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 AUTH.NAME AUTHOR AFFILIATION
 KARNER,D.B. Arizona Nuclear Power Project (formerly Arizona Public Serv
 RECIP.NAME RECIPIENT AFFILIATION
 MURLEY,T.E. Ofc of Enforcement (Post 870413)

SUBJECT: Responds to NRC 881201 notice of violations & proposed
 imposition of civil penalties in amount of \$250,000.

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Arizona Nuclear Power Project

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102-01079-DBK/TDS
December 29, 1988

DONALD B. KARNER
EXECUTIVE VICE PRESIDENT

Dr. Thomas E. Murley
Director, Office of Enforcement
U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555

Reference: Letter from Mr. J. B. Martin to Mr. D. B. Karner, dated
December 1, 1988

Dear Sir:

Subject: Palo Verde Nuclear Generating Station (PVNGS)
Units 1, 2 and 3
Docket No. STN 50-528 (License No. NPF-41)
STN 50-529 (License No. NPF-51)
STN 50-530 (License No. NPF-74)
Replies to Notices of Violations and Proposed Imposition of Civil
Penalties
File: 88-070-026

Mr. John B. Martin, Regional Administrator of Region V of the U. S. Nuclear
Regulatory Commission, transmitted with the referenced letter, dated December
1, 1988, the following:

1. Notice of Violation and Proposed Imposition of Civil Penalty
(Reactor Operations), dated December 1, 1988, issued in Docket No.
50-528, License NPF-41 for Palo Verde Nuclear Generating Station
Unit 1.
2. Notice of Violation and Proposed Imposition of Civil Penalties
(Radiological Controls), dated December 1, 1988, issued in Docket
Nos. 50-528, 50-529 and 50-530, License Nos. NPF-41, NPF-51 and
NPF-74 for Palo Verde Nuclear Generating Station, Unit 1, Unit 2
and Unit 3.

Attachment 1 to this letter provides ANPP's reply to item 1. Replies to item
2 are provided in Attachments 2 and 3 to this letter. The replies are
submitted in accordance with the instructions in the notices and 10 CFR
2.201. We have elected not to contest the alleged violations nor to protest
or seek mitigation of the civil penalties proposed to be imposed.
Accordingly, our check in the amount of \$250,000 payable to the Treasurer of
the United States is submitted in payment of such civil penalties. The
additional violation transmitted with the referenced letter which was not
assessed a civil penalty has been responded to under a separate cover.
(Reference ANPP Letter from D. B. Karner to Director, Office of Enforcement
U.S. Nuclear Regulatory Commission, Letter No. 102-01070-DBK/TDS, dated
December 19, 1988.)

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With regard to the first Notice of Violation, Mr. Martin's transmittal letter attributed the poor operator performance that led to the inadvertent inoperability of both Unit 1 essential chilled water systems to inadequate and informal communications. This event was identified by ANPP and a description of the event submitted in Licensee Event Report 1-88-017. Our investigations confirm that the primary direct causes of the violation were inadequacy and informality of communications (i) between the involved Reactor and Auxiliary Operators, (ii) between the involved Auxiliary Operator and the Assistant Shift Supervisor and (iii) between the separate unit organizations. Additionally, several programmatic weaknesses were identified: i.e., inadequate administrative controls for the use of information signs and labels, the improper manipulation of valves, inadequacies in training on proper oral communications, the lack of training in supervisory skills, and inadequate coordination among unit organizations. Our reply to this Notice of Violation describes the immediate and interim corrective actions that were taken to prevent recurrence of the type of performance that resulted in the violation. More significantly, the reply describes the corrective actions which were undertaken to address the programmatic deficiencies. We will monitor the effectiveness of these actions and make such enhancements as our monitoring indicates are appropriate.

With respect to the second Notice of Violation in the area of radiological controls (i.e., the overexposure event and inadequacies in control of access to High Radiation Areas), Attachments 2 and 3 to this letter comprise ANPP's reply. The events involving the overexposure of an individual in Unit 2 and inadequacies in the control of access to high radiation areas in Unit 3 were discovered by ANPP and descriptions of these events submitted in Licensee Event Reports 2-88-011 and 3-88-005 respectively.

Mr. Martin's transmittal letter expressed his concern with the significant weakness in the Palo Verde Radiation Protection Program and recommended implementation of the corrective actions discussed at the September 14, 1988, meeting between ANPP and Region V representatives. Attachment 4 to this letter sets forth ANPP's commitment to take such corrective actions and provides a current status report of the efforts taken to date. A more detailed description of the program to improve the effectiveness of the Radiation Protection Program was presented to Region V at the Management Conference held in Phoenix on December 1, 1988; a description of this program is iterated in Attachment 5 to this letter.

We recognize that the other concerns expressed by Mr. Martin, i.e., establishing a proper working atmosphere, effective use of oversight groups and the need for consistently critical investigations of incidents, apply not only to radiation protection, but to all activities at Palo Verde. The actions that have been taken and the programs underway to address them including scheduled completion dates were also presented at the December 1, 1988 Management Conference.

At the Management Conference, we described the actions taken and planned to improve the working atmosphere at Palo Verde including establishment of proper attitudes, enhancements in staffing and organization, clarification of objectives stressing safety and excellence over production and cost, improving communication of management expectations, and increased APS executive and senior management involvement. In the areas of achieving more effective utilization of oversight groups, we discussed the QA Improvement Program which

includes an evaluation of the roles of all oversight groups (i.e., QA, NSG, ISEG) and management involvement in requiring prompt completion of corrective measures. In the area of improving our investigation of incidents, we explained our Incident Investigation Program which reaches not only reportable incidents, but precursors to such incidents as well. Additionally, we explained the functions of the recently established Nuclear Oversight Committee and its reporting relationship to the APS Board of Directors and executive management.

Though not relevant to the Replies to the Notices of Violation nor Mr. Martin's concerns expressed in his transmittal letter, the significant enhancements in the Palo Verde System Engineer Program and the comprehensive Engineering Excellence Program were also discussed at the December 1, 1988, Management Conference.

Finally, in response to a concern about the need for employees to consult supervision when questions about tasks or procedures arise, a memorandum has been issued to all Palo Verde personnel reminding them of ANPP management's expectation that work be stopped and supervision consulted whenever a question arises about work tasks or procedures.

In summation, I trust that our Replies to the Notices of Violations, including the corrective actions that have been completed or are in progress and the comprehensive actions and programs described at the recent Management Conference demonstrate, first, that APS is dedicated to achieving its goal of excellence in performance at Palo Verde and, second, that APS management is aggressively pursuing every avenue to reach that goal.

If you should have any questions regarding these responses, please contact me or Mr. Timothy Shriver of my staff at (602) 393-2521.

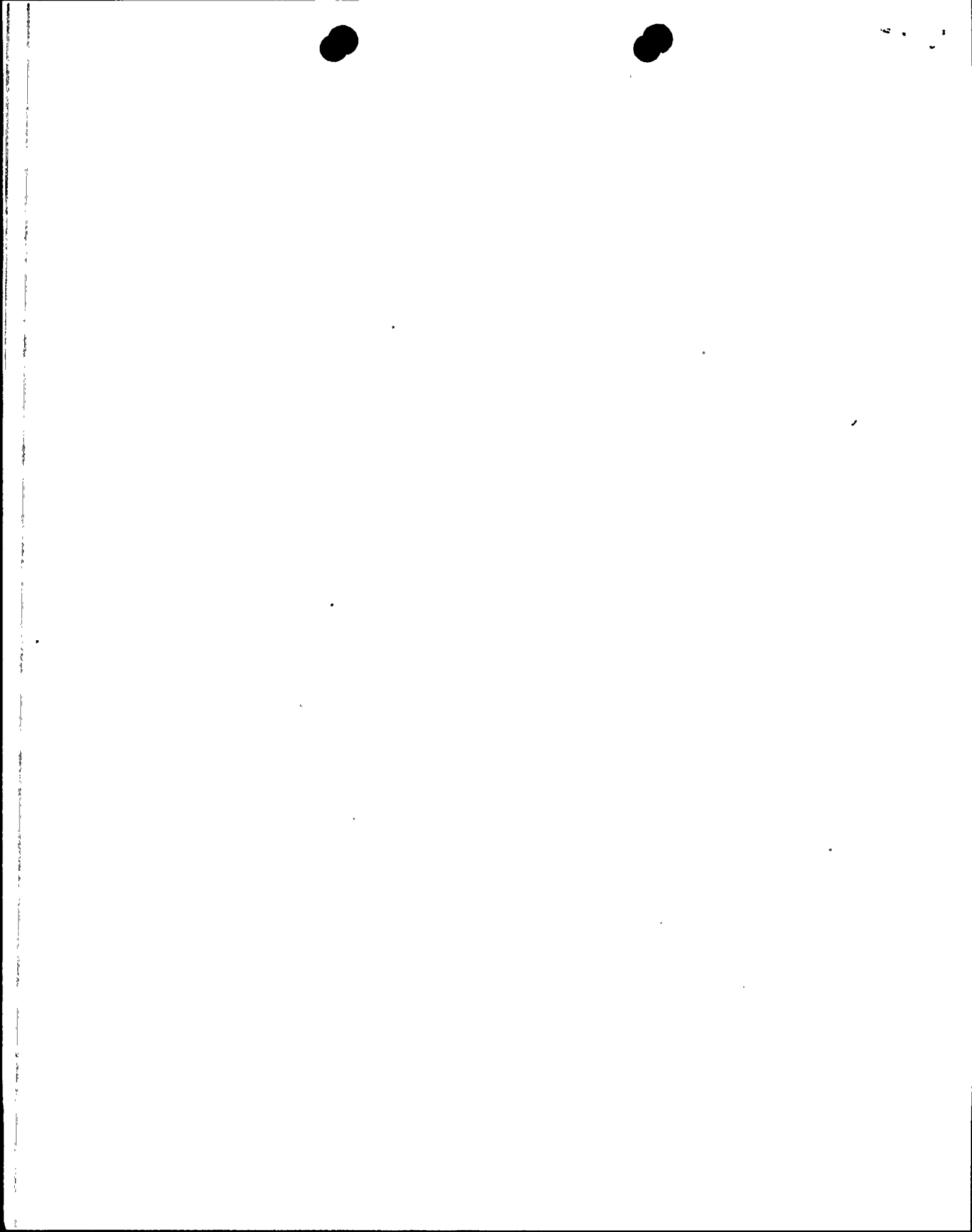


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- Enclosures:
- (a) Attachment 1, Reply to Notice of Violation and Proposed Imposition of Civil Penalty (Reactor Operations)
 - (b) Attachment 2, Reply to Notice of Violation and Proposed Imposition of Civil Penalties (Radiological Controls Part I)
 - (c) Attachment 3, Reply to Notice of Violation and Proposed Imposition of Civil Penalties (Radiological Controls Part II)
 - (d) Attachment 4, Status of Corrective Actions
 - (e) Attachment 5, Description of the Radiation Protection Department Program Evaluation
 - (f) Check payable to Treasurer of the United States

cc: J. G. Haynes
J. B. Martin
T. J. Polich
M. J. Davis
T. L. Chan
A. C. Gehr

[all w/o Enclosure (f)]



STATE OF ARIZONA)
) ss.
COUNTY OF MARICOPA)

I, Donald B. Karner, represent that I am Executive Vice President, Arizona Nuclear Power Project, that the foregoing document has been signed by me on behalf of Arizona Public Service Company with full authority to do so, that I have read such document and know its contents, and that to the best of my knowledge and belief, the statements made therein are true.

Donald B. Karner
Donald B. Karner

Sworn to before me this 29th day of Dec., 1988.

Lucinda Buraszeski
Notary Public

My Commission Expires:

Jan. 4, 1991

ATTACHMENT 1

NOTICE OF VIOLATION
AND
PROPOSED IMPOSITION OF CIVIL PENALTY
(Reactor Operations)

Arizona Public Service
Palo Verde Nuclear Generating
Station, Unit 1

Docket No. 50-528
License No. NPF-41
EA 88-182

During an inspection conducted during the period of July 5 to July 8, 1988, a violation of NRC requirements was identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (1988), the Nuclear Regulatory Commission proposes to impose a civil penalty pursuant to Section 234 of the Atomic Energy Act of 1954, as amended (Act), 42 U.S.C. 2282, and 10 CFR 2.205. The particular violation and associated civil penalty are set forth below:

VIOLATION ASSESSED CIVIL PENALTY

- I. Technical Specification (T.S.) 3.7.6 requires that at least two independent essential chilled water loops be operable during operation modes 1, 2, 3, and 4. With no essential chilled water loops operable, T.S. 3.7.6 does not provide specific ACTION requirements, and therefore the provisions of T.S. 3.0.3 are applicable. T.S. 3.0.3 requires that when a Limiting Condition for Operation is not met, except as provided in the ACTION requirement of the associated T.S., action shall be initiated within 1 hour to place the unit in a Mode in which the specification does not apply by placing the unit in at least Hot Standby within 6 hours and at least Cold Shutdown within the following 30 hours.

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Contrary to the above, on May 20 to May 29, 1988, while Palo Verde Unit 1 was operating in Mode 1, both loops of the essential chilled water system were rendered inoperable, but the licensee neither restored loop operability nor placed the unit in the required Mode.

