

WOLF CREEK

NUCLEAR OPERATING CORPORATION

Otto L. Maynard
Vice President Plant Operations

April 6, 1993
WO 93-0071

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Mail Station P1-137
Washington, D. C. 20555

Subject: Docket No. 50-482: Licensee Event Report 93-002-00

Gentlemen:

The attached Licensee Event Report (LER) is being submitted pursuant to 10 CFR 50.73 (a) (2) (iv) concerning an Engineering Safety Features Actuation.

Very truly yours,



Otto L. Maynard
Vice President
Plant Operations

OLM/jan

Attachment

cc: W. D. Johnson (NRC), w/a
J. L. Milhoan (NRC), w/a
G. A. Pick (NRC), w/a
W. D. Reckley (NRC), w/a

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LICENSEE EVENT REPORT (LER)

On March 10, 1993, at 1123 CST, the Wolf Creek Generating Station Control Room received two automatic Engineered Safety Featured Actuation Signals (ESFAS): Control Room Ventilation Isolation Signal (CRVIS) and Containment Purge Isolation Signal (CPIS). The actuations were caused by a high gaseous radiation signal from Containment Purge Radiation Monitor GTRE22. Due to the increased radiation levels in Containment, from unknown causes, a Containment evacuation was ordered by the Shift Supervisor. The Equipment Hatch and Personnel Hatch inner door were closed within 22 minutes of the event, and verified closed in the Control Room within 29 minutes of the event.

Prior to the event, the plant was in MODE 5, Reactor Coolant System (RCS) temperature was approximately 100 degrees Fahrenheit, RCS vented (0 psig), and reactor vessel water level was 18" below the flange. Preparations to break the Conoseals were in progress.

Again, on March 11, 1993, at 0340 CST, GTRE22 went into the "alert" range but no ESFAS occurred. Prior to this second occurrence, the plant was in MODE 6, all vessel head studs were detensioned and RCS was at about 100 degrees Fahrenheit. Reactor vessel level was 18 inches below the flange.

A number of areas were identified for possible improvement including the time frame for Pressurizer Relief Tank (PRT) purging and depressurization, evaluation of Target Rock Solenoid Operated Valve (SOV) applications in clearance orders, the replacement schedule for Target Rock SOVs, and incorporation of the unidirectional characteristics of SOVs into licensed and non-licensed training.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 50.0 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

PLANT CONDITIONS AT THE TIME OF EVENT:

Mode 5 - Cold Shutdown
RCS Pressure: 0 psig (vented)
RCS Temperature: < 100F
RCS Water Level: 18 inches below the flange

DESCRIPTION OF EVENT:

On 3/10/93 at 1123 CST, a Containment Purge Isolation Signal (CPIS) and a Control Room Ventilation Isolation Signal (CRVIS) were generated by a signal from Containment Purge Radiation Monitor [IL-MON], GTRE22. A phone call was made at 1301 CST, in accordance with 10CFR50.73 (a) (2) (iv) to report an event that resulted in the actuation of Engineered Safety Feature Actuation Signals (ESFAS).

Prior to the event the plant was in MODE 5 with the RCS [AB] temperature between 95 - 100 degrees Fahrenheit and 0 psig, as indicated on the temporary pressure gauges installed at XV-5 and BB8016B, in accordance with procedure GEN-00-007, "RCS Drain Down". GEN-00-007 was revised in February 1992 to provide nitrogen over pressure on the Pressurizer for RCS drain down and to isolate the Pressurizer Relief Tank (PRT) [AB-TK] from the Pressurizer. This change reduced the volume of nitrogen required to drain the RCS.

At the time of this event, Residual Heat Removal (RHR) [BP] Train A was in service and RHR Train B was in stand by. Reactor vessel water level was being controlled at approximately 18 inches below the flange.

Commencing prior to the event, Clearance Order 93-0435-BG was being completed to allow an inspection of the refueling cavity drain valve ECV7129 [DA-V]. This clearance order tagged out the Reactor Coolant Pump Seal Return [CB-PSX], Excess Letdown Heat Exchanger [CB-HX], and the Reactor Coolant Drain Tank (RCDT) [AB-TK] per Outage Window 5190. The clearance order also required the Excess Letdown line to be drained to the Containment normal sumps (see attached figure A).

Excess Letdown Heat Exchanger drain valve BGV221 [CB-V] was opened to the drain system (see attached figure A). One of the work activities in Outage Window 5190 was to inspect ECV7129, the refueling pool drain valve to the RCDT. This activity was scheduled to start before filling the refueling pool due to a problem with the valve experienced at Callaway.

The clearance order isolated the Excess Letdown line upstream of the heat exchanger, various flow paths to the RCDT, the flow path to the Seal Water Heat Exchanger [CB-HX], and electrically isolated Pressurizer Relief Tank Isolation Valves, BBHV-8157A/B [AB-ISV] (see attached figure A). The only way to isolate the Excess Letdown Heat Exchanger from the PRT is to use BBHV-8157A/B.

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At the time valve BGV221 was opened, there was 9 psig pressure in the PRT. During the time radiation in Containment was increasing, the pressure in the PRT was decreasing. The PRT contained a mixture of gases including radioactive noble gas.

A short time after valve BGV221 was opened, the Health Physics (H.P.) Technician at the Containment Personnel Hatch was notified by the Control Room of an increase in radiation on GTRE22, and he notified the H.P. on the 2000' level of Containment that the radiation levels were increasing. The Health Physics Technician notified the Operator of the increasing radiation levels. Since the only activity the Operator performed which opened a system was opening valve BGV221, the Operator went and shut BGV221. Subsequently, PRT pressure was steady at 6 psig. Target Rock SOVs BBHV8157 A and/or B had leaked by in the reverse direction. The normal direction of flow through these valves is toward the PRT.

