

## CHAIRMAN Resource

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**Sent:** Friday, January 06, 2017 9:08 PM  
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**Cc:** William Maurer  
**Subject:** [External\_Sender] Call to close Pilgrim Nuclear Reactor/pending winter storm to hit Plymouth  
**Attachments:** NRC January 26, 2015 Supplemental Inspection Report.pdf; ATT00001.htm; Pilgrim LOOP Summary 2 - Google Docs.pdf; ATT00002.htm

To whom it may concern:

Cape Downwinders is calling on the Nuclear Regulatory Commission to order the shut down of the Pilgrim nuclear reactor due to the impending winter storm to hit Plymouth.

The following is an excerpt from the forecast from the National Weather Service on 1/6/2017: *"Impacts: near blizzard conditions are possible as snow becomes heavy at times along with gusty northeast winds resulting in considerable blowing and drifting of snow with near White Out Conditions Forecast. Untreated roads will become snow covered and slick. Visibility will be reduced. Travel will become hazardous."*

A complete and updated forecast can be found at this link: [Winter Storm Warning in Massachusetts](#)

Pilgrim's switch yard has a long and well known history of ground faulting also called "flash overs" which results in a Loss Of Offsite Power (LOOP) event and then a Scram. Since the Blizzard of '78' Pilgrim's switch yard has failed during blizzards and nor'easter storms nine (9) times (see attachment: Pilgrim LOOP Summary). To make matters worse, evacuations are impossible during severe winter weather conditions, sometimes for days before even limited travel is possible, never mind evacuating volumes of traffic. The NRC had reported that, during a winter storm in 2015, evacuation was possible when, in fact, area emergency directors said otherwise. <http://files.ctctcdn.com/3f5c2ed6201/2c33881e-5d41-4ff8-a627-5ca685aa489c.pdf>

Pilgrim was never shut down in advance of severe winter weather conditions as a precaution until concerned citizens connected the dots for Entergy, the NRC and MEMA after the January 2015 Nor'easter and Blizzard named Juno that infamously revealed the weaknesses of the MBTA. If you didn't know, Pilgrim has it's own problems with severe winter. These failures have been recurrent since 1978, and the vulnerabilities of Pilgrim's switch yard to severe winter weather conditions have never been resolved. Again, thanks to concerned citizens, precautionary shut downs were finally considered before Nor'easter Neptune hit in February, 2015. Before this, they just kept rolling the dice until Pilgrim Scrammed. It's important to note that the Juno scram was complicated by multiple safety equipment failures during the Scram and was labelled a 'near miss' by the Union of Concerned Scientists.

Connecting the dots isn't complicated, insightful or heady stuff, especially for experts who are intimately familiar with Pilgrim's problems. We can only think of two reasons that MEMA, FEMA, the NRC, Entergy, Pilgrim Nuclear Power Plant employees, staff and management failed to recognize the risk they were subjecting the public to:

- Incompetence of the Emergency Management professionals at FEMA and MEMA, the risk assessment experts at the NRC and management of Pilgrim by Entergy.
- With Safety Culture issues in the spot light these days, possibly willful and reckless risk taking with public safety to maximize profit.

Therefore we are writing to demand Pilgrim be shut down in a controlled fashion in advance of the approaching storm as a precaution in light of the switch yard weaknesses and risks associated with Scrams at a forty-four year old reactor showing it's age. Pilgrim is one three most unsafe reactors in the country, all three reactors not coincidentally owned and operated by Entergy. In addition, the fact is evacuations are impossible during severe winter weather conditions.

One final piece of information is quite concerning. In the January 26, 2015 Supplemental Inspection Report (attached), it was reported that Entergy forgot to send the insulators that failed in the February 8, 2013 blizzard named NEMO. They were discovered in storage and had never been sent out for the testing required and necessary to make a Root Cause Determination of the switch yard failure and formulate a Corrective Action Plan going forward. Similarly the NRC never picked up on the oversight either until stumbling over the insulators two years after the fact. A copy of the January 26, 2015 Supplemental Inspection Report is attached and the segment is highlighted on page 4.

Cape Downwinders continues to call for the immediate and permanent shut down of Pilgrim. Given the impending winter storm and particularly after the leaked NRC email highlighting the lack of maintenance, incompetent procedural applications, and ongoing equipment failures, as a minimal

request we demand the shut down of Pilgrim nuclear reactor during this winter storm for public safety.

For Cape Downwinders,

William Maurer, Falmouth [wmmaurer@comcast.net](mailto:wmmaurer@comcast.net) Diane Turco, Harwich [tturco@comcast.net](mailto:tturco@comcast.net)



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION I  
2100 RENAISSANCE BLVD., SUITE 100  
KING OF PRUSSIA, PA 19406-2713

January 26, 2015

EA 14-229

Mr. John Dent  
Site Vice President  
Entergy Nuclear Operations, Inc.  
Pilgrim Nuclear Power Station  
600 Rocky Hill Road  
Plymouth, MA 02360-5508

**SUBJECT: PILGRIM NUCLEAR POWER STATION - NRC 95002 SUPPLEMENTAL  
INSPECTION REPORT 05000293/2014008 AND ASSIGNMENT OF TWO  
PARALLEL WHITE PERFORMANCE INDICATOR INSPECTION FINDINGS**

Dear Mr. Dent:

On December 2, 2014, the U.S. Nuclear Regulatory Commission (NRC) completed a supplemental inspection in accordance with Inspection Procedure (IP) 95002 at Pilgrim Nuclear Power Station (Pilgrim). The enclosed report documents the inspection results, which were discussed on December 12, 2014, with you and other members of your staff. The inspection was performed because Pilgrim experienced four scrams in 2013 which resulted in two performance indicators (PI) in the Initiating Events cornerstone, Unplanned Scrams per 7000 Critical Hours and Unplanned Scrams with Complications, crossing the threshold from Green to White. Entergy Nuclear Operations, Inc. (Entergy) performed four root cause evaluations for the individual scram events. Additionally, Entergy performed a root cause evaluation to assess the commonalities between the four scram events and a common cause analysis to assess if any safety culture aspects caused or significantly contributed to the events.

The NRC performed this supplemental inspection to determine if: (1) the root and contributing causes of individual and collective risk-significant performance issues were understood; (2) the extent of condition and extent of cause for the individual and collective risk-significant performance issues were understood; and (3) your completed or planned corrective actions for the risk-significant performance issues are sufficient to address the root and contributing causes and prevent recurrence. The NRC also conducted an independent review of the extent of condition and extent of cause for the two white PIs and an assessment of whether any safety culture component caused or significantly contributed to the performance issues.

Overall, the NRC has determined that your actions have not provided the assurance level to fully meet all of the inspection objectives and have correspondingly determined that Pilgrim will remain in the Degraded Cornerstone of the Action Matrix by the assignment of two parallel White PI inspection findings. Although inspectors determined that, in general, Entergy's problem identification, cause evaluation, and corrective action plans for the White PIs were adequate, they identified deficiencies regarding Entergy's execution of corrective actions

documented in the corrective action plans, as well as Entergy's understanding of some of the causes of the issues. Specifically, inspectors identified several examples where corrective actions were not completed as intended or were closed prematurely. Additionally, for one of the root cause evaluations, inspectors determined that Entergy failed to investigate a deficient condition in accordance with corrective action program (CAP) requirements to ensure they fully understood all of the causes of one of the scram events.

With respect to the safety culture review, inspectors determined that Entergy's evaluations appropriately identified the safety culture aspects that caused or significantly contributed to the performance issues. In particular, Entergy identified that implementation of the station's CAP has not been effective in ensuring adequate corrective actions are taken to address issues in a timely manner. Inspectors determined that the specific deficiencies in execution of corrective actions and causal analysis were indicative of the CAP implementation weakness identified in the safety culture review. Correspondingly, inspectors determined that corrective actions identified to improve performance in this area have not been effective. Ultimately, inspectors determined that your actions in total did not provide the assurance level required to meet inspection objectives and represent a significant weakness. In accordance with IP 95002 and Inspection Manual Chapter 0305, if the licensee did not (1) adequately evaluate the causes or (2) take or plan adequate corrective actions for a safety-significant PI, then a parallel PI inspection finding will be opened and given the same color as the PI. As such, based on the significant weakness identified above, the NRC is assigning two parallel White PI inspection findings in this report.

Accordingly, Pilgrim will remain in the Degraded Cornerstone Column of the Action Matrix until the NRC verifies, through the successful completion of a supplemental inspection, that Entergy has taken actions to address the deficiencies identified in evaluation or correction of the individual performance issues discussed above. Specifically, the inspection will verify that Entergy has taken action to: (1) address the specific deficiencies in execution of corrective actions; (2) address the deficient cause evaluation; and (3) understand why corrective actions intended to address the identified CAP implementation weakness were not effective at ensuring the inspection objectives were satisfied. You or your staff should contact the NRC for a follow-up inspection when sufficient corrective actions have been completed or planned to address these weaknesses. Additionally, the NRC will continue to assess the effectiveness and sustainability of your efforts to address challenges in CAP implementation during the next biennial problem identification and resolution inspection, scheduled for August 2015.

In addition to the two parallel White PI inspection findings, this report documents two findings of very low safety significance (Green). One of these findings was determined to involve a violation of NRC requirements. However, because of the very low safety significance, and because it is entered into your CAP, the NRC is treating this finding as a non-cited violation, consistent with Section 2.3.2.a of the NRC Enforcement Policy. If you contest the non-cited violation in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001; with copies to the Regional Administrator, Region I; the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001; and the NRC Resident Inspector at Pilgrim. In addition, if you disagree with the cross-cutting aspect assigned to any finding, or a finding not associated with a regulatory requirement in this report, you should provide a response within 30

J. Dent

3

days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I, and the NRC Resident Inspector at Pilgrim.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

*/RA/*

Ho K. Nieh, Director  
Division of Reactor Projects

Docket No. 50-293  
License No. DPR-35

Enclosure: Inspection Report No. 05000293/2014008  
w/ Attachment: Supplemental Information

cc w/encl: Distribution via ListServ

days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region I, and the NRC Resident Inspector at Pilgrim.

In accordance with Title 10 of the *Code of Federal Regulations* (10 CFR) 2.390, "Public Inspections, Exemptions, Requests for Withholding," of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC's Public Document Room or from the Publicly Available Records component of the NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

Sincerely,

**/RA/**

Ho K. Nieh, Director  
Division of Reactor Projects

Docket No. 50-293  
License No. DPR-35

Enclosure: Inspection Report No. 05000293/2014008  
w/ Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION

REGION I

Docket No. 50-293

License No. DPR-35

Report No. 05000293/2014008

Licensee: Entergy Nuclear Operations, Inc. (Entergy)

Facility: Pilgrim Nuclear Power Station

Location: Plymouth, Massachusetts

Dates: November 3, 2014 through December 12, 2014

Inspectors: J. Greives, Senior Resident Inspector, Lead Inspector  
C. Bickett, Senior Project Engineer  
S. Rich, Resident Inspector  
J. Patel, Reactor Inspector  
M. Keefe, Human Factors Specialist, Safety Culture Lead  
S. Morrow, Human Factors Engineer  
A. Keim, Reactor Operations Engineer  
B. Smith, Resident Inspector

Approved by: Raymond R. McKinley, Chief  
Reactor Projects Branch 5  
Division of Reactor Projects

## TABLE OF CONTENTS

SUMMARY OF FINDINGS .....	3
REPORT DETAILS .....	8
4. OTHER ACTIVITES .....	8
4OA4 Supplemental Inspection (95002) .....	8
01 Inspection Scope.....	8
02 Evaluation of the Inspection Requirements.....	9
02.01 Problem Identification.....	9
02.02 Root Cause, Extent of Condition, and Extent of Cause Evaluation.....	14
02.03 Corrective Actions .....	25
02.04 Independent Assessment of Extent of Condition and Extent of Cause.....	42
02.05 Safety Culture Consideration .....	46
02.06 Evaluation of IMC 0305 Criteria for Treatment of Old Design Issues.....	48
ATTACHMENT: SUPPLEMENTAL INFORMATION.....	49
SUPPLEMENTAL INFORMATION .....	A-1
KEY POINTS OF CONTACT .....	A-1
LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED.....	A-1
LIST OF DOCUMENTS REVIEWED .....	A-2
LIST OF ACRONYMS.....	A-6

## SUMMARY OF FINDINGS

Inspection Report (IR) 05000293/2014008; 11/3/2014 – 12/12/2014; Pilgrim Nuclear Power Station (Pilgrim); Supplemental Inspection – Inspection Procedure (IP) 95002.

A senior resident inspector, senior project engineer, two resident inspectors, one reactor inspector, one human factors specialist, one human factors engineer, and one reactor operations engineer performed this inspection. The inspectors assigned two White parallel Performance Indicator (PI) inspection findings. Additionally, inspectors identified two findings of very low safety significance (Green), one of which was determined to be a non-cited violation (NCV). The significance of most findings is indicated by their color (i.e., greater than Green, or Green, White, Yellow, Red) and determined using Inspection Manual Chapter (IMC) 0609, "Significance Determination Process (SDP)," dated June 2, 2011. Cross-cutting aspects are determined using IMC 0310, "Aspects Within the Cross-Cutting Areas," dated December 4, 2014. All violations of NRC requirements are dispositioned in accordance with the NRC's Enforcement Policy, dated July 9, 2013. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process," Revision 5, February 2014.

### **Cornerstone: Initiating Events**

The NRC staff performed this supplemental inspection in accordance with IP 95002, "Supplemental Inspection for One Degraded Cornerstone or Any Three White Inputs in a Strategic Performance Area," dated February 9, 2011, to assess Entergy's root and common cause evaluations associated with Pilgrim's entry into the Degraded Cornerstone Column of the Reactor Oversight Program (ROP) Action matrix due to two White PIs in the Initiating Events cornerstone. Pilgrim experienced four scrams in 2013 which resulted in the Unplanned Scrams per 7000 Critical Hours and Unplanned Scrams with Complications PIs crossing the threshold from Green to White.

Entergy performed a root cause evaluation (RCE) for each of the unplanned scram events. Additionally, Entergy performed a RCE upon entry into the Degraded Cornerstone Column to identify weaknesses which led to the degraded cornerstone and to document a collective causal evaluation. Entergy also conducted a common cause analysis (CCA) to perform a review of the site safety culture and determine if any aspects of safety culture contributed to the four scram events. For each of the evaluations, Entergy identified corrective actions to address the identified causes. In performance of these reviews, Entergy identified challenges in corrective action program (CAP) implementation in that Entergy has not taken corrective actions to address identified issues and causes in a timely manner. Entergy's CCA documented that this was the leading driver behind challenges in nuclear safety culture behaviors at Pilgrim. Additionally, Entergy identified that individuals did not always understand the importance of adhering to nuclear standards and that station leaders have not consistently exhibited behaviors that set the appropriate standards.

Although, the inspectors determined that, in general, Entergy's problem identification, cause evaluation, and corrective action plans for the two White Initiating Events PIs were adequate, they identified deficiencies regarding Entergy's execution of corrective actions documented in the corrective action plans, as well as Entergy's understanding of some of the causes of the issues.

Inspectors identified that Entergy had not completed several corrective actions adequately or in a timely manner as specified in the RCEs and as required by their CAP. Specifically, for the scram which occurred on February 8, 2013, during a winter storm, Entergy did not complete an action to send a faulted component for failure analysis in accordance with CAP procedure requirements. This prevented the inspectors from verifying that Entergy understood the material condition of the main switchyard transformer insulators and that the material condition and supporting preventative maintenance tasks were sufficient. The intent of this testing is to assist in determining a replacement strategy for insulators and is used to determine the condition of the insulator exterior glazing which is effective against contamination from coastal salt, fog, and/or mist conditions. Additionally, inspectors identified that Entergy had failed to complete one of the effectiveness reviews for this RCE in accordance with their CAP requirements.

