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OFFICE OF NUCLEAR REACTOR REGULATION

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Licensee: Pennsylvania Power and Light Company

Facility Name: Susquehanna Steam Electric Station

Inspection Conducted: January 30 through February 1, 1996

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Enclosure

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1.0 EXECUTIVE SUMMARY

This inspection was conducted from January 30 through February 1, 1996 at Pennsylvania Power and Light Company's (PP&L) Susquehanna Steam Electric Station. This was a routine, announced inspection to assess the qualification of fire barrier penetration seals. Overall, the inspectors concluded that PP&L has implemented and maintained an acceptable fire barrier penetration seal program. No major concerns were identified in the qualification, maintenance, or surveillance of the penetration seals. Also, no generic penetration seal problems were identified.

One Observation (96201-01) was identified concerning missing damming material on penetration X-12-5-75 rendering the penetration seal unqualified for the required 3 hour fire rating. Two weaknesses were identified concerning the lack of identification tags on penetrations and the fact that one BG&E inspector performed virtually all of the penetration seal surveillances during the last performance of the procedure.

2.0 INSPECTION FINDINGS

2.1 Procurement Documentation

The inspectors reviewed PP&L's procurement process for fire barrier penetration seal material. Several completed receipt inspections were compared to the packaging slips that were included with the shipments of seal material. Also the seal material specifications and shelf-life were checked on the selected received material documents.

PP&L has contracted the fire barrier penetration seal installation and maintenance program to Brand Fire Protection Services, Inc. (Brand), which maintains an office on-site staffed by a project manager and a fire protection engineer. Brand personnel are responsible for the procurement and inspection of all materials that are received for seal replacement or repair.

The process used to procure fire barrier penetration seal materials was initiated by Brand. A material request including a list of the materials needed was submitted to PP&L. PP&L checked the materials against their Approved Materials Manual, which lists materials approved to be used on-site, and then authorized the material request. The on-site Brand personnel then proceeded to order necessary materials from their corporate warehouse in Addison, Illinois.

Brand personnel were notified upon the arrival of fire barrier penetration seal materials on-site. Brand personnel then conducted a receipt inspection of the material to determine if the materials received were acceptable.

The procurement documents that were reviewed by the inspectors were consistent with the receipt documentation and no anomalies were identified. The area of procurement documentation was determined by the inspectors to be adequate.

2.2 Seal/Barrier Compatibility

The inspectors reviewed five barrier ratings with the respective five penetration seal ratings for compatibility. Various penetration seals located in the lower cable spreading rooms were reviewed. The compatibility was characterized by PP&L fire barrier rating drawings and the associated qualification fire test.

The fire barrier ratings for the walls and floor of the lower spreading rooms in the control building for Units No 1. and No. 2 were established by drawing C-1750. This drawing identified that the walls surrounding these rooms and the floors of these rooms are 3-hour fire rated, thereby requiring a 3-hour fire rated penetration seal through these walls and floors. The penetration seal installation and associated qualification fire tests confirmed that the design fire rating for all penetrations seals included in this review were appropriate.

The inspector's review of the barrier and penetration seal compatibility found no discrepancies.

2.3 Fire Endurance Tests and Deviations

The inspectors reviewed four Brand fire test reports. PP&L's use of the fire test reports was assessed based upon applicability to the selected penetration seals. The assessment included the following: fire test duration, maximum opening size, seal free area, seal orientation, seal material, seal material thickness, and type of penetration. Also, PP&L's engineering evaluations were reviewed for technical basis for deviations from the fire test configurations.

Test Reports 748-103, 748-134, 748-220, and 1042-01 were referenced as the qualifying fire tests for one or more of the fire barrier penetration seals inspected. The inspectors examined several penetration seals to verify that the as-built seals matched the typical details that were provided by Brand. Three of the penetration seals that were evaluated deviated from the typical detail in either size or maximum free area or both. The penetrations in question were X-24-4-42, X-24-4-41, and X-24-4-38. In 1990 Brand revised the detail drawings, and PP&L performed a complete walkdown of penetration seals to determine if they conformed to the descriptions provided by the revised detail drawings. PP&L determined that a large number of seals deviated from the revised detail drawings.

