



1881 - 1981

PHILADELPHIA ELECTRIC COMPANY

2301 MARKET STREET

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PHILADELPHIA, PA. 19101

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50-277

50-278

Personal Privacy Information Deleted
in Accordance with the
Freedom of Information Act

November 13, 1981

Mr. R. C. Haynes, Director
Office of Inspection and Enforcement
Region I
US Nuclear Regulatory Commission
631 Park Avenue
King of Prussia, PA 19406

Dear Ron:

Attached is report of investigation relating to a high reported exposure on a Philadelphia Electric Company employee's badge for the month of August, 1981. The report responds to a request by J. M. Allen, Deputy Director, Region I, on October 22.

Philadelphia Electric Company has concluded that although the reported high reading on the TLD is correct, our employee could not have been wearing the badge at the time of its exposure and therefore, he did not receive a radiation exposure in excess of limits.

My staff, as well as the investigators who conducted these studies, are available for further discussion if you wish.

Very truly yours,

M. J. Cooney
Superintendent
Generation Division - Nuclear

Attachment

1X15

81-197

S7-1
2301 Market Street

November 13, 1981

FROM: M. J. Cooney
TO: S. L. Daltroff, Vice President
Electric Production Department
SUBJECT: Report of Investigation Concerning Employee
Radiation Badge Overexposure

The attached report of investigations concerning reported employee radiation badge overexposure concludes that, although the reported high reading is correct, the employee could not have been wearing the badge at the time of exposure and, therefore, did not receive exposure in excess of limits.

R. H. Moore, Superintendent of Quality Assurance, with dosimetry consultant, Dr. Sami Sherbini of Porter Consultant, Inc., visited Eberline Dosimetry laboratories of Santa Fe, New Mexico, to investigate the validity of the reported high exposure. They could not identify any credible sources of error and have concluded that the badge was overexposed to a value of 14 rem.

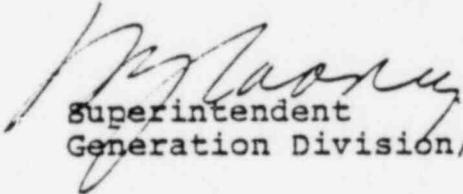
A. J. Hogan, staff engineer, Mechanical Engineering Division, investigated the event as related to activities at the Peach Bottom station. Mr. Hogan interviewed the principal, his fellow employees, his supervision, as well as the health physics staff. He examined procedures and records and after studying all available information, has concluded with reasonable certainty that the man did not receive an overexposure.

Mr. Hogan's investigation uncovered some poor practices as well as procedural deficiencies. Personnel entering and leaving radiation areas have not been rigorously following documentation and reporting requirements of procedures as related to radiation work permits. Procedures relating to badge accountability need strengthening to ensure prompt detection of lost badges. The potential for dropping or losing badges is too high. A better method for attaching badges must be developed. Corrective action to revise procedures and improve the methods

has been initiated. Procedures to monitor badge loss will be in place by November 30, 1981. The use of the computer to assist in monitoring is being investigated. Safety Division has been requested to assist in developing improved badge attachment devices.

In addition to Mr. Hogan's investigation, the health physics staff at Peach Bottom thoroughly investigated this matter. A detailed reconstruction of the man's activities throughout the month of August forces the conclusion that no overexposure could have developed. The details of this investigation have been closely examined by the Director-Radiation Protection who also concludes that no overexposure occurred.

In summary, the reported badge high reading is confirmed, but very high confidence exists that the employee was not wearing the badge at the time of its exposure and, therefore, did not experience a radiation exposure above limits.


Superintendent
Generation Division/Nuclear

cc: V. S. Boyer
J. W. Gallagher

PHILADELPHIA ELECTRIC COMPANY

INVESTIGATION OF A REPORTED
EXCESSIVE DOSIMETRY BADGE READING AT
PEACH BOTTOM ATOMIC POWER STATION

November 13, 1981

INDEX

TAB 1 - A. J. Hogan: Report of Investigation of High Dose
Reading at Peach Bottom Atomic Power
Station

TAB 2 - R. H. Moore: Inspection of Eberline Dosimetry Lab

TAB 3 - Peach Bottom Station: Report on High Badge Reading -
Peach Bottom Atomic Power Station

TAB-1

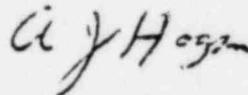
MECHANICAL ENGINEERING DIVISION

N-2-1 - 2301 MARKET STREET

November 12, 1981

FROM: A. J. Hogan
TO: M. J. Cooney, Superintendent
Nuclear,
Generation Division
SUBJECT: Report of Investigation of High Dose Reading at PBAPS

Attached for your information is a second revised report of the investigation you requested concerning the reported high Eberline dose in August at the PBAPS.



