in BVPS Operating Manual Table No. 48-5, "Engineered Safety Features Systems List of Red/Green Tagged Valves-Unit 1." (Table

No. 48-9 identifies all ESF manual valves that are to be tagged with permanently affixed red or green tags indicating (i) the normal position of the valve and (ii) that the valve is part of an ESF system.) During this tour, four valves which are part of the ESF system (SI-26, QS-9, RW-206, CHV-CV-151-1) were observed not to have the special ESF identification tags installed, but no other discrepancies were noted. Subsequently, the licensee initiated a check of all ESF manual valves to confirm the presence of the identification tags.

The NRC Investigation Team examined applicable station logs and records relating to the actions taken by the licensee following the events of June 5 and 6, 1981. In addition, the Investigation Team accompanied operators and shift operating supervisors during verification of ESF alignment and operational surveillances. This was done to evaluate the adequacy of and adherence to the licensee's contingency actions and to ascertain if operation of safety-related systems conformed with the Technical Specifications and the licensee's approved procedures. The operating procedures reviewed by the Investigation Team are identified in Exhibit 15. No abnormal conditions were identified.

B. Security Contingency Actions



An intensive search for the missing chains and padlocks was initiated by the licensee. The search resulted in the discovery of numerous pieces of chain similar to the missing chains, but none could be identified as having come from the four valves. Likewise, several padlocks were found, but since the same type of padlock was used elsewhere in the facility, it was not possible to specifically relate the padlocks found to the four valves.

The Investigation Team interviewed several security force members and ascertained that security personnel were not familiar with valve SI-26, the auxiliary feedwater valves, or any other locked valves in the PAB. The security force has no responsibility for checking the safety locks on various valves within the PAB.

The Investigation Team also reviewed logs, personnel access lists from before and after the events of June 5-6, and licensee procedures. In reviewing the personnel access lists, the team determined that the licensee had granted vital area access authorization to certain personnel, although these individuals had no demonstrated need for such access. The licensee immediately initiated a review of access authorizations to delete personnel without a need for vital area access. Also examined were DLC's access control procedures for eliminating personnel access authorization due to termination. The Investigation Team determined that the procedures did not adequately address contractor personnel. The licensee took action to revise the procedures and correct the situation.

C. Training and Qualification of Nuclear Operators

During the interviews of plant personnel to establish the detailed sequence of events, the Investigation Team learned that some nuclear operators had apparently been assigned unsupervised tasks for which they were not qualified. These tasks included surveillance tests and system line-up checks of safety-related equipment. In assessing the impact this had on the continued safe operation of the plant, the Investigation Team examined the licensee's nuclear operator training and qualification program, as described in Technical Specifications 6.3.1 and 6.4.1 and, by reference, ANSI N18.1-1971. The team reviewed licensee procedures, reports, and training and qualification records for nuclear operators (Exhibit 16). In addition, interviews were conducted with plant supervisory personnel, nuclear operators, and training staff members.

The Investigation Team determined that certain nuclear operator trainees had performed the following unsupervised tasks for which they were not qualified:

- Operating Surveillance Test 1.11.13, Boron Injection Surge Tank Level Verification, performed at 2:30 a.m., February 5, 1981.

- Operating Surveillance Test 1.7.1, Boric Acid Transfer Pump (1CH-P-2A) Operational Test, performed at 12:00 p.m., May 5, 1981.

- Operating Surveillance Test 1.32.1, Chemical Waste Sump PH Monitor Operability Check, performed at 4:30 a.m., June 4, 1981.

- System lineup checks, system/component status checks, and valve operations, performed on the following dates in 1981: February 5, March 2, March 3, May 5, May 6, May 7, June 4, and June 5.

These tasks were subsequently performed by qualified operators.

