U.S. NUCLEAR REGULATORY COMMISSION
REGION I

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Licensee:	BEC Energy 800 Boylston Street Boston, Massachusetts 02199
Facility:	Pilgrim Nuclear Power Station
Inspection Period:	January 25, 1999, through March 7, 1999
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EXECUTIVE SUMMARY

Pilgrim Nuclear Power Station
NRC Inspection Report 50-293/99-01

This integrated inspection includes aspects of licensee operations, engineering, maintenance, and plant support. The report covers resident inspection for the period of January 25, 1999, through March 7, 1999; in addition, it includes Region I specialist inspector reviews of radiological controls during the week of February 8 - 12, 1999, and a routine core inspection of the security program during the period of March 1-5, 1999.

Operations

- Operators completed operational activities well including a scheduled plant down power to perform control rod scram time testing. Good communication and procedure adherence was observed. The pre-evolutionary brief for this evolution was comprehensive which covered actions for a potential feed water malfunction. Members of the quality assurance staff were observed in the control room providing independent oversight. (Section O1.1)

- Nuclear watch engineer (NWE) shift turnovers were good. In addition to reviewing current plant conditions, the NWEs discussed changes in plant status since the crew's last watch as well as scheduled plant activities. (Section O1.1)

- Operators identified that sample valves were left open out of the normally closed position in the SWC system. The root cause evaluation thoroughly reviewed the human performance aspects of this event. Human error leading to a valve misalignment in the stator cooling water system is considered a non-cited violation. (NCV 99-01-01) (Section O2.1)

- The operations staff did not promptly inform the security staff or senior site management of an operational event which had the potential to involve security tampering issues. Subsequent licensee and NRC review determined that the event did not involve tampering. (Section O2.1)

- The inspector concluded that the Nuclear Safety Review and Audit Committee effectively performed review and audit of station activities and met TS requirements. (Section O7.1)

Maintenance

- Operators were knowledgeable of the recently implemented diesel TS due to effective training and management oversight. (Section M1.1)

- Good pre-job briefs and procedure adherence was displayed during routine maintenance and surveillance activities. (Section M1.1)

- In response to an unplanned trip of an EDG, maintenance troubleshooting identified that the most likely cause involved incorrect calibration of the engine protector. The licensee

interfaced well with the vendor and performed detailed troubleshooting of the trip setpoint in the I&C shop. Maintenance rule requirements regarding the diesel failure and unavailability were properly captured in the licensee's program. (Section M.1.1)

- New fuel inspection training covered all requirements contained in the fuel inspection procedure. The inspection of the fuel bundles was rigorous as demonstrated by the identification of some small foreign material. Good oversight was provided during the training and inspection activities. (Section M1.2)

- A review of control room deficiencies revealed that there was a general increasing trend during 1998. This resulted primarily from a lower problem reporting threshold and also due to I&C staffing issues. Work control group self assessments noted the increasing trend but did not contain actions to reduce the overall number of control room deficiencies. (Section M2.1)

Engineering

- The engineering backlog was tracked by engineering management with established goals in place. The overall backlog has started to trend down slightly during the last quarter. Engineering self assessments determined that additional resources were needed in the form of 4 to 6 additional full time engineers. (Section E2.1)

- A relatively large number (i.e., 76) of operability evaluations remain open. Also, the licensee has not yet established the process for written justification of operability evaluations which will not be resolved during the first opportunity in RFO12. (Section E2.1)

- A design control error effecting the control room air filtration system is considered a non-cited violation (99-01-02). (Section E8.4)

Plant Support

- A limited radiological site characterization performed in February 1999 showed that significant amounts of radioactive contamination were not present in onsite surface soils and appropriate records of spills and other unusual occurrences involving the spread of contamination were maintained in accordance with 10 CFR 50.75 (g). (Section R1.1)

- Radiological planning for refuel outage (RFO) 12 was properly focused on minimizing radiation exposure associated with drywell work where as much as 220 person-rem or 71% of RFO12 dose is expected to be received. The use of expanded dose goals to increase personnel awareness and encourage dose minimization, installation of additional permanent shielding, and assignment of a drywell manager to improve work coordination and reduce time in the drywell through efficiency improvements were positive initiatives. (Section R1.2)

- Security and safeguards activities were performed in a manner that protected public health and safety in the areas of alarm stations, communications, and protected area access control of personnel, packages and vehicles. This portion of the program, as implemented, met the licensee's commitments and NRC requirements. (Section S1)

- Security facilities and equipment in the areas of protected area assessment aids, protected area detection aids, and personnel search equipment were well maintained and reliable, and met the licensee's commitments and NRC requirements. (Section S2)

- Security and safeguards procedures and documentation were properly implemented. Event logs were being properly maintained and effectively used to analyze, track, and resolve safeguards events. (Section S3)

- The security force members (SFMs) adequately demonstrated that they had the requisite knowledge necessary to implement the duties and responsibilities associated with their position. (Section S4)

- Training was conducted in accordance with the training and qualification plan, and based upon interviews and inspector observations was considered effective. (Section S5)

- The level of management support was adequate to ensure effective implementation of the security program, and was evidenced by adequate staffing levels and the allocations of resources to support programmatic needs. (Section S6)

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ATTACHMENTS

REPORT DETAILS

Summary of Plant Status

Pilgrim Nuclear Power Station (PNPS) operated at 100 percent power during this inspection period, with the exception of a planned down power to 50 percent on February 18, 1999. The scheduled down power was to perform scram timing testing and quarterly turbine valve testing.