Staff Engineer

Attachment

Copies to: S. L. Daltroff
E. C. Kistner
V. S. Boyer
J. S. Kemper
W. J. Knapp
W. T. Ullrich

AJH:cic11/10/81- 8

REPORT OF INVESTIGATION OF
HIGH READING ON
MONTHLY TLD BADGE
PEACH BOTTOM ATOMIC POWER STATION

A. J. HOGAN

Background

On September 9, 1981, the PBAPS was notified by phone by Eberline according to procedure that one TLD badge assigned to a PBAPS worker for the month of August 1981 had a very high reading, namely 12.5 rem of whole body gamma radiation. No beta radiation was measured since the TLD chip exposed to beta radiation measured the same as the shielded chip sensitive to gamma only. When a calibration correction is applied, the indicated dose becomes 14.1 rem.

The initial investigation by plant personnel concluded that since a lost badge report was on file for this man for August his Eberline TLD badge had been lost during part of the month, and, therefore, this reading did not represent a valid dose to the individual. Nothing further was done at this time.

Lost badges which have later been found and read have usually indicated low doses, but a few have been in the rem range.

It was later discovered by PBAPS personnel that it was only the daily Harshaw badge which had been reported lost by the individual, not the monthly Eberline badge. This was brought to the attention of PBAPS Engineer - Health Physics by phone at home when discovered about September 24. Due to a misunderstanding, the information was not reported to the PBAPS Superintendent until September 28 when the Engineer - Health Physics returned from vacation.

From September 29, when the individual was first interviewed, until October 5, when the NRC site inspector was notified, an investigation was conducted by PBAPS personnel. The Director of Radiation Protection and NRC Region I were informed of the high reading on October 7.

During this investigation several facts were uncovered. Harshaw TLD badge data for the individual exists for all periods during the month of August except for 5 days starting on August 13 and ending about 4:00 P. M. on August 17 when a temporary Harshaw TLD badge was issued to the individual. The permanent Harshaw TLD badge previously assigned to the man during August, was last read on August 12. It was reported lost by the man about 4:00 P. M. on August 17. A second permanent Harshaw badge was issued to the man on August 20. This was used for the remainder of the month.

The total dose for the period July 28 through August 31, inclusive, as measured by the Harshaw badges assigned to this individual with the exception of the 5 days when no Harshaw badge data exists was 319 mr. An estimated dose for the other 5 days as determined from consideration of where the man worked and what doses were received by those who worked with him was 330 mr, making a total dose for the month (plus 3 days in July) about 649 mr. Considering where the man worked and considering the small doses received by those who were with him and all who

- 2 -

were in the same general areas throughout the month, it was concluded by PBAPS personnel that the reported dose reading did not represent a dose actually received by the man.

On the afternoon of October 9, I was asked by the Superintendent of the Generation Division-Nuclear to conduct an investigation of the event as related to activities at PBAPS. A second investigation by a consultant was directed toward the badge processing at Eberline. My investigation began on October 13 and continued through October 27 when it was believed that all available significant information had been obtained. On November 9, the investigation was reopened when it was reported that additional information had been obtained from the man.

Description of Investigation

Numerous interviews were conducted with PBAPS personnel in Dosimetry, Security, Health Physics and the Assistant Superintendent. Interviews were also conducted with the individual and four of his coworkers. PBAPS's records were reviewed, and pertinent data abstracted. The investigation concentrated on the 5 day period when no Harshaw TLD data was available, since it is believed the available Harshaw badge data is valid and precludes a real dose to the man during the periods when Harshaw data exists.

Pertinent Information Learned

1. The man is stationed at the PBAPS and normally works in Electrical Maintenance-Susquehanna Area. This group is based at the PBAPS Unit No. 1 (outside the security fence) and works at the station. Members may also work some days at Muddy Run or other locations in the area away from Peach Bottom.
2. He has been assigned to PBAPS for over 3 years, starting as a helper and advancing in normal progression. About 6 months ago he made second class electrician. He was therefore familiar with the plant and was accustomed to working in radiation areas.
3. During the 5 day period from August 13 to 17, inclusive, he worked inside the power block some time during each day. He entered the Unit 2 reactor building (refueling floor) on August 13 and entered the Unit 3 reactor building on all 5 days.
4. He was signed in and out on a Radiation Work Permit on August 14 (one entry 97 minutes), on August 15 (two entries 103 minutes and 36 minutes) and on August 17 prior to being issued a temporary Harshaw badge (two entries 105 minutes and 99 minutes - plus a third entry of 56 minutes after the temporary badge was issued). This indicated that he had worked at least in low radiation fields on these days (all in the Unit 3 drywell). Times are maximum possible times from change room to job and back to change room as indicated by the security system card-out data. He was not signed on a Radiation Work Permit on August 13 or 16.
5. On August 13 the individual worked 91 minutes on the Unit 2 refueling floor and 35 minutes in the Unit 3 reactor building outside the drywell. The highest radiation level on the Unit 2 refueling floor during that period was 20 mr/hr. on a hose stored in a corner. The general field was 2-4 mr/hr. on the refueling floor as determined by survey performed about the time he left the area on August 13.