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



ATTACHMENT 1

REPLY TO NOTICE OF VIOLATION
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(Reactor Operations)

1. ADMISSION OR DENIAL OF THE ALLEGED VIOLATION

1.1 ANPP admits the alleged violation.

1.2 This violation was identified by ANPP on May 29, 1988, and subsequently reported to the NRC in Unit 1 Licensee Event Report 88-017-00 and Supplement 88-017-01. The deficient condition was corrected within 30 minutes of discovery.

1.3 An evaluation was conducted and the results forwarded to the NRC for evaluation that addressed the safety significance of the event as described in the Notice of Violation. Based upon the results of the evaluation, it was concluded that under postulated accident conditions, the event as described in the Notice of Violation would have no safety significance. [Reference letter from D. B. Karner dated November 9, 1988, 161-01476-DBK/ACR]

2. REASON FOR VIOLATION

During a walkdown conducted as a result of deficiencies identified during a procedure review, it was identified that the non-seismically qualified local flow indicators for the Essential Chilled Water loops were not properly isolated from the seismically qualified Essential Chilled Water (ECW) System in Units 1, 2 and 3. Specifically, the local



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(Reactor Operations)

flow indicator isolation valves were found open contrary to the required system lineup. It was subsequently determined during the investigation of the event that the valves had most likely been left open following the conduct of a routine preventive maintenance (PM) task. This assumption was made because the PM task did not require that the valves be shut following completion of the work. However, neither a definitive root cause nor time of the valves being mispositioned could be determined. In order to prevent recurrence, based upon the assumption that the valves were mispositioned due to a lack of procedural guidance, the appropriate PM tasks were revised to state that the valves must be left in the closed position. As an additional measure, the operating procedures, which were initially reviewed, for the ECW System were revised to include a cautionary note emphasizing the importance of ensuring that the non-seismically qualified flow indicator isolation valves remain shut.

Following the procedure revisions a Unit 3 Shift Supervisor ordered laminated plastic labels designed to be placed near the local flow indicator isolation valves specifying that the valves remain in a closed position for all three units. The Shift Supervisor initiated this action as an additional measure for ensuring that the local flow indicator isolation valves would remain shut. After receipt of the plastic labels, the Unit 3 Shift Supervisor had them installed in Unit 3



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and sent the remaining plastic labels to Units 1 and 2 Control Rooms with a yellow 3 inch by 5 inch sheet of self-sticking message paper indicating the flow indicator numbers.

The plastic labels were received by the Unit 1 Assistant Shift Supervisor, and on May 20, 1988, he assigned a Reactor Operator the task of determining where the plastic labels were to be affixed and having an off-shift Auxiliary Operator install the labels. The assigned Reactor Operator determined where the labels were to be installed by researching the piping and instrumentation drawings (P&ID's). It should be noted that there are no specific valve numbers indicated on the P&ID's for valves such as the ECW System local flow indicator isolation valves. Because the P&ID's didn't indicate the isolation valve numbers, the Reactor Operator recorded the flow instrumentation root valve numbers on the 3 inch by 5 inch message paper. He copied the pertinent pages from the valve alignment list and contacted an off-shift Auxiliary Operator to have the labels installed.

The Auxiliary Operator reported to the Reactor Operator in the control room, and they discussed the location for installing the plastic labels. The Reactor Operator instructed the Auxiliary Operator to install the labels on the local flow indicators. The Auxiliary Operator then reviewed the documentation prepared by the Reactor Operator.

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During the Auxiliary Operator's review, the Reactor Operator answered a Control Room telephone. After completing the phone call, the Reactor Operator observed that the Auxiliary Operator had left the Control Room. The Reactor Operator assumed that the Auxiliary Operator had received sufficient instructions and understood the assigned task.

The Auxiliary Operator left the Control Room with the plastic labels and the 3 inch by 5 inch self-sticking message paper under the impression that he was to affix the labels near the valves that were indicated on the message paper (i.e., the root valves). The Auxiliary Operator located the root valves, installed the plastic labels, and then believing he was complying with the warning on each plastic label, shut the valves. Manipulation of valves in this manner is contrary to approved instructions provided by the Operating Department Guidelines. The Auxiliary Operator then reported back to the Assistant Shift Supervisor in the Control Room that he had installed the plastic labels and the valves were shut. The Auxiliary Operator asked if he should complete any paperwork. The Assistant Shift Supervisor, under the impression that the Auxiliary Operator had verified the flow indicator isolation valves were shut and had not manipulated any valves, responded that no paperwork was necessary. The Auxiliary Operator made a general comment that he did not think it was correct to isolate all flow indication. The Auxiliary Operator's comment was a general comment not directed to a specific individual. No one acknowledged his comment, therefore he took no further action.



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On May 29, 1988, Control Room personnel attempted to start the essential chiller in preparation for routine auxiliary feedwater pump surveillance testing. It was discovered that the essential chillers would not start because the inadvertent closure of the root valves prevented ECW flow indication to the ECW Chiller System controls. The valves were opened and the essential chillers were returned to operability.

As a result of ANPP's event investigations, it was determined that inadequate communication between the personnel involved caused this event.

3. CORRECTIVE STEPS WHICH HAVE BEEN TAKEN AND THE RESULTS ACHIEVED

Immediate action was taken by Unit 1 operations personnel to open the flow instrumentation root valves and restore the Essential Chilled Water System to operability as described in Section 2. These corrective steps were effective in restoring Unit 1 ECW System Trains "A" and "B" to an operable status as required by Technical Specification 3.7.6.

Additionally, Units 2 and 3 Control Room personnel were notified and the ECW Systems in Units 2 and 3 were verified to be operable. It was also verified that the plastic laminated labels for Units 2 and 3 were properly installed, that the flow instrument root valves were open, and that the flow indicator isolation valves were shut.



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(Reactor Operations)

4. CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

The following immediate interim measures were taken and have been completed:

- The Unit 1 Plant Manager issued a directive to Unit 1 personnel stating that warning labels of the type discussed in Section 2 are not to be installed without his specific prior approval. The Unit 1 Plant Manager further provided verbal instructions that, before he would grant his approval, personnel would have to prepare and issue an approved work authorization document to ensure that the work obtained appropriate reviews and approvals.
- The Unit 1 Plant Management issued a directive to Unit 1 operations personnel requiring that they utilize more formal communications when discussing plant status.
- The Unit 1 Plant Manager issued a directive to all Unit 1 personnel requiring that they adopt a more conservative approach when plant conditions or indications are present which are other than normally expected and directing them to question their supervisors whenever there is a concern about the propriety of an action.



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- The Unit 1 Plant Management issued a directive to all Unit 1 operations personnel requiring that they review the administrative requirements governing valve manipulation.
- Appropriate disciplinary measures were taken for the personnel involved.

In addition to the interim measures discussed above, long term corrective actions were developed based upon the results of a Special Plant Event Evaluation and a Human Performance Evaluation System (HPES) review. The Special Plant Event Evaluation is documented in a Special Plant Event Evaluation Report (SPEER). The HPES review was performed to address the personnel performance problems which occurred. Based upon the results of the evaluations, specific corrective actions to prevent recurrence were developed. A summary of those actions are provided below.

1. Concern:

Warning tags did not include identification of the specific equipment to which they were applied.



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Corrective Actions:

- a. A program to control fabrication, use and installation of Information Signs and Tags is being developed.

Schedule for Implementation: March, 1989

- b. A procedure regarding the utilization of Information Signs and Tags is being established.

Schedule for Implementation: March, 1989

2. Concern:

The warning labels were provided directly from the Unit 3 Shift Supervisor to the Unit 1 Assistant Shift Supervisor without adequate instructions on their use.

Corrective Actions:

- a. A need for a policy regarding information transfer for plant changes or improvements between Units was evaluated and determined not to be required.

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(Reactor Operations)

- b. The Information Sign and Tag Control procedure will delineate controls for obtaining approval to hang labels or signs and for providing installation instructions to each unit.

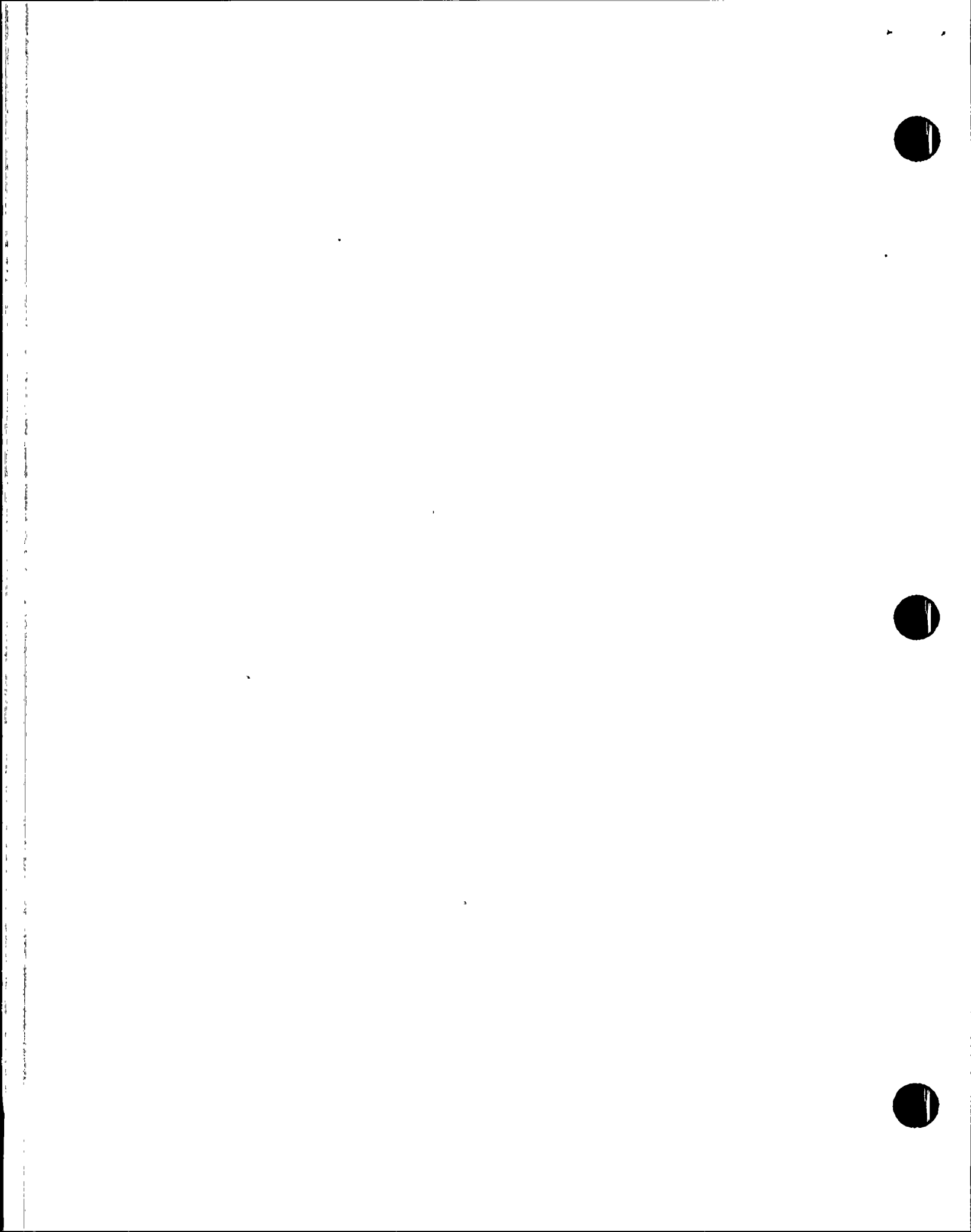
Schedule for Procedure Implementation: March, 1989.

3. Concern:

The Auxiliary Operator closed the root valves without instructions to do so and without notifying Control Room personnel in advance. In addition, communication of the valve manipulation upon returning to the Control Room was inadequate.

Corrective Actions:

- a. Practice in proper communications methodologies has been incorporated into Operations personnel (including Auxiliary Operator) training requirements.
- b. Appropriate Operations Department administrative controls have been reviewed to determine if additional guidance for Auxiliary Operator "work practices" was needed. Based upon this evaluation, no further guidance was deemed necessary.



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- c. Applicable Operations Department administrative controls will be evaluated and appropriate portions will be included in Auxiliary Operator training.

Schedule for Completion: April, 1989

4. Concern:

The Auxiliary Operator did not complete the appropriate documentation following repositioning of the valves:

Corrective Actions:

- a. Operations management has reemphasized the requirement that Operations personnel utilize valve manipulation sheets for valve alignments per Operations Department administrative controls.
- b. On-the-job training for Auxiliary Operators will be revised to include knowledge verification of appropriate administrative requirements for valve manipulation.

Schedule for Revision: April, 1989



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- c. The Auxiliary Operator training regarding the administrative requirements for valve manipulation will be evaluated and upgraded as appropriate.

Schedule for Completion: April, 1989

5. Concern:

The Reactor Operator assigned the task to the Auxiliary Operator without ensuring the Auxiliary Operator understood the specific activity he was expected to perform.

Corrective Actions:

- a. Communications requirements for use in briefing or assigning actions to Control Room personnel and Auxiliary Operators have been established.
- b. Communications training will be provided to the Control Room Operators which stresses the importance of clear and complete written communications when they are used.

Schedule for incorporation into Training Program: December, 1988

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(Reactor Operations)

- c. Supervisory skills training is being provided to Reactor Operators.
- d. Communications requirements will be included in a Job-Task-Analysis for the Reactor Operators and implemented in the initial Reactor Operator training program.