In reviewing the training and qualification records for the nuclear operators, the team also determined that the records contained no documentation for training in the following areas:

- Plant System Layout Qualifications
- Nuclear Operator Attendant Qualifications
- Radiation Protection for Nuclear Operators
- Theory and Systems for Nuclear Operators
- Operating Procedures for Nuclear Operators

The team also noted that a system for evaluating the effectiveness of the operators' training had not been established as required by the BVPS Station Training Manual, Section 2.3.4.2, and ANSI N18.1-1971.

D. Additional Events Reviewed

The Investigation Team reviewed other unusual events which occurred during the period one month prior to the June 5 event until the last day the Investigation Team was on site, July 10, 1981. These reviews were conducted to identify additional problems that could be related to the mispositioning of SI-26 and the removal of the chains and padlocks from the four valves. The inspectors examined applicable station logs, records, and reports for the operational events described below and conducted interviews with operators, shift operating supervisors and plant management personnel involved with the events or subsequent evaluation of them.

(1) Trip of Main Feedwater Pump (FWP-1A)

At 2:27 p.m. on June 2, 1981, the 1A main feedwater pump tripped. The nuclear control operators (F. Nelson, S. Checketts and J. Daugherty - see Interviews, Exhibits 4, 17 and 18) were able to respond to this transient and restart the feedwater pump approximately one minute after it tripped. The licensee's investigation concluded that the pump had most likely been accidentally tripped by construction personnel who were working inside the 1A2 motor breaker cabinet. Approximately ten hours later, a startup operator investigated an annunciation of the "1A Main Feed Pump Lube Oil Trouble Alarm" and discovered that the instrument isolation valves for the three feedwater pump lube oil system pressure switches (PS-LO-205A1, A2, and A3) were shut when required to be open. The isolation valves were returned to their normal (open) position and the alarm condition was cleared. The relationship of the isolation of these pressure switches to the feedwater pump trip, if any, is not known. However, it is known that if the oil pressure at PS-LO-205A2 dropped (bled down) to

below 5 psig, a trip of the feedwater pump motor breaker would occur and the low oil pressure would prevent a pump restart. The licensee has been unable to identify the reason for these valves being closed.

Further details describing this event and the licensee review, investigation, and analysis are contained in three DLC internal memoranda (Exhibits 19, 20 and 21).

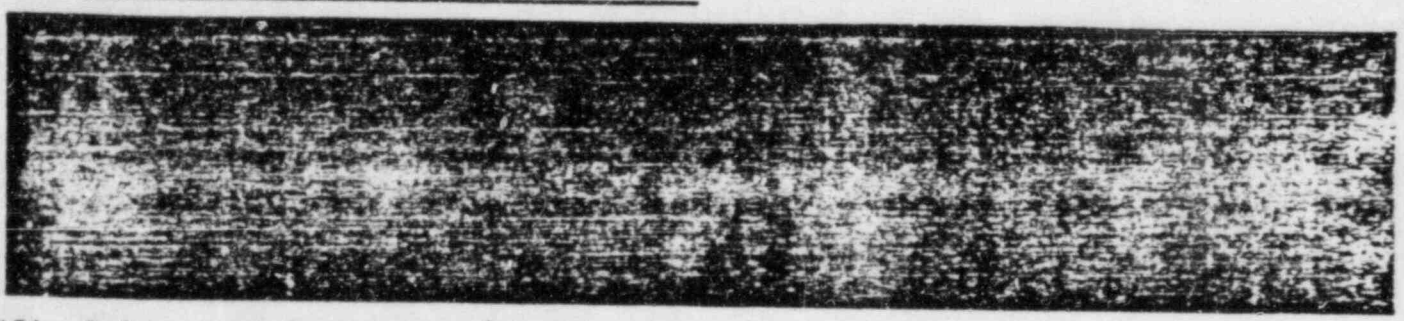
(2) Loss of Security System Uninterruptable Power Supply

On June 11, 1981, the security system uninterruptable power supply was taken out of service because of unexplained spurious alarms. This problem was examined by the licensee, and it was found that the cause was a mechanical defect in the electrical breaker controlling the system.