The radiation levels in the Unit 3 reactor building through out the period were generally less than 5 mr/hr. with limited marked areas of 40-50 mr/hr. The levels at the drywell entrance were 2-10 mr/hr. The remaining time he was not known to be in any significant radiation field.

6. On August 14 he worked 97 minutes in the Unit 3 drywell on the recirc pump leads with others.
7. On August 15 he worked a total of 139 minutes in the Unit 3 drywell all on elevation 135, primarily on the 3B recirculation pump. With the exception of about 15 min., he was working with others. During this short period he was hooking up welding leads around the drywell at this elevation.
8. On August 16 he spent a total of 29 minutes in four entries in the Unit 3 reactor building outside the drywell and 7 minutes in two entries in the core spray pump room. Although no surveys of the core spray pump room close to August 16 could be readily located, earlier surveys indicate general radiation levels of 2-10 mr/hr. in this area with about 20 mr/hr. on contact with a pipe. Radiation levels should have been about the same on August 16.
9. On August 17 he worked 105 minutes in the morning in the Unit 3 drywell at elevation 135 on the 3B recirc pump motor leads. This included crouching on a scaffold about 4-5 feet above the 135 grating for 20-30 minutes to remove a cover plate on the bottom of an electrical connection box held by 40-50 screws. This was done with a helper on the drywell wall side of the box. The man was on the pump side of the box. The box was 7-8 feet above the grating. The helper's Harshaw indicated a dose of 26 mr when read on August 17. This covered the period from August 11 when it was previously read.

The remaining time on the morning of August 17 was spent at the 3B recirc pump motor leads with others. During much of this period he was standing on a structure about 3 feet below the 135 elevation. None of the other men working on the leads at this time or any other time, received more than about 70 mr for any day as measured by a Harshaw badge.

In the early afternoon, he worked 99 minutes in the Unit 3 drywell. With the exception of about 30 minutes, this was at the 3B recirc pump motor leads slightly below elevation 135. For about 30 minutes he was in a full face breathing mask installing thermocouple leads for the 3B recirc pump. To perform this task he was standing on structural steel with his head 1-2 feet below elevation 135. He was the only known person in a mask below elevation 135 at this time. No mask was needed for work at the 135 elevation. Not at this time, but at other times that day other workers also spent considerable time at about this level working on the pump seal. None received unusually high doses.

The location of the individual on August 17 was corroborated by all interviewed coworkers who worked with him that day.

10. Dosimeter readings for the individual during the period of the lost Harshaw TLD badge as recorded on the RWPs were as follows:

August 14	50 mr
	60 mr
August 15	0 mr
	15 mr
	40 mr *
August 17	65 mr

These readings were of the same magnitude as other coworkers in the drywell at this time.

11. During interview, the man stated that the 40 mr * dose recorded on the RWP for the morning of August 17 was not what his dosimeter actually read. He indicated that his dosimeter was off scale, and he told the person marking down the entries to give him what the others got because he believed the dosimeter was faulty. Three other coworkers who exited with him all recorded dosimeter doses less than 20 mr. None of the 4 could recall who recorded the entries. Inspection indicated that all four were signed out by the same person using a different pen than was used on all other entries that day.

Also during interview the man stated that on August 21 his dosimeter reading was "high" - near the top of the scale. Again he told an identified coworker to write down a smaller value (a 110 mr dose was recorded). A coworker's recorded dosimeter dose on the RWP was 50 mr for that time.

On both occasions he suspected a faulty dosimeter. On August 21 his Harshaw badge read 75 mr for both August 20 and August 21, confirming that the dosimeter on this day was in error. His recorded dosimeter dose for August 20 was 90 mr.

12. On neither occasion was the high dosimeter reading reported to the HP on duty at the drywell exit as prescribed. Although there is no written procedure covering this, instructions in the General Employee Training Course (which prescribes prompt reporting to the HP) appear to be well promulgated and well understood.
13. The requirement to report high or off scale dosimeter readings was well known by the individual and his coworkers on August 17. One coworker had followed this procedure at least once during the outage. His Harshaw indicated a very low dose, indicating a faulty dosimeter reading.
14. Inspection of the HP log kept at the drywell exit indicated that twice during August a dosimeter was noted to be off scale, and on another occasion it was reported to be 410 mr. In all three cases the Harshaw badge was read immediately; all Harshaw badges indicated very low doses, proving the dosimeter readings to be faulty.