Schedule for Implementation: May, 1989

6. Concern:

The Assistant Shift Supervisor did not assure that the flow indicator isolation valves were properly statused when the Auxiliary Operator reported that the valves were manipulated.

- a. Communications requirements for Control Room personnel in briefing or assigning actions to operators, including follow-up actions, have been established.
- b. Supervisory skills training is being provided to the Assistant Shift Supervisors.



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(Reactor Operations)

5. DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance was achieved on May 29, 1988, when the Essential Chilled Water Systems were returned to an operable status. The dates for the individual corrective measures described in Section 4 are provided above.



ATTACHMENT 2

NOTICE OF VIOLATION
AND
PROPOSED IMPOSITION OF CIVIL PENALTIES
(Radiological Controls Part I)

Arizona Public Service
Palo Verde Nuclear Generating
Station, Unit 1

Docket No. 50-528
License No. NPF-41
EA 88-182

During inspections conducted during the period of May 20 to October 12, 1988, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (1988), the Nuclear Regulatory Commission proposes to impose civil penalties pursuant to Section 234 of the Atomic Energy Act of 1954, as amended (Act), 42 U. S. C. 2282, and 10 CFR 2.205. The particular violations and associated civil penalties are set forth below:

VIOLATIONS ASSESSED CIVIL PENALTIES

I.A. 10 CFR 20.101(b)(1) provides, in part: "During any calendar quarter the total occupational dose to the whole body shall not exceed 3 rems."

Contrary to the above, on May 22-23, 1988, at Palo Verde Unit 2, an individual received a whole body dose of 2.607 rems which resulted in his receiving an accumulated whole body dose of 3.209 rem for the second quarter of 1988.

B. 10 CFR 20.201(a) provides, in part: "As used in the regulations in this part 'survey' means an evaluation of the radiation hazards incident to the production, use or presence of radioactive materials or other sources of radiation under a specific set of conditions."



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(Radiological Controls Part I)

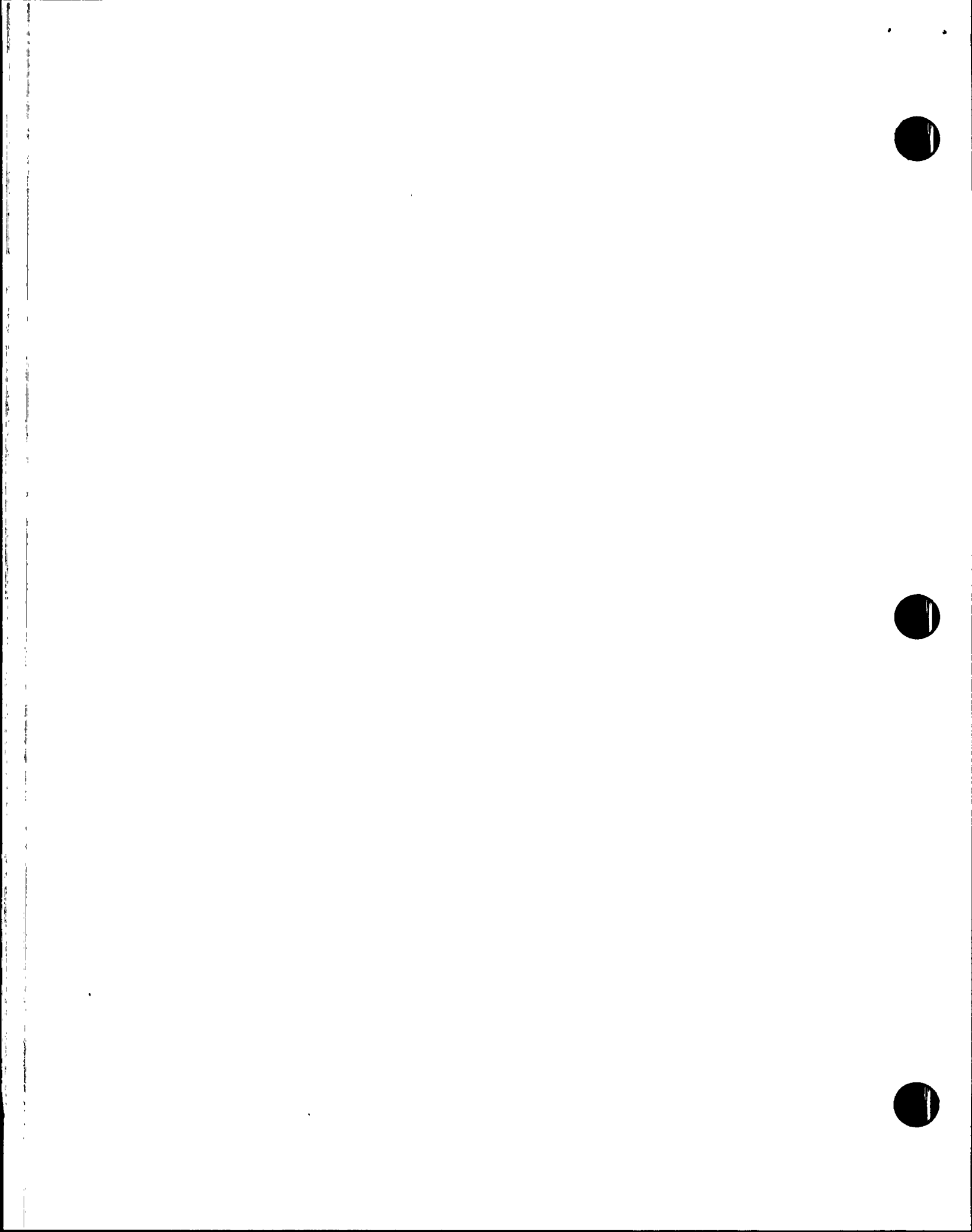
10 CFR 20.201(b) provides in part: "Each licensee shall make or cause to make such surveys as (1) may be necessary for the licensee to comply with the regulations in this part, and (2) are reasonable under the circumstances to evaluate the extent of the radiation hazards that may be present."

Contrary to the above, during May 22-23, 1988, at Palo Verde Unit 2, individuals performed maintenance activities involving work in the refueling cavity without making the necessary radiation survey to ensure compliance with 10 CFR 20.201(b)(1). Consequently, a worker received a reported accumulated dose to the whole body of 3.209 rem for the second quarter of 1988.

- C. Technical Specification 6.8.1a. provides, in part: "Written procedures shall be implemented covering the applicable procedures recommended in Appendix A of Regulatory Guide 1.33, Revision 2, February 1978."

Regulatory Guide 1.33, Appendix A, Section (7)(e)(9), requires procedures addressing implementation of an ALARA Program. Licensee procedures established pursuant to T.S. 6.8.1a. included the following requirements:

1. Procedure 75AC-9ZZ05, "ALARA Committee," Paragraph 5.2.1, states that "the ALARA Committee should meet at least monthly at the discretion of the ALARA Committee Chairman."



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(Radiological Controls Part I)

2. 75RP-9ZZ94, "ALARA Pre-Job Review," states, in part:

"6.1.3.4 If the final man-rem estimate is less than 10, the ALARA Supervisor reviews final man-rem estimates and pre-job briefing checklists, as soon as practical.

6.1.3.5 If the final man-rem estimates is greater than 10, the ALARA Supervisor will complete the ALARA Evaluation Form (Appendix D) and will forward both the Pre-job Review Form and the ALARA Evaluation Form to the Chairman of the ALARA Committee for final review and approval.

6.1.4.5 The ALARA Representative shall also perform a final man-rem estimate. If the estimate is 10 man-rem or greater, the pre-job review shall be forwarded to the ALARA Committee, by the ALARA Supervisor, for their review and approval."

3. 75RP-9ZZ97, "ALARA Post-Job Review," states, in part:

"6.1 The ALARA Supervisor shall determine whether a post-job review is required for jobs with exposures of 1.0 man-rem to 10.0 man-rem. Jobs with exposures of 10.0 man-rem or more shall be reviewed and a presentation of the review shall be made to the ALARA Committee."



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(Radiological Controls Part I)

4. 75PR-9ZZ03, "ALARA Program," Section 5.9, states, in part:

"An annual evaluation of the ALARA Program's effectiveness shall be performed to ensure a continuing commitment to maintaining personnel radiation exposure ALARA. The ALARA Supervisor shall be responsible for assimilating the information provided by the Radiological Services Manager, preparing the evaluation and making recommendation for program improvement based on this information.

The PVNGS Plant Manager and the Vice President of Nuclear Production shall review and approve as appropriate, the evaluation and any recommended improvements."

Contrary to the above procedural requirements:

1. Monthly ALARA Committee Meetings had not been held during the period of March 1987 through June 1988.
2. During 1987, of 126 jobs requiring pre-job review and approval of the ALARA Supervisor, approximately 61 were not reviewed and approved by the ALARA Supervisor. For 1988, of 73 jobs, 50 were not reviewed and approved by the ALARA Supervisor.

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(Radiological Controls Part I)

3. In 1987, two pre-job estimates of greater than 10 man-rem had not received the final review and approval of the ALARA Committee Chairman. In addition, in the first seven months of 1988, two pre-job estimates of greater than 10 man-rem had not been reviewed and approved by the ALARA Committee Chairman.
 4. In 1987, eleven man-rem job estimates of greater than 10 man-rem were not reviewed and presented to the ALARA Committee. In addition, in 1988 to the date of the inspection, eight man-rem estimates of greater than 10 man-rem including the work performed by the individual who received an overexposure (see item II.A, above), were not reviewed and presented to the ALARA Committee.
 5. In 1987, there were nine jobs with exposures in excess of 10 man-rem. As of August 11, 1988, the post-job reviews had not been presented to the ALARA Committee.
 6. An annual evaluation of the ALARA Program's effectiveness was not performed in 1987.
- D. Technical Specification 6.11.1 requires procedures for personnel radiation protection to be prepared consistent with the requirements of 10 CFR Part 20 and to be approved, maintained and adhered to for all operations involving personnel radiation exposure.



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Procedure 75RP-9ZZ44, "Radiation Exposure Permits," (REP) states, in part:

- "6.4.1 The unit [Radiation Protection] Manager or designee shall review the REP and determine whether an ALARA Review of Pre-Job briefing is required in accordance with 75RP-9ZZ94.
- 6.4.2 If an ALARA Review is required and ALARA is unavailable, the RP Technician will complete an ALARA Pre-Job review to determine any dose reduction methods which could be used for that job."

Contrary to the above procedural requirements, at least four Unit 2 REP's (Nos. 2-88-0133A, dated July 1, 1988 and 2-88-0134A, dated July 1, 1988 2-88-0135B, dated July 3, 1988, and 2-88-0122D, dated August 31, 1988) requiring ALARA reviews were implemented for use and were in effect until October 3, 1988 without any completed ALARA reviews.

Collectively, these violations have been evaluated as a Severity Level III problem (Supplement IV).

Cumulative Civil Penalty - \$100,000 (assessed equally among the violations).



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1. ADMISSION OR DENIAL OF THE ALLEGED VIOLATION

1.1 ANPP admits the alleged violations I.A through I.D.

1.2 Violations A and B were identified by ANPP on May 23, 1988, and subsequently reported to the NRC in Unit 2 Licensee Event Report 88-011-00 and Supplement 88-011-01.

2. REASON FOR VIOLATION

2.1 Description of the Event Resulting in Violations A through D

In May, 1988, as part of the cleanup and recovery after the first refueling of Palo Verde Unit 2, efforts were being made by ANPP personnel to decontaminate the Unit 2 upender cavity portion of the refueling transfer canal.

On May 21, 1988, a post decontamination survey was conducted of the area. Early on May 22, 1988, scaffolding in the northwest corner of the upender cavity was removed, but no survey of the area where the scaffolding had been located was conducted.

Later on May 22, 1988, and in accordance with Radiation Exposure Permit (REP) 2-88-0280B, an ALARA Pre-Job Briefing was conducted by the Unit 2 RP Lead Technician (utility, non-licensed) with the decontamination workers. The planned work was to remove an



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underwater vacuum and hose, cover the fuel transfer tube flange with a visqueen sheet and tape the sheet down, place a tape line on the walls approximately 7 feet from the floor, and tape down the visqueen covering the upender.

At approximately 2320 on May 22, 1988, two decontamination workers entered the west end of the upender cavity to perform their job tasks. Their actions were monitored by an RP technician (contractor, non-licensed) using remote teledose instrumentation.

The teledose monitor was attached to each worker's right upper arm. In addition to the teledose equipment, and in accordance with REP 2-88-0280B, each worker wore full jump packs at several locations. Each individual jump pack had a TLD, a low range Self Indicating Dosimeter (SID) on the body, and two high range SIDs, one of 0-1R and one of 0-5R.

The decontamination workers first removed the underwater vacuum system and performed work in a low dose area. Upon completion of these tasks, the decontamination workers placed a strip of tape approximately 7 feet from the floor on the cavity walls. They then took the roll of visqueen and taped it over the refueling transfer tube flange. In order to tape the upper portion of the flange, the workers had to stand on the fuel upender for 3 to 5 minutes. Another 3 to 5 minutes were spent standing on the cavity



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floor facing the flange. While taping the sides of the flange, one worker knelt on his right knee in the northwest corner of the upender cavity. He maintained this position for 3 to 5 minutes. After they completed taping the refueling transfer tube flange, the workers were told to continue and tape down the visqueen covering the fuel upender.