I. OPERATIONS

O1 Conduct of Operations[1]

O1.1 General Comments (71707)

Using inspection procedure 71707, the inspector conducted frequent reviews of ongoing plant operations. The inspector observed proper control room staffing, effective pre-evolutionary briefings, and plant behavior was appropriate for the plant configuration and plant activities in progress.

Anomalies note by the inspector during pant tours in the control room and plant were discussed with the nuclear watch engineer (NWE). For example, during a tour of the reactor building the inspector identified that the ATWS "Division 1 125 VDC system "A" on" indicator was not lit. The bulb was replaced and the indicator lit as designed. During a subsequent tour on the next day, the inspector again noted that the same ATWS indicator was not lit. An equipment operator inspected the ATWS panel and identified that the light socket was loose. The licensee generated a work request to correct the problem.

The inspector monitored the shift turnover between the off-going and oncoming NWE. The oncoming NWE reviewed the turnover log and the daily status sheet, walked down the operating panels, and discussed changes in the plant status since his last on-shift watch. The NWE reviewed the recent problem reports and planned activities for the scheduled shift.

The inspector monitored the February 18, 1999, scheduled plant down power. The purpose was to perform scram timing testing and quarterly turbine valve testing. The pre-evolution brief by the nuclear operating supervisor was detailed and included actions to take in the event a feed water malfunction occurred. The "A"/"B" feed water regulating valves have experienced some minor packing leakage and erratic valve operation. The inspector noted that members from the quality assurance department were also monitoring these evolutions. During the down power, operators were noted to be following the applicable procedures and using good three-way communication techniques. Equipment problems identified during the surveillance testing were entered into the licensee's corrective action process.

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[1]Topical headings such as O1, M8, etc., are used in accordance with the NRC standardized reactor inspection report outline. Individual reports are not expected to address all outline topics.

02 Operational Status of Facilities and Equipment

O2.1 Valve Misalignment Event

a. Inspection Scope (71707)

A review was performed of the circumstances surrounding a valve misalignment event involving chemistry personnel. The inspector also assessed how the licensee staff evaluated the potential for tampering.

b. Observations and Findings

During routine tour of the turbine building, the nuclear watch engineer (NWE) and turbine building operator identified that the outlet sample valves of the stator water cooling (SWC) system deionizer were open vice in the normally closed position. The valve misalignment was evident by water spraying out onto the SWC skid. The operators immediately closed the sample valves and checked the water level in the SCW system expansion tank. The level was found low so the operators added water to restore level to the normal band. The operators initiated problem report 99.9054 to document, evaluate and implement corrective actions, as needed. Additionally, the NWE contacted chemistry personnel to determine when the last sample had been taken.

During the next shift, the inspector questioned the nuclear operations supervisor (NOS) if the potential for tampering was ruled out. There were no log entries in the NOS or NWE books that addressed this aspect of the event. The inspector was informed that the valve misalignment was still under review but preliminarily suspected that a chemistry technician inadvertently left the valve open. However, the NOS stated that tampering had not been ruled out.

The inspector reviewed the tampering guidance contained in NRC Region I Instruction 960.2, Response to Indications of Potential Tampering, Arson, Vandalism or Malicious Mischief at a Licensee Facility, dated May 23, 1996, and in related NRC Information Notice 96-71, dated December 27, 1996. The inspector identified that the operations staff did not inform the licensee security staff and senior site management of this event. The inspector observed that operators were largely unaware of the guidance contained in the NRC Information Notice. Operators subsequently notified the security manager of the event at which time an investigation was initiated. After interviewing the chemistry technician involved, the security manager determined that the event resulted from poor human performance and ruled out tampering.

The licensee coded PR 99.9054 as a higher level issue that required a full root cause analysis. The licensee root cause determined that the chemistry technician did not secure the sample flow due to the lack of focus and inadequate self checking. This was a violation of procedure 7.2.51. This non-repetitive, non-willful violation is being treated as a Non-Cited Violation, consistent with Appendix C of the NRC Enforcement Policy. This violation is in the licensee's corrective action program as PR 99.9054. (**NCV 50-293/99-01-01**). Several contributing causes were identified including self imposed

schedule pressure. The licensee also reviewed several other chemistry related events that occurred during 1998 for any similarities. The inspector concluded that the root cause evaluation thoroughly reviewed the chemistry human performance aspects of this event.

Several corrective actions were identified ranging from procedure changes, physical changes to the sample line and providing additional training on self-checking for all chemistry technicians. The inspector also noted that an additional corrective action was identified to revise procedure 5.3.14 to increase the operations staff awareness of possible tampering events. Additionally, operations management issued a night order to highlight the significance of potential tampering events and the importance of promptly notifying security and senior management of potential tampering events.

c. Conclusions

Operators identified that sample valves were left open out of the normally closed position in the SWC system. The root cause evaluation thoroughly reviewed the human performance aspects of this event.

The operations staff did not have a complete understanding of the guidance for handling operational events with the potential for tampering. The licensee provided appropriate corrective actions to improve operator awareness in this area.