15. It appears to be the general belief, at least amongst this group of maintenance workers (electrical), that the dosimeters are delicate and can easily give false readings. If high with no known radiation source present, experience indicates they are generally not to be trusted.
16. During the interview, the man gave no indication that he really believed that he actually received the dose. He spoke and acted as if he had not received a high dose.
17. The man stated that he generally wears both his TLD badge and his dosimeter in a plastic bag attached to a loop on the left outside front of his coveralls and taped top and bottom to the coveralls. He believes it was worn this way on August 17.
18. The man stated that neither his Harshaw nor the Eberline badges were off his person at anytime in August while on site except when changing clothes.
19. The man stated that he turned in his security card and both badges at the guard house window when he left the site in the afternoon of August 17 (card-out records indicate this was 3:23 P. M.). He stated that when he returned about 4:00 P. M. the guard issued the security card and the Eberline badge, but the Harshaw badge was missing. He went to the dosimetry office and was issued a temporary Harshaw badge at this time. He entered the site at 4:28 P. M.
20. This was normal practice since it could happen that the regular Harshaw badge had been placed in a container and was being read or that it was mislaid in the guard house. It was assumed that the regular badge would show up by the next morning.
21. At least one complete badge package (belonging to the Assistant Superintendent) has been known to have completely disappeared in the guard house overnight.
22. The man's lost Harshaw badge has not been found. A search was made of the drywell in late September by HP personnel, but nothing was found. By this time, however, the area had been cleaned up.
23. Some search of the guard house was made in August/September, but nothing was found. When, as part of this investigation in October, the head of Plant Security at the PBAPS was asked about the search, he indicated he did not know a badge had been lost in this case. Therefore, at my request, another complete search of the guard house and dosimetry office was made, including a search of the badge boards and unassigned chips to determine if it was somehow in the wrong place. Again nothing was found.
24. A check of the records showed 12 lost badges in September in the guard house. They were all later found on the board under another name. In all cases there was a mix up with someone else of similar name.
25. For the month of June 1981, 60 of about 3000 TLD badges (Eberline and Harshaw combined) were lost. It is estimated that about half of these were later found somewhere in the plant.

26. A consultant contracted to evaluate the processing of this monthly TLD badge at Eberline has reported that the high reading most probably reflects a real dose to the badge and is not a reading error.
27. There was no radiography performed during the 5 day period which could have exposed the man.
28. The highest dose measured by Harshaw by anyone at PBAPS in August was 815 mr for 1 day, received by a man on an approved dose extension working on the regenerative heat exchanger.
29. Of 2308 other Eberline badges for PBAPS read for the month of August, 37 were in the 1-2 r range. All were explainable by the work assignments of these men. The remaining Eberline doses were distributed as follows:

Mr	Mr	Number
801 -	1000	24
601 -	800	53
401 -	600	97
201 -	400	211
0 -	200	1886

30. There were several identified "hot" sources in the Unit 3 drywell near elevation 135. One was 7 r/hr. from a reactor vessel drain line as measured on August 12 and again on August 26. It was 800 mr/hr. at 18". This spot was covered with lead for the entire outage until August 26 when the lead was removed. With the lead in place the field near it was 100-200 mr/hr. It was 400 mr/hr. on contact outside the lead on August 12.

This spot was about 60° around the drywell near the biological shield wall and away from the 3B recirc pump, with some biological shielding between.

A second was 12 r/hr. from a drain line on the RHR piping (1.4 r/hr. at 18" and 400 mr/hr. at 3') as measured on August 26. This also was covered with lead reducing the dose level to about a 60 mr/hr. field as measured on August 5 and 100 mr/hr. on August 26. This too is somewhat away from the recirc pump.

A third hot spot was 3.5 r/hr. on contact with the bottom of valve 53B on the recirc pump discharge as measured on August 13. This was directly under the area where the men were working.

31. Dose levels measured throughout August were less than 80 mr/hr. in the area and the 3B recirc pump at the 135 elevation.

32. The man did not work at PBAPS on August 18, but did on August 19. He placed his temporary Harshaw badge in the container for reading when he left on August 19.

Since it was a temporary badge, it was not returned to the badge board. On August 20 about 8:17 AM when the man entered the site, he was told to report to the Dosimetry Office to get a new Harshaw badge. At this time he filed a lost badge report for the original Harshaw lost.

33. The man was given a yellow badge on August 24, since his total estimated dose for July and August through August 22 was 612 mr, leaving only a 388 mr remaining dose available in the quarter as per PBAPS limits. A yellow badge is issued when the remaining quarterly dose is less than 400 mr. A yellow badge restricts work assignments to those not likely to result in a high radiation dose.
34. No medical examination was performed on the man during August, September or October 1981, since it was believed that the man did not actually receive a dose of this high magnitude.
35. A report of this investigation was made verbally to the PBAPS O & SR Committee on October 30, 1981.
36. A partial review of only a few of the many Radiation Work Reports for the month of August revealed that 6 out of the 11 men checked in the Electrical Maintenance group was signed in and out on an RWP at least one day without having his Harshaw "daily" TLD badge read that day. It is estimated that a complete check of all RWPs would show that almost all of the men in this group do not turn in their Harshaw each and every day worked at the PBAPS according to instructions. This appears to be common practice. When questioned, the men indicate that they don't know if they will return or not that day (the office for this group is outside the security fence), so they do not put their Harshaw badge in the container for reading. They turn in all badges at the window, and the guard hangs the package back on the board to be issued at the next entry.
37. On November 5, the man was again interviewed, this time by the Superintendent of the Maintenance Division and other Maintenance Division personnel, to determine if any more information could be obtained. At this time the man revealed that he had also lost his Eberline badge during August but had found it later. This statement is in direct conflict with a statement made in my first interview to the effect that the Eberline was definitely not lost or off his person in a radiation area at any time in August.
38. On November 9, the man was again interviewed by PBAPS personnel (in person) and myself (by phone) concerning this new information. He stated that on August 20, about 8:15 AM he observed an Eberline badge in the Unit 3 Reactor Building at elevation 135 outside the drywell near the DC motor control center in the north accumulator area.