Approximately three minutes later, at 1123 CST, the plant received the CRVIS and CPIS. The Shift Supervisor ordered a Containment Evacuation due to the unexplained increase in Containment radiation levels and as directed in alarm response procedure ALR 00-59D, "Containment Purge Isolation System". The Containment Purge System supply and exhaust ducts automatically isolated, and the Containment Hatch was ordered to be closed at 1131 CST. The normal air intake and exhaust for the Control Building automatically isolated and the building pressure was made positive and the Auxiliary Building pressure negative. At 1145 CST, it was reported to the Control Room that the Containment Hatch was closed. At 1150 CST, it was reported to the Control Room, by the Containment Coordinator, that all personnel had exited Containment and the Personnel Hatch was closed at 1151 CST. At 1155 CST, Security reported to the Control Room that all personnel had exited Containment, confirming an earlier report.

Prior to the second PRT release occurrence the plant was in MODE 6 with all the reactor vessel head studs detensioned and the RCS temperature between 95-100 degrees Fahrenheit. Reactor vessel water level was being controlled approximately 18 inches below the flange. RHR Train A was in service and RHR Train B was in stand by.

Due to the event that occurred on March 10, 1993, the Manager Operations directed that Clearance Order 93-0435-BG be changed to restore the RCDT to allow draining of the PRT. Operations Management requested a temporary change to procedure SYS BB-202, "Pressurizer Relief Tank Operation" so the PRT could be purged, depressurized and drained. This work was to be completed prior to draining the Excess Letdown Heat Exchanger.

The change to the procedure and the clearance order were prepared and approved. However, when the change to the clearance order was authorized, the entire clearance order, rather than only the change, went to the field by mistake. New tags to reposition (open) the Excess Letdown Heat Exchanger drain valves were included in the clearance order package.

Therefore, during the second PRT release occurrence, valve BGV221 was again opened. The pressure in the PRT was again seen to decrease while the gaseous radioactivity in Containment increased. This confirms that the PRT was the source of the radioactive noble gas release into Containment (see attached figure B).

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For the second occurrence, when valve BGV221 was opened, Containment radiation levels increased and the Control Room received an "alert" alarm on the Containment Purge Exhaust Radiation Monitor GTRE22 gas channel. The Control Room ordered the Operator to close all drain valves that were opened by Clearance Order 93-0435-BG. The Shift Supervisor discussed the event with the Outage Shift Manager and it was decided to close the Containment Personnel and Equipment Hatches and have all personnel, except critical path workers, exit Containment.

After the initial event, the Vice President Plant Operations commissioned an Incident Investigation Team (IIT) to perform an investigation and evaluation. Letter WO 93-0054 established the IIT membership and charter. Subsequently, per procedure ADM 01-116, "Incident Investigation," Revision 4, the IIT review was conducted and documented in Report 93-01.

ROOT CAUSES AND CONTRIBUTING FACTORS**A. Target Rock Solenoid Operated Valves (SOVs)**

A direct cause of the increased radiation event is the design misapplication of the Target Rock SOVs, BBHV-8157A/B, per IIT Report 93-01. The Target Rock SOVs lifted due to the reversed differential pressure created by the draining of the Excess Letdown Heat Exchanger per Clearance Order 93-0435-BG. The 9 psig in the PRT lifted the Target Rock SOVs and allowed the gas to be released via the open drain valve, BGV221 (see attached figures C and D and discussion below).

The Target Rock SOVs, BBHV-8157A/B, are modulating SOVs. Target Rock modulating SOVs were identified in a Union Electric letter to Westinghouse as being subject to spurious opening when subjected to rapid pressure increases (Industry Technical Information Program (ITIP) 1070).

As stated in WCGS Plant Modification Request (PMR) 4394, "existing (Target Rock) SOVs have experienced continual problems with leakage and positioning". This includes Target Rock SOVs BGHV-8357A/B [CB] and EMHV-8837A/B [BQ] as well as BBHV-8157A/B [AB]. PMR 3205, completed during Refuel Outage 5, rotated these valves 180 degrees to attempt a correction of the difficulties. As Engineering Evaluation Request (EER) 92-EM-02 states, "This did not solve the problems". NUREG-1275, Vol. 6, which was transmitted to Wolf Creek by Generic Letter 91-15, describes the unidirectionality of the Target Rock valves (pages 10, 11, 29, Appendix A, and Appendix B). A review of the Target Rock vendor manual indicates the inlet pressure to the valve is used to make an adequate seat. Generic Letter 91-15 was made into ITIP 01746 and sent to Engineering for evaluation. Training received the two pages of recommendations from NUREG-1275, Vol. 6, in this ITIP. These two pages mentioned the directionality of solenoid valves and referenced other sections in NUREG-1275, Vol. 6. Also, NRC Information Notice (IEN) 90-64 which concerned reverse flow problems by ASCO solenoid valves (ITIP 1462) was evaluated by Engineering against Valcor and Target Rock valves and stated that none of the valves are subjected to possible reverse flow conditions. Also, Institute of Nuclear Power Operations (INPO) Operations & Maintenance Reminder (O&MR) 343, "Application Problems with Target Rock Solenoid Isolation Valves", discussed the unidirectional characteristics of the Target Rock SOVs. This O&MR was made into ITIP 702 and closed in the initial review because it was determined to be not applicable to Wolf Creek. The review stated that the orientation of Target Rock valves would be evaluated by ITIP 1070 referenced above.

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Evaluation of Target Rock Valves in PRT Release

Valves BBHV-8157A/B, which are Target Rock solenoid valves connecting the outlet of the Excess Letdown Heat Exchanger to the PRT, provided the release path from the PRT to the Excess Letdown Heat Exchanger vent valve in the incidents of 3/10/93 and 3/11/93. These valves are normally aligned such that the spring in the valves as well as the pressure from the high pressure (excess letdown) side of the valve combine to help seat the valve. In the incident of 3/10/93, the pressure in the PRT was 9 psig. In addition, the Excess Letdown Heat Exchanger was in the process of being vented to atmosphere. These evolutions resulted in the differential pressure across the valve becoming reversed. The normally high pressure side of the valve (excess letdown side) was now the low pressure side. Therefore, the excess letdown pressure was not available to help seat the valve. In addition, the normally low pressure side (PRT side) was now the high pressure side and the existing pressure in the PRT opened the valve as it acted upwards on the valve seat (see attached Figures C and D).