At this point, the affected decontamination worker knelt to tape around the northwest leg of the upender. When the worker knelt, the teledose monitor, which was attached to his right upper arm, therefore, facing the northwest corner of the refueling transfer canal, indicated substantially increased dose rates. The contractor RP technician monitoring the teledose instrument performed a quick calculation and ordered the technician out of the area to a low dose area. Total time of exposure after the dose rate increased was approximately 15 seconds.

The workers continued to perform work in the low dose area (east end of the upender) until the stay time was complete (approximately 7 minutes later). The stay time was based on heat stress considerations, the permissible dose and the measured dose rates being monitored with the remote teledose instrument. At 2355 MST, the workers exited the upender cavity. At this time the teledose instrumentation read 330 mR for the affected worker and 300 mR for the other worker.



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Upon exiting the plant's radiological controlled area (RCA), it was found that the affected worker's high range SID for his right thigh was reading approximately 2 Rem. The Dosimetry clerk immediately notified the RP Lead Technician, and all TLDs on the affected worker were expeditiously processed. Dosimetry evaluations determined that the affected worker received 2.607 Rem to his right thigh.

The Control Room was notified of this incident. The NRC was given an "information call" at 1608 MST on May 23, 1988.

2.2 Reason For Violation A

The primary cause of this incident was the lack of a proper pre-job survey of the upender cavity work area. Although the work area had been surveyed after each of the earlier decontamination efforts, those surveys were performed to evaluate the effectiveness of the efforts rather than to evaluate the radiological hazards of the work area. The final post-decon survey, which was later used instead of a proper pre-job survey, was performed with scaffolding in the work area. Although the survey was done with scaffolding in the work area and access under the scaffolding impaired, no mention of this was made on the radiation survey sheet. The RP technician who performed the



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survey discussed the scaffolding with the Lead RP Technician, but the Lead RP Technician did not think the scaffolding significantly impaired the survey results. The presence of scaffolding prevented identification of a small area of highly radioactive contamination.

There were other factors that contributed to causing this incident.

1. Some contamination remained in the upender cavity after the decontamination efforts because the drain and cleaning filter could not process the volume of water used to hydrolaze the cavity wall and floor. Less contamination would have remained in the cavity if the Fuel Pool drain and cleaning filter could have drained the cavity as fast as the hydrolazing process added water.
2. Planning for the work to be done in the upender cavity was inadequate. Job planning did not adequately provide the appropriate step-by-step sequence and the positioning of workers to perform the task. The job planners did not expect the decontamination worker to kneel while performing his task. Because the worker was not expected to kneel, teledosimetry was placed only on the worker's right upper arm and not also on the worker's thigh. Use of teledosimetry



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positioned only on the arm of the decontamination worker and not on the thigh precluded the contractor RP technician monitoring the job from observing an increased count rate in the area of the worker's knee.

3. The survey used for pre-job planning was not reviewed by the RP Supervisor prior to its use in issuing the Radiation Exposure Permit (REP). On May 20, 1988, the ALARA engineer reviewing the expected dose rates for work activities in the cavity called the ALARA Supervisor to discuss the expected exposures. On the night of May 22, 1988, the ALARA engineer again contacted the ALARA Supervisor by telephone to discuss the pre-job review. The ALARA engineer signed the pre-job review and man-rem estimate as the "ALARA Representative." He also signed for the ALARA Supervisor. The ALARA Supervisor stated after the overexposure event occurred that he had believed the job to be safe based on the survey results.

2.3 Reason For Violation B

The root cause of the violation was that the post decontamination radiation survey of May 21, 1988, was performed with scaffolding installed in the upender cavity and no mention of scaffolding was made on the radiation survey sheet and that no pre-job survey was conducted. This resulted in an inadequate survey



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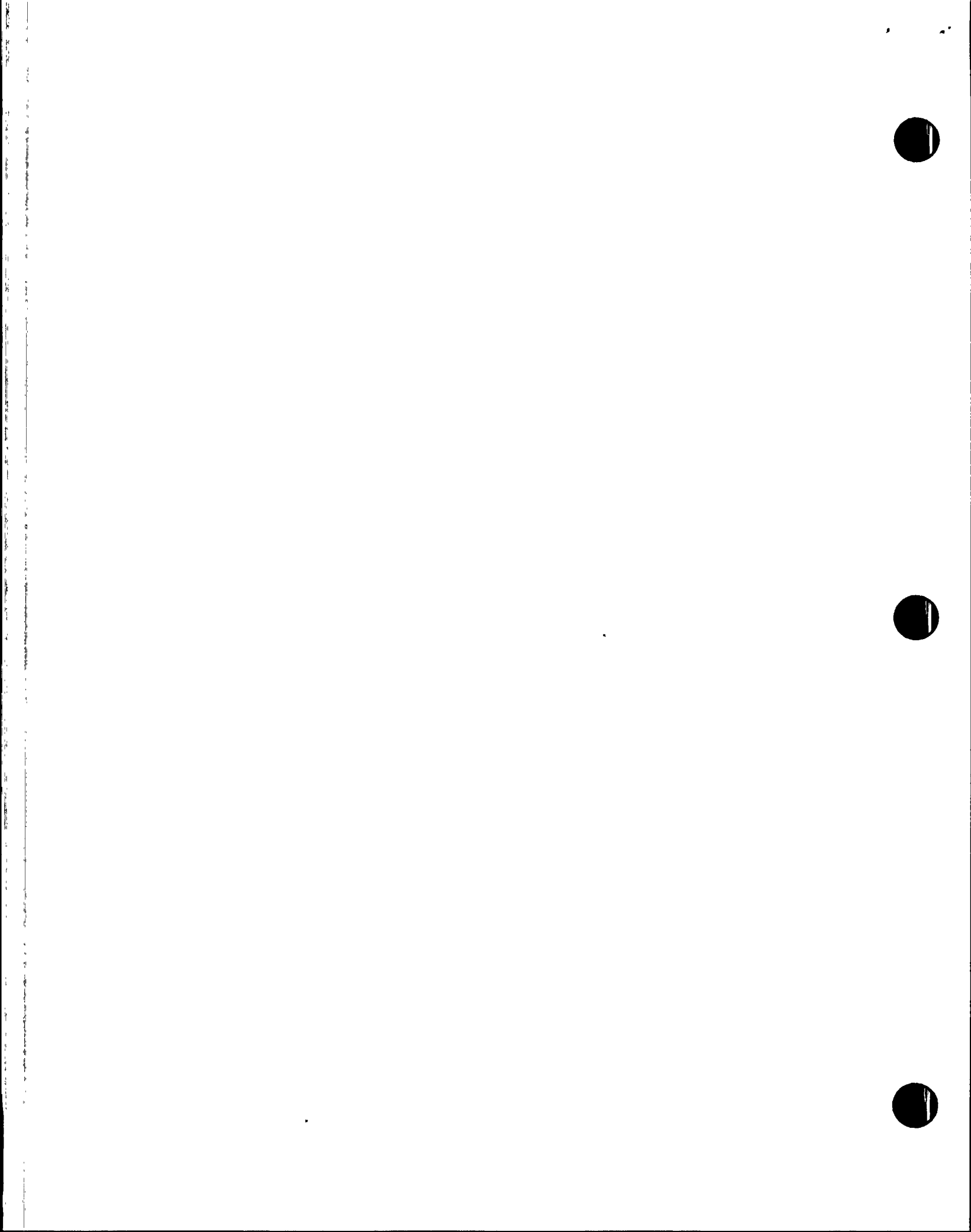
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being used for the job planning. Because the survey did not identify the radioactive hot spot in the corner of the upender cavity, the decontamination workers were not aware of the potential danger in the area.

2.4 Reason For Violations C and D

The "ALARA Committee" procedure assigns the responsibility for reviewing work tasks projected to exceed a collective dose of 10 man-rem to the ALARA Committee. The "ALARA Pre-Job Review" procedure gives the ALARA "Representative" responsibility for performing a pre-job review of the work task and making a final man-rem estimate. If the final man-rem estimate is greater than 10, the ALARA "Representative" is then responsible for forwarding the pre-job review to the ALARA Supervisor. The ALARA Supervisor is then responsible for completing an ALARA evaluation form and forwarding both the pre-job review form and the ALARA evaluation form to the Chairman of the ALARA Committee for final review and approval.

Although the initial exposure estimate for the job on May 22, 1988, was 12.05 man-rem, the ALARA Committee did not review the job prior to its performance. The ALARA engineer who performed the ALARA pre-job review and associated initial dose estimates



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signed as the reviewing "ALARA Representative." He also signed for the "ALARA Supervisor" after consultation with the ALARA Supervisor by telephone. The ALARA Supervisor has stated that he knew the man-rem estimate for the job and that he knew the requirements for an ALARA Committee review prior to job performance. However, following the approvals of the ALARA engineer and the ALARA Supervisor, the job did not receive the required ALARA Committee review. The ALARA Committee was not functioning at the time of the event and had not met for over one year. Therefore, the ALARA personnel had become accustomed to performing their duties without the benefit of an ALARA Committee review. As a result, there was little concern when the job was processed without an ALARA Committee pre-job review. The root cause of the event is considered to be a failure of the responsible supervisor to ensure the required reviews were conducted.

In accordance with the "ALARA Committee" Procedure, the Chairman of the ALARA Committee is the Manager of Radiation Protection and Chemistry. His alternate was the ALARA Supervisor. The duties of the ALARA Committee Chairman include scheduling meetings, at least monthly, of the ALARA Committee. The Manager of Radiation Protection and Chemistry voluntarily terminated employment with ANPP in May, 1988, however, he was contacted and questioned about the lack of ALARA Committee meetings. He stated that the ALARA



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Committee meetings ceased due to the difficulty experienced in obtaining a quorum. He also stated that he thought only quarterly meetings were required. He further stated that he knew that jobs expected to exceed 10 man-rem were required to have an ALARA Committee review, but he thought that the ALARA Committee Chairman could sign the reviews without a formal ALARA Committee meeting. The ALARA Supervisor also indicated that on several occasions an ALARA Committee meeting was scheduled but never held because of difficulty in obtaining a quorum (a Chairman and five members).

As discussed in the preceding paragraphs there were several contributory causes for the violations, however, the root cause is attributed to a failure of the responsible supervisor and manager (i.e., ALARA Supervisor and the Radiation Protection and Chemistry Manager) to properly carry out their responsibilities.

The failure of the management personnel discussed above is further indicated by the fact that in July of 1987 the ANPP Quality Assurance Department noted procedural compliance deficiencies in the RP Program. The QA report stated "Controls are not fully effective in meeting Radiation Protection Program objectives due to a significant number of administrative requirements not being adhered to....Procedural non-compliance is an overall problem in the ALARA Department." In March of 1988, the RP Standards Department completed a review of the ALARA Program at Palo Verde.

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The RP Standards Report identified deficiencies in the RP program and the fact that the ALARA Committee had not been meeting on a monthly basis. In April of 1988, the ANPP Quality Assurance Department reiterated the discrepancies noted by RP Standards, and issued a Corrective Action Report (CAR) to emphasize the need for corrective action. These deficiencies were clearly identified to the responsible management personnel, however, the appropriate corrective actions were not implemented.

3. CORRECTIVE STEPS WHICH HAVE BEEN TAKEN AND RESULTS ACHIEVED

3.1 Violations A and B

The individual receiving the radiation exposure slightly above quarterly limits was prohibited from working in a radiation controlled area for the remainder of the second quarter, 1988.

A radiation exposure evaluation was performed for the individual receiving the overexposure. The exposure evaluation was performed to assess the exposure received by the affected individual. The exposure evaluation indicated that the individual received the following exposures:

Whole body dose at time of event	2607 mRem
Extremity dose	7700 mRem
Total quarterly whole body dose	3209 mRem



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3.2 Violations C and D

In May, 1988, the acting Site RPM began convening quarterly meetings of the ALARA Committee. The ALARA Committee procedure was revised to enlarge and re-define the Committee membership in October, 1988.

ANPP reorganized the ALARA Group with redefined/clarified responsibilities and appointed a new supervisor. Plant procedures that involve ALARA Group responsibility or participation are being revised to reflect the reorganized ALARA Group.

The "Radiological Surveys" procedure was revised to clearly define the proper methodology to be used in conducting pre-job surveys.

The "Radiation Exposure Permit" procedure was revised to give clear guidance to RP technicians and define their roles in getting pre-job reviews completed. The revised procedure requires the RP technician to perform a preliminary dose estimate and to compare the estimate to delineated criteria for pre-job reviews. The revised procedure makes the Unit RP Manager responsible for making sure that all required pre-job reviews are complete before the job begins.

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4. CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

4.1 Violations A and B

ANPP considers the overexposure event described in Section 2 to be particularly significant. Based upon the serious nature of the event, extensive investigations have been performed to determine the factors which contributed to and resulted in the overexposure. The following corrective actions to prevent recurrence are being implemented as a result of concerns identified in Special Plant Event Evaluation Report (SPEER) 88-02-004.

1. Concern:

Decontamination efforts were not fully effective in reducing contamination/radiation levels in the canal prior to the work activity.

Corrective Actions:

- a. A draft plan has been developed to adequately decontaminate the fuel transfer canal following future outages. The plan is being evaluated by management and appropriate portions will be implemented during the spring refueling outages.



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- b. The design of the Pool Cooling System will be evaluated for possible improvements to the filter and drain system.