The spot was later personally located and identified by the man as 18" in front of the MO-21 control center partially hidden by a portable work bench which was present at the time he found the badge. (The work bench was no longer in the area on November 9.)

He picked it up and saw that it was his. He then discovered that his Eberline badge was missing.

39. The location where the badge was reported to have been found was along a pathway commonly used during the outage to get from the change room to the drywell entrance. The man traversed this path many times during August.
40. The man stated that he last remembered having his Eberline badge was when he was suiting-up about 8:15 AM on August 15. He clipped the Security badge to the neck band of his T shirt in front under his coveralls. His Eberline badge was clipped to the Security badge. His Harshaw was clipped separately to the neck band of the T shirt. His dosimeter was also clipped separately to the neck band of the T shirt. His coveralls were zipped up but the neck was open so that the Eberline badge could have fallen or been pulled off the Security badge.
41. The man did not file a lost or a found badge report for the Eberline because he did not know he had lost it until he found it, and he did not know he should have filed a found badge report.
42. The man stated that no HP or security officer at any time ever mentioned that he did not have an Eberline badge, not even on August 17 when he was told to get a new Harshaw badge since it was missing, or on the morning of August 20 when he was told to go to the dosimetry office to get his second permanent Harshaw badge when there was none attached to his Security card when issued.
43. The man indicated that on a few occasions a guard at the entrance to the power block asked about his Security badge because it was not showing, but never mentioned a missing TLD badge.
44. The Dosimetry Office indicated that most probably a man would pick up a new Harshaw without anyone asking or checking on the status of his Eberline badge.
45. The Security Office indicated that it was highly unlikely that a guard would note a missing Harshaw without noticing a missing Eberline also at the time of issue at the guard house window.
46. On November 9, Health Physics personnel measured about 2 mr/hr about 1" off the floor at the spot where the man indicates he found his Eberline. The general area measured also about 2 mr/hr.
47. The man indicated that he frisked his Eberline badge when he found it, and found no measurable radiation level.

48. Review of radiation survey records indicated that the gamma radiation field in the area between the north accumulators and the motor control centers at elevation 135 in the Unit 3 Reactor Building was measured to be 2-4 mr/hr on August 13, August 15, August 17, August 18, August 19, and August 20. No hot spots near the place where the man's Eberline was reported found were noted in any of these surveys.
49. Radiation survey data also indicated the floor drain about 1.5' from the place where the badge was reported to be found was measured to read 4 mr/hr on August 13, 2-6 mr/hr on August 19, 9 mr/hr on August 20, and 4-5 mr/hr on August 20 in gamma radiation.
50. The man stated he does not remember any radioactive equipment or hot spots in the area where the badge was reported to be found at any time during August.

Conclusions and Recommendation

1. It is not known how the man's Eberline badge received the high dose, but there is no possible known way that a real dose of this magnitude could have been received by the man, himself. For the most of the month of August he had Harshaw badge data indicating a normal low dose. For the remaining 5 day period he was not working for a sufficient length of time in a radiation field of sufficient magnitude to accumulate a 14 rem dose. In addition there were many coworkers and other craft workers in areas where he was; none received unusual or excessive doses as measured by TLD badges. There was so much activity in the drywell area around the Unit 3 recirc pump during this period that if any sufficiently high radiation field were present, someone else would have received a very high dose. No one else received a very high or unexplainable dose during the period.

IT IS CONCLUDED WITH REASONABLE CERTAINTY THAT THE MAN DID NOT ACTUALLY RECEIVE A 14 REM DOSE FOR AUGUST.

2. It is possible that the Eberline badge was deliberately dosed at some time during August while not being worn by the man.
3. It is possible, although contrary to the man's initial statement, that both of the man's badges and possibly his dosimeter were dropped to the bottom of the drywell on the morning of August 17 and retrieved by him that afternoon when he was in a mask and was below the 135 elevation in the drywell. The badges could have been there anywhere from about 3 to 7 hrs. It is probable that they could have fallen near the 3.5 r/hr. valve hot spot; at this dose rate it would take about 4 hrs. to accumulate a 14 r dose.
4. The man erred by not reporting his high and off scale dosimeter readings to the HP when leaving the drywell on August 17 and August 21.
5. The general practice by the Electrical Maintenance group of not turning in the "daily" Harshaw badge for reading is poor practice and destroys the system of "daily" badges. It is recommended that a system be established to insure all Harshaw badges are read each day they are issued.
6. The potential for dropping or losing badges is too high. A better method of attachment of badges should be developed (They were formerly worn inside coveralls on a chain around the neck, but this practice has been discontinued for safety reasons).
7. The control of badges and the monitoring of the proper wearing of badges appears to be lax. It appears from this incident that the man most probably passed into and out of the power block and possibly into and/or out of the drywell at least once and possibly a second time without his complete badge package. Apparently none of these were observed by the guards or HP personnel.

