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PENNSYLVANIA POWER & LIGHT COMPANY

Investigation of 'E' Diesel Breaker Misalignment

Job Number 739619-96

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Date issued: July 25, 1996

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CASE NO. 1-96-039

Refer to PPL Co

EXHIBIT 4

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July 25, 1996

Corporate Audit Services (Auditing) conducted a review of the circumstances surrounding the 'E' Diesel Breaker Misalignment (Misalignment) on June 14, 1996 at the Susquehanna Steam Electric Station (SSES).

The primary objective of our review was to independently evaluate the possibility of tampering as it relates to the failure to discover the Misalignment in a timely manner. On June 14, 1996 a Nuclear Plant Operator (NPO) inadvertently moved the wrong breaker while performing a routine job function which resulted in the Misalignment. During the period between June 14 and July 4, 1996, three surveillances conducted by 3 different NPOs failed to discover the Misalignment. Our review centered upon the reliability of these three surveillances and the possibility that the Misalignment could have been purposely concealed. A Plant Event Review Team (ERT) and Independent Safety Evaluation Services (ISES) are each conducting reviews of the event.

EXECUTIVE SUMMARY

In our opinion, it is unlikely that the Misalignment was purposely concealed or that someone tampered with the 'E' Diesel breaker between June 14 and July 4, 1996. In the absence of collusion, an individual would have had to purposely correct the Misalignment just prior to a June 20 surveillance and then re-set it in the improper position after a [REDACTED] surveillance was complete. We found no evidence to suggest these circumstances. JK

We believe that human error, in particular inattentiveness to detail by NPOs, is the reason the Misalignment remained undetected from June 14 until July 4, 1996. We base this conclusion upon the following facts:

- One NPO admitted that his surveillance results may not have been accurate. There is also evidence which suggests that he conducted his surveillance too quickly to be effective.
- A second NPO, whom we were unable to interview during our review, had past performance problems associated with inattentiveness to detail and performing his work too quickly.
- A third NPO admitted he did make a mistake while performing his surveillance of the 'E' Diesel. The NPO observed signs of a problem with the 'E' Diesel breaker but after assessing the situation, he convinced himself that no problem existed. Subsequently, the NPO realized he made an error in judgment.
- NPOs expressed concern about the confusing format (in particular the sequence of steps to be performed) of the diesel electrical surveillance (SO-100-005) procedure used as a guide to perform the surveillance and for documentation of results.
- Nuclear Operations does not require periodic supervisory participation for the inspection process of the diesels. This control is utilized in many other similar inspections throughout SSES.
- NPOs indicated they were 'comfortable' with the diesel electrical surveillances and did not expect to find any problems.

It may be appropriate to review the applicable procedures and training to determine the extent, if any, to which they contributed to the NPOs' overall performance.

Additional support for our opinion and details of Auditing's Action Plan follows.

BACKGROUND

Highlights of the Misalignment events are as follows:

- On June 14, 1996, NPO #1 was assigned to perform a swap of the 'E' Diesel for the 'D' Diesel. When the Misalignment was discovered and shown to NPO #1, he realized and agreed that he had moved the wrong breaker, thus resulting in a misalignment of the 'E' Diesel.
- On [REDACTED], NPO #2 performed a scheduled electrical surveillance of the 'E' Diesel and did not discover any alignment problems.
- On [REDACTED], NPO #3 performed a scheduled electrical surveillance of the 'E' Diesel and did not discover any alignment problems.
- On [REDACTED], NPO #4 performed a scheduled round (which has a different scope than a surveillance) in the 'E' Diesel building and suspected a problem with the 'E' Diesel breaker panel. He stated he did not have time to investigate the problem that night.
- On [REDACTED], NPO #5 performed a scheduled electrical surveillance of the 'E' Diesel and observed signs of a problem with the 'E' Diesel breaker. However, after assessing the situation, he convinced himself that no problem existed.
- On [REDACTED], NPO #4 performed a scheduled round in the 'E' Diesel, and upon closer inspection of the 'E' Diesel breakers, discovered the Misalignment.