PP&L issued Non-conformance Report (NCR) number 90-0049, dated February 28, 1990, to correct the discrepancies between the as-built configurations and the revised detail drawings. The licensee then performed an evaluation to justify the operability of the deviating penetration seals. The inspectors reviewed the NCR and the applicable pages of the evaluation (DK-C-AMW-140), and concluded that the determinations made by PP&L regarding the operability of seals that deviated from the fire test configurations were acceptable. The evaluation also determined that certain seals that deviated from the fire test configuration would need to be reworked or modified. The deviating penetration seal rework and modifications had been completed.

The inspectors reviewed Condition Report (CR) 95-484 addressing Event Report 29410. During an effort by PP&L to incorporate Brand detail drawings and applicable fire tests into one package, PP&L discovered that the Brand Test Report No. 1042-01 utilized the hose stream test specified in the Institute of Electrical and Electronics Engineers (IEEE) Standard 634, Standard Cable Penetration Fire Stop Qualification Test. PP&L had committed to the American Society for Testing and Materials (ASTM) E-119, Standard Test Methods for Fire Tests of Building Construction Materials, in their Fire Protection Review Report (FPRR). This constituted a failure to comply with a regulatory commitment as specified in the FPRR. The NRC was notified appropriately of this event in Event Report 29410. Immediate actions to resolve this issue included an operability determination for the affected seals, a review of industry and regulatory standards regarding testing and penetration requirements, and the initiation of a revision to the FPRR to clarify penetration seal testing requirements based on the latest regulatory guidance.

A technical evaluation, dated October 23, 1995, was completed by Brand, with the purpose of providing justification for the continued reference to Fire Test Report 1042-01 for Typical Details 111, 118, and 121. The affected seals were determined to be operable based on the fact that fire tests were conducted on seals constructed of the same material and of lesser sealant depth than the assembly represented in Fire Test 1042-01. These comparable seal assemblies passed the Fire Test and the hose stream test in accordance with ASTM E-119.

The CR and the engineering justification from Brand were reviewed by the inspectors. The inspectors concluded that the reasoning in the Brand evaluation was sound. PP&L has proposed changes to the FPRR and various specifications to accept IEEE 634 in addition to ASTM E-119.

The inspectors determined that the fire test reports were appropriate for the qualification of the fire barrier penetration seals. Also, it was determined that PP&L had evaluated deviations to the fire tests appropriately and documented these evaluations adequately.

2.4 Training

The inspectors reviewed PP&L's training of qualified PP&L and Brand personnel performing installation, inspection, and surveillance of fire barrier penetration seals. This review included training plans, procedures, and attendance records.

The PP&L personnel performing surveillances were trained appropriately as indicated by PP&L training procedures and records. The Brand installers and QC inspectors were also trained appropriately as identified by the Brand training procedures and records. One weakness was identified by the inspectors in the PP&L corporate office specification C-1027 which required a qualifying procedure for the contractor's seal selector (Brand's on-site fire protection engineer). Brand had not developed this procedure for qualifying the seal selector prior to the last fire barrier penetration seal installations. PP&L personnel were reviewing the use of specification C-1027 with site procedures at the time of the inspection.

In general, the training and qualifications of PP&L and Brand installers and QC inspectors were adequate with no major deviations from requirements.

2.5 Installed Barriers

The inspectors conducted walkdowns of the control building and examined several fire barrier penetration seals with different configurations. The inspectors selected 14 individual penetrations and examined the penetration seal for conformance with the related engineering details and the qualifying fire tests.

The plant layout drawings were reviewed and used to select fire barrier penetration seals to be inspected in the lower cable spreading room for Unit No. 1. This room was located in the control building below the control room. Various penetrations passing through the floor, walls, and ceiling of this room were randomly selected for inspection. A qualification assessment of some of these penetration seals was conducted. The assessment was performed by reviewing information from various sources, which included: drawings, SEIS (Susquehanna Equipment Information System) data, typical penetration details, and fire test reports.

The following fire barrier penetration seals were inspected:

X-27-4-39	X-27-4-42
X-27-4-41	X-27-3-70
X-27-3-71	X-27-3-72
X-27-4-38	X-21-4-D4
X-21-4-D16	X-21-4-D17
X-12-4-33	X-12-5-200
X-12-4-11	X-12-5-75

During the course of the plant inspection of installed fire barrier penetration seals, three instances were encountered where the individual penetrations were not identified with their respective drawing identification numbers. The inspectors considered this to be a weakness in the penetration seal program that could affect correct identification of penetration seals during surveillance inspections, repair work, or modifications. Examples of missing identification on penetrations, X-27-4-42, X-27-4-41, X-27-4-38, found during this inspection were communicated to PP&L fire protection personnel.