8. The action to be taken when a high dose is reported on a badge is not well established. This should be corrected.
9. The dose levels recorded in the area where the man stated he found his Eberline badge in his most recent statement do not appear to be high enough to produce a dose on the order of 14 rem.

This would require a dose level near 100 mr/hr for a maximum possible 5 day period (August 15-20) or higher for shorter periods. If such a hot spot were present, the radiation surveys in the area would have most probably detected them.

It is, therefore, concluded that the man's Eberline badge most probably did not receive its high dose lying near the motor control center in the Unit 3 Reactor Building.



QUALITY ASSURANCE

DIVISION

Investigation Report

Tab-2

PAGE 1 OF 8

Scope: Inspection of the Eberline Instrument Company, Dosimetry Lab, Santa Fe, New Mexico

Purpose: To investigate the validity of the radiation exposure dose for PBAPS T1 [REDACTED] for August, 1981 as reported by the Eberline Instrument Co. Dosimetry Lab.

Persons Contacted: [REDACTED] Eberline Health Physicist, [REDACTED] Eberline Dosimetry Lab Supervisor

Date of Inspection: October 15, 1981

Investigation Personnel: [REDACTED] Dosimetry Consultant, Porter Consultant, Inc. Robert H. Moore, Superintendent, Quality Assurance Division, PECO.

In accordance with 10 CFR 2.790 the names of individuals have been removed to avoid an unwarranted invasion of personal privacy.

SUMMARY & CONCLUSIONS

After studying the facts, observations, and conclusions contained in the details of the attached report, I have not identified any credible source of error by the Eberline Dosimetry Lab which would account for the extremely high reading of Badge I [REDACTED]. I, therefore, must conclude that the reported readings are correct and that the subject badge was, in fact, exposed to 14.1 Rads of Gamma Radiation.

RH Moore

11-6-81

Page 2 thru 8 and Exhibits A, B, D, and E of this report contain information for processing thermoluminescent dosimetry by the Eberline Instrument Company, Dosimetry Lab, and is withheld from public disclosure in accordance with 10 CFR 2.790(a)(4).

SUPPLEMENTAL TLD READING SHEET

Cust # 2544

<u>Badge No.</u>	<u>1st Chip</u>	<u>2nd Chip</u>
	<u>33</u>	<u>54</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

In accordance with 10 CFR 2.790 the names of individuals have been removed to avoid an unwarranted invasion of personal privacy.

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Second Readings: _____
Extra Controls: _____
Other: (please specify) _____

EXHIBIT C

This has already been called

TELEPHONE NOTIFICATION

Customer No. 2544

Date 9/9/81

Time 10:00 AM By L.D.

Badges Issued 05/01/81

Badges Returned 09/08/81

Badge #	Name	Gamma	Beta	Skin
1.	XXXXXXXXXX	12516	0	12516
2.				
3.				
4.				
5.				
6.				
7.	In accordance with 10 CFR 2.790 the names of			
8.	individuals have been removed to avoid an unwarranted			
9.	invasion of personal privacy.			
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				

Company Name and Location Rock Bottom

Contact ~~XXXXXXXXXX~~

Phone ~~XXXXXXXXXX~~

EXHIBIT F

REPORT ON HIGH BADGE READING
PEACH BOTTOM ATOMIC POWER STATION

Investigation by Station Personnel

Summary

A phone call from Eberline on September 9, 1981 reported a high exposure for a badge assigned to [REDACTED] (PECo Maintenance Electrician) for the month of August. The reported exposure was 14.1 rem. Independent investigations were initiated at the station and corporate levels and included an investigation of Eberline's processing of this badge. This station investigation has concluded that the 14.1 rem was not received by the individual and a conservative estimate of 0.65 rem should be assigned to [REDACTED] for record purposes.

This investigation also revealed several deficiencies on the part of the worker and the Health Physics and Chemistry Group which are being corrected by instructions and revision to procedures.

Report of Investigation

Upon receipt of the call from Eberline on September 9, Dosimetry personnel assumed the cause of the high reading to be the result of a lost badge. This assumption was based on the fact that dose management program involving Harshaw badge and RWP data had not "flagged" any unusual exposures for the month of August. This assumption also precluded a 24 hour notification to NRC of exposures greater than 5 rem. There also was delayed notification of the Engineer - Health Physics, Station Superintendent, and the Corporate Office.