O7 Quality Assurance in Operations

O7.1 Offsite Review Committee Meeting

a. Inspection Scope (71707)

The inspector attended portions of the Nuclear Safety Review and Audit Committee (NSRAC) meeting that was convened on March 2 and 3, 1999, to assess the committee performance and compliance with technical specifications (TS).

b. Observations and Findings

The NSRAC meets four times a year, which is more frequent than required by technical specifications (TS). It is comprised of both licensed and non-licensed personnel. The inspector verified that a quorum of the NSRAC committee attended the March 1999 meeting. The VP Nuclear Operations and Station Director and the General Manager Technical were also noted to be in attendance for portions of the meeting. During the meeting, various safety related topics were discussed including TS changes and the department forth quarter self assessments.

Based on observed discussions, the inspector determined that the members exhibited a good questioning attitude. The members critically reviewed the quality assurance audits and challenged the department manager on the assessments gained from the observed activities. An effective exchange of information occurred between the plant staff and the NSRAC members.

c. Conclusion

The inspector concluded that the NSRAC effectively performed review and audit of station activities and met TS requirements.

O7.2 Review of INPO Report (71707)

In February 1999, the institute of Nuclear Power Operations (INPO) issued an interim report of their evaluation of the Pilgrim Nuclear Power Station. The two week onsite evaluation was conducted in December 1998. The inspector read the report and determined that there were no safety significant findings that the NRC was not already aware of. No additional NRC inspection was required.

II. MAINTENANCE

M1 Conduct of Maintenance

M1.1 General Maintenance and Surveillance

a. Inspection Scope (61726/62703)

The inspector observed portions of selected surveillance and maintenance activities to verify use of approved procedures, correct system restoration, and proper post work testing. The following activities were observed:

8.4.1	Standby Liquid Pump Quarterly Capacity and Flow Rate Test
8M.2-2.10.1-5	Core Spray Logic System "B" Functional Test
8.2.3	Control Rod Exercise
8.M.2-2.2.1	Recirculation System Differential Pressure Test
9.9	Control Rod Scram Insertion Time Evaluation
8.9.1	Emergency Diesel Generator and Associated Emergency Bus Surveillance

b. Observations and Findings

The inspector verified that the surveillance activities appropriately implemented technical specification (TS) surveillance requirements. Good communication, procedure adherence, and ALARA techniques were displayed by the maintenance craft. The prejob briefings covered the precautions and prerequisites. The inspector verified that the licensee entered the applicable TS action statement during the maintenance activities.

On February 17, 1999, the "A" emergency diesel generator (EDG) failed to start during a routine monthly surveillance. The local annunciator alarm indicated that the EDG tripped due to high crankcase exhauster pressure. The inspector witnessed the EDG trouble shooting activities locally in the EDG building and in the I&C shop. The licencee removed the engine protector to the shop for a more controlled work environment and to better evaluate the components. The inspector noted that the licensee contacted the

vendor to assist in the troubleshooting activities. The licensee identified that the most likely cause involved the incorrect calibration of the engine protector spring. The inspector reviewed the vendor manual and noted that it recommends that the engine protector electrical brushes and diaphragm be replaced at least once per year. Discussions with the licensee revealed that the diaphragm is periodically replaced, but not the brushes. The system engineer indicated that a review of this issue would be performed.

The inspector verified that the licensee properly implemented the EDG technical specification during this event, and that the event was properly captured in the licensee's maintenance rule program. The EDG TS was recently revised allowing a longer LCO action time provided that certain conditions are met. Operations personnel were aware of the new requirements due to effective training and management oversight. The failure of the EDG to start was not characterized as a maintenance rule failure. This is consistent with licensee procedure 1.5.16, Diesel Generator Reliability Program." The malfunction of the engine protector would not have prevented the EDG from starting since this function is bypassed in an emergency. Diesel unavailability was properly captured.

c. Conclusions

Good pre-job briefs and procedure adherence was displayed during routine surveillance activities.

Troubleshooting of the EDG crankcase exhauster was thorough and included input from the diesel vendor. Work activities were conducted in the I&C shop to better evaluate the equipment condition. Maintenance rule requirements regarding the diesel failure and unavailability were properly captured in the licensee's program.

Technical specification requirements were properly implemented during observed maintenance and surveillance activities. Operators were knowledgeable of the recently implemented diesel TS due to effective training and management oversight.

M1.2 Inspection and Channeling of Nuclear Fuel

a. Inspection Scope (62707)

The inspector attended the training for and monitored the licensee during the inspection of the new fuel.

b. Observations and Findings

The training was given by a General Electric representative and included classroom presentation and a one-on-one demonstration of inspection techniques with a new fuel bundle. The quality oversight organization also monitoring the training session.