Inspectors also determined that implementation of several corrective actions was inadequate to provide assurance that the corrective action plan for a loss of reactor recirculation flow which resulted in a reactor scram on January 10, 2013, was sufficient to address the root and contributing causes, including the extent of those causes. The corrective action plan included actions to review surveillance procedures and ensure they did not have similar deficiencies (e.g., physical work complete prior to system restoration, critical steps identified). Training was conducted with personnel to reinforce human performance standards and enhanced oversight of field activities by managers and supervisors was specified to reinforce human performance standards in the field. Entergy conducted assessments of the RCE prior to this inspection and self-identified that many of these actions had either not been completed as intended or lacked sufficient evidence to support closure. Despite additional actions being specified to correct the licensee-identified deficiencies, the inspectors identified that many of the human performance related actions were either cancelled or closed. As an example, a maintenance standing order was created and signed by maintenance supervisors in September 2014 which directed interim actions for enhanced supervisor oversight and procedure review in preparation for maintenance. This was an interim action until a long-term procedure upgrade project for maintenance was complete. Despite this, inspectors identified that the maintenance standing order was not being implemented at the time of the on-site inspection. Inspector's observation of maintenance execution and review of recently completed maintenance did not support closure or cancellation of corrective actions identified in the RCE.

For the scram that occurred on August 22, 2013, an electrical transient on a non-safety-related bus resulted in the loss of all reactor feedwater. Inspectors determined that Entergy's RCE adequately investigated a modification that created the single point vulnerability (SPV) to a loss of all reactor feed. However, inspectors determined that Entergy did not investigate the cause of the electrical transient in accordance with station CAP requirements sufficiently to ensure all the causes were understood. The electrical transient was directly caused by a failed cable splice; however, Entergy did not investigate this failure mechanism sufficiently to determine the specific cause such that the extent of cause could be understood and appropriate corrective actions could be taken.

Inspectors noted that both the common cause evaluation and safety culture review performed by Entergy appropriately identified that implementation of the station's CAP had not been effective in ensuring adequate corrective actions were taken to address issues in a timely manner, and Entergy identified corrective actions to improve performance in this area. Inspectors also identified examples where corrective actions identified to address challenges in CAP implementation were not being completed as required. Specifically, two actions (departmental performance improvement coordinator mentoring and corrective action closure training with the condition review group (CRG)) were cancelled without being completed.

Inspectors' discussion with Entergy personnel revealed that the performance improvement department determined that these actions were not producing the desired results, and they decided to implement training instead. However, Entergy staff did not receive Corrective Action Review Board (CARB) approval of the changes as required by CAP procedures.

Inspectors determined that the specific deficiencies in execution of corrective actions and causal analysis were indicative of the CAP implementation weakness identified in the safety culture review and correspondingly determined that corrective actions specified in the common cause and safety culture evaluations were ineffective. As such, these issues represent a significant weakness because they did not provide assurance that you (1) understood the causes and (2) had taken or planned adequate corrective actions to address the safety-significant PIs. Therefore, in accordance with IP 95002 and IMC 0305, the NRC staff is assigning two parallel White PI inspection findings which will remain in effect until a follow-up supplemental inspection has been satisfactorily completed. In addition, the NRC staff identified two performance deficiencies during the inspectors' review of Entergy's evaluations and corrective actions. The follow-up inspection will verify that Entergy has: (1) assessed the independent failure analysis of the faulted insulator for potential impact to the RCE and revised as appropriate; (2) revised the RCE for the winter storm scram to include additional action for the incomplete effectiveness review; (3) demonstrated effectiveness of additional human performance related corrective actions implemented during the inspection through in-progress and completed work; and (4) completed the evaluation of the cause(s) for the failed splice and revised the RCE to include additional corrective actions, if appropriate. Additionally, the follow-up inspection will verify that Entergy has considered the revisions to the RCEs for potential revision to the overall common cause evaluation, which should include taking action to understand why corrective actions intended to address the identified CAP implementation weakness was not effective at ensuring the inspection objectives were satisfied.

- White. The NRC assigned two parallel White PI inspection findings involving a significant weakness identified in Entergy's causal evaluation and corrective actions for the White Unplanned Scrams per 7000 Critical Hours and White Unplanned Scrams with Complications PIs.

In accordance with IP 95002 and NRC IMC 0305, "Operating Reactor Assessment Program," parallel PI inspection findings are assigned the same safety significance as the initiating PIs. These two parallel PI inspection findings provide for additional NRC review of Entergy's actions to address the weaknesses identified in this report. These findings take the color (White) of the PIs. (Section 4AO4 02.03.f.2)

- Green. Inspectors identified a Green finding because Entergy did not fully derive the causes of the manual scram on August 22, 2013, following a loss of all feedwater. Specifically Entergy did not investigate the causes of a failed cable splice which directly caused an electrical transient that resulted in the automatic tripping of all three reactor feed pumps (RFPs) in accordance with the standards in Entergy procedures EN-LI-118, "Cause Evaluation Process," and EN-LI-118-01, "Event and Causal Factor Charting." Entergy entered the issue into the CAP as condition report (CR)-PNP-2014-5796 and initiated additional causal analysis to determine why the splice was improperly fabricated.

This performance deficiency affects the equipment performance attribute of the Initiating Events cornerstone, because the failure to fully derive the causes of the failed splice prevented them from taking appropriate actions to evaluate and correct those causes. This impacts the cornerstone objective to limit the likelihood of events that upset plant stability

and challenge critical safety functions during shutdown as well as power operations because unidentified deficiencies could lead to similar electrical transients which could cause similar plant transients and scrams. The inspectors determined the significance of the finding using IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power." The finding was determined to be of very low safety significance (Green) because the finding was a transient initiator and, although the event being evaluated for causal factors caused a reactor scram and loss of mitigation equipment, the failure to identify all the causes of the event and plan appropriate corrective actions has not resulted in a subsequent reactor scram or loss of mitigating equipment. This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Evaluation, because Entergy did not thoroughly evaluate the issue of the manual scram to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, Entergy focused on the causes related to the modification of the feed pump trips and did not fully evaluate the causes related to the failed splice. [P.2] (Section 4OA4 02.02.e)

- Green. The inspectors identified a Green finding for Entergy's failure to identify and correct conditions adverse to quality by implementing adequate and timely actions to address similar conditions. Specifically, inspectors identified multiple examples of failure to implement the corrective actions in accordance with CAP requirements which resulted in failing to identify and correct several conditions adverse to quality. Two of the finding examples also involved a NCV of Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, Appendix B, Criterion XVI, "Corrective Action." Entergy's immediate corrective actions included entering the issues into their CAP as CR-PNP-2014-5909, CR-PNP-2014-5976; CR-PNP-2014-5977, CR-PNP-2014-5682, CR-PNP-2014-5625, CR-PNP-2014-5826, CR-PNP-2014-5735, and CR-PNP-2014-06067. Additionally, Entergy took action to address the conditions adverse to quality by revising procedures and specifying additional procedure reviews to identify and correct other conditions adverse to quality.

The failure to implement CAP procedural requirements with respect to corrective action response and documentation was a performance deficiency. This finding was determined to be more than minor because it was similar to IMC 0612, "Power Reactor Inspection Reports," Appendix E, "Examples of Minor Issues," example 3.j in that it represents a significant programmatic deficiency that could lead to worse errors if uncorrected. Specifically, if left uncorrected this issue would have the potential to lead to a more significant safety concern because not following an established process for completing corrective actions could result in a failure to identify and correct conditions adverse to quality or other adverse conditions. Additionally, this performance deficiency affects the procedure quality, equipment performance, and human performance attributes of the Initiating Events cornerstone, and impacts the objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, a severe weather procedure did not prescribe sufficient actions that would limit the likelihood of ice bridging or place the plant in a condition that it could respond to a loss of offsite power (LOOP) without potentially upsetting plant stability, and the failure to conduct insulator testing prevented the station from assessing its replacement strategy. Additionally, several surveillance procedures did not provide sufficient barriers (e.g. critical step annotation, test equipment verification, etc.) in accordance with the station programs to limit the likelihood of scrams and other transients during testing.

The inspectors determined the significance of the finding using IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power." The finding was determined to be of very low safety significance (Green) because the failure to implement corrective

actions has not resulted in a subsequent reactor scram or loss of mitigating equipment. This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Resolution, because Entergy did not take effective corrective actions to address issues in a timely manner commensurate with their safety significance. Specifically, corrective actions were not completed in accordance with Entergy's CAP and, in some cases, after identification of unsatisfactory closure by Entergy, follow-up actions were inadequate to resolve the deficiencies. [P.3] (Section 4OA4 02.03.f)

## REPORT DETAILS

### 4. OTHER ACTIVITIES

#### 4OA4 Supplemental Inspection (95002)

##### 01 Inspection Scope

The NRC staff performed this supplemental inspection in accordance with IP 95002 to assess Entergy's evaluation associated with two White PIs which affected the Initiating Events cornerstone in the reactor safety strategic performance area. The objectives of the 95002 inspection were to:

- provide assurance that the root and contributing causes of individual and collective risk-significant performance issues were understood;
- provide assurance that the extent of condition and extent of cause of risk-significant issues were identified and to independently assess the extent of condition and extent of cause of individual and collective risk-significant issues;
- independently determine if safety culture components caused or significantly contributed to the performance issues; and
- provide assurance that the licensee's corrective actions for risk-significant issues were or will be sufficient to address the root and contributing causes and to preclude repetition.

Pilgrim entered the Regulatory Response Column of the NRC's ROP Action Matrix because one PI was of low to moderate safety significance (White) in the Initiating Events cornerstone. Specifically, the "Unplanned Scrams with Complications" PI crossed the Green to White threshold value in the 3<sup>rd</sup> quarter of 2013. In response to this ROP Action Matrix input, Pilgrim was transitioned to the Regulatory Response Column of the Action Matrix as documented in an assessment follow-up letter dated November 6, 2013 (ML13310A318). Subsequently, a second PI was reported of low to moderate safety significance (White) in the Initiating Events cornerstone. Specifically, the "Unplanned Scrams per 7000 Critical Hours" PI for Pilgrim crossed the threshold from Green to White in the 4<sup>th</sup> quarter of 2013. In response to these two ROP Action Matrix inputs, Pilgrim was transitioned to the Degraded Cornerstone Column of the Action Matrix as documented in an assessment letter dated March 4, 2014 (ML14063A316). The NRC informed Entergy of the intent to perform a supplemental inspection in accordance with IP 95002 in this letter.

Entergy informed the NRC on September 25, 2014, that they were ready for the supplemental inspection. In preparation for the inspection, Entergy performed a RCE for each of the unplanned scram events on January 10, 2013, February 8, 2013, August 22, 2013, and October 14, 2013. Additionally, Entergy performed a RCE upon entry into the Degraded Cornerstone Column to identify weaknesses that existed in the site organization. This RCE was conducted to identify weaknesses which led to the degraded cornerstone, and to document a collective causal evaluation. Entergy also conducted a CCA to perform a review of the site safety culture and determine if any aspects of safety culture contributed to the four scram events.

Entergy documented their assessments and evaluations associated with the events that are the focus of this inspection in the following CRs:

- CR-PNP-2013-0147 – RCE for Inadvertent Trip of Both Reactor Recirculation Pumps (RRPs) on January 10, 2013
- CR-PNP-2013-0798 – RCE for Loss of Offsite Power on February 8, 2013
- CR-PNP-2013-5949 – RCE for Manual Scram due to Trip of All Three RFPs on August 22, 2013
- CR-PNP-2013-6944 – RCE for Loss of Offsite Power and Subsequent Reactor Scram on October 14, 2013
- CR-PNP-2013-7830 – RCE for Degraded Initiating Events Cornerstone
- CR-PNP-2014-1669 – Safety Culture Aspect CCA

For clarity and ease of reading, the individual CR numbers will not be repeated in the body of this IR. The report is broken up into sections for each event. The reference to RCE or CCA in each section will be specific to the applicable CR above for the event being discussed.

The inspectors reviewed Entergy's causal evaluation for each issue in addition to other evaluations conducted in support of and as a result of the identified causes. The inspectors reviewed corrective actions that were taken or planned to address the identified causes. The inspectors also held discussions with Entergy personnel to ensure that the root and contributing causes and the contribution of safety culture components were understood and corrective actions taken or planned were appropriate to address the causes and preclude repetition. The inspectors also independently assessed the extent of condition and extent of cause of the identified issues. In addition, the inspectors performed an assessment of whether any safety culture components caused or significantly contributed to the issues.

## 02 Evaluation of the Inspection Requirements

### 02.01 Problem Identification.

- a. *IP 95002 requires that the inspection staff determine that the licensee's evaluation of the issue documents who identified the issue (i.e., licensee-identified, self-revealing, or NRC-identified) and the conditions under which the issue was identified.*

#### .1 Reactor Scram due to Inadvertent Trip of Both RRP's on January 10, 2013

On January 10, 2013, both RRP's tripped unexpectedly while Pilgrim was operating at 100 percent power. The operators responded by inserting a manual scram. The pumps tripped when Entergy staff reset the residual heat removal break detection logic with a relay inadvertently sealed in following surveillance testing. The relay sealed in when the relay cover jarred the relay while it was being installed by instrumentation and control (I&C) technicians. This was a self-revealing event, caused by the failure of I&C department personnel to ensure adequate barriers were in place to mitigate the potential adverse consequences of the error while performing the surveillance procedure. Additionally, inadequate application of human performance tools and overconfidence and complacency among the members of the I&C department contributed to this event.

The inspectors determined that Entergy's RCE appropriately documented the identification of the issues and the conditions under which they were identified.

.2 Complicated Reactor Scram due to Loss of Offsite Power on February 8, 2013

On February 8, 2013, during a significant winter storm, Pilgrim lost offsite power and experienced an automatic reactor scram from 83 percent power. This was a self-revealing event caused by external faults on the 345 kilovolt (kV) system which resulted in the loss of both 345 kV transmission lines connected to the Pilgrim switchyard ring bus. The loss of transmission lines resulted in a LOOP and a main generator load reject followed by an automatic reactor scram. During this event, Pilgrim experienced two subsequent LOOP events following the initial reactor scram. On February 8, 2013, and February 10, 2013, when the start-up transformer (SUT) was reenergized, two flashovers (phase to ground fault) occurred on the insulator supporting the 'B' phase of the 345 kV line supply to the SUT. The flashovers were determined to be caused by ice-bridging on the insulator. The subsequent LOOP events were caused by faults internal to the Pilgrim switchyard, which is operated and maintained by Entergy.

The inspectors determined that Entergy's RCE appropriately documented the identification of the issues and conditions under which they were identified.

.3 Complicated Reactor Scram due to Trip of All Three RFPs on August 22, 2013

On August 22, 2013, operators inserted a manual scram when all three RFPs tripped due to a low cooling water flow signal. This was a self-revealing event, triggered by an electrical ground in the circuit for level control valve LV-3067 which tripped open breaker Y1-24 and caused a loss of power to the cooling water flow instrumentation. The loss of power resulted in a low cooling water flow signal to the pumps because of a modification installed in 2011. This modification created a SPV in that an electrical transient on the Y-1 bus could cause a low cooling water flow trip of all three RFPs, requiring a manual scram in accordance with abnormal operating procedures. The ground occurred on an improperly fabricated splice installed in 1999.

The inspectors determined that Entergy's RCE appropriately documented the identification of the issues and the conditions under which they were identified.

.4 Complicated Reactor Scram due to Loss of Offsite Power on October 14, 2013

On October 14, 2013, during steady state reactor operations with one of two 345 kV transmission lines, Line 342, out of service for planned maintenance, the remaining 345 kV transmission, Line 355, de-energized unexpectedly, causing a LOOP and a main generator load reject followed by an automatic reactor scram. This was a self-revealing event, which was caused by the failure of equipment outside the control of Entergy. Line 355 de-energized when a wooden pole supporting the 'B' phase structure failed at an offsite substation.