Supporting documentation for installed penetration seals, including the original Internal Work Releases (IWRs) and any subsequent Repair Releases, was available in the Brand site office. The inspector reviewed the documentation for several individual seals, including 2 Technical Specification seals. During the initial walkdown of the plant, the inspector noted that seal number X-21-6-D2000 had visible evidence of repair. The inspector reviewed the file for this particular seal and noted that a repair release had been issued, and there had been a repair completed on the seal involving the addition and then removal of a temporary hose. This repair was properly documented. Repair releases had a sign-off for the technician completing the repair and 2 QC sign-offs, one for observation of the work being completed and another for the QC check of the completed seal repair. Neither Brand nor PP&L have a post-

maintenance inspection procedure for penetration seals. The final QC check, completed by Brand QC personnel after work was completed, was considered a sufficient post maintenance inspection. The inspectors agreed with this position.

Penetration X-12-5-75 was found to be missing damming material during the inspection. Test Report 1042-01 was listed as the seal qualifying document; this report qualifies a 12-inch thick Dow Corning SF-20 silicone foam seal with no damming material for the floor position. However, this particular installed seal was reported to be only 10 inches thick. Thus, the installed seal did not meet the 3 hour fire rating without damming material. Upon notification of the situation PP&L immediately initiated a condition report (RC96-116) to document the missing damming material for evaluation and resolution. Also, PP&L immediately implemented a fire watch as compensatory measures for the unqualified fire barrier penetration seal. This missing damming material was considered by the inspectors as Observation 96201-01.

Following the identification of missing damming material on penetration number X-12-5-75, an additional inspection was performed in Unit No. 2 lower cable spreading room and Unit No. 1 upper cable spreading room. The purpose of this inspection was primarily to determine if damming material was missing from other penetrations located in the ceiling of the rooms. Due to the presence of overhead cables, ducts, and structures, only about 25 percent of the ceiling surface was visible in the lower cable spreading room and five percent in the upper cable spreading room. Damming material was observed to be present on the ceiling and wall penetrations that were observed, except as noted below:

Penetration X-21-5-101	lower cable spreading room ceiling
Penetration X-12-6-23	upper cable spreading room wall

Test Report 1042-01 qualifies a seal in the same configuration as penetration X-21-5-101 with no damming material for the ceiling position. Also, Test Report 748-103 and detail 147 with engineering evaluation no. 21 on free area qualifies penetration X-12-6-23 with no damming material. Thus, the installed seals were technically acceptable without damming material.

PP&L was in the process of upgrading their computer system at the time of the inspection from the current Susquehanna Equipment Information System (SEIS) to Nuclear Information Management System (NIMS). The inspectors noted errors in the information provided by SEIS regarding penetration seal parameters. PP&L personnel were aware that errors existed and were able to provide hard copies of the correct information. The NIMS was initiated to correct the information errors. NIMS was scheduled to come on-line in March 1996.

The inspectors interviewed Brand personnel regarding contamination of seal material by impurities in filler products such as lead, iron oxide, and sulphur. The Brand project manager described the process by which samples of the seal material are cured and inspected for any deficiencies prior to installation as a penetration seal. The project manager indicated that Brand had not encountered any seal cure problems such as cold flow of the seals or

excessive seal shrinkage. The inspectors determined that the process and inspection were adequate to detect any problem with the cure of the penetration seal material.

In general, the penetration seals inspected were in good condition, with the exception of the missing damming material on X-12-5-75. The condition of the seals was evidence that maintenance had been performed where necessary.

2.6 Quality Assurance/Quality Control

The inspectors reviewed PP&L's and Brand's quality assurance (QA) and quality control (QC) programs. Included in the review were Brand's internal audits of its site program and Brand site project manager's responses, as well as PP&L's audit of Brand's penetration seal project.

An extensive review of Brand's QA manual and QA/QC procedures was completed during the NRC inspection at the Brand corporate offices in Addison, Illinois. (NRC Inspection Report Number 99901020/95-01) The inspection report indicated no concerns with the Brand QA/QC programs.

The inspectors reviewed Brand's corporate internal audits of site operations that were conducted during the last three years. The inspectors also reviewed the Brand site project manager's responses to the issues raised in the audits and found them to be adequate.