The inspector monitored the licensee performance during the inspection of several of the 160 fuel bundles and the transportation of the inspected bundle to the spent fuel pool (SFP). The inspector noted that the licensee was following the inspection

procedure and carefully tracking movement of the fuel bundles. A maintenance supervisor was overseeing the inspection activities and a reactor engineer was monitoring fuel movement activities. Good coordination was noted between the various departments. The inspector noted that maintenance personnel were closely inspecting the fuel bundles as evidenced by the identification of some foreign material (small string and paint chip). The maintenance personnel carefully removed this debris prior to placing the bundle in the SFP. Operators also displayed good awareness of equipment conditions as evidenced by the identification of a frayed cable on the refueling bridge on two separate occasions.

c. Conclusions

The new fuel inspection training provided to the licensee covered the requirements contained in the licensee's fuel inspection procedure. The inspection of the fuel bundles was rigorous as demonstrated by the identification of some small foreign material. Good oversight was provided during the training and inspection activities.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Control Room Deficiencies

a. Inspection Scope (62707)

A review was performed of all control room deficiencies to determine the overall performance trend and individual status of each item. As part of this inspection, the inspector obtained a control room deficiencies list dated February 4, 1999. Also, the inspector interviewed various licensee operations and maintenance managers which also included the work control manager. Lastly, the inspector obtained a graph of trend data from the year of 1998.

b. Observations and Findings

There were 40 total control room deficiencies which included 14 outage and 26 running repair items. The items ranged from less significant items such as labeling to more significant items such as a degraded recirculation pump speed controller and a degraded RBCCW system heat exchanger temperature control valve. Also included on the list were deficiencies with several control room chart recorders. The oldest deficiency was local power range monitor (LPRM) 28-45 which has been bypassed since 1996.

The inspector reviewed the work control status for each individual control room deficiency. Several of the work packages were waiting for instrument and controls (I&C) walkdowns or planning. A few packages were waiting on parts or engineering restraint. The inspector noted that a few of the assigned work package status codes needed to be updated. Also, the inspector noted that several of the outage related items were not yet task ready. Lastly, a review of the work control status of the dirty contacts for the "A" recirculation pump speed controller revealed that the licensee planned to perform the corrective maintenance on-line several months after the next refueling outage (i.e., RFO12). The inspector questioned why this repair was not planned sooner such as

on-line prior to the start of RFO12. The licensee initiated a review to evaluate the inspector's question.

A review of trend data of control room deficiencies during 1998 revealed a general increasing trend from 20 in February 1998 to 46 in December 1998. Inspector analysis determined that a sharp increase occurred during the second quarter of 1998. This primarily resulted from a lower problem reporting threshold. Also, the number slowly increased through the end of 1998. The inspector determined that staffing changes in the I&C group contributed to the increase in the number of control room deficiencies. At the end of this inspection period, there were signs of a lowering number of control room deficiencies.

The inspector reviewed the work control quarterly self assessments for 1998. The work control self assessment was predominantly statistically based and used checklists. The increasing number of control room deficiencies was noted in the self assessment. However, the inspector determined that there was no detailed evaluation of the overall increasing trend and possible barriers for reduction.

c. Conclusions

A review of control room deficiencies revealed that there was a general increasing trend during 1998. This adverse trend resulted primarily from a lower problem reporting threshold and also due to I&C staffing issues. Work control group self assessments noted the increasing trend but did not contain actions to reduce the number of control room deficiencies.

III. ENGINEERING

E2 Engineering Support of Facilities and Equipment

E2.1 Engineering Backlog

a. Inspection Scope (37551)

The inspector reviewed the engineering backlog to assess the overall size and trend including the number of open operability evaluations.

b. Observation and Findings

Engineering management maintained statistical data for problem report action items assigned to engineering, vendor manual updates, work request evaluations, operating experience reviews, regulatory commitments, RFO12 preparations and priority one drawing changes. There were approximately 920 open items in the engineering backlog. Each category was tracked weekly with goals established. Most items in the backlog were not overdue and an overall lowering trend was experienced during the previous three months. Additionally, a recent engineering self assessment determined that due to the design basis information project, additional engineering resource was needed. Senior plant management informed the inspector that 4 to 6 additional full time engineers would be added to the staff.

At the end of the inspection period, there were 76 open operability evaluations which was a small decrease from 88 open operability evaluations earlier in the inspection period. Eleven of the 76 open operability evaluations were coded by the licensee as more significant issues using risk assessments. The inspector questioned the licensee how many operability evaluations would not be resolved by the end of RFO12 that is scheduled to end on June 7, 1999. The licensee determined that approximately 12 evaluations would remain open, but that number was subject to change.

The inspector reviewed the controls used by the licensee to justify the adequacy of restarting from RFO12 with some open operability evaluations. NRC Generic Letter 91-18, revision I, specifies that explicit justification is required for degraded and nonconforming conditions not resolved at the first available opportunity. Engineering management informed the inspector that the integrated action database (IADB) will be used to track and justify open operability evaluations not resolved at the first opportunity. The justifications for the 12 items which will not be closed during RFO12 were not yet completed by the licensee. Operations management indicated that the operations procedure for operability evaluations will be reviewed and revised as needed to clarify the justification process.

c. Conclusions

The engineering backlog was tracked by engineering management with established goals in place. The overall backlog has started to trend down slightly during the last quarter. Engineering self assessments determined that additional resources were needed in the form of 4 to 6 additional full time engineers.

A relatively large number (i.e., 76) of operability evaluations remain open. Also, the licensee has not yet established the written justification for operability evaluations which will not be resolved during the first opportunity in RFO12.