Initial interviews with NPO #2 and #3 conducted by the ERT Team (which was formed on July 5, 1996) indicated that these NPOs believed their surveillances were properly performed and the breakers were properly aligned. Inconsistencies between the results of these surveillances and the subsequent round performed by NPO #4 raised the possibility of tampering.

ACTION PLAN

In performing our investigation, Auditing took the following actions:

- met with the ERT Team to obtain background information
- reviewed associated condition reports
- evaluated overtness, intent, and sophistication of this incident

EXHIBIT 3

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- collected and reviewed other relevant documentation including: surveillance reports, plant logs, performance evaluations and training records
- conducted a walkdown of the 'E' Diesel building
- observed a mock surveillance/round of the 'E' Diesel building
- identified individuals who were directly related to events occurring from the time the Misalignment occurred until discovered and corrected
- interviewed employees directly related to the Misalignment
- interviewed other employees who were in the 'E' Diesel building during the Misalignment period
- reviewed work authorizations associated with equipment #OA510 ('E' Diesel breaker panel)
- reviewed labeling changes on the OA510 'E' Diesel breaker panel

Evaluation of Tampering as a Root Cause

We believe the possibility of tampering is unlikely based on the following facts:

- NPO #1 admitted to making the mistake which resulted in the Misalignment on June 14, 1996.
- NPO #2 admitted that his surveillance results may not have been accurate.
- NPO #5 admitted to observing a problem with the breaker alignment.
- In the absence of collusion, an individual would have had to purposely correct the Misalignment just prior to a June 20 surveillance and then re-set it in the improper position after a June 27 surveillance was complete.
- We did not find any evidence to indicate that anyone intentionally performed any activity which would result in two of the three surveillances not discovering the Misalignment (i.e., intentionally correcting the error prior to the first and/or second surveillance and subsequently re-establishing the Misalignment prior to the third surveillance).
- The majority of NPOs interviewed told us they were not fully aware of the control room alarms associated with the 'E' Diesel breakers or the consequences of making the breaker movement, and thus would not have been confident of their ability to correct the Misalignment undetected.
- During our interviews we found no evidence of intent to cause harm (i.e., explicit or implicit threats of tampering).
- During our interviews of personnel accessing the 'E' Diesel building between June 14, 1996 and July 4, 1996, no one indicated observing or having knowledge of unusual activity within the 'E' Diesel building.

Evaluation of Human Performance Factors as a Root Cause

We believe that human error by NPOs is a more likely cause of the electrical surveillances not discovering the Misalignment based on the following:

[REDACTED] SURVEILLANCE PERFORMED BY NPO #2

Although NPO #2 initially claimed he did this surveillance accurately, he did admit to us that he "could have screwed up" (in regards to performing the surveillance). Records indicate that his surveillance was completed in 2 minutes and 11 seconds. Based upon our interview of knowledgeable SSES personnel and performance of a mock/test surveillance, we learned that it takes approximately 8 minutes to properly complete such a surveillance. NPO #2 also told us that once you get accustomed to the surveillance, you really don't have to read each label in order to complete the surveillance. NPO #2 also told us that he stood by cubicle 8 of breaker panel OA510 and looked down the row for indicator lights during his surveillance. He said he didn't "need hands on" (to physically check the breaker) "if you have proper indication on lights". An SSES unit of instruction trains NPOs to physically check the breakers in order to verify they are racked-in. NPO #2 also told us that if everything is normal as usual (and in spec) he documents equipment status on his way to another location. We believe that proper protocol would have an NPO document the equipment status concurrent with his observation, thus reducing the chance for error.

Based on the above facts, we believe that there is a strong possibility that NPO #2 did not pay attention to detail and as a result did not conduct a thorough electrical surveillance of the 'E' Diesel on [REDACTED]

[REDACTED] SURVEILLANCE PERFORMED BY NPO #3

We were unable to verify the reliability of NPO #3's surveillance (which was performed on night shift) based on the fact that he was unavailable for us to interview. However, we did perform alternative audit procedures that raise some questions about the reliability of his surveillance report. We reviewed NPO #3's past performance evaluations and interviewed past supervisors. Despite the fact that his most recent performance evaluation did not indicate any performance problems, we learned that NPO #3 has had problems with inattentiveness to detail and performing work too quickly in the recent past. In addition, NPO #3 was previously placed in the Responsible Behavior Program for a failure to properly use a procedural checklist in hand. One supervisor commented that most of NPO #3's problems or errors occurred when he was working night shift.