B. Lack of Knowledge Regarding Unidirectional Characteristics of Target Rock Solenoid Operated Valves

A second direct cause is that the Operations Department and the Outage Management Department were not aware of the unidirectional properties of Target Rock valves and any potential problems that may result from a reverse differential pressure.

The clearance order group was interviewed about the thought process behind the preparation of Clearance Order 93-0435-BG. The clearance order has a template stored in the WCNOG Mapper computer database and was used to start the preparation for this evolution. Valves BBHV-8157A/B were known to be Target Rock SOVs and were known to have leakage problems in the forward direction. However, they were the only available isolation valves for this clearance order. This clearance order had been successfully used in Refueling Outage V, but the change to GEN-00-007 which resulted in different initial conditions (i.e., PRT no longer drained and depressurized) was not apparent.

C. Lack of Proper Communication and Evaluation of Available Industry Information

A programmatic cause is that, although various sources of industry information about the unidirectional characteristics of Target Rock valves was available to WCNOG, this information was not completely communicated or properly evaluated for its application to WCGS. ITIP 01746 was sent to Engineering for evaluation, and Operations, Outage Management and Training received information copies with the two pages from the recommendations section of NUREG 1275 Vol. 6 attached. Thus, the information forwarded to Operations and Training was not complete. The IIT determined this to be the underlying reason for the second direct cause of the event (as stated in paragraph "B" above).

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D. Lack of Communication

The direct cause for the second PRT release occurrence was a communication breakdown. Poor communication was apparent in the shift turnovers between the Control Room Crews and in the Relief Crews.

E. Contributing Factors

There are two contributing factors to the root causes including:

The sequence of work activities associated with Refuel VI Outage Window 5190 led to placement of Clearance Order 93-0435-BG before the PRT was depressurized.

Clearance Order 93-0435-BG was made without consideration of the unidirectional characteristics of the Target Rock valves and that any pressure in the PRT would lift the valves when the Excess Letdown Heat Exchanger was drained. Consideration was not given to the Target Rock SOV characteristics since Operations and Outage Management were unaware of these valve properties.

CORRECTIVE ACTIONS:

A. Immediate Operator Response

A short time after drain valve BGV221 was open, the Health Physics (H.P.) Technician at the Containment Personnel Hatch was notified by the Control Room of an increase in radiation on GTRE22 and he notified the H.P. on the 2000' level of Containment that the radiation levels were increasing. The Operator then closed valve BGV221.

B. Response by Operations Management

Administrative procedure ADM 02-100, "Clearance Order Procedure" was revised on 3/19/93 to prohibit the use of Target Rock SOVs as an isolation boundary on clearance orders. In response to Corrective Action Program Performance Improvement Request (PIR) #93-0231, which was issued to Operations to assure proper corrective actions were taken, the revised procedure was issued to Operations Department personnel as essential reading. Additionally, a memo from the Operations Manager dated March 20, 1993, was distributed to Operations Personnel regarding the problems with Target Rock SOVs and stating Operations policy not to use Target Rock SOVs as boundary valves for any clearance orders.

C. Long-term Solutions Being Evaluated for Implementation

Target Rock Solenoid Operated Valves

Management will evaluate moving up the replacement of the Target Rock Valves (PMR 4394). At the present time, the Excess Letdown to the PRT valve replacement is scheduled for Refueling Outage VIII. This evaluation should be done by September 1, 1993. PIR # 93-0232 was assigned to Outage Management for closure of this corrective action.

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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 600 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-520) U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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Outage Management and Operations Management will evaluate when the purging, depressurization, and draining of the PRT should be done during outages. Any necessary changes to the process will be in place prior to Refuel Outage VII. PIR # 93-0230 was assigned to Operations for closure of this corrective action.

Dissemination and Evaluation of Information

The WCNOC Issues Review Group (formed in 1992 to improve the effectiveness of management's attention to significant issues which have the potential to affect safe operation of Wolf Creek) will review the current process for evaluation of NRC and industry information compared to the process that was in place when the pertinent information related to this event was evaluated. This review should look for further enhancements or improvements, and any necessary changes will be implemented by September 1, 1993. PIR # 93-0233 was assigned to the Vice President Plant Operations for closure of this corrective action.

Operations has considered methods of improving communication to the relief crews and between Control Room crews both during normal operations and during outages. Areas for improvement include the dissemination of information in night orders and improvements to communications during turnovers to the relief crews. Specifically, proper consideration of major plant events is given during Operation's turnover briefings.

Training

Training will incorporate the unidirectional characteristics of SOVs into licensed and non-licensed training and the Operators will be trained by September 1, 1993 as part of the Plant and Industry Events Section. PIR #93-0234 was assigned to Training for closure of this corrective action.

Safety Analysis**Radiation Protection**

The personnel hazards from exposure to the radioactive gas released in Containment on 3/10/93 were minimal. Results from particulate and iodine grab air samples showed no increase in activity. The actual results were 0.06 Maximum Permissible Concentration (MPC) particulate, 0.00 MPC iodine and 76.5 MPC noble gas. The analysis of noble gas showed 95% Xe-133, 2%, Kr-85, 1.5% Xe-131M and traces of Xe-133M and Xe-135.

The beta and gamma exposure from the noble gases can be estimated from calculations using the air concentration, the total whole body dose factor and skin dose factor listed in the WCNOC Offsite Dose Calculation Manual (ODCM), Table A-1-2. The dose conversion factors are based on Regulatory Guide 1.109. Calculations were performed based on the air sample analysis of a grab sample taken during the event and a ratio to the highest 10 minute average of the Containment atmosphere monitor (GTRE-22) was given. The total whole body exposure was approximately 29 mRem/hr, and the skin dose was approximately 35 mRem/hr. From the start of the event at 1123 CST to the Security verification of all personnel exiting containment at 1148 CST, the maximum exposure time was 25 minutes.

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The Thermo-Luminescent Dosimeters (TLD) of the two last individuals to exit Containment were processed. No beta exposure was detected, and the gamma exposure was consistent with their Pocket Ion Chamber (IC) readings.