Upon receipt of the hard copy report from the badge processor (Eberline) on September 24, 1981, a search for documentation to prove that this badge was lost during the reporting period was unsuccessful. The Station Superintendent received indication from the Engineer - Health Physics of the data report by the badge processor. Due to the absence of extremely high radiation work field at that point during the outage, it was concluded on September 28, that the exposure was anomolous. The Health Physics Supervisor and the Physicist - Dosimetry, were directed by the Engineer - Health Physics to begin an immediate data search and to collaborate on collation of

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the pertinent data prior to the Station Superintendent advisement of NRC.

A chronological summary of [REDACTED] work assignments was requested from Electrical Maintenance supervision and a dosimetry record search for Harshaw data and dose extension authorizations was begun.

Electrical Maintenance supervision provided a comprehensive list of dates, work locations, work assignments, and names of co-workers involved with [REDACTED] during this period. This list permitted review of radiation work permits to aid in establishing credibility of estimated exposures assigned to [REDACTED], by comparison with exposures of other personnel assigned to work with him; and the analysis of area survey data, exposure time data, and Harshaw exposure data of co-workers in his work areas.

A review of [REDACTED] work assignments and his co-workers exposures was performed prior to an interview with him. Exposure data revealed no single individual had more than 826 mrem for the month of August. Additionally, there was no indication on appropriate Radiation Work Permits of any off scale or high reading dosimeters.

On September 29, [REDACTED] was interviewed by [REDACTED]. During the interview, [REDACTED] indicated the following:

- 1) he always wore his badges together and in the chest area
- 2) he did not recall working near any posted hot spots or areas indicated by high Rad flasher lamps.
- 3) there were two occasions on which he had problems with direct reading dosimeters.
- 4) When he exited the containment after working in the 3B Recirc. Pump Motor area on or about August 15, a maintenance helper observed his dosimeter read off-scale. [REDACTED] was aware of the off scale reading and failed to report it to the health physics technician who was located nearby. Further, he agreed to have a 60 mrem exposure entered on the RWP Access Control and Exposure Sheet on the assumption that the dosimeter was defective. A

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failure to report an off scale dosimeter reading is a violation of health physics instructions. This value was reported to be based on an average of co-workers' values.

- 5) On August 21, when exiting from Unit 2 MO-53B valve work area, a co-worker, identified as [REDACTED], read his direct reading dosimeter. The reading was higher than expected. A dosimeter value of 360 mrem was selected as the exit reading. This resulted in an arbitrary exposure reading of 110 mrem. [REDACTED] was aware of this and again failed to appraise health physics.

The investigation did not reveal notification of any Health Physics representative regarding off scale or high dosimeter readings at any time.

A survey of the Unit 3B recirculating pump motor and motor lead penetration area conducted on September 9, 1981 revealed no exposure rate in excess of 70 to 100 mrem per hour.

On September 30, 1981, [REDACTED] was re-interviewed by [REDACTED]. In this time, he explained why he did not deposit his Harshaw badge in the bucket for daily readings. He said since he did not know whether he would be assigned to the plant for overtime, he would leave the badges with the guards when going back to the Unit 1 electrical maintenance shop instead of dropping the Harshaw in to bucket for processing. If he was not assigned to Unit 2 and 3 for overtime, the Harshaw badge was apparently returned to the badge board without being read. The failure to read the Harshaw, although contrary to procedure, does not seriously affect the overall dose management program.

On Monday, October 5, 1981, verification was made by [REDACTED] that he did find [REDACTED] dosimeter either off-scale or high, but did not indicate that fact on the RWP. A later meeting was attended by [REDACTED] and [REDACTED] of Health Physics; and [REDACTED], [REDACTED] and [REDACTED] of Electric Maintenance. Additional work assignments were discussed. It was also established by [REDACTED] that the date of the off-scale dosimeter reading was August 17, not August 15, and that a lower dosimeter reading was substituted on a RWP on October 21 in lieu of a higher actual reading.

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This information was presented to the Station Superintendent. The decision was made that [REDACTED] had not received the 14 rem and that [REDACTED] would research exposure of additional individuals whose names were to be provided by Electrical Maintenance. [REDACTED] was then directed to notify [REDACTED], Director - Radiation Protection Section, Corporate Office; and, also to notify the NRC.

On Wednesday, October 7, [REDACTED] and the NRC were notified. On Thursday, October 8, [REDACTED] convened a meeting of [REDACTED] and [REDACTED] Health Physics; and [REDACTED], [REDACTED] and [REDACTED] of Electrical Maintenance during which information previously described was reported. [REDACTED] forcefully stressed to [REDACTED] and the supervisor the importance of following procedures and good Health Physics practices. On October 9, Electric Production Management ordered independent investigations which were subsequently assigned to the Mechanical Engineering Department and Quality Assurance Superintendent with the assistance of a consultant expert in Thermal Luminescence Dosimetry.

On Friday, October 9, data was collected and provided by [REDACTED] at a meeting with the site NRC inspector, [REDACTED].

An NRC health physics inspector, [REDACTED] began an inspection on Tuesday, October 13, 1981 and held an exit interview on Thursday, October 15, and reserved conclusions until completion of the PECO report.