Although NPO #3 did receive breaker training in February 1995, our review of certain 'E' Diesel breaker training data indicated that NPO #3 did not receive revised OA510 breaker racking training in the 4th Quarter 1995.

Based on the above facts in combination with the results of our interviews with NPOs #2 and #5 (see below), we believe the possibility exists that NPO #3 did not conduct an accurate surveillance. We understand that Nuclear Operations plans to interview this NPO prior to his return to duty.

SURVEILLANCE PERFORMED BY NPO #5

NPO #5 admitted he made a mistake while performing his surveillance of the 'E' Diesel on [REDACTED]. Specifically, he stated that he did not open the OA51005 breaker panel to verify that the breaker was in the proper position. He also told us that he had observed signs of what he thought could be a problem with that breaker, but after assessing the situation, he convinced himself that no problem existed and he did not notify the control room. This NPO was relatively inexperienced in performing this particular surveillance and told us that this was only the third time he had done it. He told us he had difficulty following the surveillance procedure and that this contributed to his mistake.

When questioned by a shift supervisor after the Misalignment was discovered, NPO #5 immediately realized he made an error in judgment during his surveillance. He stated that he concluded too quickly that no problem existed. He also stated that he did not see the instructions on the surveillance procedure requiring him to verify that the OA51005 breaker was in the proper position.

OTHER FACTORS

In addition to the above information, we believe there are other factors indicating the existence of human performance problems associated with NPOs not paying attention to detail. Certain reoccurring themes surfaced during our interviews. These included:

- More experienced NPOs were generally 'comfortable' with the 'E' Diesel surveillances and did not expect to find any problems.
- Other NPOs expressed concern about the confusing format (in particular the sequence of steps to be performed) of the diesel electrical surveillance procedure (SO-100-005) which is used by NPOs as a guide to perform the surveillance and for documentation of results.
- Nuclear Operations does not require periodic supervisory participation for the inspection process of the diesels. This control is utilized in many other similar inspections throughout SSES.

ACKNOWLEDGMENT

We wish to acknowledge the assistance that Nuclear Department personnel provided to us during our review.

If you need additional information or would like clarification on any items contained in this report, please feel free to contact us.

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August 16, 1996

Mr. K. V. Chambliss:

Re: Supplement to Investigation of 'E' Diesel
Breaker Misalignment Report

At the time Corporate Audit Services issued our report entitled "Investigation of 'E' Diesel Breaker Misalignment" (dated July 25, 1996 - Job #739619-96), we were unable to interview one of the NPOs (NPO #3) who performed Surveillance and Rounds of the 'E' Diesel Generator Building. However, on July 29, 1996, we interviewed NPO #3 to determine the circumstances surrounding his [REDACTED] Surveillance and Rounds of the 'E' Diesel Generator Building in which he did not detect a breaker misalignment. 7C

Following are highlights of our interview with NPO #3:

At the start of the interview, NPO #3 was confident that he had properly conducted the Surveillance & Rounds on [REDACTED]. However, later in the interview he indicated that potential tampering or a mistake on his part (inspecting the wrong breaker) are two reasons why his Surveillance did not detect a breaker misalignment. In his opinion, each possibility had an equal probability of being the cause. Near the close of the interview, he indicated there was a 60-70% chance that he could have made a mistake by inspecting the wrong panel in conducting his Surveillance. 7C

Although NPO #3 stated it typically takes him 10 - 15 minutes to do Surveillance and Rounds of the 'E' Diesel Generator Building, security access data indicates he performed the [REDACTED] Surveillance and Rounds in approximately 5 minutes. 7C

The results of this interview did not change our overall report conclusion that it is unlikely that someone tampered with the 'E' Diesel breaker. We base this conclusion on the facts described in the aforementioned report. We believe that human error is the reason the misalignment remained undetected from June 14 until July 4, 1996.





Please note that on July 30, 1996, Auditing informally communicated the results of this interview to you.

If you need additional information or would like clarification on the interview results, please feel free to contact me at ETN 220-4801.

Martin F. Urban

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Corporate Audit Services

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