The inspectors determined that Entergy's RCE appropriately documented the identification of the issues and conditions under which they were identified.

- b. *IP 95002 requires that the inspection staff determine that the licensee's evaluation of the issue documents how long the issue existed and prior opportunities for identification.*

.1 Reactor Scram due to Inadvertent Trip of Both RRP's on January 10, 2013

Difficulties with relay cover installation were a long-standing problem at Pilgrim. Entergy personnel developed a tool to assist in cover reinstallation, but did not incorporate steps in their procedures to verify the relay had not changed state during installation. The RCE documented that the department was accustomed to overcoming difficulties and working around them.

Entergy had prior opportunities to identify the issue with relay cover installation during their review of operating experience (OE) from plants outside the Entergy fleet. Specifically, Entergy staff reviewed reports on inadvertent logic actuations due to relay cover replacement on June 14, 2011, and August 16, 2012. Their RCE states that at the time of review, Entergy believed the OE was not relevant to Pilgrim.

The inspectors determined that Entergy's RCE was adequate with respect to identifying how long the issue existed and prior opportunities for identification.

.2 Complicated Reactor Scram due to Loss of Offsite Power on February 8, 2013

The RCE for this event documented that a similar event occurred in 2008, when weather related build-up of snow and ice on a bushing associated with the 'A' phase of an air-circuit breaker in the switchyard caused a current path to ground, known as a flashover, resulting in a main generator load reject and reactor scram. During that event, a LOOP occurred due to a flashover of the arcing horn on the transmission line which was isolated by breaker operations at the Pilgrim switchyard. Procedures were revised to provide guidance for increased monitoring of switchyard during winter storms. However, corrective actions taken in 2008 were not adequate to prevent the event of February 8, 2013. Those previous corrective actions to prevent recurrence (CAPRs) failing to prevent recurrence of the event was identified as one of the contributing causes in the RCE.

The inspectors determined that Entergy's RCE was adequate with respect to identifying how long the issue existed and prior opportunities for identification.

.3 Complicated Reactor Scram due to Trip of All Three RFP's on August 22, 2013

Plant design change 98-38 installed the splice on the non-safety-related cables to a level control valve, LV-3067, in 1999. The splice was inside the flexible conduit leading to the valve, and its location was not marked on any drawings. Because of this, Entergy determined that there were no prior opportunities for identification of the deficient splice.

Entergy had two prior opportunities to identify the SPV introduced by the low cooling coil flow instrument modification in 2011, and documented both of them in the RCE. An individual in the training department wrote CR-PNP-2011-3253 on July 7, 2011, observing that all three feed pumps would now trip on a sustained loss of power to their cooling coil flow instruments, and that the procedures had not been updated to reflect this. Entergy determined that the trips were acceptable because a loss of all feedwater is an analyzed transient. The corrective actions to address the CR included changing

the procedures, training operators on the new trip, and issuing a human performance clock reset memo discussing the importance of updating all procedures following design changes. Because of these corrective actions, Entergy staff at all levels had an opportunity to question the introduction of a new SPV.

Additionally, an individual in the operations department wrote CR-PNP-2011-5012 on November 5, 2011. This CR questioned why the feed pumps tripped automatically on low flow, and yet the operating procedure for the turbine building closed cooling water system had an attachment that allowed bypassing the feed water pump low cooling coil flow trip. The CR was closed with no action taken, and a work tracking assignment was given to system engineering to determine whether it was better to trip the pumps automatically on low flow or to manually trip them on high bearing temperature. This was an opportunity to remove the pump trip on low flow and prevent the event on August 22, 2013. Instead, system engineering recommended maintaining the automatic trip and removing the procedure instruction to bypass it.

The inspectors determined that Entergy's RCE was adequate with respect to identifying how long the issue existed and prior opportunities for identification.

.4 Complicated Reactor Scram due to Loss of Offsite Power on October 14, 2013

The RCE for this event documented that similar LOOP events that occurred were weather related and that corrective actions that were implemented for the causes could not have prevented this event. Entergy's RCE stated that Pilgrim places the offsite transmission lines in a single point vulnerable condition for maintenance in accordance with procedures and that, following entering this condition, the single offsite line failed due to a degraded electrical pole. Entergy determined that there were no missed opportunities for identification of the defective pole because it was outside of the Pilgrim switchyard and therefore outside of Entergy's control.

The inspectors determined that Entergy's RCE was adequate with respect to identifying how long the issue existed and prior opportunities for identification.

- c. *IP 95002 requires that the inspection staff determine that the licensee's evaluation documents the plant specific risk consequences, as applicable, and compliance concerns associated with the issues both individually and collectively.*

.1 Reactor Scram due to Inadvertent Trip of Both RRPs on January 10, 2013

Entergy's RCE reviewed and documented the consequences of the scram. A trip of both RRPs is an analyzed transient documented in Pilgrim's updated final safety analysis report (UFSAR). Pilgrim did not challenge safety limits, design limits, or fission product barriers. Entergy's risk significance determination for the scram resulted in a value of 2.5 E-7 for Conditional Core Damage Probability (CCDP).

The inspectors determined that Entergy appropriately documented the plant-specific risk consequences and compliance concerns for this event.

.2 Complicated Reactor Scram due to Loss of Offsite Power on February 8, 2013

Entergy's RCE reviewed and documented the consequences of this event. The safety significance of this event was primarily associated with the initial main generator load reject and reactor scram, which is an analyzed transient in Pilgrim's UFSAR. Despite the loss of power to the SUT during and following the storm, operators established and maintained safe shutdown conditions in accordance with station procedures. The emergency diesel generators started and loaded as expected following the loss of the SUT. Based on the challenges to safety systems during and following the event, CCDP for the event was estimated to be 3.2E-05.

The inspector determined that Entergy appropriately documented the plant-specific risk consequences and compliance concerns associated with this event.

.3 Complicated Reactor Scram due to Trip of All Three RFPs on August 22, 2013

Entergy's RCE reviewed and documented the consequences of the scram. A loss of all feedwater is an analyzed transient documented in Pilgrim's UFSAR. Pilgrim did not challenge safety limits, design limits, or fission product barriers. Entergy's risk significance determination for the scram resulted in a value of 4.3 E-7 for CCDP.

The inspectors determined that Entergy appropriately documented the plant-specific risk consequences and compliance concerns for this event.

.4 Complicated Reactor Scram due to Loss of Offsite Power on October 14, 2013

Entergy's RCE reviewed and documented the consequences of this event. The safety significance of this event was primarily associated with the main generator load reject and reactor scram that occurred when transmission Line 355 de-energized, which is an analyzed transient in Pilgrim's UFSAR. Despite the LOOP to the SUT, operators established and maintained safe shutdown conditions in accordance with station procedures. The emergency diesel generators started and loaded as expected following the loss of SUT. During the event, the availability of the shutdown transformer and station blackout diesel generator was not challenged. Based on challenges to safety systems, CCDP for the event was estimated to be 2.7E-05.

The inspectors determined that Entergy appropriately documented the plant-specific risk consequences and compliance concerns associated with this event.

.5 Root Cause Evaluation of Degraded Initiating Events Cornerstone

Entergy's RCE of the Degraded Initiating Events Cornerstone evaluated risk significance collectively and determined that the four events did not overlap in time. The station modified the average maintenance full power model to evaluate the collective impact of the events and determined that the increase in core damage frequency was 8.30E-7 per year which is less than the 1E-6 per year screening criterion for risk significance.

The inspectors determined that Entergy appropriately documented the risk consequences and compliance concerns associated with the collective events.

d. Findings

No findings were identified.

02.02 Root Cause, Extent of Condition, and Extent of Cause Evaluation.

- a. *IP 95002 requires that the inspection staff determine that the licensee evaluated the issue using a systematic methodology to identify the root and contributing causes.*

.1 Reactor Scram due to Inadvertent Trip of Both RRP's on January 10, 2013

Entergy performed a RCE in accordance with Entergy procedure EN-LI-118, "Causal Evaluation Process," and its associated attachments. Entergy used the following systematic methods to complete the RCE:

- Behavioral Analysis;
- Barrier Analysis;
- Event and Causal Factor Charting;
- Failure Mode Analysis; and
- "Why" Staircase tool.

The inspectors determined that Entergy evaluated the issues using a systematic method to identify root and common causes.

.2 Complicated Reactor Scram due to Loss of Offsite Power on February 8, 2013

Entergy performed a RCE in accordance with Entergy procedure EN-LI-118, "Cause Evaluation Process," and its associated attachments. Entergy used the following systematic methods to complete RCE:

- Organization and Programmatic Causal Evaluation;
- Fault Tree Analysis;
- Failure Mode Analysis;
- Barrier Analysis; and
- Comparative Timeline.

The inspectors determined that Entergy evaluated the issue using a systematic method to identify root and common causes.

.3 Complicated Reactor Scram due to Trip of All Three RFP's on August 22, 2013

Entergy performed a RCE in accordance with Entergy procedure EN-LI-118, "Causal Evaluation Process," and its associated attachments. Entergy used the following systematic methods to complete the RCE:

- Barrier Analysis;
- Event and Causal Factor Charting;
- Failure Mode Analysis; and
- "Why" Staircase tool.

The inspectors determined that Entergy evaluated the issues using a systematic method to identify root and common causes.

.4 Complicated Reactor Scram due to Loss of Offsite Power on October 14, 2013

Entergy performed a RCE in accordance with Entergy procedure EN-LI-118, "Cause Evaluation Process," and its associated attachments. Entergy used the following systematic methods to complete RCE:

- Event and Causal Factor Charting; and
- "Why" Staircase Tool.

The inspectors determined that Entergy evaluated the issue using a systematic method to identify root and common causes.

.5 Root Cause Evaluation of Degraded Initiating Events Cornerstone

Entergy performed a RCE in accordance with Entergy procedure EN-LI-118, "Cause Evaluation Process," and associated attachments. Entergy used the following systematic methods to complete the evaluation:

- Pareto analysis (data binning);
- Stream analysis;
- Trend code binning, using trend codes assigned to each of the four individual root causes; and
- Kepner-Tregoe analysis.

The inspectors determined that Entergy evaluated the issues using a systematic method to identify root and common causes.

- b. *IP 95002 requires that the inspection staff determine that the licensee's RCE was conducted to a level of detail commensurate with the significance of the issue.*

.1 Reactor Scram due to Inadvertent Trip of Both RRP's on January 10, 2013

Entergy assembled a multi-discipline team to perform the RCE for this issue. In addition to the direct cause of the inadvertent seal-in of a relay during cover replacement, the evaluation identified one root cause and two contributing causes:

- I&C department personnel failed to ensure that the surveillance procedure included adequate barriers during surveillance testing to mitigate potential adverse consequences. Specifically, personnel did not ensure the procedure included steps of sufficient detail to remove and reinstall relay covers and the validation of relay state was not completed immediately prior to the resetting of logic (Root Cause);
- Inadequate application of human performance tools by I&C department personnel (Contributing Cause); and
- Overconfidence and complacency was demonstrated by I&C department personnel who were tolerant to the difficulty in relay cover installation. Personnel were aware that replacing the relay covers was difficult, but it became a normal practice to make

multiple attempts because no consequences had previously occurred at Pilgrim. (Contributing Cause).

Based on the in-depth analysis performed for this RCE, the inspectors concluded that the evaluation was conducted to a level of detail commensurate with the significance of the problem.

## .2 Complicated Reactor Scram due to Loss of Offsite Power on February 8, 2013

Entergy assembled a multi-discipline team to perform the RCE for this issue. The RCE identified two root causes and three contributing causes:

- The coincident loss of transmission lines from faults external to Pilgrim resulted in a LOOP, main generator load reject, and reactor scram. This cause was determined to be outside the control of Entergy (Root Cause);
- Entergy failed to ensure that procedures established adequate pre-defined, risk-based criteria to guide operators confronted with deteriorating switchyard conditions during and following a blizzard (Root Cause);
- Entergy failed to ensure that procedure 2.1.42, "Operation During Severe Weather," provided guidance for operators to determine which severe snow storms were most likely to challenge Pilgrim switchyard reliability (Contributing Cause);
- Entergy did not ensure that CAPRs from previous severe weather events prevented recurrence (Contributing Cause); and
- Previously identified internal OE was not successfully utilized by Entergy to direct removal of snow and ice from transformer insulators prior to reenergizing (Contributing Cause).

Based on the extensive work performed for this RCE, the inspectors concluded that the RCE was conducted to a level of detail commensurate with the significance of the problem.

## .3 Complicated Reactor Scram due to Trip of All Three RFPs on August 22, 2013

Entergy assembled a multi-discipline team to perform the RCE for this issue. The evaluation identified a direct cause, a root cause and a contributing cause:

- An undocumented splice associated with LV-3067 failed and damaged the cable section resulting in a short to ground and the tripping of breaker Y1-24, which removed power from the RFP seal cooling coil flow instruments and generated trip signals for all three RFPs (Direct Cause);
- The SPV design criteria associated with the RFP low seal cooling water flow modification was not clearly defined by Entergy. The intent of the modification was to reduce the likelihood of a spurious feed pump trip due to a failed switch. However, the modification ultimately resulted in the introduction of a SPV such that a loss of circuit 24 on bus Y1 would trip all three RFPs. When the design was initially approved, Entergy personnel did not recognize that the instruments were all powered from the same source because the design criteria did not specifically call out that design aspect (Root Cause); and

- Corrective actions to address a CR which identified the above SPV failed to adequately address the concern (Contributing Cause).

Inspectors concluded that the RCE was conducted to a level of detail necessary to evaluate Entergy's introduction of a SPV as well as their failure to effectively use the CAP when it was subsequently identified. However, Entergy did not identify a root or contributing cause for the failure of the undocumented splice, even though without the short to ground the event would not have occurred. Entergy considered the causes of the failed splice in their event and causal factor chart and in their "Why" staircase. Entergy terminated their event and causal factor chart at "maintenance work practices," which does not meet the criteria listed in governing procedure for a root or contributing cause. The procedure for the "Why" staircase method cautions that it may only get to the general area of the cause and most likely will require further analysis to establish the exact cause. Based on this, the inspectors determined that the RCE was not conducted to a sufficient level of detail. The related finding is documented in Section 4OA4.02.02.e of this report.

#### .4 Complicated Reactor Scram due to Loss of Offsite Power on October 14, 2013

Entergy assembled a multi-discipline team to perform the RCE for this issue. In addition to the direct cause of the failure of a defective pole at an offsite substation, which was determined to be outside the control of Entergy, the RCE documented one root and one contributing cause:

- Entergy failed to ensure that station procedures contained adequate pre-defined, risk-based criteria for planned maintenance on offsite transmission equipment which places Pilgrim in an SPV to an automatic scram (Root Cause); and
- The design for generation at Pilgrim is less than robust, with only two paths for generation output and offsite power supply (Contributing Cause).

The inspectors concluded that the RCE was conducted to a level of detail commensurate with the significance of the problem.

#### .5 Root Cause Evaluation of Degraded Initiating Events Cornerstone

Entergy performed a RCE in response to Pilgrim's entry into the Degraded Cornerstone column of the ROP Action Matrix. This RCE was performed by a multi-disciplined team consisting of personnel from Maintenance, Engineering, Regulatory Affairs, and Corporate Regulatory Assurance, as well as a specialist consultant. The root cause team used multiple analysis methods and identified one root cause and three contributing causes:

- Site leadership did not effectively ensure specific corrective or mitigating actions were developed and implemented to address operational risk (Root Cause);
- Entergy did not ensure that the CAP was effective at ensuring adequate corrective actions were taken to prevent subsequent reactor scrams. The station previously entered issues either similar or directly related to the January 10, 2013, February 8, 2013, and August 22, 2013, scrams into the CAP, but did not develop corrective actions to effectively fix the issues (Contributing Cause);

- Entergy did not ensure the OE program was effectively used to ensure proactive measures were taken to prevent similar events from occurring at Pilgrim (Contributing Cause); and
- Entergy did not ensure that procedures included all elements of operational risk. Specifically, procedures did not adequately define frequency/probability, address passive risk, or provide formal tracking of compensatory measures (Contributing Cause).