The "Panasonic type 802" TLD, which is used at WCNOG, has demonstrated that it is capable of measuring the lowest-energy photons emitted by noble gas isotopes, including Xe-133 (0.03 - 0.081 ME). The betas emitted by noble gas can be accounted for in the algorithm when processing the TLDs.

Surveys taken at the Personnel Hatch showed 12 mRem/hr gamma and 25 mRem/hr beta while personnel were exiting the area. These values are consistent with the calculations from the air sample taken at the same time. The area radiation monitor at the Personnel Hatch inside Containment, SDRE-40 [IL-MON], increased approximately 0.2 mR/hr to 1.0 mR/hr during the event.

During the second PRT release occurrence on March 11, 1993, increased airborne activity was again observed. The decision was made to close the Equipment Hatch and the Personnel Hatch a second time. The levels of activity were a factor of 5 times less than those observed on March 10, 1993, and the Containment was evacuated. Based on the grab samples obtained, the whole body and skin exposure were 3 mRem/hr each. As stated earlier, the TLDs used at WCNOG would be able to monitor the exposure from the noble gases, thus additional manual calculations were not performed or required.

Radiological Effluents

On March 10, 1993, at 1110-1115 CST, radioactive gas from the Pressurizer Relief Tank (PRT) was released into the Containment atmosphere. A Containment shutdown purge was in progress at a flow rate of 18661 CFM. The purge was being monitored for particulate, iodine, and noble gas by Radiation Monitor GTRE-22. (Note: Monitor GTRE-33 was out of service for calibration by I&C.) An increase in the Containment atmosphere gas activity was immediately seen on Containment Atmosphere Radiation Monitors GTRE-31 and GTRE-32 [IL-MON]. At 1123 CST, GTRE-22 reached the high setpoint of 1.00E^{-3} uCi/cc and initiated a CPIS/CRVIS (see attached Figure E).

The high setpoint of 1.00E^{-3} uCi/cc for gas monitor GTRE-22 is a conservative setpoint used for normal plant operation based on the worst case basis of only Ar-41 being present in the Containment atmosphere. A fixed setpoint had been chosen for Containment purges to preclude I&C from changing the Engineered Safety Feature Actuation Signal (ESFAS) setpoint for each purge performed. The actual setpoint calculated per the ODCM based on the gases present was 1.00E^{-2} uCi/cc. (Note: The high setpoint calculations are based on the 10CFR20 instantaneous release rate limits.)

Once the CPIS/CRVIS occurred, the Containment Building was evacuated. The Auxiliary Building during a CPIS/CRVIS is at a lower pressure than the Containment which ensures flow into the Equipment Hatch and out through the Personnel Hatch. This flow prevents a release out of the Equipment Hatch to the outside atmosphere. Health Physics personnel verified flow into the Auxiliary Building by a piece of maslin hanging in the Personnel Hatch and by finding 75 MPC of noble gas just outside the Personnel Hatch in the Auxiliary Building.

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ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-830), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

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Results Engineering performs STS PE-04A/B, "Auxiliary Building and Control Room Pressure Tests," to ensure the Control Room maintains at least a +.25 inch W. G. pressure and the Auxiliary Building maintains at least -0.25 inch W.G. pressure during a CRVIS lineup. These surveillances are required to maintain Technical Specification operability.

The gas activity in Containment reached a maximum of 1.45E^{-3} uCi/cc (indicated on GTRE-31) and leveled off at approximately 4.3E^{-4} uCi/cc. A grab sample was taken at 1215 CST which indicated 4.33E^{-4} uCi/cc. This grab sample was used to generate a new Containment Purge Permit and the ESFAS setpoint was raised to 1.00E^{-2} uCi/cc. The Containment Atmosphere was then purged out through the Unit Vent. (Note: The Unit Vent System has a filtration system for particulate and iodine removal.)

The worst-case calculated dose to the public due to the increased activity in Containment prior to and following the CPIS are detailed on Table 1.

The release calculations were performed using the maximum gas concentration for the entire release time in order to be conservative. The results, as indicated above, show the release was many orders of magnitude below the limits.

The second PRT release occurred early on the morning of March 11, 1993, was only one fifth the magnitude of the original event. Therefore, the second release was insignificant compared to the release limits (see attached figure E).

Containment Evacuation Evaluation

In the case of the first event, the Containment Coordinator and Containment H.P. Technician at the 2047' level were informed by the Control Room of increased airborne activity levels on the monitors. The H.P. Technician verified that the Eberline AMS-3 air monitor also showed an increase. The Containment Coordinator alerted the Equipment Hatch closure team. As the Containment Coordinator was returning to the control point, he heard the Containment ventilation secure and the AMS-3 alarm. The Equipment Hatch was ordered closed. The Containment evacuation alarm was then sounded. The Containment Coordinator informed three H.P. Technicians at the 2047' level to evacuate all personnel. The H.P. Technician on the 2047' level called the control point on 2000' level to inform the personnel there to evacuate. The H.P. Technician on the 2000' level toured inside the bioshield to inform workers to evacuate. After everyone on the 2000' level had left, the H.P. Technicians toured each level on the way up to the 2047' level to ensure all personnel had exited. Workers dressed in plastics and respirators in the reactor cavity were motioned to come up.

An Operator and the Containment Coordinator closed the inner door to the Personnel Hatch after everyone was through the airlock. After Security verified there were no other personnel logged into the area, the outer door to the Personnel Hatch was secured.

Approximately seven H.P. Technicians responded to the containment personnel hatch from the Access Control office to help personnel undress, frisk and exit the RCA. Frisking stations were setup on the 2026' and 2000' levels of the Auxiliary Building. The workers were very responsive to the directions given by the H.P. Technicians.

NRC FORM 366A (6-89)		U.S. NUCLEAR REGULATORY COMMISSION		APPROVED OMB NO. 3150-0104 EXPIRES 4/30/92	
LICENSEE EVENT REPORT (LER) TEXT CONTINUATION				ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.	