PP&L did not have a separate quality control program for penetration seals. PP&L relied solely on the QA/QC programs of Brand. PP&L's QA department was responsible for auditing Brand in order to assure that the QA/QC programs of Brand were acceptable. PP&L also conducted their own surveillances of penetration seals in accordance with their Technical Specifications.

The inspectors reviewed the latest QA audit (95-145) conducted by PP&L's Nuclear Assessment Services (NAS) group at Brand, including both headquarters and on-site operations. The audit was extensive and resulted in 9 findings. PP&L had not completed their review of Brand's responses at the time of the inspection. The inspectors interviewed the audit team leader for additional insight into the audit findings. In general, the audit team leader indicated that Brand was performing adequately. The inspectors also reviewed NQAP-QA-405, the QA procedure for Supplier Audits. The completion of the audit, as described in the report (95-145), and the presentation of the audit findings were completed according to the procedure.

PP&L procedures required an annual performance evaluation of vendors, with QA audits at least once every three years. Additional audits of Brand were conducted in August 1989, May 1992, and May 1994. The audits conducted in 1992 and 1994 were conducted by the Nuclear Procurement Issues Committee (NUPIC), a joint utility group. These audits reported a number of findings: eight in 1992 and four in 1994. PP&L determined that none of the findings had a significant impact upon the fire barrier penetration seal program. PP&L took credit for the NUPIC result as the triennial audit of the Brand program. The inspectors reviewed the audits and determined that no safety significant issues existed.

PP&L's QA department conducted audits of the entire fire protection program at Susquehanna and several surveillances on different areas of fire protection. The inspectors reviewed the fire protection program audits from October 17, 1994 and August 8, 1995. Overall, the audit results indicated that the fire protection program was being carried out according to existing program requirements. Penetration seals were specifically addressed in the later report. This included a review of ten randomly selected seals and all supporting documentation, including typical details and the related fire tests. No safety significant issues specifically related to penetration seals were identified in these audits.

The inspectors reviewed the following QA surveillance reports involving fire protection and penetration seals that were performed by the licensee: Fire Protection Surveillance Frequency Review (May 25, 1995), Penetration Seal Maintenance Limiting Condition for Operation (LCO) Review (September 21, 1995), and Brand Fire Protection Services Penetration Seal Typical Detail and Matrix Sheet Review (December 7, 1995). No safety significant issues were identified in these reports.

The determination of the inspectors was that PP&L and Brand had adequate QA programs and no safety significant issues were identified in the implementation of the programs.

2.7 Surveillances

The inspectors reviewed the latest surveillance reports for Unit 1, Unit 2, and plant common areas. The Susquehanna Fire Barrier Penetration Seal surveillance program was based on their Technical Specification for fire protection which specifies that 10% of the Technical Specification penetration seals in the plant must be inspected every 18 months, with all Technical Specification seals being evaluated in 15 years.

Surveillances were conducted according to the specified schedule and the inspectors identified no concerns with the surveillance reports. Most of the surveillances were conducted by one BG&E inspector during the last performance of the procedure and the evaluation and operability determination for every seal inspected was made by a single reviewer. PP&L should consider using additional inspectors in order to provide a more balanced perspective for the surveillance.

A 100% inspection of Technical Specification penetration seals in the control building was completed in 1994, due to the discovery of a number of degraded seals. All the seals that were discovered as degraded have since been repaired.

The area of surveillances was considered by the inspectors to be adequate.

3.0 EXIT MEETING

The exit meeting was conducted on 1 February 1996 by the NRC lead inspector prior to the team's departure from Susquehanna Steam Electric Station (SSES).

The preliminary findings of the inspection team were discussed with various members of the PP&L staff at this meeting. The following were in attendance at the exit meeting or contacted during the inspection.

C. Coddington	SSES Licensing
J. Tripoli	SSES Fire Protection Group Leader
C. Burke	SSES Senior Project Engineer
D. Zaprazny	SSES Project Engineer
J. Newsome	Brand Fire Protection Services, Inc
S. Davis	SSES Fire Protection Engineer
R. Wehry	SSES Licensing
G. Kuczynski	SSES Plant Manager
H. Palmer	SSES NSE Manager
B. McDermott	NRC Resident
J. O'Jullivan	SSES SMG Supervisor
E. McMaurer	SSES Maintenance
J. Finnegan	SSES OES Supervisor
M. Rebuck	SSES Quality Control
J. McLuskey	SSES PSER
R. Prego	SSES NAS Supervisor
M. Dower	SSES PSER