(3) Valve VS-D-5-5A Chain Damaged

On June 13, 1981, a Shift Supervisor, while making safety valve alignment verification checks at 8:30 p.m., found a link in the chain on valve VS-D-5-5A (Purge and Exhaust Containment Isolation Valve) cut, but the chain still properly in place and the valve in its normal position. The chain link gave way when the Shift Supervisor pulled hard on the chain. The licensee concluded that the chain had originally been placed on the valve in this condition, perhaps as the result of splicing two shorter chains together. It was determined that the last time the valve was chained and padlocked was on May 7, 1981 (James Schwarz, see Interview, Exhibit 22).

(4) Access Control Card Reader Failure



(5) Release of Radioactive Gas into the PAB

At 5:39 p.m. on June 17, 1981, a Boron Recovery Degasifier gas relief valve lifted, causing higher than normal radioactive gas levels in the Primary Auxiliary Building. Both degasifiers had been shut down for pump repairs. A temporary flow path from the containment drain tank to the coolant recovery (holdup) tanks had been established by way of the idle degasifiers. The licensee's investigation revealed that diversion of the chemical volume control system (CVCS) letdown flow to the degasifiers caused them to fill with water, lifting the relief valve. The relief valve passed coolant to the gaseous waste

(GW) header, flooding and tripping the GW fans. Concurrent with the relief valve lifting, a gasket joint in the degasifier cubicle also leaked. This series of personnel errors and equipment failures allowed radioactive gases (xenon, cesium and rubidium) to accumulate before they were vented through the PAB stack. The PAB vent stack radiation monitor indicated the radioactivity released from the building to be about 1 percent of the Technical Specification instantaneous release rate limits.

(6) Water Accumulation in Solid Waste Area

On June 18, 1981, approximately 8-10,000 gallons of water were discovered in the east waste sump area of the Solid Waste Building. The licensee's investigation revealed that the water resulted from overfilling the 4A Coolant Recovery Tank (CRT) during the period June 11-13, 1981. When this tank was overfilled, the overflow flowed through a 2-inch diameter sweep gas line into the solid waste cubicle sumps. General radioactivity and boron concentrations in both the CRT and the water found in the solid waste building sumps were consistent. Operator error was principally responsible for this event.

(7) Diesel Driven Fire Pump Failure

The diesel driven fire pump (DDFP) engine failed during routine surveillance testing, on June 22, 1981. The engine displayed symptoms of a blown head gasket and started to seize prior to shutdown. A replacement diesel-driven pump was connected to the system and almost immediately a fuel system problem developed. A second temporary pump was placed into service. There was no indication that either pump had been deliberately damaged.

(8) Containment Air Lock Testing

At approximately 3:00 a.m. on June 25, 1981, operators assigned to perform the Containment Air Lock Leakage Test (OST 1.47.1) reported that they were unable to open the air lock outer door. This was documented in the Shift Operating Report (S1-1) and the Nuclear Control Operators Report (S1-4).

The air lock outer door was subsequently opened with a hydraulic jack, and the operators discovered that the test pressurization system and gap between the door seals was pressurized, causing the difficulty in door operation. The Containment Air Lock Leakage Test procedure requires the 38 psig test pressure to be bled (vented) from the pressurization system and the gap between the door seals after completion of the test. Since none of the associated valves were found to be mispositioned, the licensee believes that, on this occasion, air leakage past the test panel air supply and bypass valves after the previous test had pressurized the test system and

door seal gap. This condition was not detected by the operators because OST 1.47.1 requires the test panel air pressure indicator to be isolated when not in use. At approximately 12:55 p.m. on June 25, 1981, the air lock door functioned properly and the leakage test (OST 1.47.1) was completed satisfactorily. The licensee's evaluation concluded that the air supply valve on the test panel was apparently not fully closed, causing air pressure to be imposed on the door seals. With air pressure on the seals, the door was forced outward against the breach ring, causing the jamming. With the air supply valve fully shut, no further problems were encountered.

The Investigation Team determined that there was no apparent relationship between the operational events described above and the two events which occurred on June 5 and 6, 1981.