Based on review of this RCE, the inspectors concluded that Entergy conducted the collective evaluation to a level of detail commensurate with the significance of the problem.

- c. *IP 95002 requires that the inspection staff determine that the licensee's RCE included a consideration of prior occurrences of the issue and knowledge of OE.*

.1 Reactor Scram due to Inadvertent Trip of Both RRP's on January 10, 2013

Entergy's RCE contained a review of both internal and external OE. Entergy did not identify any other plant trips caused by human performance errors during relay maintenance at Pilgrim.

Entergy did identify two OE communications relevant to the issue from the last five years. In both cases, the I&C point of contact for OE had reviewed the communications and determined they did not need to share them further with the rest of the department. During the pre-job brief, personnel discussed OE on a different subject that was also relevant to the task. The evaluation considered the OE communications to be missed opportunities, but did not consider them as missed barriers because personnel used OE as expected prior to the event.

Entergy determined that latent organization issues associated with the previously identified causes existed. The evaluation determined that there was evidence of an omission of relevant information in the procedure that would have prevented the recirculation pump trip from occurring. Specifically, if the procedure had contained steps directing when to reinstall the relay cover, Entergy could have assured that the relay state would be verified after the cover was replaced. Additionally, Entergy determined that there was evidence that personnel had insufficient awareness of the impact of their actions on safety, and that management follow-up of activities was ineffective in identifying shortcomings. In particular, the technicians were not sufficiently aware that relay cover replacement could change the relay's state, and management did not recognize the significance of difficult to replace relay covers. Finally, Entergy determined that there was evidence that the response to the repetitive issue of difficult to replace relay covers was untimely.

Based on Entergy's detailed evaluation and conclusions, the inspectors determined that the RCE included a consideration of prior occurrences of the issues and knowledge of prior OE.

.2 Complicated Reactor Scram due to Loss of Offsite Power on February 8, 2013

Entergy's RCE contained a review of both internal and external OE. Entergy's review included a search on internal OE for the Entergy Fleet and a search of OE external to

Entergy. Review was also performed to determine if any Entergy responses to industry OE were applicable or could have mitigated this event.

Entergy's internal OE review identified one event applicable to this RCE. The root cause of that event (CR-PNP-2008-3963) was similar to the scram which occurred on February 8, 2013. Entergy determined that those previous CAPRs associated with the previous LOOP event failed to prevent recurrence of this event. The RCE identified this as one of the contributing causes.

Based on Entergy's detailed evaluation and conclusions, the inspectors determined that the RCE included a consideration of prior occurrences of the issues and knowledge of prior OE.

.3 Complicated Reactor Scram due to Trip of All Three RFPs on August 22, 2013

Entergy's RCE contained a review of both internal and external OE. Entergy identified several trips caused by incorrect modifications or SPVs at other sites, but determined that none were similar enough to prompt corrective actions that could have prevented the scram on August 22, 2013. An internal OE search identified a similar SPV at another Entergy site several years prior. Entergy did not identify any additional corrective actions as a result of their OE search.

Entergy determined that latent organization issues associated with the previously identified causes existed. The evaluation determined that there was evidence that personnel had insufficient awareness of the impact of their actions on safety and that job standards were not adequately defined or communicated because engineering management did not appropriately challenge the design change after reviewing the CRs questioning it. It also determined that there is a lack of program evaluation process because the engineering quality review team did not adequately challenge the engineering change during their review. Additionally, the approval of the engineering change is evidence that there was a lack of evaluation of risk and consequences prior to making a change that would have an adverse impact. Finally, the evaluation concluded that the corrective actions for previously identified problems failed to take meaningful corrective actions. Specifically, the corrective actions to two CRs questioning the design change did not have corrective actions that addressed the issue.

Based on Entergy's detailed evaluation and conclusions, the inspectors determined that the RCE included a consideration of prior occurrences of the issues and knowledge of prior OE.

.4 Complicated Reactor Scram due to Loss of Offsite Power on October 14, 2013

Entergy's RCE contained a review of both internal and external OE. Entergy's review included a search on internal OE for the Entergy Fleet and search for OE external to Entergy. Review was also performed to determine if any Entergy responses to external OE were applicable or could have mitigated this event.

The RCE indicated that the events described in the OE section were not directly related to this root cause. Those events were associated with a weather related event (e.g. lightning strike, high winds, hurricane, etc.). The RCE identified that those events were not missed opportunities because they were not directly applicable to this event.

Based on Entergy's detailed evaluation and conclusions, the inspectors determined that the RCE included a consideration of prior occurrences of the issues and knowledge of prior OE.

.5 Root Cause Evaluation of Degraded Initiating Events Cornerstone

Entergy's RCE included a review of internal, fleet, and industry OE. Additionally, the RCE determined that one of the contributing causes was ineffective utilization of the site OE program in that the station did not take measures based on industry events to prevent similar events from occurring at Pilgrim. OE issues were available, but did not result in actions to prevent issues. The station identified the following corrective actions:

- Benchmark other stations in the fleet to identify any gaps in the program;
- Complete an OE familiarization briefing for site managers in various departments;
- Complete an OE familiarization briefing for the department OE points of contact; and
- Review OE PIs during the CRG meetings.

Based on Entergy's evaluation and conclusions, the inspectors determined that the RCE included a consideration of prior occurrences of the issues and knowledge of prior OE. However, the inspectors did note some weaknesses in implementation of the corrective actions related to this contributing cause. These weaknesses are discussed in Section 4OA4.02.03.a.5 of this report.

- d. *IP 95002 requires that the inspection staff determine that the licensee's RCE addresses the extent of condition and extent of cause of the issues.*

.1 Reactor Scram due to Inadvertent Trip of Both RRP's on January 10, 2013

Entergy performed an extent of condition review on the direct cause of the event, a relay left in an energized state following surveillance restoration. Entergy reviewed site procedures in all departments and identified those which required personnel to remove and replace relay covers in order to perform work.

Entergy performed an extent of cause review for the lack of annotation of critical steps to prevent a major plant event in the "return to normal" section of procedure 8.M.2-2.10.2-9, the maintenance procedure that resulted in the reactor scram. They considered other actions involving relays that otherwise have immediate adverse consequences in procedure 8.M.2-2.10.2-9 and in other maintenance procedures.

Entergy also performed an extent of cause review for the failure to use the human performance tool Stop-Think-Act-Review (STAR) during relay cover removal and reinstallation. They considered the failure to use STAR during other procedurally-controlled maintenance department work and the failure to use other human performance tools during relay cover work as well as other types of work.

The inspectors noted that Entergy's RCE did not include an extent of cause assessment for the contributing cause of overconfidence and complacency by personnel in the I&C

department, nor did it include a discussion of why one was not necessary. Entergy documented this issue in CR-PNP-2014-5772 and updated their RCE. Revision 5 of the RCE, dated November 16, 2014, included an extent of cause discussion on technician complacency and overconfidence during relay cover removal and installation. They considered the impact of those same technicians, as well as other technicians, exhibiting complacency and overconfidence during relay cover removal and installation and other critical procedure work. The corrective actions identified to address the extent of cause were either previously identified and implemented to address this issue, or were the same as the corrective actions for the other causes.

Because an extent of cause discussion for the contributing cause was needed, the inspectors concluded that omitting it was a weakness. The inspectors determined this weakness was a minor issue because Entergy's review showed that no new corrective actions were necessary as a result of the assessment.

The inspectors concluded that Entergy's RCE addressed the extent of condition and extent of cause of the issues.

## .2 Complicated Reactor Scram due to Loss of Offsite Power on February 8, 2013

Entergy's RCE reviewed the extent of condition for this event using the "same-similar" methodology in accordance with procedure EN-LI-118, "Cause Evaluation Process." Entergy defined the condition as the loss of the SUT due to accumulation of salt and snow causing a flashover. Entergy's extent of condition review focused on ensuring that other possible conditions that could cause a flashover were addressed in the other severe weather procedures.

Entergy reviewed the extent of cause for each root cause and each contributing cause using the "same-similar" methodology. The RCE stated that the first root cause was the coincidental loss of transmission lines 342 and 355 from faults external to the Pilgrim switchyard. Entergy determined that the extent of cause for the first root cause would include loss of either transmission line from faults external to the switchyard. However, because faults occurring external to the Pilgrim switchyard are outside the control of Entergy, corrective actions included determining what actions the transmission operator took in response to the LOOP events to improve reliability of service to the SUT and providing them a demonstration of a LOOP event in the plant simulator with the intent of improving the working relationship between the transmission operator and Entergy.

For the second root cause, inadequate pre-defined, risk based criteria established to guide operators confronted with deteriorating switchyard conditions during and following a blizzard, Entergy determined that the extent of cause would include procedural guidance for deteriorating switchyard conditions during and following other severe weather. Entergy addressed the extent of cause by documenting the review of procedure EN-FAP-EP-010, "Severe Weather Response," and other severe weather procedures that could result in a LOOP.

The inspectors concluded that Entergy's RCE addressed the extent of condition and extent of cause of the issues.

.3 Complicated Reactor Scram due to Trip of All Three RFPs on August 22, 2013

Entergy performed an extent of condition review on the direct cause of the event, an undocumented splice installed in a flexible conduit under PDC 98-38. Entergy considered the potential impact of other legacy cable splice failures that could have been installed during the same design change.

Entergy performed an extent of cause review for the engineering change review process to identify the inadequate design introduced by the SPV modification. Entergy considered the possibility of other modifications introducing new SPVs and other SPV modifications having unintended consequences. Corrective actions included reviewing all engineering changes intended to resolve SPVs as well as all modifications completed in the past five years to ensure new SPVs were not created.

Entergy also performed an extent of cause review for the inadequate response to CR-PNP-2011-3253, which was screened as a category 'C' CR. Entergy considered the failure to resolve design vulnerabilities raised in other CRs. Entergy reviewed other category 'C' CRs in the past five years which identified design vulnerabilities to determine whether the response to each was adequate. The cause report itself discussed two category 'C' level CRs that provided opportunities for prior identification of the new SPV. The CAP tracking system search performed as part of the extent of cause corrective action used keywords that only captured one of the two CRs. Inspectors determined that this called into question the quality of the search and associated results. Entergy wrote CR-PNP-2014-5722 and performed a new extent of cause search which did not identify any additional CRs that were not previously identified. Because additional review was needed, the inspectors concluded that Entergy's search was a weakness in their extent of cause review. However, the inspectors determined this weakness was a minor issue because Entergy's review showed that no new corrective actions were necessary as a result of the assessment.

In general, the inspectors concluded that Entergy's RCE addressed the extent of condition and extent of cause of the issues. However, follow-up inspection of the extent of cause will be performed for additional causes determined as a result of corrective actions to address the finding documented in section 4OA4.02.02.e of this report.

.4 Complicated Reactor Scram due to Loss of Offsite Power on October 14, 2013

Entergy reviewed the extent of condition for this event using the "same-similar" methodology in accordance with procedure EN-LI-118, "Cause Evaluation Process." Entergy defined the condition as the failure of the in-service offsite power line when operating with a single source and therefore focused their extent of condition review on other conditions where a single failure could result in a LOOP. Because the failure that was experienced was outside of the control of Entergy, corrective actions were taken to ensure that the risk of operating with a single source was managed appropriately.

Entergy reviewed the extent of cause for each root cause and each contributing cause. The review was performed using the "same-similar" methodology. Entergy identified the root cause as the station procedure contained inadequate pre-defined risk-based criteria for planned maintenance on offsite transmission equipment that places station in a SPV susceptible to an automatic reactor scram. Entergy determined that the extent of cause would include review of other procedure deficiencies for planned maintenance on offsite

transmission equipment in procedure 1.5.22, "Station Risk Assessment Process," and other station risk procedures. Entergy's corrective actions to address the extent of cause included a revision to procedure 1.5.22 requiring a critical evolution meeting for any activity that would require single 345 kV line operation as well as the development of mitigating actions to be implemented prior to removing either 345 kV line from service.

The inspectors concluded that Entergy's RCE addressed the extent of condition and extent of cause of the issue.

#### .5 Root Cause Evaluation of Degraded Initiating Events Cornerstone

The purpose of Entergy's RCE of the Degraded Initiating Events Cornerstone was to identify any causes common to the four unplanned scrams that occurred between January 10, 2013 and October 14, 2013. The station performed extent of cause reviews on the root and contributing causes that were common to the events.

Entergy's corrective actions developed from the extent of cause review included:

- Training focused on risk awareness and risk management for site management;
- Review of all CAPRs issued since 2008 to ensure that these actions adequately address the applicable root causes;
- Apparent cause and RCE training for individuals in various departments across the station;
- Benchmarking other stations in the fleet to identify any gaps in the OE program at Pilgrim;
- OE familiarization briefings for the department OE points of contact;
- Reviewing OE PIs during the CRG meetings;
- Reviewing other areas where low regulatory margin may exist, such as other NRC PIs that may be close to threshold, and areas where the station may be close to developing cross-cutting themes; and
- Implementing a procedure upgrade project in the Maintenance department to bring procedures up to fleet standards.

The RCE noted that one of the contributing causes was that the site OE program was not effectively used to ensure proactive measures were taken based on industry events to prevent similar events from occurring at Pilgrim. Inspectors reviewed the extent of cause actions for this issue and noted that the station did not include the security organization in the OE familiarization briefings. Though OE in the security department is covered under a different procedure, the inspectors concluded that the security department would also potentially be vulnerable to inadequate implementation of its OE program. The station generated CR-PNP-2014-05795 and generated an action to provide the training to the Security department.

The inspectors concluded that the extent of condition and extent of cause identified in Entergy's RCE, including additional action in response to inspector's concerns, was adequate.

e. Findings

Introduction: The inspectors identified a green finding because Entergy did not fully derive the causes of the manual scram on August 22, 2013, following a loss of all feedwater. Specifically, Entergy did not investigate the causes of the failed cable splice which directly caused an electrical transient that resulted in the automatic tripping of all three RFPs in accordance with CAP requirements.

Description: On August 22, 2013, Pilgrim station experienced a failed splice on a non-safety-related power supply to a level control valve, which caused an electrical transient that directly led to the automatic trip of all three RFPs when combined with a latent issue related to a modification. Entergy performed a RCE of the event and identified the failed splice as a direct cause. Inspectors determined that Entergy failed to investigate the cause of the electrical transient in accordance with station CAP procedures sufficiently to ensure all of the root and contributing causes of the event were understood. Their investigation determined that the splice failed because it was improperly fabricated when it was installed in 1999 as a part of a modification package on balance of plant valves. The splice was inside a flexible conduit, had two splices on parallel wires places right next to each other instead of being staggered, and the splice had not been properly crimped. Entergy performed an extent of condition review to verify there were no other splices installed in flexible conduit by the same modification package.

Entergy used multiple causal evaluation methods as part of their RCE. Three of these (event and causal factor charting, failure modes analysis, and the “why” staircase analysis) discussed the failed splice. Entergy’s CAP procedures state that neither the failure modes analysis nor the “why” staircase are acceptable stand-alone methods of evaluation. The failure modes analysis method is described in EN-LI-118-08, “Failure Modes Analysis,” Revision 2. This procedure states that the output of the failure modes analysis will only be the direct cause, so it must be used with another method. The “why” staircase method is described in EN-LI-118-11, “Why Staircase,” Revision 0. This procedure states that for human performance problems, the method may only get to the general area of the cause and most likely will require further analysis to establish the exact cause. In the “why” staircase for this RCE, Entergy stopped at “failure to follow requirements of design change and [procedure] 3.M.3-51,” which is a human performance issue.