Schedule Completion Date: April, 1989

2. Concern:

A Unit 2 RP Lead Technician felt painting was unnecessary and had voiced these concerns to the ALARA Supervisor and Radiation Protection Manager. The Lead Technician later stated that she also had concerns about the safety of the job. These concerns were not adequately communicated to the Unit 2 RP Manager.

Corrective Actions

- a. A memo was issued to all Radiation Protection personnel reminding them of their responsibility to monitor radiological working conditions and stop work if warranted. Additionally, Radiation Protection personnel were reminded of their right to elevate concerns to the appropriate level of management until resolution is obtained.



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- b. The Unit 2 Plant Manager issued a memo to the Unit 2 RP Manager directing him to take appropriate action when a Unit 2 RP employee raises radiological safety concerns. The memo also directed the RP Manager to maintain open communication within the RP Department, routinely review department personnel activities, and routinely review the results of department activities (e.g., surveys).

3. Concern:

Incomplete radiological survey information was utilized to plan for and perform the painting preparations.

Corrective Actions

- a. The radiological survey procedure was revised to require notes on survey sheets concerning radiological conditions in the work area, the purpose of the survey, the limitations of the survey, and whether any conditions in the area prevented or impaired the ability to perform a complete survey. Additional guidance was included in the procedure concerning movement of non-radiological components in the survey area.



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- b. A memo was issued by the RP Standards Supervisor to Unit RP Managers and Lead technicians discussing survey thumb rules. The memo emphasized the need to perform especially detailed surveys in areas where a potential of the presence of hot particles exists. Appropriate procedures have been revised to include guidance promulgated by the memo.
 - c. A policy statement concerning the definition of pre-job survey (versus routine survey) was issued to all RP Technicians. The policy statement also informed the technicians that their signature on the survey indicated that all radiological hazards in the work environment have been properly identified.
 - d. RP personnel have been trained on the procedure revisions and have been required to review SPEER 88-02-004.
 - e. RP Standards Group personnel have increased the frequency of Unit tours to assist in the identification and correction of observed deficiencies.
4. Concern:

Not all dose rate instrumentation (i.e., R0-7 High Range Survey System) was available for conducting a detailed pre-job survey.

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Corrective Actions:

An evaluation of the R0-7 High Range Survey System has been performed and improvements are being implemented.

5. Concern:

Pre-job planning was not adequate in ensuring that the work activity preparation was performed without exceeding exposure limits, and the originally planned job scope changed after the workers had received their pre-job briefing.

Corrective Actions

- a. The Unit 2 RP Manager, the Site RP Manager and the Unit 2 Plant Manager issued a memo to Unit 2 RP personnel establishing several temporary measures applicable to work in High Radiation, High Contamination and Hot Particle Control Areas. These measures included direction: (1) to perform a careful pre-job review to determine the adequacy and



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completeness of data necessary to support safe work and (2) to document and resolve significant radiological concerns prior to work continuation.

- b. Workers in pre-job briefings are being reminded to notify the cognizant RP technicians and/or ALARA engineer if the job scope changes from the original plan.
- c. Radiation Exposure Permits will include cautions with respect to body position while performing work in an area.

The above items were evaluated for inclusion in appropriate administrative control procedures. Where applicable, the procedures have been revised (e.g., 75RP-9ZZ94, "ALARA Pre-Job Review", 75RP-9ZZ46, "Radiological Surveys", and 75AC-9RP01, "Radiation Exposure and Access Control").

6. Concern:

Confusion existed between ALARA personnel and Unit 2 Radiation Protection personnel regarding their respective roles in assuring radiological safety in Unit 2.

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Corrective Actions

An independent evaluation is being conducted of the ALARA and Radiation Protection Programs to determine divisions of responsibility for the performance of detailed pre-job walk-throughs; the performance of adequate pre-job briefings to ensure that cautions and limitations are established concerning dosimetry, stay times, body positions; and the establishment of detailed dosimetry requirements.

Schedule: The details of this evaluation and the implementation schedule are provided in Attachment 5.

7. Concern:

The ANPP Hot Particle Control Program does not appear to be adequate in preventing personnel exposure incidents.

Corrective Actions:

- a. An evaluation of ANPP's Hot Particle Control Program was performed by the RP Standards group. Based upon the evaluation, recommendations were provided to the Director of Standards and Technical Support. The recommendations are

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being evaluated for implementation. Appropriate revisions will be implemented following the Director's review.

Schedule for Completion: March 30, 1989

- b. Training is provided to all PVNGS personnel regarding the hazards associated with hot particles. This training is provided during Radiological Work Practices, initial training and retraining.

4.2 VIOLATIONS FOR C AND D

In response to questions raised by NRC personnel during a meeting held on August 8, 1988, ANPP reassessed the May 22, 1988, overexposure event. Included in the reassessment was an evaluation of management's actions that will be taken as a result of ANPP's reassessment of the event are discussed in Attachment 4.

ANPP initiated an independent evaluation of the Palo Verde Radiation Protection program to determine the means of assuring adequate future performance. Attachment 5 presents a summary of this independent evaluation.

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As discussed in Section 3.2, plant procedures involving the ALARA group are currently being revised to reflect the recent reorganization of the group.

Schedule Completion Date: March, 1989

5. DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Corrective action milestone completion dates are provided with their respective corrective actions in Section 4.

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Arizona Public Service
Palo Verde Nuclear Generating
Station, Unit 1

Docket No. 50-528
License No. NPF-41
EA 88-182

During inspections conducted during the period of May 20 to October 12, 1988, violations of NRC requirements were identified. In accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions," 10 CFR Part 2, Appendix C (1988), the Nuclear Regulatory Commission proposes to impose civil penalties pursuant to Section 234 of the Atomic Energy Act of 1954, as amended (Act), 42 U. S. C. 2282, and 10 CFR 2.205. The particular violations and associated civil penalties are set forth below:

VIOLATIONS ASSESSED CIVIL PENALTIES

II.A. Technical Specification 6.12.2 provides, in part:

"In addition to the requirements of Specification 6.12.1, areas accessible to personnel with radiation levels such that a major portion of the body could receive in 1 hour a dose greater than 1000 mrem shall be provided with locked doors to prevent unauthorized entry, and the keys shall be maintained under the administrative control of the Shift Supervisor on duty and/or radiation protection supervision. Doors shall remain locked except during periods of access by personnel under an approved REP which shall specify the dose rate levels in the immediate work area and the maximum allowable stay time for individuals in that area."

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Contrary to the above, on June 27, 1988, an unlocked door at Palo Verde Unit 2 provided access to an area on the 100' and 120' level of the Radwaste Building High Level Drum Storage and Transfer Cart area, where the intensity of radiation was such that a major portion of the body could have received up to 3500 mrem in one hour.

B. Technical Specification 6.12.1 states, in part:

"In lieu of the 'control device' or 'alarm signal' required by paragraph 20.203(c)(2) of 10 CFR Part II0, each high radiation area in which the dose rate is greater than 100 mrem/hr but less than 1000 mrem/hr shall be barricaded and conspicuously posted."

Contrary to the above, on August 9, 1988, at Unit 2:

1. A high radiation area consisting of the outlet end of the "A" Shutdown Heat exchanger, which had whole body radiation exposure levels of 140 mrem/hr at eighteen inches, was not barricaded.
2. A high radiation area consisting of the Unit "B" Shutdown cooling valve, S1B-V910, with radiation levels of 120 mrem/hr at eighteen inches, was not conspicuously posted and one side was not barricaded.



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3. A high radiation area consisting of Shutdown Cooling valve, S1A-V172, and piping, EW-UV 65, with radiation levels of 150 mrem/hr at eighteen inches, was not conspicuously posted, and two sides of the area were not barricaded.
- C. Technical Specification 6.11.1 requires procedures for personnel radiation protection to be prepared consistent with the requirements of 10 CFR Part 110, and to be approved, maintained, and adhered to for all operations involving personnel radiation exposure.
1. Procedure 75AC-9ZZ01, "Radiation Exposure and Access Control" states, in part:

"5.1.1 All personnel who enter the Radiological Controlled Area must read and sign-in on the appropriate REP. By signing in they indicate they have read and understand the requirements and will comply. Personnel shall read their appropriate REP prior to each entry to determine whether it has been revised."
 2. Radiation Exposure Permit No. 3-88-0008A, "Minor Work in Clean and Contaminated Areas," requires personnel covered by REP No. 3-88-0008A to "contact RP prior to start to work," and prohibits entry into high radiation and locked high radiation areas.

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Contrary to the above procedural requirements:

1. On September 8, 9 and 12, 1988, two contract Maintenance Electricians working under REP-3-88-0008A, without first contacting RP to inform RP that they were going to enter high radiation areas, entered the unlocked entrances to the High Activity Spent Resin Tank Room and the Waste Gas Decay Tank rooms, which were high radiation areas.
2. On September 8, 1988, without first contacting RP to inform RP that he was going to enter high radiation areas, one contract Maintenance Electrician authorized to work under REP-3-88-0008A entered the Unit 3 High Activity Spent Resin Tank Room, No. R-125, a locked high radiation area.

Collectively, these violations have been evaluated as a Severity Level III problem. (Supplement IV).

Cumulative Civil Penalty - \$100,000 (assessed equally among the violations).



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II.A.1. ADMISSION OR DENIAL OF ALLEGED VIOLATION II.A.

ANPP admits the violation.

II.A.2. REASON FOR VIOLATION

The design of the Palo Verde Unit 2 Radwaste Building provides no personnel access ways (i.e., doorways) into the High Level Drum Storage area or the Transfer Cart area. These two areas are separated by two concrete partitions, one that is 7'4" high and one that is 2'6" high. Surrounding both these areas is a concrete shield wall that is 12' high in some places and 19' high in others.

The solidification process installed in the Palo Verde Radwaste Building is not used. As a result, the High Level Drum Storage area and the Transfer Cart area were not used to solidify waste in drums. Portions of the two areas were used to store some high level waste, but the entire area was not a high radiation area as it would have been if the installed solidification process was used.

Since the space was available, a decision was made to temporarily store high level radioactive waste in the High Level Drum Storage area. Only one corner of the area was necessary to meet the storage

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requirements. Additional shielding was placed on top of and around the high level waste containers that were placed in the area. Dose rates in the immediate vicinity of the containers sometimes exceeded 1000 mrem per hour.

It was later determined that additional temporary storage space for radioactive waste was required. The decision was made to place the additional waste immediately beside the shielded containers in the High Level Drum Storage area. In order for personnel to carry bags of waste from the

Truck Bay area into the High level Drum Storage area, ladders were placed leading from the floor of the mezzanine area over a 19' section of the shield wall and down onto the roof of the Solidification Panel hallway, which protrudes into the High Level Drum Storage area next to the Transfer Cart area. Another ladder was placed from the Solidification Panel hallway roof down into the High Level Drum Storage area floor. The ladders provided the shortest route from the Truck Bay to the corner of the High Level Drum Storage area. The shortest route meant less exposure to individuals carrying the bags of radioactive waste. Access could have been gained to the corner of the High Level Drum Storage area via a wire mesh door, but this would have meant the individual carrying the bags would have had to go through

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the wire mesh door, around the end of the 19' shield wall, onto the 12' roof of the Waste Feed Pump room adjoining the Transfer Cart area, up the ladder onto the Waste Feed Tank roof, down the ladder from this roof onto the floor of the Transfer Cart area, use temporary ladders to go over the 7'4" partition, and into the High Level Drum Storage area. This route would not have been in compliance with good ALARA principles and it would have presented a personnel safety hazard.