E8 Miscellaneous Engineering Issues (92903)

E8.1 (Closed) LER 50-293/98-04-01: Emergency Diesel Generator (EDG) Air Temperature Below Design Limits

This LER supplement documents the corrective actions planned by the licensee to resolve the EDG low room temperature issue. The licensee intends to perform a safety evaluation to establish a revised design basis low temperature limit of 40°F. LER 98-04 was previously discussed in NRC Inspection Report 50-293/98-10. The inspector conducted an on-site review of the LER and verified that the corrective actions are being tracked in the licensee's corrective action program. This LER supplement is **closed**

E8.2 (Closed) LER 50-293/98-07-01: Single Failure Vulnerability of the Residual Heat Removal (RHR) System When in Suppression Pool Cooling Mode

This LER supplement documents the corrective actions planned by the licensee to resolve the RHR single failure vulnerability while in the suppression pool cooling mode. The licensee plans on submitting a license amendment to exclude the combination of events from the licensing basis. LER 98-07 was previously discussed in NRC

Inspection Report 50-293/98-10. The inspector conducted an on-site review of the LER and verified that the corrective actions are being tracked in the licensee's corrective action program. This LER supplement is **closed**.

E8.3 (Closed) LER 50-293/98-15-01: Non-Conservative Degraded Voltage Trip Setpoint

This LER supplement documented the status of the licensee's corrective actions and to correct a statement in the safety consequences. This issue was previously discussed in NRC Inspection Report 50-293/98-06. This LER supplement is **closed**.

E8.4 (Closed) LER 50-293/98-24: Control Room High efficiency Air Filtration System (CRHEAFS) Outside Design Basis

This LER documented that duct tape was installed between the CRHEAFS fan shaft and the fan supply housing instead of mechanical seals. The lack of fan seals could permit approximately 100 cfm of unfiltered air into the control room. The purchase order for the fans did not specify shaft seals nor was the licensee able to verify that one was ever installed. An engineering evaluation was performed that concluded that the system remained operable. Using a realistic source term and actual CRHEAFS test data, the dose to the operators would remain below required limits.

The inspector conducted an on-site review of the LER and reviewed the corresponding engineering evaluation and proposed corrective actions and found them to be appropriate. The inspector verified that the licensee generated a maintenance work request and intends on correcting the problem prior to start up from the May 1999 refueling outage. The lack of a mechanical seal in the CRHEAFS fan shaft is considered a violation of NRC design control requirements. This non-repetitive, non-willful violation is being treated as a Non-Cited Violation, consistent with Appendix C of the NRC Enforcement Policy. (**NCV 50-293/99-01-02**) This violation is in the licensee's corrective action program as PR 98.9528. This LER is **closed**.

IV. PLANT SUPPORT

R1 Radiological Protection and Chemistry (RP&C) Controls

R1.1 February 1999 Limited Radiological Site Characterization

a. Inspection Scope (83726)

In preparation for the potential sale of Pilgrim Nuclear Power Station, BEC Energy conducted a limited radiological site characterization to evaluate the extent of residual radioactivity in site surface soils, storm drain catch basins, and in ground water. Information was gathered by a review of criteria developed for the February 1999 limited site radiological characterization; preliminary results from the limited site characterization; the site 10 CFR 50.75(g) file; documentation associated with a 1993 onsite disposal of construction soil made in accordance with 10 CFR 20.302(a); interviews with cognizant personnel; and tours of the site.

b. Observations and Findings

A limited radiological site characterization plan was developed based on a review of past spills documented in a 10 CFR 50.75(g) file and interviews with knowledgeable personnel with the goal being to provide a limited but representative sampling of the site environs. The sampling effort included direct in-situ gamma measurements, sediment sampling from storm drain catch basins, and soil and ground water samples. Approximately 166 locations across the site were evaluated and a total of about 213 samples/measurements were made. A review of a site map with identified sampling locations and a review of the site 10 CFR 50.75(g) file (i.e., documentation of past site spills) showed that the sample plan provided a reasonable sampling of the site and included biased samples in areas that could have been affected by plant operations. The detection limit used for soil and water was one tenth of the calculated value that would result in a total effective dose equivalent of 25 mrem/year to a critical population.

Overall sampling results showed that significant amounts of radioactive contamination were not present in surface soils, storm drain catch basins, or groundwater. Three locations, including one soil sample (SS-16) and two storm drain catch basins (CB-1 and CB-4), were found to have radioactive contamination above the established detection limit. Sampling and survey results showed that the location of soil sample SS-16 was remediated by the act of sampling. A preliminary evaluation of the hazard associated with the contamination detected in the storm drain catch basins determined remediation of the storm drain catch basins was not required due to low radioactivity levels. Although the exact reason for the presence of contamination at the three locations was not established, the likely origin of the contamination was determined based on reviews of plant practices and documentation in the site 10 CFR 50.75(g) file. Locations with radioactive contamination above the established detection limit were as follows:

Pilgrim Limited Site Characterization - February 1999: Locations with Detectable Contamination**			
Sample	Location	Isotopic Activity (pCi/kg)	Likely Source of Contamination Based on Review of Plant Practices and 10CFR50.75 (g) file
Soil: SS-16	Yard Between CST & Fire Water Tanks	Cs-137: 14,500 Co-60: 753	Migration from former spills at the radwaste truck lock or from former outside radioactive material storage areas
Catch Basin: CB-1	~100 ft. South of Intake Structure	Cs-137: 2,220 Co-60: 531	Neutralizer Sump (normal effluent pathway)
Catch Basin: CB-4	~25 ft. South of Offgas Retention Bldg	Cs-137: 2,080 C0-60: 465	Resin released via the plant equipment exhaust duct, discovered in June 1982.