The event and causal factor charting method is described in EN-LI-118-01, “Event and Causal Factor Charting,” Revision 2, and is the only method of the three intended for stand-alone use. This procedure directs them to “continue to investigate and develop the chart until one of the following limits is reached: (1) the cause is outside the control of Entergy, (2) the correction of the cause is determined to be cost prohibitive, (3) the primary effect is fully explained, or (4) there are no other causes that explain the effect being evaluated.” Entergy terminated their chart at “maintenance work practices,” which does not meet any of the criteria listed in EN-LI-118-01.

Ultimately, Entergy did not identify corrective actions to correct the cause of the failed splice and inspectors could not verify that actions taken to ensure other splices were not improperly installed were sufficient. The inspectors questioned why Entergy had not continued to investigate what caused the splice to be improperly fabricated in accordance with station procedures such that either appropriate corrective actions could be planned or justification as to why no corrective actions were required could be

provided. In response to inspectors' questions, Entergy entered the issue into the CAP as CR-PNP-2014-5796 and initiated additional causal analysis to determine why the splice was improperly fabricated.

Analysis: Contrary to the standards in Entergy procedures EN-LI-118, "Cause Evaluation Process," and EN-LI-118-01, "Event and Causal Factor Charting," Entergy did not fully derive the causes of the manual scram following a loss of all feedwater. Specifically, Entergy did not investigate the causes of the failed splice until the cause was outside their control, correction was cost prohibitive, the effect was fully explained, or there were no other causes. This performance deficiency affects the equipment performance attribute of the Initiating Events cornerstone, because the failure to fully derive the causes of the failed splice prevented them from taking appropriate actions to evaluate and correct those causes. This impacts the cornerstone objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations because unidentified deficiencies could lead to similar electrical transients which could cause similar transients.

The inspectors determined the significance of the finding using IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power." The finding was determined to be of very low safety significance (Green) because the finding was a transient initiator and, although the event being evaluated for causal factors caused a reactor scram and loss of mitigation equipment, the failure to identify all the causes of the event and plan appropriate corrective actions has not resulted in a subsequent reactor scram or loss of mitigating equipment.

This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Evaluation, because Entergy did not thoroughly evaluate the issue of the manual scram to ensure that resolutions address causes and extent of conditions commensurate with their safety significance. Specifically, Entergy focused on the causes related to the modification of the feed pump trips and did not evaluate the causes related to the failed splice. [P.2]

Enforcement: This finding does not involve enforcement action because no regulatory requirement violation was identified. Because this finding does not involve a violation and is of very low safety significance, it is identified as a finding (**FIN 05000293/2014008-01, Failure to Fully Derive the Causes of a Manual Scram**).

### 02.03 Corrective Actions.

- a. *IP 95002 requires that the inspection staff determine that (1) the licensee specified appropriate corrective actions for each root and/or contributing cause, or (2) an evaluation that states no actions are necessary is adequate.*
- .1 Reactor Scram due to Inadvertent Trip of Both RRP's on January 10, 2013

Entergy's RCE identified corrective actions addressing each of the root and contributing causes as well as any additional identified weaknesses. CAPRs were identified for the root cause. The inspectors reviewed all of the corrective actions to ensure that they addressed the identified causes. The CAPRs included revising I&C and electrical maintenance procedures to include steps, marked as critical steps, to remove and replace relay covers, and to verify relay state after the covers are replaced. Entergy

recognized that performing the procedure revisions would take some time and developed a maintenance standing order that required supervisors to review the applicable maintenance procedures prior to the pre-job brief as well as enhanced supervisor oversight of relay cover removal and installation until the CAPRs had been completed.

Inspectors determined that the procedure changes specified by the CAPRs will not prevent inadvertent relay actuation, but should prevent adverse consequences if technicians properly apply human performance tools. No consideration was discussed in the RCE for corrective actions that did not rely on human performance, such as test method changes or hardware modifications. Entergy documented this observation in CR-PNP-2014-5714 and determined that no changes to the corrective action plan were required.

Additional corrective actions to address the extent of cause of the root cause included adding critical steps to remove and replace relay covers in other procedures, including operations and mechanical maintenance procedures. They also included implementing a procedure upgrade project for all of the procedures in the Maintenance department. In the interim, actions were established for maintenance supervisors to review procedures prior to or at the pre-job brief to ensure that critical steps are annotated and that the supervisor understands what potential adverse consequences could occur during performance of the maintenance.

Corrective actions for the contributing causes included training on procedure use and adherence for the technicians involved during the event and for all maintenance supervisors. Corrective actions also included developing a checklist of good procedure use behaviors and performing increased supervisor observations of surveillances using the checklist. This checklist included verification that technicians are identifying critical steps in procedures and implementing appropriate human performance tools during maintenance. Maintenance supervisors, as well as supervisors from other departments at Pilgrim, performed these observations.

In general, the inspectors determined that the proposed corrective actions were appropriate and addressed each root and contributing cause. However, inspectors reviewed those corrective actions that were completed at the time of the inspection and noted deficiencies in the execution of some of the corrective actions.

Entergy conducted assessments of the RCE prior to the inspection and self-identified in CR-PNP-2014-3931 that many of the completed actions had either not been completed as intended or lacked sufficient evidence to support closure. Despite additional actions being specified to correct the licensee-identified deficiencies, inspectors' review of the completed corrective actions and interview of maintenance supervisors identified that some of the corrective actions were either cancelled or closed. A maintenance standing order was created and signed by maintenance supervisors in September 2014 which directed interim actions for enhanced supervisor oversight and procedure review in preparation for maintenance to be implemented. Despite this, inspectors identified that the maintenance standing order was not being implemented at the time of the on-site inspection. In response, Entergy stated that continued improvement in the area of human performance in maintenance was intended to be corrected by other routine processes that had been implemented outside the RCE.

To determine whether the closure of the corrective actions was appropriate, inspectors reviewed a sampling of other surveillances performed during October and November. Despite the corrective actions being completed, inspectors noted several similar deficiencies:

- Several procedures did not have critical steps annotated as such;
- A technician identified a critical step during a pre-job brief, but did not generate a CR or a procedure feedback form to document and permanently correct the deficiency; and
- One procedure contained steps that directed calibration of an instrument after fuses and alarms had been verified restored, an action that if performed without re-performing steps in the body of the procedure would result in an adverse consequence.

Entergy generated CR-PNP-2014-5909, CR-PNP-2014-5976, and CR-PNP-2014-5977 to document these observations.

Additionally, inspectors observed similar behaviors to those exhibited in the two contributing causes of the RCE during in-progress maintenance. On November 4, 2014, the inspectors observed primary containment isolation logic testing that included installing a switched jumper to set up the correct logic for the testing. The technicians were sensitive to the risk of a jumper coming loose, but they proceeded on with the test even after struggling to install the jumper. Later during the surveillance, the jumper detached from the plant equipment. After discussing with their supervisor, who was present during the test, the technicians restored the disconnected jumper and continued with the surveillance. Entergy determined that proceeding when initially challenged by jumper installation and failing to inform the shift manager when the jumper became detached were contrary to expectations. Entergy wrote CR-PNP-2014-5682 to document the issue.

Finally, during reactor protection system testing on November 3, 2014, a half scram occurred earlier than expected when a technician's finger slipped off the "INOP/INHIBIT" pushbutton. A precaution in the procedure warned that not engaging the pushbutton would bring in a half scram and Entergy staff stated that the challenge of continuously holding the button down had been recognized historically. Despite this known challenge, Entergy proceeded with the planned work. Entergy wrote CR-PNP-2014-5625 to document the half scram.

Section 5.6[4](c) of EN-LI-102 states that corrective action response must address the intent of the action. Inspectors determined that failing to perform the action as documented did not meet the intent of the action specified in the RCE. Ultimately, inspectors determined that observations of maintenance execution did not support closure or cancellation of corrective actions identified in the RCE. In response to inspectors concerns, Entergy revised the RCE to include additional corrective actions for procedural reviews prior to performance of work and enhanced oversight. Ultimately, inspectors determined that the numerous procedure deficiencies and human performance issues identified by inspectors represented conditions adverse to quality that were reasonably within Entergy's ability to identify and correct by execution of corrective actions identified in the RCE. This performance deficiency and associated finding are documented in section 4OA4.02.03.f of this report.

## .2 Complicated Reactor Scram due to Loss of Offsite Power on February 8, 2013

Entergy's RCE identified several corrective actions addressing each of the root and contributing causes as well as any additional identified weaknesses. Higher tiered CAPRs were identified for the second root cause. The first root cause did not have a CAPR assigned because the faults occurred outside of Entergy's control. The inspectors determined that this basis was acceptable in accordance with procedure EN-LI-118, "Cause Evaluation Process." The inspectors reviewed all of the corrective actions to ensure that they addressed the identified causes. The CAPRs included:

- Revising procedure 2.1.42, "Operations During Severe Weather," to develop and implement procedural guidance containing a systematic process for removal and restoration of bus sections during and following blizzard conditions; and
- Developing procedural guidance for de-icing insulating material susceptible to a flashover event in the switchyard following blizzard conditions.

In addition to the CAPRs listed above, Entergy identified additional corrective actions to fully address the causes, including the extent of those causes. Those corrective actions included:

- Reviewing the actions taken by the grid operator to improve reliability of service to the SUT;
- Conducting an engineering study to determine feasible switchyard upgrades to improve resistance to flashovers;
- Replacing the insulator on the T-931 disconnect that faulted during the event and sending to a vendor for analysis;
- Revision to severe weather procedures to provide operators guidance for reducing reactor power during blizzard conditions based on grid reliability;
- Revision to procedure 3.M.3-71 for cleaning and inspection of insulators;
- Performing a review of all open and closed RCEs since 2008 to validate that completed CAPRs adequately addressed the applicable root causes;
- Revision to procedure 2.2.1, "345 kV System," to add a statement to inspect the switchyard for conditions that could cause flashover if restoring 345 kV line during storm recovery; and
- Revision to procedure 8.C.40, "Seasonal Weather Surveillance," to ensure equipment necessary for de-icing insulators is available for the winter season.

In general, inspectors determined that the proposed corrective actions were appropriate and addressed each of the root and contributing causes. However, inspectors reviewed those corrective actions that were completed at the time of the inspection and noted deficiencies in the execution of some of the corrective actions.

With regard to the changes to severe weather procedures, inspectors identified that there were no substantive procedure changes for pre-storm actions and one change that directed a down power of the plant under the specific conditions could have precluded operators from taking action to down power the plant under the same conditions observed during the February 8, 2013, winter storm. Specifically, changes made to the procedure for severe storm preparations directed operators to reduce power to within the capacity of the turbine bypass valve if an "imminent" load reject is expected. The conditions provided for "imminent" load reject in the procedure revision did not match the

conditions encountered during the 2013 winter storm. The inspectors noted that these inadequacies were not identified when performing the effectiveness review for the procedure change, which included a table top demonstration of the procedure. Entergy entered the issue into the CAP as CR-PNP-2014-05826 and made numerous additional changes to the procedure. The inspectors reviewed the changes and determined that they reasonably corrected the cause identified in the RCE. Section 5.6[4](c) of EN-LI-102 states that corrective action response must address the intent of the action. Inspector determined the implemented corrective actions had not met the intent of the action specified by the RCE because it did not adequately address the causes.

Additionally, Entergy identified as a contributing cause that corrective actions for previous similar LOOPS did not preclude recurrence, in part, because failure analysis had not been conducted on faulted insulators in a previous LOOP event. To address this, the RCE assigned a corrective action to replace the insulator that faulted twice during the winter storm and send it to a vendor for failure analysis. The intent of this testing was to assist in determining a replacement strategy for insulators and is used to determine the condition of the insulator exterior glazing which is effective against contamination from coastal salt, fog, and/or mist conditions. Inspectors identified that, despite the insulator having been removed from service and stored in a warehouse since June 2014, it had not been sent off for analysis at the time of the inspection. In review of the corrective actions specified in the RCE, inspectors notified that an action was created as a priority 1 correct condition action to replace the insulator and send to a vendor for failure analysis. The work order that removed and replaced the faulted insulator was completed in June 2014. Maintenance personnel closed the corrective action on September 2, 2014 by opening a new action, assigned to engineering personnel, to send the component for failure analysis. This new corrective action was categorized as a "priority 4 general action" (i.e. enhancement). Section 5.6[4](c) of EN-LI-102 states that corrective action response "must not indicate correction or implementation based on future action."

On August 28, 2014, Entergy generated CR-2014-4265 due to unsatisfactory closure of the corrective actions. Specifically, the CR stated that the "response did not complete action specified in [the] RCE." It continued that "not completing the task as described should need CARB approval. This alters the RCE Interim Actions as specified." In response to the CR, Entergy generated two new actions which resulted in coaching on the inadequate corrective action closure and approval of the deviation. In review of the actions performed, inspectors identified that response to the new actions failed to identify that the CAP was not implemented correctly and failed to ensure the action was prioritized appropriately. Ultimately, inspectors determined that the actions taken by Entergy were not in accordance with their CAP because the corrective action was closed improperly. In response to inspectors concerns, Entergy generated CR-PNP-2014-05735 and sent the insulator for failure analysis and was awaiting results and the completion of this inspection. This performance deficiency and associated finding are documented in section 4OA4.02.03.f of this report.

### .3 Complicated Reactor Scram due to Trip of All Three RFPs on August 22, 2013

Entergy's RCE identified corrective actions addressing each of the root and contributing causes. CAPRs were identified for the root cause. The inspectors reviewed all of the corrective actions to ensure they addressed the identified causes. The CAPRs included implementing a modification to remove the RFP low cooling coil flow trip entirely, and

reviewing all modifications done to address SPVs to ensure unintended consequences had not been introduced.

Additional corrective actions to address the extent of cause of the root cause included a review of all modifications implemented since 2008 to ensure none of them created unintended SPVs. Entergy corrected the direct cause by repairing the splice and addressed the extent of condition by verifying all other splices done under plant design change 98-38 were located in junction boxes or conduit. Corrective action for the identified contributing cause was to conduct a search of the CAP for other category 'C' CRs documenting design vulnerabilities initiated since 2008 to verify the responses fully addressed the issues raised. Additionally, Entergy credited corrective actions performed under CR-PNP-2013-1572 and CR-PNP-2013-1577 to address this contributing cause. Those corrective actions included training and new expectations for the engineering department on using technical rigor.

In general, the inspectors determined that the proposed corrective actions were appropriate and addressed each identified root and contributing cause.

#### .4 Complicated Reactor Scram due to Loss of Offsite Power on October 14, 2013

Entergy's RCE identified several corrective actions addressing each of the root and contributing cause as well as any additional identified weaknesses. CAPRs were identified for the root cause. The inspectors reviewed all of the corrective actions to ensure that they addressed the identified causes. The CAPRs included:

- Revising procedure 1.5.22, "Risk Assessment Process," to recognize and assess 345 kV single line vulnerability;
- Developing and formalizing mitigation actions required to be implemented prior to removing either 345 kV line from service; and
- Developing additional requirements to control work during operations with a single offsite power source.

In addition to the CAPRs listed above, Entergy identified the following corrective actions to fully address the root and contributing causes:

- Contact industry organizations to determine if any standard or guidance document exists for addressing planned maintenance on a transmission line;
- Revision to procedure 1.5.22 and procedure EN-FAP-WM-002 to require a critical evolution meeting for any activity that would require single 345 kV line operations;
- Perform a feasibility study to install third transmission line and present it to the Plant Health Committee; and
- Verify replacement of the wooden poles at the offsite substation with a metal structure.

The inspectors determined that the proposed corrective actions were appropriate and addressed each root and contributing cause.

## .5 Root Cause Evaluation of Degraded Initiating Events Cornerstone

Entergy's RCE identified one root cause and three contributing causes related to the four scrams that transitioned the station into the Degraded Cornerstone of the NRC's Action Matrix. The inspectors reviewed all of the corrective actions to ensure that they addressed the identified causes.