Because the decision was made to install ladders over the shield wall, Unit 2 Radiation Protection personnel became concerned that someone could potentially enter the Truck Bay, ascend the stairs onto the platform, and, using the installed ladders, cross the shield wall without being aware that there was a high radiation area on the other side. With the ladders in place, ANPP believed the shield wall and wire mesh door would not meet the requirements of a full enclosure defined by T.S. 6.12.2, because access could be gained by climbing over the shield wall with the ladders. At that time, the wire mesh doors were not lockable but were designed to have locks installed. Accordingly, since the shield wall and wire mesh doors did not qualify as a full enclosure under T.S. 6.12.2, pursuant to the alternative provisions of T.S. 6.12.2, Unit 2 Radiation Protection personnel installed conspicuous postings and flashing lights along the top of the shield

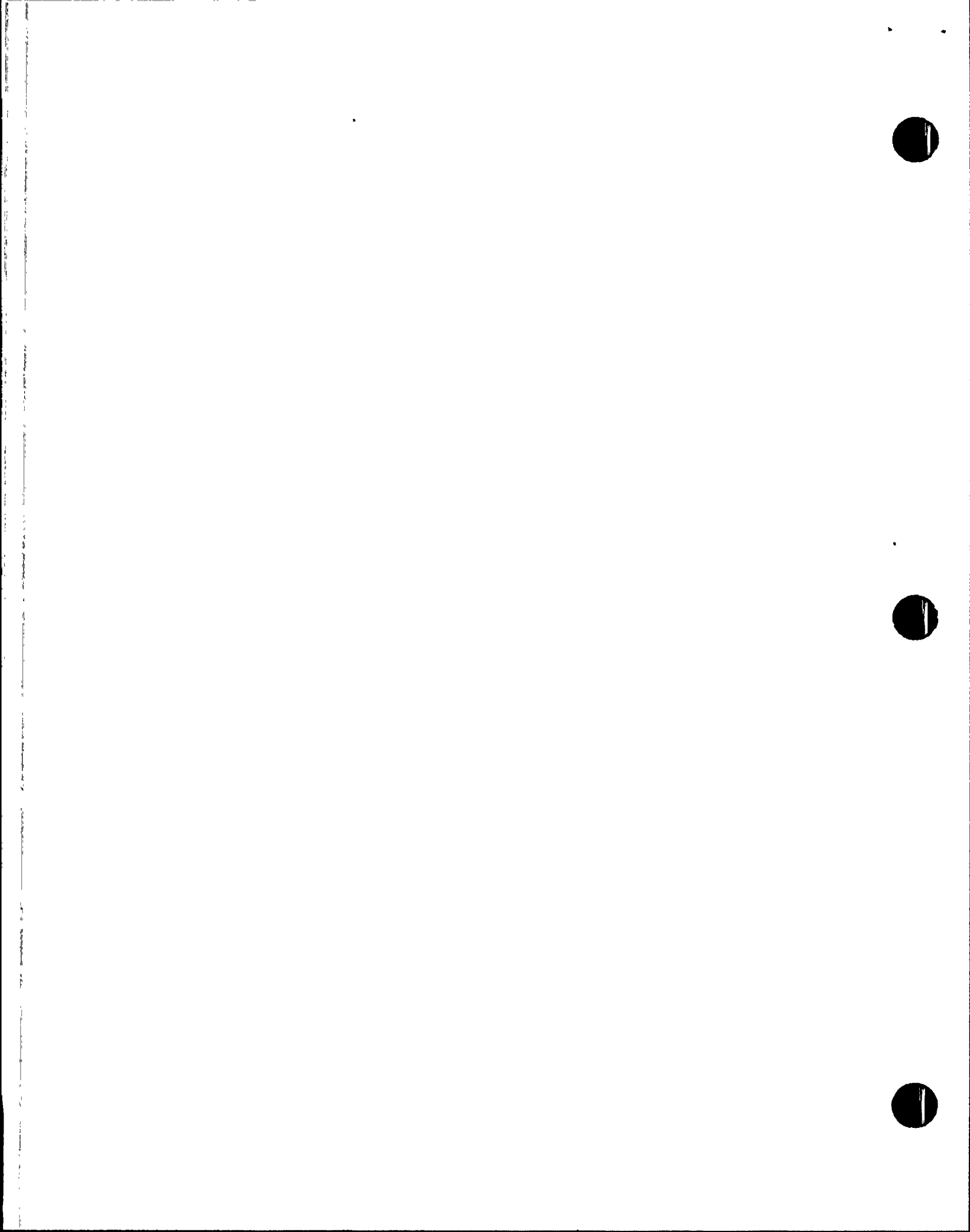
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wall, down the shield wall onto the Solidification Panel hallway roof, across the Solidification Panel hallway roof and back up onto the top of the shield wall, down the shield wall near the wire mesh door, and along the handrail on the roof of the Waste Feed Pump room adjoining the Transfer Cart area. A step-off pad was provided near the base of the new ladders on the Solidification Panel hallway roof outside the lighted boundary. Because conspicuous posting and flashing lights were placed along the roof handrail, the wire mesh door was never made lockable. The unlocked door allowed personnel access to non-high radiation areas without needing a key. With the ladders in place, locking the door would have served no enclosure function.

ANPP believed that such postings and flashing lights complied with T.S. 6.12.2 and would also be an appropriate practice that complied with Information Notice 84-82 because only a portion of the High Level Drum Storage area was a High Radiation Area.

The NRC inspector disagreed with ANPP's interpretation of T.S. 6.12.2, pointing out that the shield wall and a lockable wire mesh door provided an enclosure that could be adequately locked and that installation of the ladders was inappropriate.



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II.A.3. CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND RESULTS ACHIEVED

Upon identification of the NRC Inspector's concerns, the temporary ladders were removed from the shield wall. The wire mesh door was made lockable and locked. The flashing warning lights on the hallway roof were moved onto the top of the shield wall, where the ladders were located previously, to provide an additional measure of protection for the subject area. Walkdowns were conducted in Units 1, 2 and 3 and area surveys were reviewed to identify any other areas within the Units where access to a High Radiation Area is required to be locked. No other areas were identified requiring corrective actions in light of lessons learned from this event.

Access to the Unit 2 High Level Drum Storage area in the Radwaste Building is currently provided via a locked gate and a temporary scaffolding bridge over the Transfer Cart area.

II.A.4. CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FUTURE VIOLATIONS

II.A.4.1 The Site Radiation Protection Manager has clarified the requirement of Technical Specification of 6.12.2 and provided the clarification to the Unit Radiation Protection Managers.

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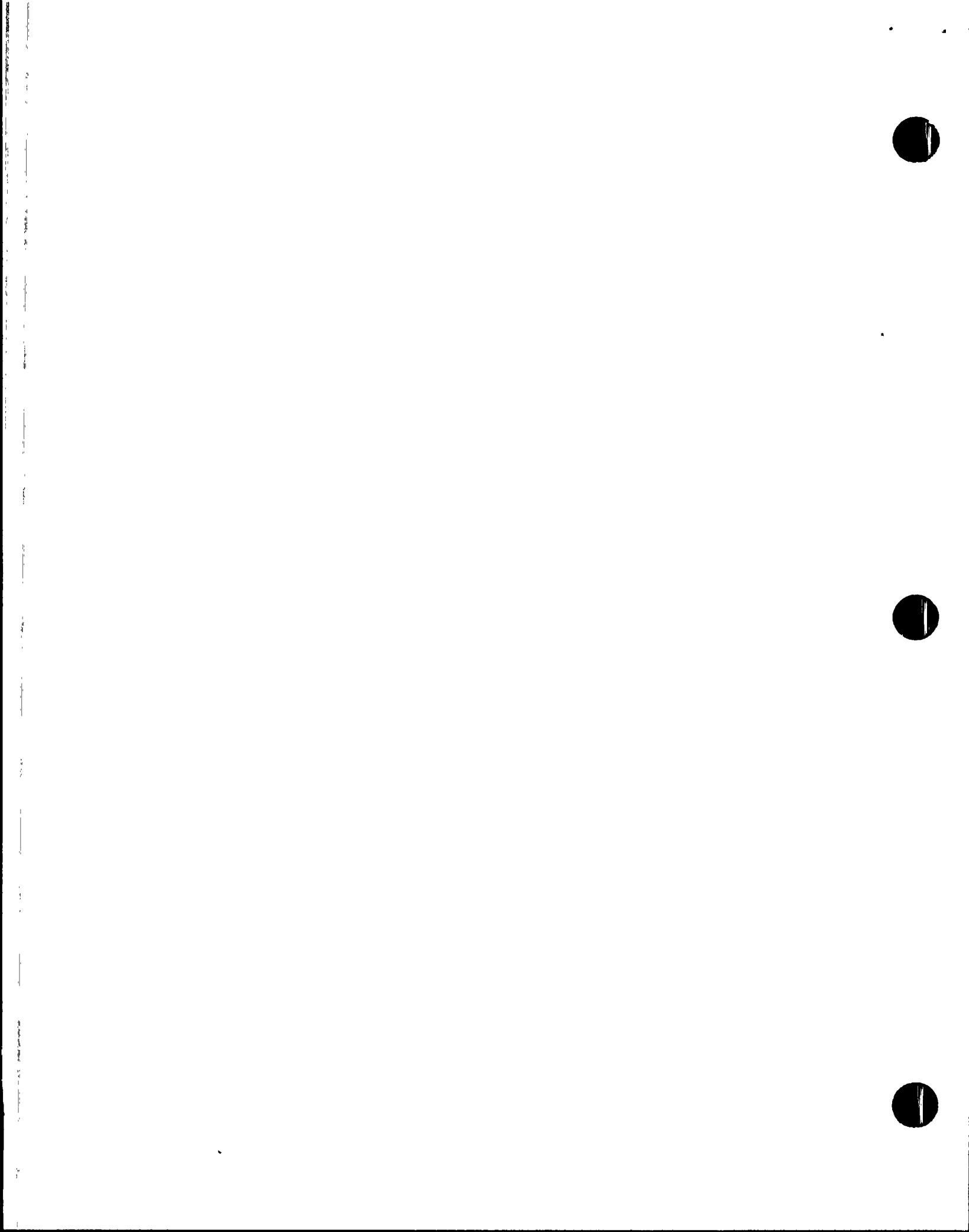
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II.A.4.2 The Unit RP Managers have provided instruction to Unit RP personnel regarding the proper implementation of Technical Specification 6.12.2. Additionally, the guidance promulgated in Information Notice 88-79 has been provided to Unit RP personnel.

II.A.4.3 Procedure 75RP-0ZZ01, "Radiation Posting", was revised to clarify the requirements for Locked High Radiation Area and posting.

II.A.5. DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance was achieved on June 30, 1988, when the temporary access ladders were removed and the wire mesh door was locked as required by Technical Specification 6.12.2.



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II.B.1. ADMISSION OR DENIAL OF THE ALLEGED VIOLATION II.B.

ANPP admits the violation.

II.B.2. REASONS FOR VIOLATION II.B.

During Unit 2's first refueling outage which ended in June, 1988, the "A" and "B" Train Shutdown Cooling Heat Exchanger rooms were posted as High Radiation Areas. Both entire rooms were posted as such due to fluctuating radiological conditions resulting from the periodic circulation of reactor coolant through the Shutdown Heat Exchangers.

Subsequent to the refueling outage, Unit 2 Radiation Protection personnel determined that it was no longer necessary to post the entire rooms as High Radiation Areas. On July 23, 1988, Unit 2 Radiation Protection personnel conducted a survey of both rooms in order to identify individual, localized high radiation areas and to repost areas in the rooms as Radiation Areas. The following provides a discussion for each of the cited problems in the Notice of Violation.

II.B.2.1 Problem 1

"A high radiation area consisting of the outlet end of the "A" Shutdown Heat Exchanger...was not barricaded."

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Discussion

The information provided above, quoted from the December 1, 1988, Notice of Violation, is not consistent with ANPP's understanding of the inspector's concerns at the time of the inspection on August 9, 1988. Oral statements provided by ANPP RP technicians indicate that on August 9, 1988, the NRC inspector was concerned about a posting at the outlet end of the "B" Shutdown Heat Exchanger. The inspector's concern regarding the "A" Shutdown Heat Exchanger is discussed below in Section II.B.2.3. Based upon ANPP's understanding of the NRC inspector's concern, an investigation was conducted to determine why the outlet end of the "B" Shutdown Heat Exchanger was not properly barricaded. The discussion that follows is based on ANPP's understanding of the NRC inspector's concern and ANPP's subsequent investigation and corrective actions.

As a result of a survey conducted in July 23, 1988, (Survey 2-88-06798) Unit 2 Radiation Protection personnel properly identified the reactor coolant inlet/outlet end of the "B" Shutdown Heat Exchanger as being High Radiation Area. As a result, an area around this end of the heat exchanger was properly posted and barricaded. When posting and barricading this area, glue-backed



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wall clips used to support the barricading material and postings were affixed to nearby insulation covering the heat exchanger and outlet piping.

A routine, weekly survey was performed on August 4, 1988, (Survey 2-88-07008). During the weekly survey, the inlet/outlet end of the "B" Shutdown Heat Exchanger was verified to remain a High Radiation Area. The established posting and barricade were noted to be properly installed.

Between August 4 and August 9, 1988, one of the glue-backed wall clips loosened and fell from the location where it had been attached. On August 9, 1988, the degraded barrier was observed by the NRC inspector.

II.B.2.2 Problem 2

"A high radiation area consisting of the Unit "B" Shutdown cooling valve, S1B-V910, ... was not conspicuously posted and on one side was not barricaded."

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Discussion

As a result of a survey conducted on July 23, 1988, (Survey 2-88-06798) Unit 2 Radiation Protection Personnel properly identified an area in the vicinity of SIB-V910 as being a High Radiation Area. The piping near SIB-V910 was found to have a 500 mrem/hr hot spot and a 100 mrem/hr dose rate at eighteen inches. Accordingly, the area in the vicinity of SIB-V910 was properly posted and barricaded as being a High Radiation Area. When posting and barricading the area, tape was utilized to support the barricading material and postings. It should be noted that the High Radiation Area was within a properly posted and barricaded Contaminated Area.

A routine, weekly survey was performed on August 4, 1988, (Survey 2-88-07008). As a result of the survey, similar radiological conditions were identified, and the area near SIB-V190 was noted to be properly posted and barricaded.

Between August 4 and August 9, 1988, the tape supporting and barricading and posting on one side of SIB-V910 loosened, allowing the barricade to fall. On August 9, 1988, the degraded barrier was observed by the NRC inspector. The posting and barrier material along one side of the posted area were found by ANPP to have fallen



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under the piping in the vicinity. The front access to the area near SIB-V910 remained properly posted as a High Radiation Area. The other side of the posted area was flanked by horizontal piping which adequately prohibited access.

II.B.2.3 Problem 3

"A high radiation area consisting of Shutdown Cooling Valve, SIA-V172, and piping EW-UV 65, ... was not conspicuously posted, and two sides of the area were not barricaded."