**Greater than 2.5 mrem/y total effective dose equivalent

SS-16 Soil Sample:

The SS-16 soil sample was obtained at the union of three small cracks in the asphalt located between the condensate storage tanks and the fire water tanks. The location was sampled to a depth of two feet and contamination was detected only in the top six inches of soil. Six additional soil samples, each at a five foot radius from SS-16, were obtained to evaluate the extent of soil contamination. Preliminary results available at the time of the inspection showed that the act of sampling remediated the soil at SS-16 and no contamination was detected in the top six inches of soil of any of the additional samples. Based on those preliminary results the licensee concluded that the contamination detected at SS-16 was anomalous and not pervasive in the soil, and likely migrated from a former spill at the radwaste truck lock or from a former nearby outside radioactive material storage area.

Storm Drain Catch Basins CB-1 and CB-4

Storm drain catch basins CB-1 and CB-4 were sampled simply by scooping sediment from the storm drain catch basins. Catch basin CB-1 was within a storm drain tree (flow path) that received a monitored effluent from the neutralizer sump and collected water from storm drains located on the south western side of the site. The outfall of the storm drain tree was monitored by monthly grab samples and was released to the discharge canal which was a monitored effluent pathway. Catch basin CB-4 was within a storm drain tree that collected surface water from the south and eastern areas of the site and released the water to the intake canal. The outfall of the storm drain was monitored monthly by grab samples.

Licensee staff attributed contamination in catch basin CB-1 to the neutralizer sump that discharged to the storm drain as a normal effluent pathway. Based on review of the site 10 CFR 50.75(g) file, licensee staff concluded that contamination in catch basin CB-4 likely originated from condensate resin that was known to have been released from the plant exhaust duct to building roofs and the yard in June of 1982. A U.S. Department of Energy computer code named RESRAD was used to evaluate the hazard associated with the presence of contamination in the storm drain. Results of the computer code calculation showed that if the contamination in the catch basis was pervasive in surface soil, the total effective dose equivalent per year to an average member of a critical group would be about 10 mrem/year, which is below the 25 mrem/year radiological criteria for unrestricted use presented in 10 CFR 20.1402. The licensee further reported that the contamination in the catch basin sediment did not produce radiation levels above background as detected with standard radiation survey instruments and could not be detected using typical removable contamination survey techniques. Accordingly, based on the low radioactivity levels present, the licensee concluded that no radiological postings or radiological access controls for storm drain access were warranted. Licensee staff also determined that if the contamination in the storm drain were mixed with a sufficient volume of water to carry the sediment to the storm drain outfall, the contamination would be below detection limits and therefore would also be below 10 CFR 20, Appendix B, effluent limits. Licensee staff further reported that samples from storm drain outfalls were collected on a monthly basis and had not shown any significant activity and the environmental monitoring program had not detected

significant offsite contamination. Consequently, licensee staff concluded that the contamination detected in the storm drain sediment did not present a hazard to personnel on or offsite.

10 CFR 50.75(g) file

A 10 CFR 50.75(g) file was maintained that provided records of spills or other unusual occurrences which involved the spread or identification of contamination in or around the facility. Records included 25 separate entries spanning from September 1975 to February 1999, and included the results of the February 1999 site radiological characterization evaluation. Each entry included a description and/or map of affected areas, a description of circumstances which resulted in the contamination if known, the date of occurrence/identification, and a description of any remediation performed. Records showed and licensee staff reported that the majority of items included in the 10 CFR 50.75(g) file were completely remediated when they occurred but were included in the file as relevant information for future decommissioning. Overall, records were clear and legible; however, some records included only a general description of affected areas (i.e., were not precise) and a few pages were difficult to read or illegible.

The file also contained details regarding a 1993 onsite disposal of slightly contaminated construction soil that was made in accordance with 10 CFR 20.302(a). Records were complete and calculations showed that residual radioactivity present in the soil would meet criteria considered acceptable for unrestricted use in accordance with 10 CFR 20.1402.

c. Conclusions

A limited radiological site characterization performed in February 1999, showed that significant amounts of radioactive contamination were not present in onsite surface soils and appropriate records of spills and other unusual occurrences involving the spread of contamination were maintained in accordance with 10 CFR 50.75(g).

R1.2 ALARA Planning for Refueling Outage

a. Inspection Scope (83728)

A review was performed of preparations and plans to maintain radiation exposures during refuel outage (RFO) 12 as low as is reasonably achievable (ALARA). Information was gathered by a review of radiation dose goals, a summary of ALARA Planning for RFO12, radiological survey data for the drywell, selected ALARA job packages, interviews with cognizant personnel, and tours through the plant.