Entergy identified the root cause of the collective evaluation that site leadership did not effectively ensure specific corrective or mitigating actions were developed and implemented to address operational risk. This occurred because the likelihood (frequency) of potential events was underestimated and existing site conditions and practices were viewed as acceptable. In addition to the corrective actions already identified in each of the individual root causes for each of the scrams, Entergy developed and implemented a new site procedure for risk management. Specifically, as a CAPR, the station developed and implemented Pilgrim procedure 1.3.142, "PNPS Risk Review and Disposition." The purpose of this procedure is to provide guidance for disposition of certain risk elements that currently may not get site management risk consideration including active and "latent" or passive risk decisions. This procedure also provides a structure for evaluating passive risk associated with not taking action, such as deferring work or not adding scope to an outage, and can also be used on an as-needed basis when this risk decision is not clear, or there are competing organizational priorities. This procedure was not intended to supersede any specific existing guidance.

Entergy is tracking implementation of this procedure in LO-PNPLO-2014-00122. At the time of this inspection, Entergy had completed four evaluations in accordance with this procedure; three were in progress.

It appears that the procedure has provided Entergy an additional tool for making risk-informed decisions. However, it was not clear to the inspectors how implementation of this procedure would have resulted in a different outcome for the events analyzed in this RCE. Other established station procedures, such as those for evaluating OE, on-line work management, and the CAP, all provide a process for evaluating a condition and reaching a decision. For each of the events described in this root cause, it appears Entergy was implementing established station procedures without giving due consideration to the risk associated with those decisions.

Entergy acknowledged that a new procedure in and of itself will not solve the issue related to inadequate risk-based decision-making because that process is, in part, related to the culture at the site. In addition to implementation of this new process, Entergy has completed some one-time training related to risk. The inspectors questioned the sustainability of this action given the limited training, and the station noted that the need for additional training will be monitored via the Department Performance Review Meeting process, as described in Entergy procedure EN-LI-121, "Trending and Performance Review Process." Pilgrim staff also indicated that station management is reinforcing these expectations, and holding personnel accountable via the station's accountability model. Inspectors determined that the CAPR, in conjunction with other actions planned to address the station's cultural perception of risk, would reasonably correct the identified root cause.

As part of this RCE, Entergy identified contributing causes associated with implementation of the CAP, implementation of the OE program, and procedure quality as it pertained to inclusion of operational risk.

In addition to corrective actions already implemented as part of the individual RCEs, Entergy:

- Assigned mitigating strategy reviews for items on the long standing equipment issues list, including SPVs and first-time high critical preventive maintenance;
- Adjusted the CRG meeting agenda such that the group would complete review of the oldest/longest corrective actions as well as the corrective actions with upcoming due dates, with a focus on priorities and any interim or compensatory actions that may be needed; and
- Completed OE familiarization briefing for various site managers.

Finally, inspectors reviewed Entergy's CCA which assessed if any safety culture aspects caused or significantly contributed to the events. As discussed in section 4OA4.02.05, the CCA identified challenges in CAP implementation, adherence to standards, and leader behaviors as drivers to the performance issues. In addition to the corrective actions implemented for the five RCEs discussed above, Entergy's corrective action plan for the CCA included:

- Mentoring of the department performance improvement coordinators (DPICs) to include coverage of their roles and responsibilities and expectations;
- Reviewing corrective action closure documentation that did not meet expectations, as well as requirements for closure documentation with the CRG;
- Developing and implementing an accountability model; and
- Implementing CAP recovery indicators that are reflective of CAP performance issues.

In general, inspectors determined that the proposed corrective actions were appropriate and addressed each of the root and contributing causes. However, inspectors reviewed those corrective actions that were completed at the time of the inspection and noted deficiencies in the execution of some of the corrective actions that were relevant to CAP implementation improvement:

- CA13 to the safety culture aspect CCA stated, in part, "Mentor DPICs. This is recommended to be done over several months in a comprehensive manner to include coverage of roles, responsibilities, and expectations...This activity shall commence on or before June 6th (start date considered critical) and be tracked and updated weekly for six months." Based on interviews with station personnel and review of documentation associated with the corrective action, the inspectors determined that the station started the action, but did not complete it as written.
- CA15 to the safety culture aspect CCA stated, in part, "Review corrective action closures where performance falls short of expectations with the CRG and the leader and supervisory team meeting...Create new action and repeat for four consecutive months." Based on review of documentation and interviews with station personnel, the inspectors determined that the station completed this action for April, but did not complete any additional sessions, as required by the approved corrective action.

For both of these examples, inspector's discussion with Entergy personnel revealed that the performance improvement department determined that these actions were not producing the desired results, and decided to implement training instead. However, Entergy staff never brought these corrective actions to the CARB for approval of the revision as required by EN-LI-102. These were entered into the CAP as CR-PNP-2014-06040.

- b. *IP 95002 requires that the inspection staff determine that the licensee prioritized corrective actions with consideration of risk significance and regulatory compliance.*

.1 Reactor Scram due to Inadvertent Trip of Both RRP's on January 10, 2013

Entergy prioritized corrective actions with consideration of risk significance and regulatory compliance. CAPRs were given adequate due dates and were completed commensurate with their risk significance. The procedures that required relay cover removal and replacement were revised in the order in which they were required for maintenance, ensuring that those needed for scheduled work would be ready prior to execution of the activity.

.2 Complicated Reactor Scram due to Loss of Offsite Power on February 8, 2013

Entergy prioritized corrective actions with consideration of risk significance and regulatory compliance. With the exception of the finding and observations documented in sections 4OA4.02.03.f and 02.03.a.2, respectively, CAPRs and corrective actions associated with two root causes and three contributing causes were given adequate due dates and were completed commensurate with their risk significance. At the time of the inspection, all CAPRs and corrective actions that were not already completed had reasonably scheduled due dates.

.3 Complicated Reactor Scram due to Trip of All Three RFP's on August 22, 2013

Entergy prioritized corrective actions with consideration of risk significance and regulatory compliance. CAPRs were given adequate due dates and were completed commensurate with their risk significance. Entergy completed the splice repair and removal of the low flow trip prior to returning the plant to power. All other corrective actions were complete prior to the inspection.

.4 Complicated Reactor Scram due to Loss of Offsite Power on October 14, 2013

Entergy prioritized corrective actions with consideration of risk significance and regulatory compliance. CAPRs and corrective actions associated with a root cause and a contributing cause were given adequate due dates and were completed commensurate with their risk significance. At the time of inspection, all CAPRs and corrective actions were completed.

.5 Root Cause Evaluation of Degraded Initiating Events Cornerstone

The inspectors reviewed the prioritization of the corrective actions associated with the RCE, as well as the procedural requirements found in Entergy procedure EN-LI-102, "Corrective Action Program." The inspectors verified that the prioritization was in accordance with site procedures and based on consideration of risk significance and regulatory compliance.

- c. *IP 95002 requires that the inspection staff determine that the licensee established a schedule for implementing and completing the corrective actions.*

.1 Reactor Scram due to Inadvertent Trip of Both RRP's on January 10, 2013

Entergy established a schedule for completing corrective actions associated with this event and assigned corrective actions to the appropriate individuals or organizations to ensure that the actions were planned or taken in a timely manner. In general, CAPRs and corrective actions associated with the identified root cause and the contributing causes were scheduled commensurate with their risk significance. However, inspectors identified that several corrective actions were entered into the CAP tracking system as "acknowledge that..." the corrective action will occur, rather than execution of corrective action itself. For example, inspectors identified that corrective actions 21-24, which specified that procedures be prioritized and reviewed for deficiencies similar to the ones revealed by the scram, were entered into the CAP tracking system as an action to each supervisor to acknowledge that they will prioritize and review the procedures. As documented in section 4OA4.02.03.a.1 and in the finding in 4OA4.02.03.f of this report, inspectors identified multiple examples where corrective actions were not completed as specified in the RCE.

.2 Complicated Reactor Scram due to Loss of Offsite Power on February 8, 2013

Entergy established a schedule for completing corrective actions associated with this event and assigned corrective actions to the appropriate individuals or organizations to ensure that the actions were planned or taken in a timely manner. In general, CAPRs and corrective actions associated with the two identified root causes and the contributing causes were adequately scheduled and completed commensurate with their risk significance. At the time of the inspection, all CAPRs and corrective actions that were not already completed had reasonably scheduled due dates. However, inspectors identified that one corrective action that was intended to address a contributing cause had not been taken in a timely manner. Specifically, the inspectors noted that the corrective action to conduct an engineering study to determine feasible switchyard upgrades to improve the resistance to flashovers due to ice-bridging on insulators was extended a total of 11 times. At the time of inspection (21 months since the event), Entergy had not made a decision as to whether the modification would be funded and implemented. The inspectors determined that Entergy did not prioritize this corrective action to address the issue in a timely manner commensurate with its safety significance. Entergy entered this into the CAP as CR-PNP-2014-05824 and CR-PNP-2014-05827 and subsequently approved the funding for the modification of the switchyard. Because the action was not completed in a timely manner, inspectors determined that it was a weakness. However, inspectors determined that actions taken by Entergy during the inspection were adequate and no additional follow-up inspection was required.

.3 Complicated Reactor Scram due to Trip of All Three RFPs on August 22, 2013

Entergy established a schedule for completing corrective actions associated with this event and assigned corrective actions to the appropriate individuals or organizations to ensure that the actions were taken in a timely manner. CAPRs and other corrective actions associated with the identified causes were adequately scheduled and completed commensurate with their risk significance. At the time of the inspection, all corrective actions were completed.

.4 Complicated Reactor Scram due to Loss of Offsite Power on October 14, 2013

Entergy established a schedule for completing corrective actions associated with this event and assigned corrective actions to the appropriate individuals or organizations to ensure that the actions were planned or taken in a timely manner. CAPRs and corrective actions associated with root cause and the contributing cause were adequately scheduled and completed commensurate with their risk significance. At the time of the inspection, all CAPRs and corrective actions were completed.

.5 Root Cause Evaluation of Degraded Initiating Events Cornerstone

Entergy's corrective action plan provided dates for completion of the actions as described in the RCE of the Degraded Initiating Events Cornerstone. At the time of the inspection, all but three of the corrective actions related to CR-PNP-2013-07830 have been completed. The remaining corrective actions are completion of SPV training, completion of training on Pilgrim Procedure No. 1.3.142, "PNPS Risk Review and Disposition," and implementation of the Maintenance procedure upgrade project.

The inspectors reviewed the open corrective actions related to training and determined that the schedule for implementation and completion was reasonable. With respect to the procedure upgrade project in the Maintenance department, corrective action 59 documents that the current due date for this corrective action is April 30, 2015. Based on documentation review and interviews with station personnel, the inspectors noted that the procedure upgrade project is off schedule and will not be complete by this date. Discussion with Maintenance department management identified that they had developed a revised procedure scope and were implementing the procedure upgrades with dedicated resources to a revised schedule. Inspectors determined that this long-term action was reasonable when considered in conjunction with other corrective actions intended to identify procedure deficiencies prior to and during maintenance execution.

With regard to the action to assign mitigating strategy reviews for all items on the long standing equipment issues list, the station completed assignment of these reviews and opened corrective actions 35-53 to develop the mitigating strategies for each of the issues. Entergy staff completed documentation of each of these mitigating strategies and closed the associated corrective actions.

Per EN-DC-336, "Plant Health Committee," Revision 8, mitigating strategy reviews are to be reviewed and challenged by the Plant Health Committee when initially developed, when revised, and at least annually. The inspectors inquired as to the status of this review. The station scheduled Plant Health Committee review of the SPV mitigating strategies, and this review is scheduled to be completed by the end of the year.

However, the station has not yet scheduled the Plant Health Committee review of the mitigating strategies for the first-time high critical preventive maintenance tasks.

The root cause identified for this RCE was that site leadership did not effectively ensure specific corrective or mitigating actions were developed and implemented to address operational risk. Though the CR associated with this RCE had actions to track assignment and development of the mitigating strategy reviews, there were no actions tracking the Plant Health Committee's review of the mitigating strategies (i.e., station management accepting the risk associated with these strategies). Entergy identified an action to have the Plant Health Committee review these items prior to the next refueling outage. Inspectors determined that failing to track management review of the mitigating strategies was a weakness. However, inspectors determined that actions taken by Entergy during the inspection were adequate and no additional follow-up inspection was required.

- d. *IP 95002 requires that the inspection staff determine that the licensee developed quantitative and/or qualitative measures of success for determining the effectiveness of the corrective actions to preclude repetition.*

.1 Reactor Scram due to Inadvertent Trip of Both RRP's on January 10, 2013

Entergy plans to complete the effectiveness review by January 30, 2015. It includes observation of the use of five procedures revised as part of the CAPRs. Success criteria include the presence of steps to remove and replace relay covers and to verify relay state after replacing the cover, and technician implementation of the procedure in accordance with procedure EN-HU-106, "Procedure and Work Instruction Use and Adherence."

The inspectors determined that Entergy had established adequate measures for determining the effectiveness of the CAPRs.

.2 Complicated Reactor Scram due to Loss of Offsite Power on February 8, 2013

Entergy identified two effectiveness reviews, one for each CAPR, to ensure that these actions prevent recurrence and are complete and appropriate. Each CAPR has quantitative and qualitative criteria assigned in the effectiveness review plan in accordance with procedure EN-LI-118, "Cause Evaluation Process."

The inspectors determined that Entergy had established adequate measures for determining the effectiveness of the CAPRs. Inspectors noted that one of the effectiveness reviews was completed at the time of the inspection and determined that it appropriately evaluated the effectiveness of the corrective action assigned to address the root cause. As documented in section 4OA4.02.03.f of this report, inspectors identified that the second effectiveness review had not been completed in accordance with the CAP requirements. Entergy entered the issue into the CAP as CR-PNP-2014-06067.

.3 Complicated Reactor Scram due to Trip of All Three RFP's on August 22, 2013

On August 26, 2013, just after implementation of the modification to remove the low flow trip from the RFPs, a new ground caused breaker Y1-24 to trip open again. The feed

pumps did not receive trip signals, verifying the effectiveness of that CAPR. Entergy plans to complete the effectiveness review for the CAPR to review other modifications by November 25, 2014. It includes a snapshot assessment of modifications to address SPVs and includes a criterion for success to identify no new issues with the modifications.

The inspectors determined that Entergy had established adequate measures for determining the effectiveness of the CAPRs.

.4 Complicated Reactor Scram due to Loss of Offsite Power on October 14, 2013

Entergy identified one effectiveness review addressing three CAPRs to ensure that these actions prevent recurrence and are complete and appropriate. The effectiveness review plan assigned quantitative and qualitative criteria. The method described in the plan was to perform a snapshot self-assessment to review implementation of revised procedural guidance for risk management of 345 kV planned maintenance. Success criteria were established that required adequate documentation of the systematic process for risk review. The inspectors reviewed the completed effectiveness review and determined that it appropriately evaluated the effectiveness of the CAPR.

The inspectors determined that Entergy had established adequate measure for determining the effectiveness of the CAPRs.

.5 Root Cause Evaluation of Degraded Initiating Events Cornerstone

Entergy has planned two effectiveness reviews for the CAPR to ensure that this action is complete, appropriate, and prevents recurrence. These two effectiveness reviews include one initial implementation review, and one snapshot self-assessment. Each effectiveness review contains success criteria, and has been drafted in accordance with Entergy procedure EN-LI-118, "Cause Evaluation Process." Entergy originally scheduled the initial implementation review to be completed August 15, 2014. However, due to the limited number of times the station has implemented Pilgrim procedure 1.3.142 since its issuance on July 31, 2014, the station has rescheduled this effectiveness review twice. The current due date is February 18, 2015.

The inspectors determined that Entergy had established an effectiveness review plan for the CAPR associated with the root cause identified in this evaluation.