Discussion

As a result of the survey conducted on July 23, 1988, (Survey 2-88-06798) the areas located on the Valve Gallery side of the pipe penetration wall opening were identified as a High Radiation Area and a Contaminated Area. The appropriate barricades and postings were placed on the Valve Gallery side of the wall separating the Heat Exchanger and Valve Gallery. The Radiation Protection Technicians performing the survey determined that barricading and posting of the pipe penetration opening on the Shutdown Heat Exchanger side of the wall was not necessary due to the physical lay-out of the components in the area. For an individual to access the High Radiation Area through the pipe penetration opening from the Heat Exchanger side of the wall, the individual would have to climb over a handrail and a twenty-four (24) inch pipe that



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penetrates the opening. The root cause of the event was a decision made by the Radiation Protection technician. While there is physically enough room for some individuals to gain access through the wall opening, the Radiation Protection technicians did not feel that the pathway through the wall opening was a plausible alternative to using the normal walkway around the wall. Additionally, access to the area through the wall opening is not needed during routine plant operations. Accordingly, the opening in the wall was not posted.

II.B.3. CORRECTIVE STEPS WHICH HAVE BEEN TAKEN AND RESULTS ACHIEVED

II.B.3.1 Concerning the degraded barrier discussed in paragraph II.B.2.1, stanchions were installed in place of the glue-backed wall clips.

II.B.3.2 Concerning the degraded barrier discussed in paragraph II.B.2.2, the barrier was reinstalled by tying the barrier to a fixed structure.

II.B.3.3 Concerning the opening in the wall separating the heat exchanger and valve gallery in the "A" Shutdown Heat Exchanger room discussed in paragraph II.B.2.3, barricading and postings were installed on the Heat Exchanger side of the wall.



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II.B.3.4 Additional radiological surveys were performed in both Unit 2 Shutdown Heat Exchanger rooms to verify that barricading and posting were adequate.

II.B.3.5 All tape which was being used to secure barricades in Unit 2 was replaced with wall clips and/or stanchions where appropriate.

II.B.3.6 All barricades and postings throughout Unit 2 were verified to be properly installed. This verification was performed by Unit 2 Radiation Protection personnel and then verified on a sample basis in the auxiliary building by the acting Unit 2 Radiation Protection Manager and the Unit 1 Radiation Protection Manager.

II.B.4. CORRECTIVE STEPS WHICH WILL BE TAKEN TO AVOID FURTHER VIOLATION.

II.B.4.1 Unit 2 Radiation Protection personnel have received additional training concerning the need to maintain an adequate level of attention to detail when establishing and checking radiological controls such as High Radiation Area barricading and posting.

II.B.4.2 The Unit 2 Radiation Protection Manager has instructed Unit 2 Radiation Protection personnel not to use tape when securing radiological boundaries and postings except as a

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short term measure until other suitable measures can be employed.

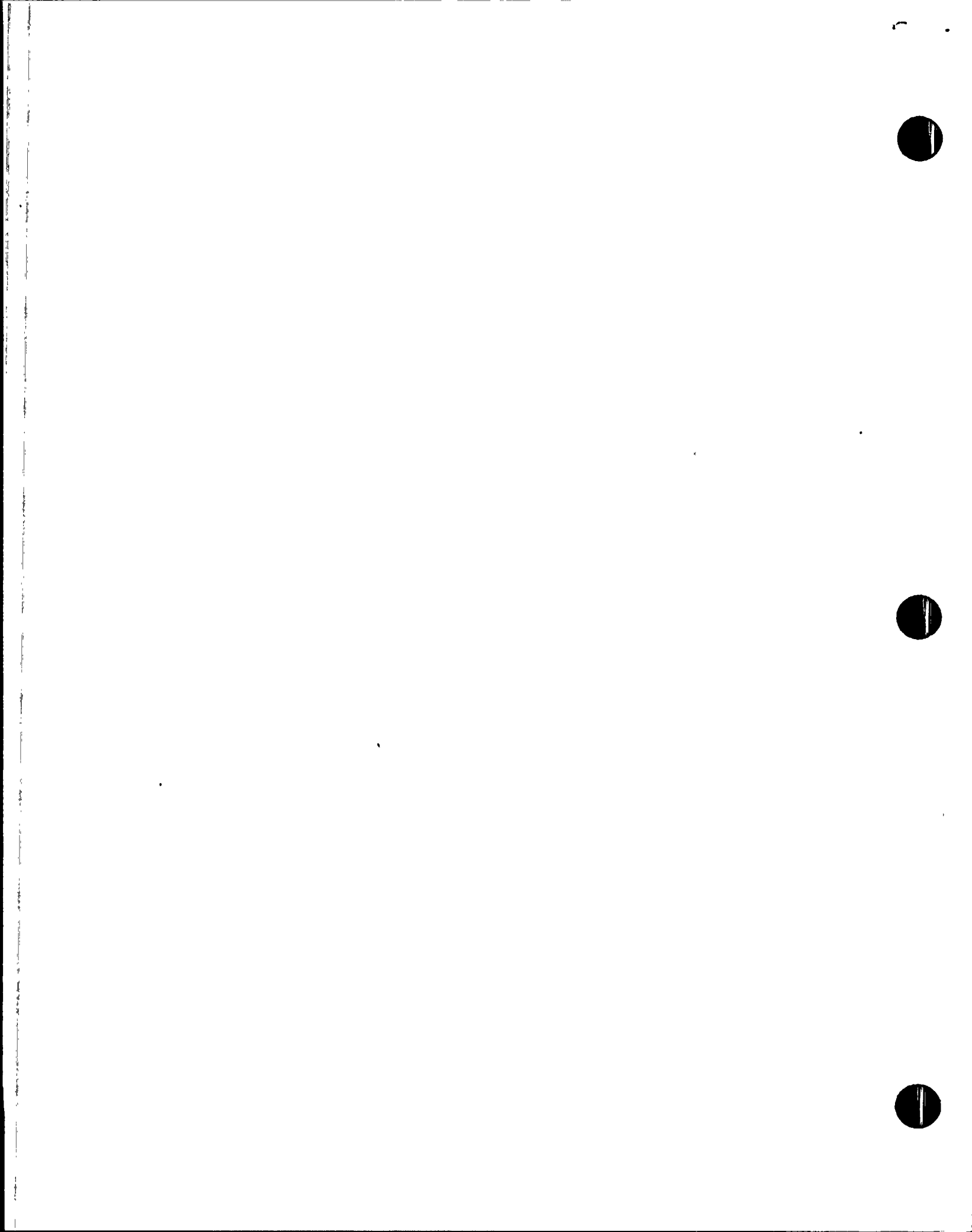
II.B.4.3 Barricades and postings that use glue-backed wall clips are being inspected by RP personnel during routine, shiftly RP lead tours.

II.B.4.4 Periodic tours of radiological posting will be performed to verify newly posted areas are adequate and that established postings are not degraded.

II.B.4.5 An evaluation of the ANPP Radiation Protection Program is being conducted. This evaluation is discussed in Attachment 5.

II.B.5. DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance was achieved on August 9, 1988, when the degraded and/or deficient barricades and postings were replaced or corrected.



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II.C.1. ADMISSION OR DENIAL OF THE ALLEGED VIOLATION II.C.

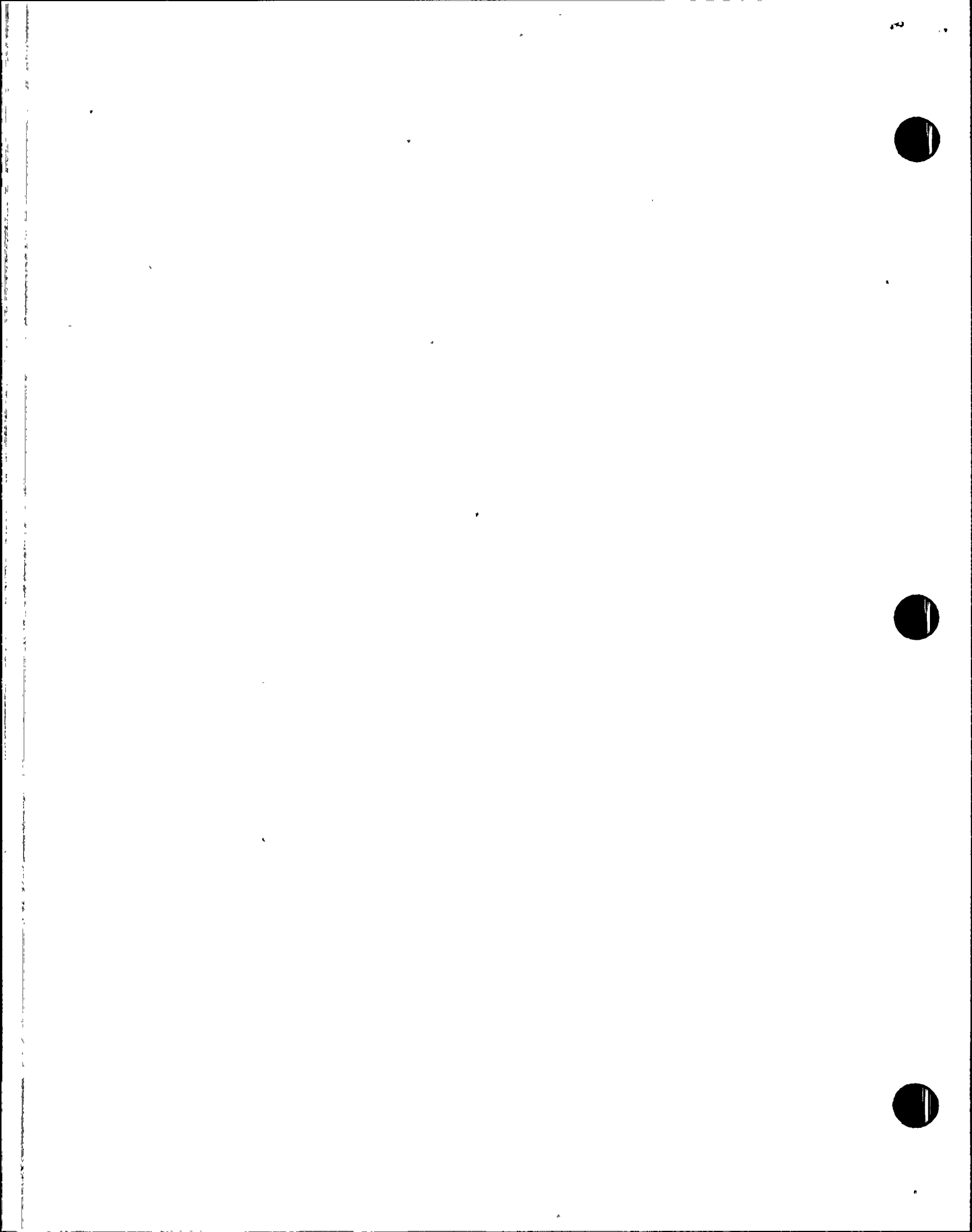
II.C.1.1 ANPP admits the violation.

II.C.1.2 This violation was identified by ANPP on September 12, 1988, and subsequently reported to the NRC in Unit 3 Licensee Event Report 88-005-00.

II.C.2. REASON FOR VIOLATION

On September 8, 1988, two Unit 3 Maintenance Department Technicians were assigned a routine preventive maintenance (PM) task. The PM task required that lighting in the Unit 3 Radwaste Building be inspected, cleaned and replaced where necessary. The technicians planned to conduct the inspection on September 8, 1988, and the cleaning and necessary relamping on subsequent days.

Prior to the start of the assigned PM task, the Maintenance Technicians informed the Unit 3 Shift Supervisor and Radiation Protection (RP) personnel of their assigned duties. The work document being utilized by the technicians delineated that the work be performed in accordance with a Radiation Exposure Permit (REP) which permitted minor work in non-contaminated and contaminated areas. The REP included the following instruction: "NO ENTRY INTO HIGH CONTAMINATION, HIGH RADIATION, LOCKED HIGH RADIATION OR AREAS



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REQUIRING RESPIRATORY PROTECTION." The Maintenance Technicians and the RP personnel did not discuss entry into high radiation areas. Therefore, no additional radiation protection measures were specified by RP personnel. The Maintenance Technicians assumed that their initial contact with RP personnel was sufficient to authorize entry into all areas in the Radwaste Building, despite the explicit instruction in the REP barring entry into high radiation areas.

During the inspection portion of the PM task on September 8, 1988, the technicians encountered postings at the entrance to the Waste Gas Decay Tank rooms stating that the rooms were High Radiation Areas (HRA) under certain plant conditions, that a dose rate meter was required for entry, and that RP was to be contacted prior to entry. The technicians mistakenly assumed that their initial notification of RP prior to starting the job was sufficient for entry into the HRA and proceeded to the Radwaste Control Room in order to borrow a dose rate meter from Operations Support personnel. The technicians contacted an Operations Support Technician in the Radwaste Control Room, informed him that they were performing a routine lighting maintenance task, and requested the use of a dose rate meter pursuant to the posting in the Waste Gas Decay Tank room. The Operations Support Technician provided the Maintenance Department Technicians the dose rate meter requesting that they only use it on the 140 ft. level of the Radwaste Building. The Operations Support Technician mentioned that the



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maintenance technicians would not need the dose rate meter throughout the rest of the Radwaste Building because there were no other "accessible" areas in which a dose rate meter was required. The Maintenance Department Technicians misinterpreted this information to mean that entry into all other areas was permitted without additional controls. The technicians proceeded to complete their lighting inspection in the Waste Gas Decay Tank Room on the 140 ft. level and returned the dose rate meter to the Radwaste Control Room.