FACILITY NAME (1) Wolf Creek Generating Station	DOCKET NUMBER (2) 0 5 0 0 0 4 8 2 9 3	LER NUMBER (6)			PAGE (3)		
		YEAR 93	SEQUENTIAL NUMBER 0 0 2	REVISION NUMBER 0 0	1 0 OF 1 6		

TEXT (If more space is required, use additional NRC Form 366A's) (17)

A number of good practices were observed during the evacuation including:

- Health Physics and Operations personnel along with the Containment Coordinator, ensured all personnel were evacuated prior to leaving Containment.
- Personnel exited expeditiously and orderly.
- Several H.P. Technicians responded to the Personnel Hatch to help frisk the workers and eventually release them from the RCA.
- Remote frisking stations were quickly set up on the 2000' level and the 2026' level of the Auxiliary Building.
- The contingency plan to stage personnel at the Equipment Hatch for quick closure worked very well.
- Excellent communication was demonstrated between the Control Room and the Containment Coordinator.

Integrated Plant Response

No radioactive release limits were exceeded during this event. All engineered safety equipment functioned properly, thus ensuring the health and safety of the public and plant safety.

Previous Similar Occurrences

Licensee Event Report (LER) 90-003-00 discusses a previous related occurrence in which a CPIS and a CRVIS were generated as a result of high gaseous activity. As a result of LER 90-003-00, a caution was added to GEN-00-007 to alert the Control Room Operators of the potential for an accumulation of gaseous activity and to provide guidance on closure of the manual vent valve if the Containment Purge Exhaust System is secured.

LER 91-018-00 discusses a previous related occurrence in which a CPIS and CRVIS were generated as a result of high gaseous activity. As a result of LER 91-018-00, GEN-00-007 was revised to push the entire gas bubble out of the Pressurizer and into the PRT as the Pressurizer is taken solid, then isolates the PRT and the gas is subsequently taken to the waste gas system. This method was utilized during a Conoseal repair evolution in February 1992 and worked well. However, the Target Rock SOVs were not placed in a reverse differential pressure situation because the Excess Letdown system was not depressurized and drained.

There have been no previous CPIS/CRVIS actuations due to the unidirectional characteristics of Target Rock Solenoid Operated Valves. The corrective actions taken from the above related events could not have prevented this recent event from occurring.

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

DOCKET NUMBER (2)

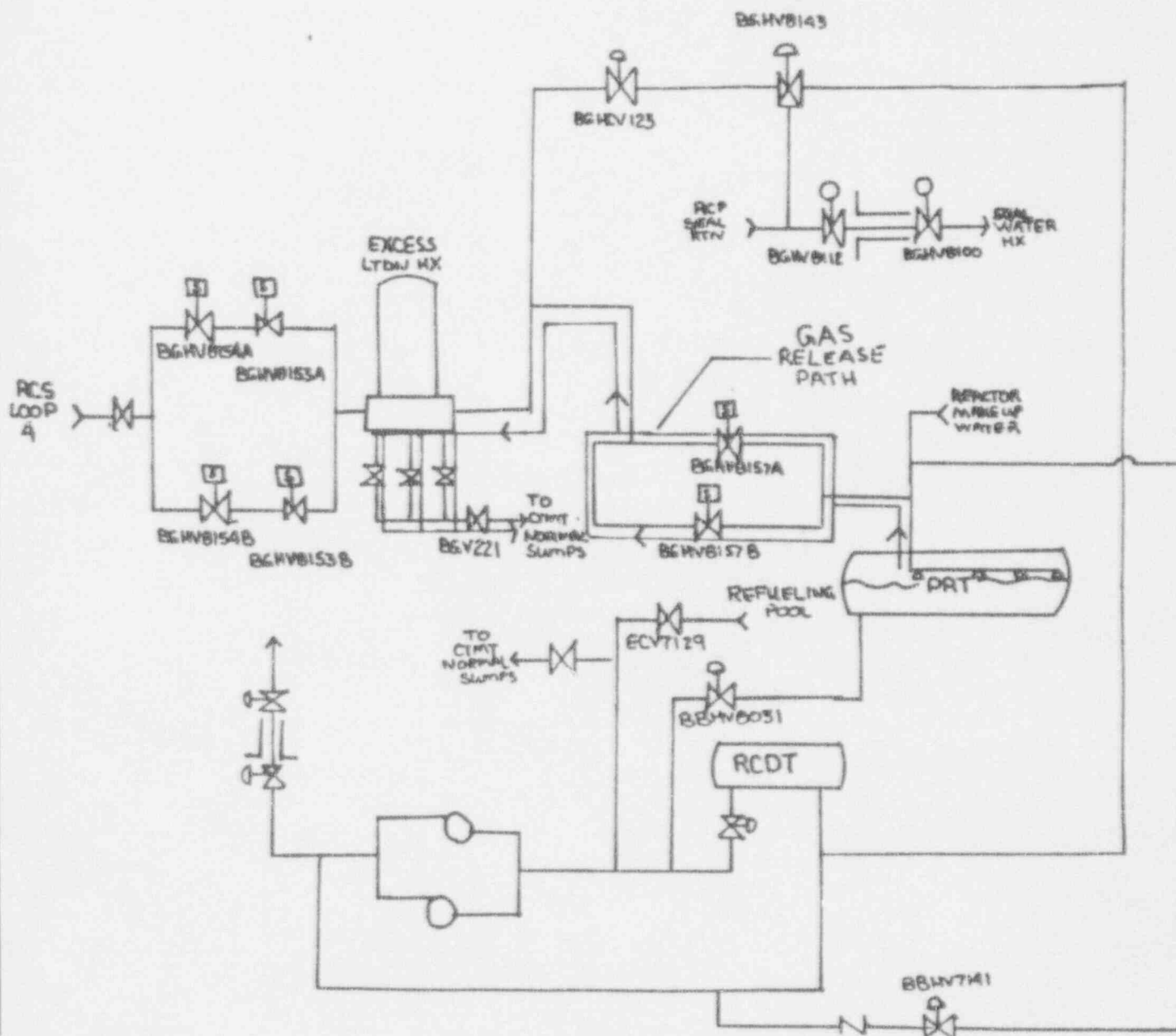
LER NUMBER (6)