b. Observations and Findings

Radiation dose goals had been established for major work groups and activities scheduled for RFO 12. This included maintenance, plant modifications, engineering and quality control, scaffolding and insulation work, radiation protection, refueling, operations and chemistry, and security and fire watch tours. The outage dose estimate was

approximately 339 person-rem and a challenge goal of 310 person-rem had been established by the Station ALARA Committee. Approximately 220 person-rem or ~71% of the 310 person-rem goal was expected to be received supporting and performing work in the drywell. The drywell dose estimate included dose savings from previous dose reduction measures including a 1997 chemical decontamination of recirculation discharge piping, use of depleted zinc injection, and installed permanent shielding. Some dose savings were also expected from work scope reductions including relief from five recirculation nozzle inspection requirements due to hydrogen water chemistry and predicted reductions in snubber inspection scope. Other savings were expected to come from improved shielding, remote monitoring of personnel, improved management oversight to reduce person-hours in the radiologically controlled areas, unlatching control rod drives from the refuel floor, expanded use of drywell dose goals, and improved planning for drywell work. A radiological controls drywell manager had been assigned and an ALARA action team had been established to focus on improved coordination and reducing time in the drywell through efficiency improvements. Examples of efficiency improvements included set-up of a tool crib at the drywell, planned use of an electronic chain hoist, setup of water drainage stations, installation of temporary electrical and water supplies, installation of a temporary drywell ladder, and expanded use of audiovisual equipment for communications and monitoring.

c. Conclusion

Radiological planning for refuel outage (RFO) 12 was properly focused on minimizing radiation exposure associated with drywell work where as much as 220 person-rem or 71% of RFO12 dose is expected to be received. Previous drywell dose saving initiatives included chemical decontamination of the recirculation discharge system, use of depleted zinc injection, and installation of permanent shielding. Planned initiatives for RFO12 include expanded use of drywell dose goals to increase personnel awareness and encourage dose minimization, installation of additional permanent shielding, and assignment of a drywell manager with a focus on improving work coordination and reducing time in the drywell through efficiency improvements.

S1 Conduct of Security and Safeguards Activities

a. Inspection Scope (81700)

Determine whether the conduct of security and safeguards activities met the licensee's commitments in the NRC-approved security plan (the Plan) and NRC regulatory requirements. The security program was inspected during the period of March 1-5, 1999. Areas inspected included: alarm stations; communications; protected area (PA) access control of personnel, packages and vehicles.

b. Observations and Findings

Alarm Stations. Multiple observations of operations in the Central Alarm Station (CAS), and the Secondary Alarm Station (SAS) provided verification that the alarm stations were equipped with appropriate alarms, surveillance and communications capabilities. Interviews with the alarm station operators found them knowledgeable of their duties

and responsibilities. It was also verified, through observations and interviews, that the alarm stations were continuously manned, independent and diverse so that no single act could remove the plants capability for detecting a threat and calling for assistance and the alarm stations did not contain any operational activities that could interfere with the execution of the detection, assessment and response functions.

Communications. Document reviews and discussions with alarm station operators, demonstrated that the alarm stations were capable of maintaining continuous intercommunications, communications with each security force member (SFM) on duty, and were exercising daily communication methods with the local law enforcement agencies as committed to in the Plan.

PA Access Control of Personnel, Hand-Carried Packages and Vehicles. On March 2 and 3, 1999, personnel and package search activities were observed at the personnel access portal. It was determined that positive controls were in place to ensure only authorized individuals were granted access to the PA and that all personnel and hand carried items entering the PA were properly searched. In addition, on March 3 and 4, 1999, the physical search of three vehicles at the vehicle entry point was observed. The searches were thorough and vehicle entries were properly documented.

c. Conclusions

The licensee conducted its security and safeguards activities in a manner that protected public health and safety and that this portion of the program, as implemented, met the licensee's commitments and NRC requirements.

S2 Status of Security Facilities and Equipment

a. Inspection Scope (81700)

Areas inspected were: PA assessment aids, PA detection aids and personnel search equipment testing.

b. Observations and Findings

PA Assessment Aids. On March 2 and 3, 1999, the effectiveness of the assessment aids was evaluated, by observing on closed circuit television(CCTV) in the SAS and CAS, respectively, a SFM conducting a walkdown of the perimeter of the PA. The assessment aids generally had good picture quality and zone overlap. Additionally, to ensure Plan commitments are satisfied, the licensee has procedures in place requiring the implementation of compensatory measures in the event the alarm station operators are unable to properly assess the cause of an alarm.

Personnel and Package Search Equipment. On March 2 and 3, 1999, both routine use and performance testing of the licensee's personnel and package search equipment were observed. Observations and procedural reviews indicated that the search equipment performed in accordance with licensee procedures and Plan commitments.

PA Detection Aids. During the camera walkdowns on March 2 and 3, 1999, multiple observations of a SFM conducting performance testing of the perimeter intrusion detection system (PIDS) were conducted. The appropriate alarms were generated in each attempt. The equipment was functional and effective and met the requirements of the Plan.

c. Conclusions

The licensee's security facilities and equipment were determined to be well maintained and reliable, and were able to meet the licensee's commitments and NRC requirements.

S3 Security and Safeguards Procedures and Documentation

a. Inspection Scope (81700)

Areas inspected were: implementing procedures and security event logs.

b. Observations and Findings

Security Program Procedures. Verification that the procedures were consistent with the Plan commitments, and were properly implemented was accomplished by reviewing selected implementing procedures associated with PA access control of personnel, packages and vehicles, testing and maintenance of personnel search equipment and performance testing of PA detection aids.

Security Event Logs. The Security Event Logs for the previous twelve months were reviewed. Based on this review, and discussion with security management, it was determined that the licensee appropriately analyzed, tracked, resolved and documented safeguards events that the licensee determined did not require a report to the NRC within 1 hour.

c. Conclusions

Security and safeguards procedures and documentation were being properly implemented. Event Logs were being properly maintained and effectively used to analyze, track, and resolve safeguards events.