On October 14, [REDACTED] and [REDACTED] met with [REDACTED] and [REDACTED]. In this follow-up interview, [REDACTED] indicated that when he initially read [REDACTED] dosimeter, the dosimeter reading was higher than expected. [REDACTED] believed this high reading to be in error because he and [REDACTED] had been working side by side. A reading was logged for [REDACTED] comparable to [REDACTED] reading. During this interview, [REDACTED] emphasized to [REDACTED] the importance of following good Health Physics practices and procedures and the need to notify Health Physics of any unusual exposure conditions so they can investigate the incident and decide on the appropriate exposure.

Summary sheets of data extracted from information collected during the site investigation are attached.

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WORK LOCATION(S) BY DAY



August, 1981

DATE

LOCATION(S)

1	PB Turbine Group No RWP work
2	Day Off
3	MO 3989 A Not signed in on RWP
4	MO 3989 A and Outside Lighting
5	MO 3989 A
6	Blue Light on Door #146 No RWP
7	3B Recirc. Pump Motor
8	MO 3200 B
9	3B Recirc. Pump Motor
10	3B Recirc. Pump Motor & U3 EL 234 Head Heaters MO 3041 B, MO 3373, MO 3374
11	Day Off
12	MO 03-13-15 & MO 3200 B
13	MO 03-13-15 & 3B Recirc. Pump Motor
14	MO-3374
15	3B Recirc. Pump Motor
16	3B Recirc. Pump Motor
17	3B Recirc. Pump Motor
18	Muddy Run
19	Outside Lighting & U3 North & South Accum Area
20	South Sub. Station & U3 Recirc. Pump Motor
21	U/2 MO 57 & MO 53 B
22	3A Main XFMR & MO 53 B & 2A Target Rock Valve
23	3A Main XFMR
24	A0 3147 A & 3A Main XFMR
25	Conowingo & 3A Main XFMR
26	Conowingo & 3A Main XFMR
27	Conowingo & 3A Main XFMR
28	Conowingo & 3A Main XFMR
29	3A Main XFMR
30	3A Main XFMR
31	Conowingo & MO 23-25 (No RWP)

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RADIATION EXPOSURE ASSIGNMENT BY DAY

[REDACTED] August, 1981

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<u>DATE</u>	<u>HARSHAW (mR)</u>	<u>DOSIMETER (mR)</u>	<u>SURVEY (mR)</u>	<u>NOTES</u>
1	Not Read	No RWP work	N/A	*
2	—	—	—	Day Off
3	Not Read	No RWP work	N/A	*
4	63	0	N/A	7-27 to 8-4 incl.
5	3	0	N/A	—
6	Not Read	No RWP work	N/A	*
7	9	No RWP work	N/A	8-6 & 7 incl.
8	Not Read	90	N/A	*
9	72	110 (4RWP entries)	N/A	8-8 & 9 incl.
10	Not Read	No RWP work	N/A	*
11	Not Read	—	N/A	Day Off
12	34	85 (3RWP entries)	N/A	8-10 & 12 incl.
13	Not Read	No RWP work	N/A	*
14	Not Read	50	N/A	*
15	Not Read	75 (2RWP entries)	N/A	*
16	Not Read	No RWP work	N/A	*
17	Not Read	145 (2RWP entries)	60	Harshaw Lost
18	Not Read	—	—	Muddy Run
19	20	No RWP work	N/A	8-17 to 19 incl.
20	Not Read	90 (1RWP entry)	N/A	*
21	75	110 (1RWP entry)	N/A	8-20 & 21 incl.
22	51	105 (2RWP entries)	N/A	*
23	Not Read	No RWP work	N/A	*
24	Not Read	0	N/A	8-23 to 24 incl.
25	Not Read	No RWP work	N/A	*
26	Not Read	No RWP work	N/A	*
27	Not Read	No RWP work	N/A	*
28	Not Read	No RWP work	N/A	*
29	Not Read	No RWP work	N/A	*
30	Not Read	No RWP work	N/A	*
31	6	No RWP work	N/A	8-25 to 31 incl.

* = Harshaw not deposited in bucket for reading.

EXPOSURE DATA IN MREM FOR [REDACTED] AND CO-WORKERS

August, 1981

Day

1											
2			11								
3						3		3	14	2	
4	63				62	<1		1	9	3	
5	3					42			<1		
6					4	<1		11			
7	9							11	<1	18	
8			8							20	
9	72				<1	22		15			
10									>1		
11			68						>1		
12	34	3	13	8	67						
13		20									
14		22			70					3	
15			6		4					41	
16				21	15					9	
17			73	38	<1		55	68	27	3	
18			33			36	13	46	<1	21	
19	20			2	<1					22	
20			59	<1	<1	66	1	4	60	3	
21	75		2			21	2		23	54	
22	51					<1				62	
23				<1		2					
24		21		<1					4		
25	6	<1	<1	2		6			11		
26		2	<1						<1		
27			<1						1		
28			<1	2		2		12	<1		
29										16	
30			<1	22						3	2
31	6				3		10				6

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