PAGE (3)

Wolf Creek Generating Station

0 5 0 0 0 4 8 2 9 3 -- 0 0 2 -- 0 0 1 1 OF 1 6

TEXT (If more space is required, use additional NRC Form 366A's) (17)

Simplified Diagram
RCDT, Excess Letdown, and PRT
Figure A

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATIONESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS
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AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR
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FACILITY NAME (1)

DOCKET NUMBER (2)

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PAGE (3)

Wolf Creek Generating Station

0 5 0 0 0 4 8 2

9 3

- 0 0 2

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1 2 OF

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TEXT (If more space is required, use additional NRC Form 385A's) (17)

PRT Second Occurrence
Figure B

SELECT A FUNCTION KEY

TH: 0

3/12/93
05:32:15

SPDS

HISTORICAL TREND - PRT

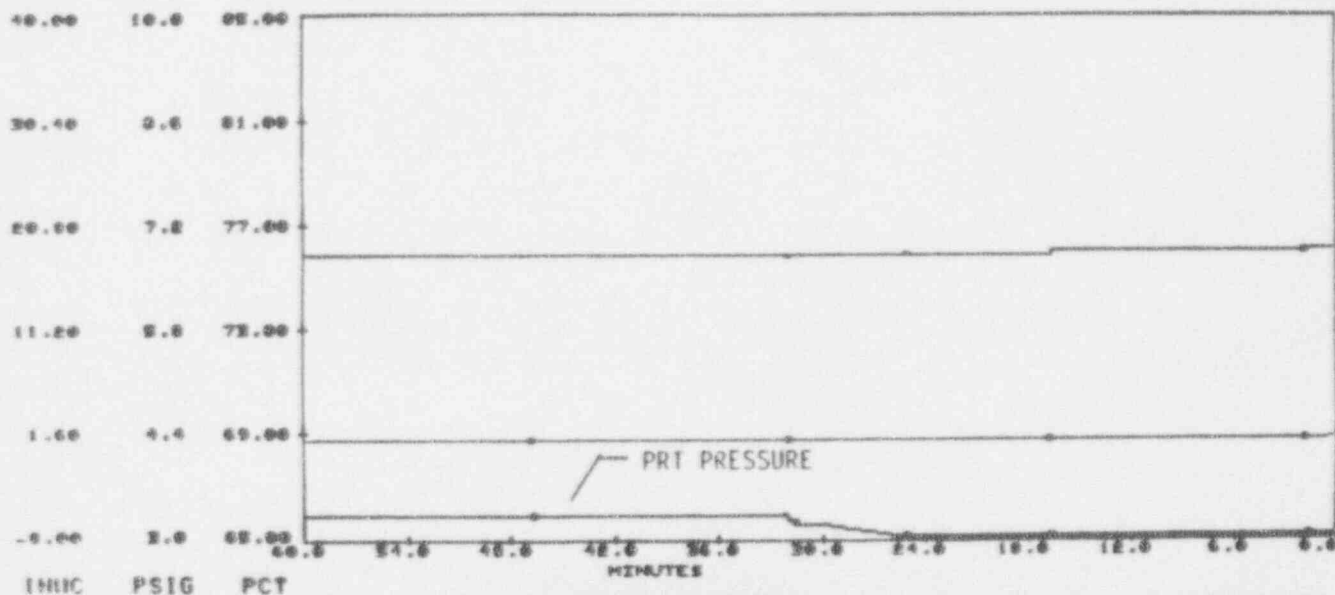
11-MAR-1993
04:00:49

POINT ID SYMB

DESCRIPTION

QUAL CFIT CURRENT MAXIMUM MINIMUM

DBL0470	--	PRESSURIZER RELIEF TANK L	GOOD PROP	76.09	76.69	75.84
BEP0469A	--	PRESSURIZER RELIEF TANK P	LALM PROP	2.7	3.3	2.7
OTF0040	--	CONT-AUX BLD DIFF PRESS	GOOD PROP	1.14	1.15	1.10



CANCEL

F1=START
PREV CHNGF2=
H.C.F3=FAST FORM F4=
TERM=TT07 CPU=B CONSOLE=PRIN/BACF5=
MODE=CLD SHDN EVENT=AUTOF6=
VIDEO COPY

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1)

DOCKET NUMBER (2)