- e. *IP 95002 requires that the inspection staff determine that the licensee's planned or taken corrective actions adequately address a Notice of Violation (NOV) that was the basis for the supplemental inspection, if applicable.*

The NRC staff did not issue an NOV to Entergy; therefore, this inspection requirement was not applicable.

f. Findings and Observations

.1 Finding for Failure to Complete Several Corrective Actions as Required by Program Requirements

Introduction: The inspectors identified a Green finding for Entergy's failure to identify and correct conditions adverse to quality by implementing adequate and timely actions to address similar conditions. Specifically, inspectors identified multiple examples of failure to implement the corrective actions in accordance with CAP requirements which resulted in failing to identify and correct several conditions adverse to quality. Two of the examples also involved a violation of 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," which is being treated as a NCV, as described below.

Description: In 2013, four reactor scrams occurred at Pilgrim which resulted in two PIs in the Initiating Events cornerstone crossing the Green to White threshold. To address these risk significant performance issues, both individually and collectively, Entergy performed four RCEs for the individual scram events which occurred on January 10, February 8, August 22, and October 14. Additionally, Entergy performed a RCE to assess the commonalities between the four scram events and CCA to assess if any safety culture aspects caused or significantly contributed to the events.

EN-LI-102, "Corrective Action Program," Revision 23, "provides instructions for the administration of Entergy corrective action process, including the identification, reporting, evaluation, and correction of a broad range of problems, areas for improvements, and standards performance deficiencies. Issues addressed in the corrective action process must include Adverse Conditions and Conditions Adverse to Quality, and can include minor problems that may be precursors to more significant events, areas for improvement and standards performance deficiencies identified during assessments and other activities." To that end, EN-LI-102 contains instructions for review and approval of corrective action development, response and documentation, and due date extensions. Section 5.6[4] of EN-LI-102 states that corrective action response must address the intent of the action and must not indicate correction or implementation based on future action. In review of the corrective action plans and status of completed or scheduled corrective actions to address the risk-significant performance issues, inspectors identified multiple deficiencies in implementing the CAP procedure.

As documented in section 4OA4.02.03.a.1, a.2, a.4, and d.2 of this report, inspectors identified that some of the corrective actions specified in the RCEs were not completed in accordance with CAP requirements. Specifically, inspectors identified:

- Several of the human performance related corrective actions from the RCE of a scram on January 10, 2013, during surveillance testing had been cancelled or closed. To determine whether the closure of the corrective actions was appropriate, inspectors reviewed a sampling of recently performed surveillances and observed performance of maintenance in the field. During this review, inspectors noted that several procedures did not have critical steps annotated as such, one procedure directed work to be performed following system restoration, and identified examples of technicians proceeding with testing when challenged with test equipment challenges or unexpected system response. Ultimately, inspectors determined that observations of maintenance execution did not support closure or cancellation of corrective actions identified in the RCE and

determined that the numerous procedure deficiencies and human performance issues identified by inspectors represented conditions adverse to quality that were reasonably within Entergy's ability to identify and correct by execution of corrective actions identified in the RCE;

- Despite corrective actions to upgrade severe weather procedures to address deficiencies revealed during a winter storm on February 8, 2013, inspectors identified that the procedure changes did not fully meet the intent of the corrective actions because there were no substantive changes to the procedures for pre-storm actions. Additionally, inspectors determined that the inadequate guidance for pre-storm actions represented a condition adverse to quality that was reasonably within Entergy's ability to identify and correct by execution of corrective actions identified in the RCE;
- An action to send a transformer insulator that faulted offsite for vendor analysis was not completed as required by CAP requirements. Despite being self-identified by Entergy in preparation for the inspection, this deficiency still existed at the time of the inspection; and
- One of two effectiveness reviews for a RCE was not completed as required by CAP requirements.

Entergy entered the issues into the CAP as CR-PNP-2014-5909, CR-PNP-2014-5976, CR-PNP-2014-5977, CR-PNP-2014-5682, CR-PNP-2014-5625, CR-PNP-2014-5826, CR-PNP-2014-5735, and CR-PNP-2014-06067 and took action to address the identified deficiencies. In particular, for the first example, Entergy revised the RCE to include additional corrective actions for procedural reviews prior to performance of work and enhanced oversight of maintenance activities. For the second example, Entergy made numerous additional changes to severe weather procedures.

As discussed in section 4OA4.02.05.b.1, Entergy's site safety culture review adequately identified the components of nuclear safety culture that caused or significantly contributed to the four scram events. In particular, inspectors noted Entergy identified that implementation of the station's CAP has not been effective in ensuring adequate corrective actions are taken to address issues in a timely manner, and Entergy identified corrective actions to improve performance in this area. As discussed in section 4OA4.02.05.a.5, inspectors identified examples of approved corrective actions intended to address challenges in CAP implementation not being completed as prescribed. For these corrective actions, inspector's discussion with Entergy personnel revealed that the performance improvement department determined that the actions were not producing the desired results, and decided to implement CAP training instead. However, Entergy did not present these change to the CARB for approval of the revision as required by EN-LI-102. This was entered into the CAP as CR-PNP-2014-06040.

Ultimately, inspectors determined that the specific deficiencies in execution of corrective actions identified by inspectors were symptomatic of the identified challenges in CAP implementation, and correspondingly determined that corrective actions specified in the common cause and safety culture evaluations were not effective at ensuring that performance issues identified by the numerous RCEs were corrected.

Analysis: The failure to implement CAP procedural requirements with respect to corrective action response and documentation was a performance deficiency. This finding was determined to be more than minor because it was similar to IMC 0612, "Power Reactor Inspection Reports," Appendix E, "Examples of Minor Issues," Example

3.j in that it represents a significant programmatic deficiency that could lead to worse errors if uncorrected. Specifically, not following an established process for completing corrective actions could result in a failure to identify and correct conditions adverse to quality or other adverse conditions. Additionally, this performance deficiency affects the procedure quality, equipment performance, and human performance attributes of the Initiating Events cornerstone, and impacts the objective to limit the likelihood of events that upset plant stability and challenge critical safety functions during shutdown as well as power operations. Specifically, a severe weather procedure did not prescribe sufficient actions that would limit the likelihood of ice bridging or place the plant in a condition that it could respond to a LOOP without potentially upsetting plant stability and the failure to conduct insulator testing prevented the station from assessing its replacement strategy. Additionally, several surveillance procedures did not provide sufficient barriers (e.g. critical step annotation, test equipment verification, etc.) in accordance with the station programs to limit the likelihood of scrams and other transients during testing.

The inspectors determined the significance of the finding using IMC 0609, Appendix A, "The Significance Determination Process for Findings At-Power." The finding was determined to be of very low safety significance (Green) because the failure to implement corrective actions has not resulted in a subsequent reactor scram or loss of mitigating equipment. This finding had a cross-cutting aspect in the area of Problem Identification and Resolution, Resolution, because Entergy did not take effective corrective actions to address issues in a timely manner commensurate with their safety significance. Specifically, corrective actions were not completed in accordance with Entergy's CAP and, in some cases, after identification of unsatisfactory closure by Entergy, follow-up actions were inadequate to resolve the deficiencies. [P.3]

Enforcement: 10 CFR Part 50, Appendix B, Criterion XVI, "Corrective Action," requires, in part, that measures shall be established to assure that conditions adverse to quality, such as failures, malfunctions, deficiencies, deviations, defective material and equipment, and non-conformances are promptly identified and corrected. Contrary to the above, inspectors identified multiple examples prior to November 7, 2014, where Entergy did not establish measures to assure that conditions adverse to quality were promptly identified and corrected. Specifically, inspectors determined that a severe weather procedure did not provide adequate guidance for operators to prepare the plant for an incoming storm. The inspectors determined that this condition adverse to quality was not adequately corrected when it was revealed by a storm on February 8, 2013. Additionally, inspectors identified several conditions adverse to quality in the execution or documentation of quality related surveillance procedures. The inspectors determined that these deficiencies were not identified and corrected by adequate implementation of human performance related corrective actions. Other examples provided are not associated with safety-related equipment and therefore failure to implement the CAP did not result in the failure to identify or correct conditions adverse to quality. Entergy's immediate corrective actions included entering the issues into their CAP as CR-PNP-2014-5909, CR-PNP-2014-5976, CR-PNP-2014-5977, CR-PNP-2014-5682, CR-PNP-2014-5625, CR-PNP-2014-5826, CR-PNP-2014-5735, and CR-PNP-2014-06067. Additionally, Entergy revised the severe weather procedure to adequately address the deficiencies, sent the faulted insulator for failure analysis, and implemented additional corrective actions to address similar surveillance procedure deficiencies, including additional procedure reviews and enhanced supervisor oversight. Because the violation is of very low safety significance and has been entered into Entergy's CAP, this violation

is being treated as a NCV, consistent with section 2.3.2.a of the Enforcement Policy.  
**(NCV 05000293/2014008-02, Failure to Complete Several Corrective Actions as Required by Program Requirements)**

## .2 Parallel White PI Findings

Introduction: The NRC assigned two parallel PI inspection findings of low to moderate safety significance (White) for the failure to adequately evaluate the causes and implement corrective actions sufficient to address the root and contributing causes that resulted in the White Unplanned Scrams per 7000 Critical Hours and White Unplanned Scrams with Complications PIs.

Description: The inspectors identified deficiencies regarding Entergy's execution of corrective actions documented in the RCEs, as well as understanding of some of the causes of the issues. Specifically, inspectors identified several examples in the RCEs where corrective actions were not completed as intended or were closed prematurely. Additionally, for one of the RCEs, inspectors determined that Entergy failed to investigate a deficient condition sufficiently to ensure they fully understood all of the causes of the event.

Inspectors determined that the specific deficiencies in execution of CAP procedures discussed in the findings in sections 02.02.e.1 and 02.03.f.1 of this report were indicative of the CAP implementation weakness that Entergy identified as part of their common cause and safety culture evaluations. Correspondingly, inspectors determined that corrective actions specified in the common cause and safety culture evaluations were not effective at ensuring that all the causes of the performance issues were understood and that corrective actions taken were adequate to address the identified root and contributing causes. Taken collectively, the issues associated with the two White PIs represent a significant weakness, as discussed in IP 95002.

Analysis: In accordance with IMC 0305, "Operating Reactor Assessment Program," the inspectors identified two parallel PI inspection findings because Entergy failed to adequately evaluate all the causes and implement corrective actions sufficient to address the identified root and contributing causes that resulted in the White Unplanned Scrams per 7000 Critical Hours and White Unplanned Scrams with Complications PIs. The parallel PI findings are assigned the same safety significance as the initiating PIs. Since the initiating PIs were both White, these inspection findings have been assigned a low to moderate safety significance (White). These parallel PI inspection findings provide for additional NRC review of Entergy's actions to address the weaknesses identified in this report.

Because these are parallel PI inspection findings, they were not assessed for cross-cutting aspects.

Enforcement: No violation of regulatory requirements is associated with these findings. The parallel inspection finding associated with the White Unplanned Scrams per 7000 Critical Hours PI will take effect in the 1st quarter of 2014, which is the quarter the White PI was no longer considered an Action Matrix input in accordance with Section 11.02.b of IMC 0305, "Operating Reactor Assessment Program." Similarly, the parallel finding associated with the White Unplanned Scrams with Complications PI will take effect in the 3rd quarter of 2014. The findings will be removed from consideration of future agency

action (per the Action Matrix) in the quarter following the successful completion of the follow-up supplemental inspection. The parallel PI inspection findings will not be double-counted with the PIs with which they are associated. **(FIN 05000293/2014008-03, Parallel White Unplanned Scrams per 7000 Critical Hours PI Finding; FIN 05000293/2014008-04, Parallel White Unplanned Scrams with Complications PI Finding)**

#### 02.04 Independent Assessment of Extent of Condition and Extent of Cause.

##### a. Inspection Scope

*IP 95002 requires that the inspection staff perform a focused inspection to independently assess the validity of the licensee's conclusions regarding the extent of condition and extent of cause of the issue(s). The objective of this requirement is to independently sample performance, as necessary, within the key attributes of the cornerstone(s) that are related to the subject issue(s) to ensure that the licensee's evaluation regarding the extent of condition and extent of cause is sufficiently comprehensive.*

In conducting this independent review, the inspectors interviewed station management and personnel, reviewed procedures and program documentation, and reviewed existing station program monitoring and improvement efforts, including review of corrective action documents. The inspectors observed performance of maintenance and reviewed completed maintenance documents.

##### b. Assessment

###### .1 Reactor Scram due to Inadvertent Trip of Both RRP's on January 10, 2013

In conducting this independent review, the inspectors observed the pre-job brief for and the performance of primary containment isolation system logic testing by I&C technicians while onsite. In the office, the inspectors reviewed the documentation associated with 12 completed surveillance activities from October 2014 and discussed observations with Entergy staff. The inspectors also reviewed a sampling of maintenance department supervisor observations and procedure feedback forms.

The inspectors concluded that Entergy's determination of extent of condition and extent of cause for this scram event were valid and sufficiently comprehensive. Findings and observations related to the corrective actions to address the extent of condition and extent of cause discovered during the independent assessment are discussed in sections 4OA4.02.03.a.1 and 4OA4.02.03.f of this report.

###### .2 Complicated Reactor Scram due to Loss of Offsite Power on February 8, 2013

Entergy identified as causal to the event that procedures contained inadequate pre-defined risk-based criteria for operators to manipulate switchyard components during and following a blizzard, previous CAPRs taken did not prevent recurrence, and previously identified internal OE was not successfully utilized to direct removal of snow and ice from insulators on the SUT bus prior to reenergizing.

The inspectors assessed whether Entergy's extent of condition and extent of cause evaluations sufficiently identified operational challenges in the other severe weather

related procedures. The inspectors identified that minor deficiencies existed in Entergy procedure 5.2.2, "High Winds (Hurricane)." In this procedure, various steps described a self-sustaining condition that was not consistent with the design of the system. The procedure stated that reducing power to 130 megawatts will provide the capability to maintain the reactor in service in the event both 345 kV lines are de-energized. The inspectors reviewed the design documentation for the 345 kV system and interviewed operations personnel to assess the validity of this statement and whether it would impact the station's response to a severe weather event. During interviews, Entergy staff stated that the loss of both 345 kV lines to the Pilgrim switchyard would result in a reactor scram regardless of initial reactor power. The inspectors also noted that the procedure provided unclear guidance for operators to address flooding during a hurricane. Section 4.1, Step [2](h) of the procedure stated "consider taking precautionary measures to prevent/limit water ingress into the essential equipment area." Inspectors determined that this step did not provide clear pre-defined guidance for what actions should be performed. Entergy entered the issues into the CAP as CR-PNP-2014-06051 so that action could be taken to revise the procedure.

The inspectors determined that Entergy conducted a comprehensive extent of condition and extent of cause review. In general, the inspectors concluded that Entergy's determination of extent of condition and extent of cause for this event were valid and sufficiently comprehensive, and that corrective actions, including actions taken to address concerns identified by inspectors, were sufficient to address them.

### .3 Complicated Reactor Scram due to Trip of All Three RFPs on August 22, 2013

To independently assess Entergy's extent of cause assessment for the contributing cause which documented inadequate response to a category 'C' CR, the inspectors conducted searches of the CAP tracking system to verify Entergy was not continuing to close out category 'C' CRs which identified design vulnerabilities without fully addressing the concerns raised by the writer. During this review, the inspectors identified two CRs that did not have corrective actions that fully addressed the concerns raised in the initiation statement:

- CR-PNP-2014-2515, assigned to security, documented a concern related to cyber security. While the primary concern raised turned out to be a drawing error and not the true configuration, the CR raised a secondary concern which was not addressed by Entergy. Entergy documented and addressed the second concern in CR-PNP-2014-6012.
- CR-PNP-2014-4247, assigned to project management, documented a growing shoal that could impact the flow of cooler temperature water to the plant, potentially resulting in the high temperatures that required downpowers in 2013. The only corrective actions taken to date have included putting the issue on the margin management list and writing a funding request. In discussions with inspectors, Entergy stated that they did not need to take further actions because the shoal is only a minor impact on the intake temperatures. Though inspectors determined this was reasonable, they determined that there was insufficient documentation in the CR response to reach this conclusion.