S4 Security and Safeguards Staff Knowledge and Performance

a. Inspection Scope (81700)

Area inspected was: security staff requisite knowledge

b. Observations and Findings

Security Force Requisite Knowledge. Observations of a number of SFMs in the performance of their routine duties were conducted during the inspection period. These observations included alarm station operations, personnel, package and vehicle

searches, and performance testing of the PIDS. Additionally, interviews of SFMs were conducted. Based on the responses, it was determined that the SFMs were knowledgeable of their responsibilities and duties, and could effectively carry out their assignments.

c. Conclusions

The SFMs adequately demonstrated that they had the requisite knowledge necessary to effectively implement the duties and responsibilities associated with their position.

S5 Security and Safeguards Staff Training and Qualification

a. Inspection Scope (81700)

Areas inspected were security training and qualifications, and training records.

b. Observations and Findings

Security Training and Qualifications. On March 3, 1999, eight randomly selected T&Q records of SFMs were reviewed. Physical and requalification records were inspected for armed and supervisory personnel. The results of the review indicated that the security force was being trained in accordance with the approved T&Q plan. In addition, on March 4, 1999, observation of a classroom briefing was conducted. The classroom briefing was related to vehicle search procedures.

Training Records. Review of training records indicated that the records were properly maintained, accurate and reflected the current qualifications of the SFMs.

c. Conclusions

Security force personnel were being trained in accordance with the requirements of the training and qualification plan. Training documentation was properly maintained and accurate and the training provided by the training staff was effective.

S6 Security Organization and Administration

a. Inspection Scope (81700)

Areas inspected were: management effectiveness and staffing levels.

b. Observations and Findings

Management Effectiveness. A review of the management organizational structure and reporting chain indicated that the Security Manager's position in the organizational structure provides a means for making senior management aware of programmatic needs.

Staffing Levels. The inspector verified that the total number of trained SFMs immediately available on shift met the requirements specified in the Plan.

c. Conclusion

The level of management support was adequate to ensure effective implementation of the security program, and was evidenced by adequate staffing levels and the allocations of resources to support programmatic needs.

V. MANAGEMENT MEETINGS

X1 Exit Meeting Summary

The inspector met with licensee representatives at the conclusion of the inspection on March 19, 1999. At that time, the purpose and scope of the inspection were reviewed, and the preliminary findings were presented. The licensee acknowledged the preliminary inspection findings.

X3 Management Meeting Summary

On February 11th and 12th, Mr. Hubert Miller, NRC Region I Administrator, Mr. A. Randolph Blough, Director of Division of Reactor Projects, and Mr. Clifford Anderson, Branch Chief, visited the site. All toured the plant, interviewed various licensee personnel and met with the resident inspectors. On February 12th, Mr. Blough made a presentation on the new reactor oversight program to the Pilgrim Branch American Nuclear Society.

ATTACHMENT 1

INSPECTION PROCEDURES USED

IP 37551:	Onsite Engineering
IP 40500:	Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 61726:	Surveillance Observation
IP 62707:	Maintenance Observation
IP 71707:	Plant Operations
IP 71750:	Plant Support Activities
IP 81700:	Physical Security Program for Power Reactors
IP 82301:	Evaluation of Exercises for Power Reactors
IP 92700:	Onsite Followup of Written Reports of Nonroutine Events at Power Reactor Facilities
IP 92901:	Followup - Operations
IP 92902:	Followup - Maintenance
IP 92903:	Followup - Engineering
IP 92904:	Followup - Plant Support
IP 93702:	Prompt Onsite Response to Events at Operating Power Reactors

ITEMS OPENED, CLOSED, AND UPDATED

Closed

LER 98-04-01	Emergency Diesel Generator (EDG) Air Temperature Below Design Limits
LER 98-07-01	Single Failure Vulnerability of the Residual Heat Removal (RHR) System When in Suppression Pool Cooling Mode
LER 98-15-01 Non-	Conservative Degraded Voltage Trip Setpoint
LER 98-24	Control Room High efficiency Air Filtration System (CRHEAFS) Outside Design Basis

Open/Closed

NCV 99-01-01	Chemistry Sample Valves Left Open
NCV 99-01-02	Control Room High efficiency Air Filtration System (CRHEAFS) Outside Design Basis

LIST OF ACRONYMS USED

ALARA	As Low As Is Reasonably Achievable
BECo	Boston Edison Company
CAS	Central Alarm Station
CCTV	closed circuit television
CFR	Code of Federal Regulations
DRP	Division of Reactor Projects
EP	Emergency Preparedness
IFI	Inspection Follow-Up Item
IR	Inspection Report
LER	Licensee Event Report
NCV	Non-Cited Violation
NOV	Notice of Violation
NRC	Nuclear Regulatory Commission
NRR	Office of Nuclear Reactor Regulation
PA	protected area
PDR	Public Document Room
PNPS	Pilgrim Nuclear Power Station
QA	quality assurance
RFO	Refueling Outage
SAS	Secondary Alarm Station
SFM	security force member
T&Q	training and qualification
the Plan	NRC-approved physical security plan
UFSAR	Updated Final Safety Analysis Report
VIO	Violation