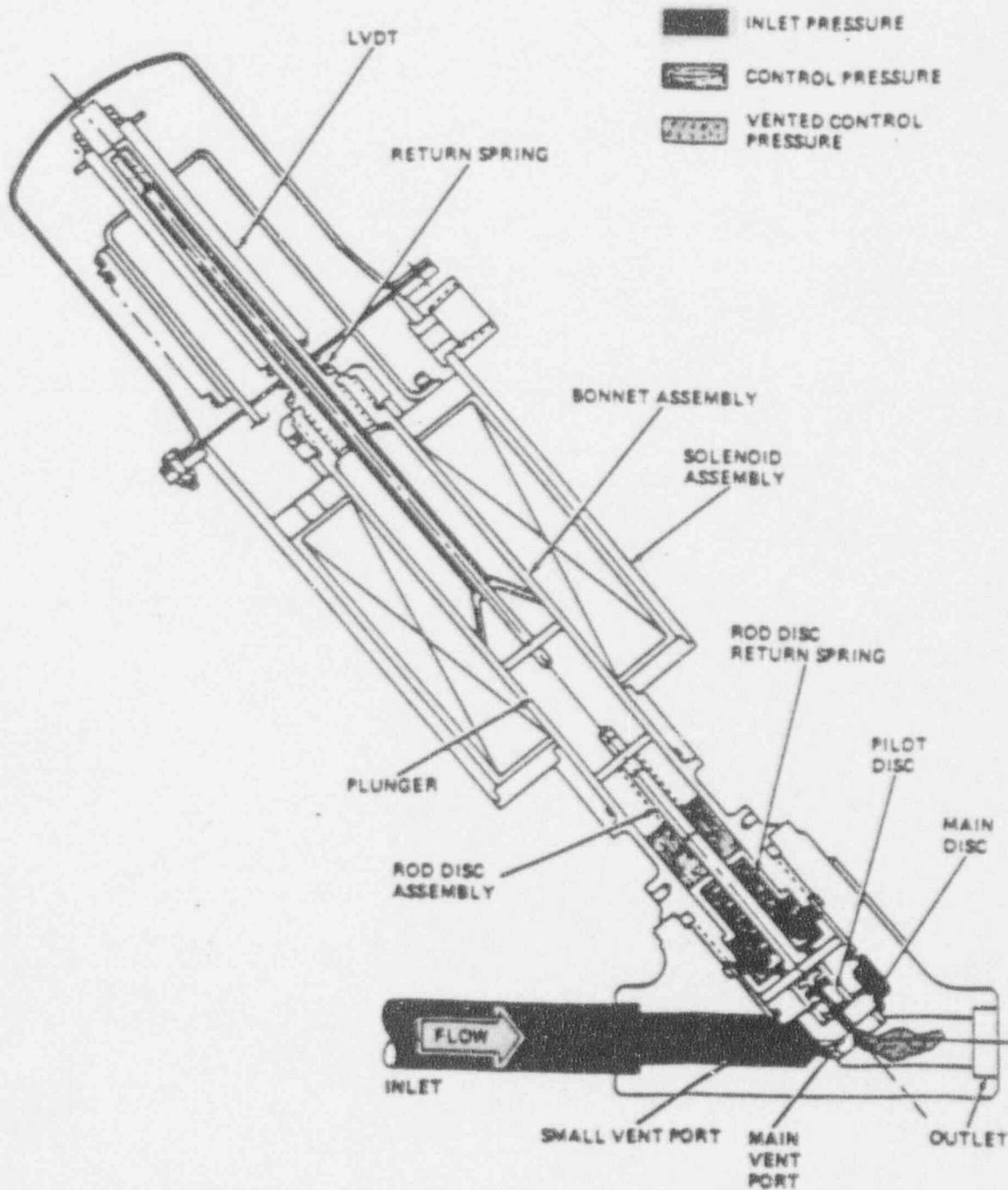
LER NUMBER (6)

PAGE (3)

Wolf Creek Generating Station

0 15 0 0 0 4 8 2 9 3 - 0 0 2 - 0 0 1 3 OF 1 6

TEXT (If more space is required, use additional NRC Form 366A's) (17)

Solenoid Operated Valve
Figure C

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS INFORMATION COLLECTION REQUEST: 500 HRS. FORWARD COMMENTS REGARDING BURDEN ESTIMATE TO THE RECORDS AND REPORTS MANAGEMENT BRANCH (P-530), U.S. NUCLEAR REGULATORY COMMISSION, WASHINGTON, DC 20555, AND TO THE PAPERWORK REDUCTION PROJECT (3150-0104), OFFICE OF MANAGEMENT AND BUDGET, WASHINGTON, DC 20503.

FACILITY NAME (1)

DOCKET NUMBER (2)

LER NUMBER (6)

PAGE (3)

Wolf Creek Generating Station

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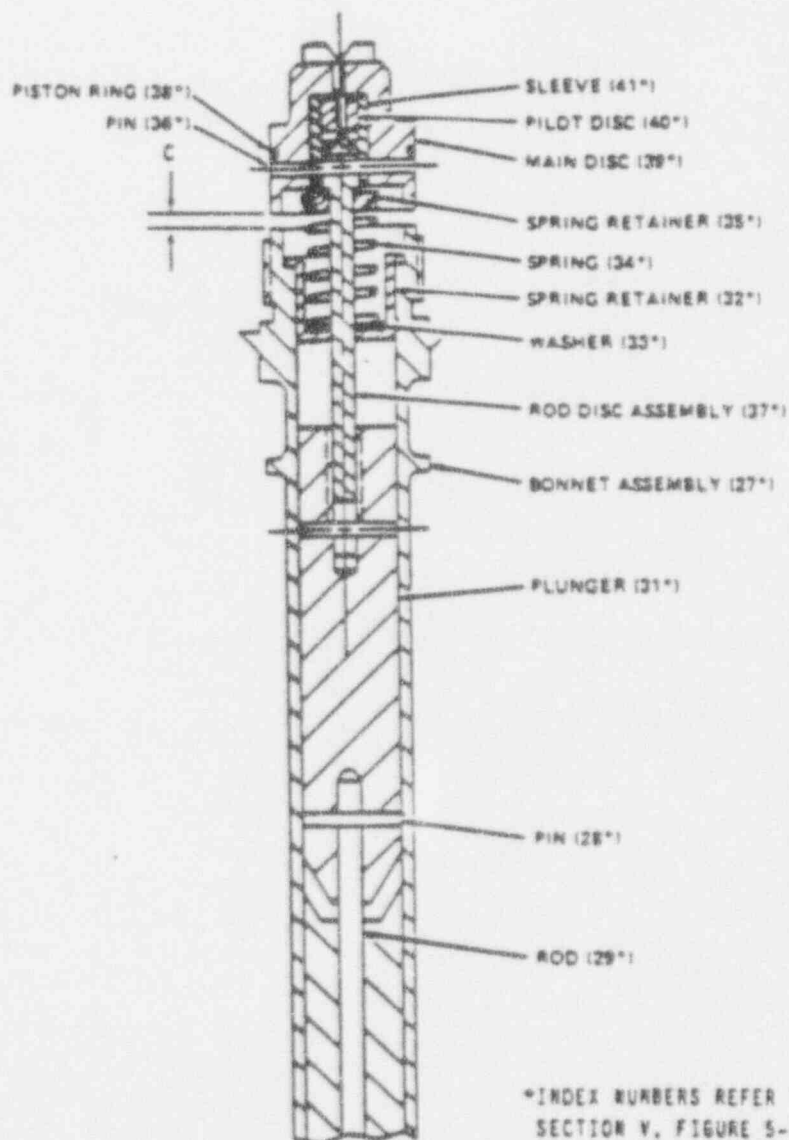
4