The technicians continued with their inspection in other levels of the Radwaste Building. As the technicians approached the High Level Spent Resin Tank Room, they noted that it was also posted as a High Radiation Area and required that RP be contacted prior to entry. They observed that the door to the room was locked, but that it did not specify that a dose rate meter was required for entry. They also assumed that their initial contact with RP satisfied the posted requirement. One of the technicians then utilized a screwdriver to slide the lock bolt on the door clear of the strike plate and opened the door. The other technician questioned entry into the area in this manner, but was assured that it was "okay" and did not question his co-worker further.

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After making a quick visual examination of the room (approximately five seconds), the technician exited the area and both technicians continued with their inspection efforts.

On the following day, September 9, 1988, the same technicians reentered the Radwaste Building to begin the relamping determined necessary by their inspection. The Operations Shift Supervisor and Radiation Protection personnel were informed of the work, and the dose rate meter was again obtained from the Radwaste Control Room for use in the Waste Gas Decay Tank Room. The relamping effort was completed on the 140 ft. level, and the technicians exited the building.

The relamping was resumed on September 12, 1988, on the 100 ft. and 120 ft. elevations. As the technicians were about to enter the High Level Spent Resin Tank Room, their Supervisor came by on a routine inspection of work in progress and inquired if they had checked with RP for permission to enter the HRA. The technicians informed him that they had notified RP of the relamping in the Radwaste Building. The Supervisor directed the technicians to ensure that they had permission from RP for entering that particular room.

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One of the technicians contacted RP and inquired about entering the tank room. The technician was informed by RP that entry into the room for lamp changeout was prohibited due to existence of a radiation field in the room in excess of 1000 mrem per hour. Both Maintenance Department Technicians discussed this information and decided that they should discuss what had occurred with RP.

This violation occurred directly as a result of procedural violations by the technicians contributed to by communication deficiencies and inattention to detail.

The communications between the Radiation Protection (RP) personnel and the Maintenance Department were inadequate. The maintenance technicians should have provided a better description of the scope of the work to be accomplished. Additionally, the RP personnel should have recognized that the inspection and maintenance of lighting throughout the Radwaste Building would require entry into high radiation areas and provided appropriate instructions regarding entry into such areas. Additionally, the communications between the Maintenance Department Technicians and the Operations Support Technicians was inadequate. The technicians should have ensured that they had an adequate level of understanding regarding the use of the dose rate meter in the Radwaste Building.

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There was inadequate attention to detail during the preparation of the work document being utilized to perform the relamping task. The procedural reviewers of the work document did not take adequate measures to ensure that the appropriate Radiation Exposure Permit was specified in the work document.

However, as discussed above, the root cause of the event was that the Maintenance Department Technicians did not comply with the instructions in the Radiation Exposure Permit to not enter High Radiation Areas. Additionally, the technicians did not comply with posted instructions to contact RP prior to entering the High Radiation Areas.

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II.C.3. CORRECTIVE STEPS THAT HAVE BEEN TAKEN AND RESULTS ACHIEVED

The Maintenance Department Technician who defeated the lock to gain entry to the High Level Spent Resin Tank Room was appropriately disciplined and was denied access pending further training. Additionally, his thermoluminescent dosimeter (TLD) was analyzed and it was determined that he had received zero mrem as a result of the unauthorized entry to inspect the lighting in such room.

II.C.4. CORRECTIVE STEPS THAT WILL BE TAKEN TO AVOID FURTHER VIOLATIONS

II.C.4.1 An independent consultant has been employed by ANPP management to evaluate the Radiation Protection Program. This evaluation is discussed more fully in Attachment 5. As an interim measure a memo has been issued to the Unit Radiation Protection Managers and Lead Technicians for Units 1, 2 and 3, discussing the importance of ensuring that Radiation Protection personnel adequately discuss planned work with plant workers. Radiation Protection personnel in Units 1, 2 and 3 have been instructed to ensure that they take the appropriate measures for ensuring that they have an adequate understanding of work to be performed.

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II.C.4.2 The involved technicians have received disciplinary action in accordance with ANPP's disciplinary policy. The individuals have received appropriate additional training. The Unit 3 Radiation Protection Manager has interviewed both individuals to determine that an adequate knowledge level has been achieved.

II.C.4.3 ANPP will develop administrative controls delineating the control measures to be utilized for issuing dose rate instrumentation.

Schedule for Completion: First Quarter, 1989

II.C.4.4 It was determined that ANPP's administrative controls governing radiological posting methodologies were in compliance with federal requirements; however, an enhancement has been implemented to require specific postings for Locked High Radiation Areas.

II.C.4.5 ANPP has evaluated the effectiveness and use of the locking devices utilized to prevent entry into current Locked High Radiation Areas or areas which are anticipated to be Locked High Radiation Areas. Based upon the evaluation, replacement locking mechanisms will be ordered. Following delivery, a schedule for installing the new

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locks will be established.

II.C.4.6 ANPP Training has conducted a random, independent evaluation of radiation worker knowledge regarding the posting and control of High Radiation Areas. The results of this evaluation were utilized to develop an enhanced radworker training program.

II.C.4.7 An evaluation of the process for specifying the applicable Radiation Exposure Permit on work documents will be conducted. Based upon the results of the evaluation, appropriate administrative guidance will be promulgated.

Schedule for Completion: March, 1989



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II.C.5. DATE WHEN FULL COMPLIANCE WILL BE ACHIEVED

Full compliance was achieved on September 12, 1988, after the individuals exited the high radiation areas.

The dates for implementing the individual corrective measures discussed in Section II.C.4. are included with the applicable item.

ATTACHMENT 4

STATUS OF CORRECTIVE ACTIONS

As discussed in Mr. Martin's letter to D. B. Karner dated December 1, 1988, a meeting was held in NRC Region V offices to discuss the results of a reevaluation of the overexposure event which occurred on May 22, 1988, at PVNGS. As a result of the reevaluation, eight corrective actions were established by ANPP management for implementation. The following status is provided concerning the implementation of those actions:

I. Fill the vacant Radiation Protection/Chemistry Manager's position.

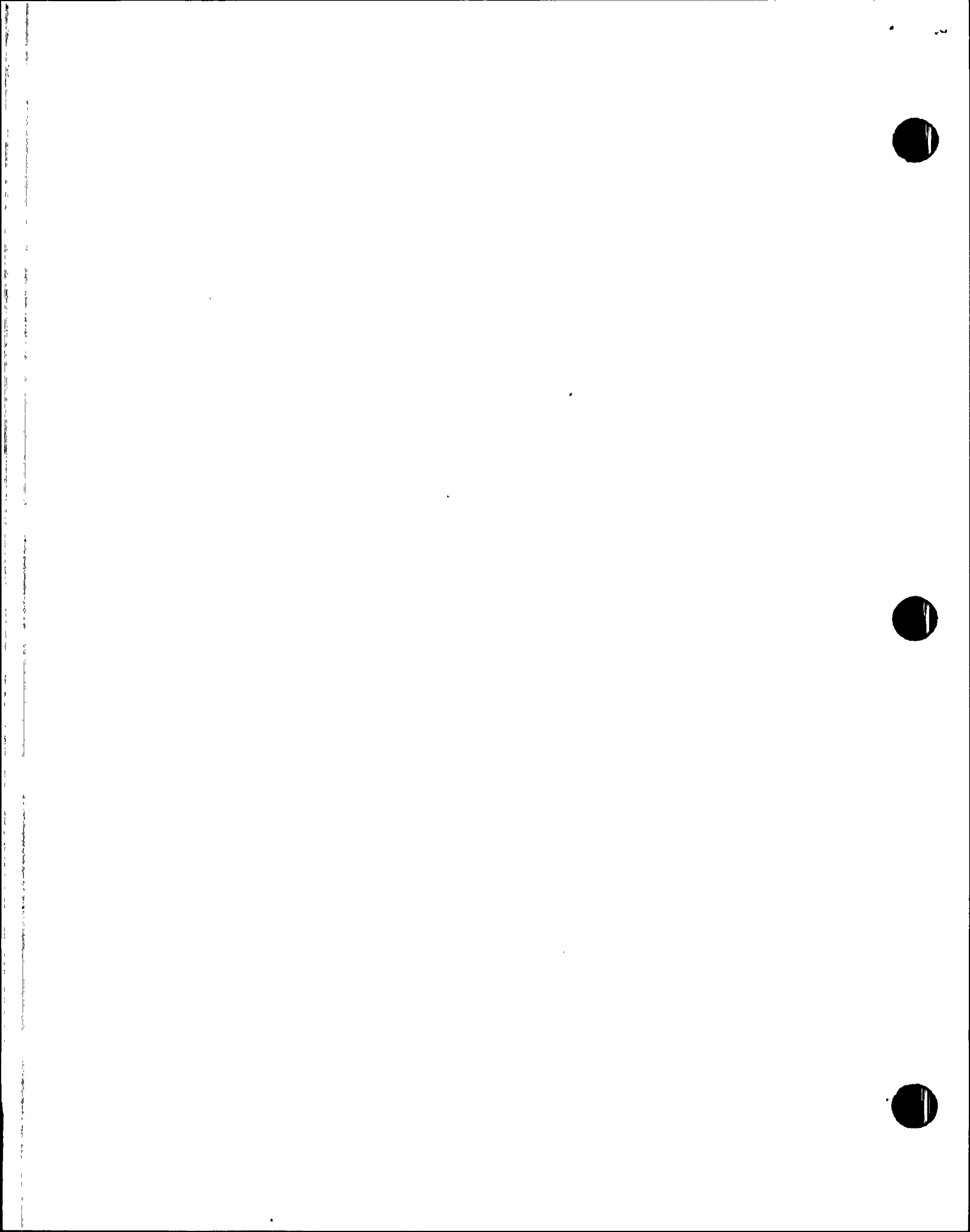
Status: Efforts to fill the vacant position are continuing. As an interim measure, a temporary Site RPM was named in October, 1988.

II. Clearly define the authority of the Radiation Protection/Chemistry Manager and procedurally establish formal lines of communication.

Status: A memo has been issued by the Vice President, Nuclear Production, discussing Functional Organizational Responsibilities.

III. Clearly define the relationship between the Radiation Protection/Chemistry Manager, Unit RP Managers, Central RP Manager and Unit Radiation Protection Technicians.

Status: Refer to Item II



ATTACHMENT 4

STATUS OF CORRECTIVE ACTIONS

- IV. Conduct a detailed evaluation of performance in the RP area including associated areas such as the ALARA program to determine the adequacy of training, staffing, procedural controls, organization, etc.

Status: The evaluation has been completed and a draft report is currently undergoing an initial management review. Refer to Attachment 5 for further information.

- V. Conduct an evaluation of the existing problem identification and resolution processes to determine their effectiveness.

Status: The evaluation has been scheduled and will be completed by December, 1989.

- VI. Obtain approval and implement the PVNGS Incident Investigation Program.

Status: The program has undergone a final management review. The controlling procedures will be approved in January, 1989, with full program implementation expected in February, 1989.

- VII. Continue development and implementation of the contractor training program in the RP area.

Status: The program has been developed and is currently being reviewed by senior ANPP management. Implementation will be in sufficient time to support the upcoming outages.



ATTACHMENT 4

STATUS OF CORRECTIVE ACTIONS

VIII. Evaluate the need for performance based supervisory skills training for recently promoted supervisory personnel.

Status: The evaluation has been completed by the ANPP Training Department. The resulting recommendations have been discussed with senior APS management and are currently being evaluated.

ATTACHMENT 5

DESCRIPTION OF THE RADIATION PROTECTION
DEPARTMENT PROGRAM EVALUATION

At an NRC/ANPP Management meeting held on December 1, 1988, ANPP presented the details of an RP Program Evaluation which had been initiated. A summary of the evaluation is provided below:

I. Evaluation

A. The evaluation was conducted utilizing defined detailed review guides* in the following areas;

1. Program Overview
2. External Radiation Exposure Control
3. Internal Radiation Exposure Control
4. Radiation Exposure Reduction
5. Control of Radioactive Contamination
6. Control of Solid Radwaste
7. Control of Work Involving Radiological Protection
8. Radiological Training and Qualification of Personnel

*Copies of the guides were provided to NRC Region V on December 1, 1988.

B. The evaluation included a review of NRC inspection reports, INPO audits and other ANPP evaluations that have been conducted.



ATTACHMENT 5

DESCRIPTION OF THE RADIATION PROTECTION
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II. Conduct of the Evaluation

Under the direction of the Site RPM, the evaluation was conducted by site RP specialists from Quality Assurance, Training, RP Standards and Unit 3 RP.

III. Implementation Schedule

A. Expected completion of the evaluation by mid-December, 1988.

Status: The evaluation has been completed and a draft report is currently undergoing initial management review.

B. Review final report and recommended corrective actions with RP and upper ANPP management.

Status: Review is currently scheduled to be completed the week of January 9, 1989.

C. Schedule and assign responsibility for implementing corrective actions during January, 1989.

Status: Based upon items A and B, this action is on schedule.



ATTACHMENT 5

DESCRIPTION OF THE RADIATION PROTECTION
DEPARTMENT PROGRAM EVALUATION

- D. Implement priority corrective actions prior to spring outages.

Status: Will be based on the schedule developed in item C.

- E. Assessment of effective corrective actions included with total implementation schedule.

Status: Will be based on the schedule developed in item C.



ENCLOSURE (f)

CHECK