OF

1

6

TEXT (If more space is required, use additional NRC Form 385A's) (17)

Solenoid Operated Valve
Figure D

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

ESTIMATED BURDEN PER RESPONSE TO COMPLY WITH THIS
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OF MANAGEMENT AND BUDGET WASHINGTON, DC 20503

FACILITY NAME (1) Wolf Creek Generating Station	DOCKET NUMBER (2) 0500048293	LER NUMBER (8)			PAGE (3)		
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER			
		-00	2	-00	15	OF	16

TEXT (If more space is required, use additional NRC Form 386A's) (17)

Radiation Monitor Data
Figure E

SELECT FUNCTION KEY

TH: ■

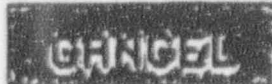
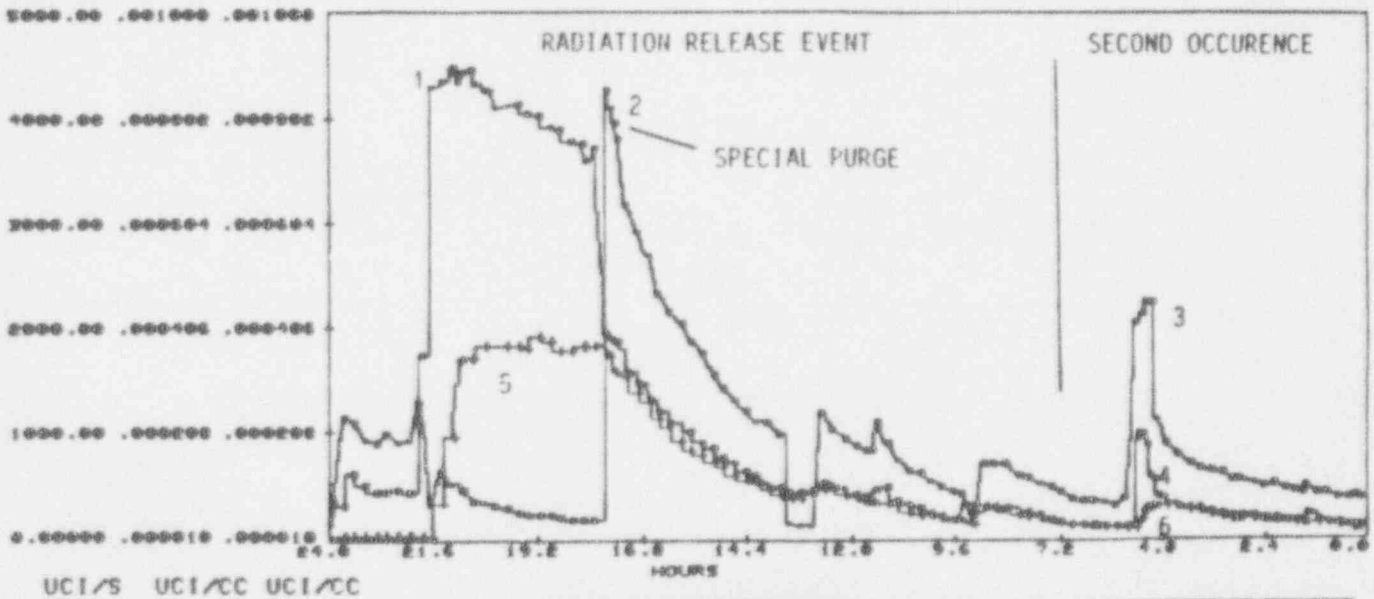
3/11/93
09:33:00



HISTORICAL TREND - ALR

11-MAR-1993
09:01:13

POINT ID SYMB	DESCRIPTION	QUAL	CFIT	CURRENT	MAXIMUM	MINIMUM
GTN0323	++ CONTAINMENT ATMOS	GOOD	PROP	.245E-4	.391E-3	.316E-5
GTN0223	-- CTMNT PURGE EXHAUST	GOOD	PROP	.310E-4	.900E-3	.267E-4
GTN0213	-- UNIT VENT EFFLUENT GAS	GOOD	PROP	.3775E3	.4279E4	.1024E3



F1= PREV CORR F2=PAUSE W.C. F3=FAST FORM F4=REWIND F5=NEW TIME F6=NEW PLOT
TERM=TT24 CPU=B CONSOLE=PRIM/BAC MODE=CLO SHOH EVENT=NORMAL VIDEO COPY

1 - GT RE-22 3 - Unit Vent effluent 5 - GT RE-32
2 - Unit Vent effluent 4 - GT RE-22 6 - GT RE-32

LICENSEE EVENT REPORT (LER)
TEXT CONTINUATION

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FACILITY NAME (1) Wolf Creek Generating Station	DOCKET NUMBER (2) 0 5 0 0 0 4 8 2	LER NUMBER (6)			PAGE (3)	
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER		
		9 3	— 0 0 2	— 0 0	1 6	OF 1 6

TEXT (If more space is required, use additional NRC Form 365A's) (17)

Calculated Dose to the Public
Table 1

Type	Limit	Units	Before CPIS	After CPIS
10CFR20 Whole Body Dose Rate	500	mRem/yr	4.86	2.38
10CFR20 Skin Dose Rate	3000	mRem/yr	12.3	6.01
10CFR20 Organ Dose Rate	1500	mRem/yr	3.68E ⁻⁴	3.68E ⁻⁴
10CFR50 Quarterly Whole Body Dose	2.50	mRem	1.02E ⁻⁴	1.26E ⁻³
10CFR50 Quarterly Skin Dose	7.50	mRem	2.57E ⁻⁴	3.18E ⁻³
10CFR50 Quarterly Gamma Air Dose	5.00	mRad	1.22E ⁻⁴	1.51E ⁻³
10CFR50 Quarterly Beta Air Dose	10.00	mRad	3.87E ⁻⁴	4.78E ⁻³