The corrective action that was intended to address the extent of this contributing cause only addressed the engineering department. Since both of these CRs were assigned outside of the Engineering department, they were not reviewed as part of the extent of

cause action. Inspectors determined that not considering CRs from other departments that could identify design vulnerabilities was a weakness. However, inspectors determined that the weakness was minor because it did not affect the ability to meet the inspection objectives.

In general, the inspectors concluded that Entergy's determination of extent and condition and extent of cause for this scram event, as well as the corrective actions assigned to each, were valid and sufficiently comprehensive. As discussed in the finding in section 4OA4.02.02.e of this report, Entergy had not completed evaluating the causes of the failed splice at the conclusion of this inspection. Validation of the extent of those causes through independent assessment will be reexamined during the follow-up inspection.

.4 Complicated Reactor Scram due to Loss of Offsite Power on October 14, 2013

Entergy determined that the scope of the extent of condition for this event was to assess the 345 kV system for other potential single failure vulnerabilities in the switchyard and transmission lines. Entergy initiated corrective actions to perform a feasibility study of installing a 3<sup>rd</sup> transmission line and required conduct of critical evolution meetings for any activity that would require operation with a single 345 kV offsite power line. The RCE addressed the extent of condition and extent of cause, and assigned corrective actions based on the identified extent of condition and extent of cause.

The inspectors determined that Entergy conducted a comprehensive extent of condition and extent of cause review. The inspectors did not identify any substantive extent of condition and extent of cause issues that Entergy was not aware of and had not already identified with corrective action plans in place. The inspectors concluded that Entergy's determination of extent of condition and extent of cause for this event, as well as the corrective actions assigned to each, were valid and sufficiently comprehensive.

.5 Root Cause Evaluation of Degraded Initiating Events Cornerstone

The inspectors concluded that Entergy's determination of extent of condition and extent of cause for the collective evaluations of the two White PIs, and the corrective actions identified, were of reasonable breadth and depth. The two White PIs ultimately revealed organizational issues associated with the consideration of operational risk, both in decision making and procedures, and implementation of the corrective action and OE programs. To independently assess the extent of those causes, the inspectors' review focused on corrective actions to address operational risk decision-making and implementation of the CAP. The inspectors observed various station meetings, including a CRG meeting as well as an Operations Focus Meeting. In preparation for the inspection, Entergy self-identified that extent of condition and extent of cause evaluations were narrowly focused and took additional action to address each of the five RCEs that were subject to this inspection. Based on the additional weaknesses in CAP implementation identified by the inspectors, the scope of the team's independent review was expanded to provide further assurance that the station had adequately identified the extent of the issue and ensure that corrective actions were adequate. Using portions of IP 71152, inspectors reviewed a sampling of recent RCEs to ensure that the extent of

conditions and causes were reasonable and that corrective actions were adequate. Inspectors identified:

- The RCE for a loss of control room annunciators (CR-PNP-2013-5208) did not include sufficient justification for not identifying corrective actions to address the extent of condition. The direct cause was the failure of the primary controller card due to age. The report stated that the backup card was identical but did not require replacement because it was operating properly when the primary failed. When questioned, Entergy proved that they had replaced the backup card several months before the event and therefore it did not need immediate replacement. The root cause report should have included this information and did not. Entergy documented this observation in CR-PNP-2014-6096.
- The RCE for a manual scram during a reactor shutdown due to an unexpected vessel depressurization (CR-PNP-2013-2275) identified as a root cause of the scram that an incorrect step was inserted into the shutdown procedure in 2003. Two specific weaknesses were identified during this review:
  - The extent of cause reviewed all procedure changes to the shutdown and startup procedures made between 2003 and 2013. The extent of cause discussion in the report did not discuss why the scope was limited to the startup and shutdown procedures, nor did it perform a risk assessment of potential extent of cause actions. Entergy wrote CR-PNP-2014-6070 to document this.
  - Cause and/or corrective actions for CR-PNP-2013-2275 were potentially incorrect. The contributing cause was the processing of a new step in the shutdown procedure as a non-intent change instead of an intent change. The corrective action added a step to supplement this determination. Inspectors reviewed other procedure changes and determined the cause was potentially more attributed to implementation of the existing process vice a process inadequacy. Entergy wrote CR-PNP-2014-6076 to document this.
- The RCE for a failed post-work test on the 2C main steam isolation valve (MSIV) (CR-PNP-2013-4041) identified the condition as packing leakage due to a galled valve stem which occurred during reassembly. The cause was identified as inadequate supplemental worker oversight. The inspectors determined that corrective actions for extent of condition and extent of cause were potentially inadequate. Specifically, the extent of condition was limited to the other seven MSIVs and did not include other motor operated valves or a justification for why they could not be affected. The extent of cause was limited to outage oversight issues and did not consider whether oversight of on-line activities completed by supplemental workers was affected. Entergy wrote CR-PNP-2014-6087 to document this observation.

Based on these observations, inspectors determined that CAP implementation issues existed across several departments at the station and inspectors confirmed that Entergy had existing corrective actions planned or implemented to address the issues. However, based on observations documented throughout this report, inspectors concluded that these corrective actions were not effective at ensuring that the inspection objectives of this IP could be met.

c. Findings

No findings were identified.

02.05 Safety Culture Consideration

a. Inspection Scope

*IP 95002 requires that the inspection staff perform a focused inspection to independently determine that the licensee's RCE appropriately considered whether any safety culture component caused or significantly contributed to any risk significant issue.*

Inspectors reviewed Entergy's apparent cause evaluation which documented the Safety Culture Aspect CCA (CR-PNP-2014-1669). As part of this cause evaluation, Entergy reviewed 135 causal evaluations associated with recent events and conducted 35 small group feedback sessions with the workforce that gathered opinions and impressions about the safety culture at the station. The station then binned this data against various safety culture aspects and conducted a stream analysis as a method of causal evaluation. The evaluation identified three apparent causes:

- Resolution – In some cases, the site has not taken effective corrective actions to address identified issues and causes in a timely manner. The cause evaluation documented that this is the leading driver behind issues with nuclear safety culture behaviors at Pilgrim.
- Standards – In some cases, individuals do not understand the importance of adherence to nuclear standards.
- Leader Behaviors – In some cases, leaders have not exhibited behaviors that set the standard for safety.

The inspectors independently assessed the relationship between the safety culture aspects and the performance issues through use of focus groups and interviews, observation of a Nuclear Safety Culture Monitoring Panel (NSCMP) meeting, and review of cause evaluations, self-assessments, and corrective action documents. The inspectors interviewed 85 staff members, including 12 supervisors and senior management personnel. Based on review of the applicable cause evaluations, the inspectors selected participants for the focus groups and interviews from the following organizations: Operations, Engineering, Maintenance, Radiation Protection, Chemistry, and Security. Focus groups did not combine supervisors with staff-level personnel. The inspectors designed the focus groups and interviews to gather information on the safety culture at the station with questions directed towards specific safety culture aspects. The questions covered the following areas<sup>1</sup>:

- Leadership safety values and actions, including station resources and leader behaviors;
- Problem identification and resolution;
- Personal accountability, including the Pilgrim accountability and culpability models;

<sup>1</sup> For more information on the specific topics included in these areas, refer to NRC Inspection Manual Chapter 0310, "Aspects Within the Cross-Cutting Areas," issued 12/19/2013 (ADAMS Accession Number ML13351A028).

- Work processes, including work management, procedure adequacy, and procedural adherence;
- Continuous learning, including initial and continuing training and use of OE;
- Safety conscious work environment and alternative processes for raising concerns;
- Effective safety communication, including communicating the basis for decisions;
- Questioning attitude; and
- Decision-making, including station processes used for decision making.

b. Assessment

The inspectors reviewed the apparent cause evaluation and confirmed through independent assessment that the three safety culture aspects identified were appropriate. In addition, based on input from the focus groups, interviews, and review of documentation, the inspectors had the following safety culture observations:

- Most employees interviewed expressed confidence in the current leadership team, and believed there had been improvements in the nuclear safety culture at the station over the past year. Most employees believe the station is headed in a positive direction.
- There was no evidence of an issue with the safety conscious work environment at the station. All employees interviewed felt encouraged to raise nuclear safety concerns through multiple avenues. There were no indications that harassment or retaliation for raising safety concerns was tolerated at Pilgrim.
- Employees expressed a willingness to use the station's CAP to identify plant issues and deficiencies. Employees stated that they were willing to raise safety issues through the CAP, and were aware of the availability of alternate reporting channels, including the Employee Concerns Program. Additionally, workers noted that they would not hesitate to stop work in the event they receive an unexpected response, or if there was a problem with a step in a procedure.
- Employees noted an increased emphasis on communication at the station, specifically related to communicating the bases for decisions. This increased emphasis was apparent to most of the workforce interviewed, and employees stated that they appreciated management's willingness to communicate.
- There were several examples of confusion regarding the Pilgrim "Accountability Model." In particular, the implementation of the "200% Accountability" concept was not well understood in all departments. However, employees indicated that there is good differentiation between discipline and accountability. Employees recognized that they were accountable for station performance and believed that discipline was administered fairly.
- The focus groups revealed examples of challenges with communication in the Security department on both day and night shifts. Officers indicated they were not receiving adequate pre-shift briefs, primarily because there was not time set aside to perform briefings with the entire crew of officers when they began their shift. Instead, supervisors were delivering communications to officers one-on-one or via radio. Station management was aware of the communication issues and was working on corrective actions to make improvements in this area.
- Some employees interviewed expressed concern that maintenance employees were not receiving adequate training, which was leaving them feeling unprepared to perform work for some tasks. Employees believed that some of the training

concerns were due to a lack of knowledge transfer when employees turn over. Many employees interviewed held the perception that Entergy had a policy that prohibited the site from filling positions before the positions were vacated. The team verified with the Human Resources Manager that there is no such Entergy policy; however, the manager acknowledged the perception of a policy and planned to continue to communicate staffing strategies to station personnel.

During the inspection, the team observed a NSCMP meeting. The station identified the NSCMP process as the primary means of monitoring safety culture effectiveness and sustainability in CR-2014-01669. However, the station also self-identified weaknesses with the effectiveness of the monitoring panel in early 2014. During interviews, management indicated they had taken actions to improve the effectiveness of the monitoring panel. The team observed many of these improvements at the panel meeting, including constructive dialog, respectful challenging, and development of corrective actions for improvement. A monitoring panel member from another Entergy site was also at the meeting to offer feedback for benchmarking and continued improvement.

The team identified a potential gap in the safety culture assessment in that the design of the assessment did not allow for reviewing data from individual departments, which could have prevented the station from identifying challenges in safety culture within specific departments. However, the team did not identify any departments with safety culture concerns beyond those that had previously been identified by Pilgrim through their safety culture monitoring process. The departments with specific challenges in safety culture components had corrective actions underway and were given special attention during the NSCMP meeting.

The team discussed these safety culture observations with senior management at the station. In most cases, the senior management team was aware of the perceptions of plant staff and had corrective actions in place to address identified weaknesses. Overall, the inspectors determined that the cause evaluations associated with this inspection appropriately considered safety culture aspects as they related to the various root and significant contributing causes.

Additionally, the inspectors reviewed Entergy's corrective action plan related to this CCA. In general, the inspectors determined that the corrective actions appeared to be adequate to address the causes. However, based on identified deficiencies in execution of the CAP documented throughout this report, inspectors determined that corrective actions intended to address this area were not yet sufficiently effective to ensure that the inspection objectives were met.

#### 02.06 Evaluation of IMC 0305 Criteria for Treatment of Old Design Issues

Entergy did not request credit for self-identification of an old design issue; therefore, the risk-significant issues were not evaluated against the IMC 0305 criteria for treatment of an old design issue.

4OA6 MeetingsExit Meeting Summary

On November 20, 2014, the inspectors met with Mr. J. Dent, Site Vice President, and other members of his staff to discuss preliminary observations and issues identified during the onsite inspection. The inspectors informed Entergy that the material provided and gathered during the onsite inspection would be reviewed in office and discussed with regional management prior to the completion of the inspection.

On December 12, 2014, the inspectors presented the inspection results to Mr. J. Dent, Site Vice President, and other members of his staff. The inspectors asked Entergy whether any material examined during the inspection should be considered proprietary. No proprietary information was retained by the inspection team.

**ATTACHMENT: SUPPLEMENTAL INFORMATION**

**SUPPLEMENTAL INFORMATION****KEY POINTS OF CONTACT**Licensee Personnel

N. Berg	Contractor
T. Bordelon	Performance Improvement Manager
S. Burke	Senior Staff Engineer
K. Connerton	Operations
B. Chenard	Engineering Director
S. Das	Senior Lead Engineer
B. Deacon	Senior Maintenance Specialist
M. Farrell	Nuclear Control Technician
J. Freeman	Lead Nuclear Control Technician
J. Gerety	System Engineering Manager
P. Gerry	Operating Experience Coordinator
B. Hannigan	Equipment Reliability Coordinator
E. Herbert	I&C Superintendent
S. Hudson	System Engineer
K. Kee	Engineering Design Programs Supervisor
J. Macdonald	Operations Department Manager
A. Madeiras	Design Engineering, Mechanical and Civil
E. McCaffrey	System Engineer
M. McDonald	Shift Supervisor
F. McGinnis	Licensing Engineer
D. Miller	Maintenance Coordinator
J. O'Donnell	NSSS Supervisor
P. O'Neil	Contractor
J. Ohrenberger	Senior Maintenance Manager
B. Rancourt	Senior Lead Engineer
F. Russell	Preventive Maintenance Engineer
J. Shumate	Senior Manager, Production
R. Swanson	Balance of Plant Systems Manager
T. Wheble	I&C Supervisor
T. White	Design and Program Engineering Manager
M. Williams	Nuclear Safety Licensing Specialist
K. Woods	Engineer

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**Opened

05000293/2014008-03	FIN	Parallel White Unplanned Scrams per 7000 Critical Hours PI Finding (4OA4.02.03.f)
05000293/2014008-04	FIN	Parallel White Unplanned Scrams with Complications PI Finding (4OA4.02.03.f)

Opened/Closed

05000293/2014008-01	FIN	Failure to Fully Derive the Causes of a Manual Scram (4OA4.02.02.e)
05000293/2014008-02	NCV	Failure to Complete Several Corrective Actions as Required by Program Requirements (4OA4.02.03.f)

**LIST OF DOCUMENTS REVIEWED**Procedures

1.3.142, PNPS Risk Review and Disposition, Revision 0  
 1.3.142, PNPS Risk Review and Disposition, Revision 1  
 1.3.143, PNPS Accountability Model, Revision 1  
 1.4.4, New England Power Grid Operations/Interfaces, Revision 26  
 1.5.22, Risk Assessment Process, Revision 24  
 2.1.14, Station Power Changes, Revision 112  
 2.1.37, Coastal Storm – Preparation and Actions, Revision 35  
 2.1.42, Operations During Severe Weather, Revision 20  
 2.2.1, 345 kV System, Revision 41  
 2.2.7, 480V AC System, Revision 32  
 2.4.150, Loss of Feedwater Heating, Revision 22  
 3.M.3-71, Inspection and Maintenance of 345 kV Disconnects, Insulators, and Miscellaneous Switchyard Components, Revision 7  
 5.2.2, High Winds (Hurricane), Revision 35  
 5.2.3, Tornado, Revision 21  
 8.M.2-1.5.3.1, Primary Containment Isolation Logic Channel Test – Channel A1 – Critical Maintenance, Revision 23  
 8.M.2-2.10.2-9, RHR System Reactor Pressure Permissive Loop Selection Logic Functional Test, Revision 24, 25, 28  
 8.M.2-2.10.2-9, RHR System Reactor Pressure Permissive Loop Selection Logic Functional Test, completed 1/12/13  
 8.M.2-3.6.1, Control Rod Block from (A) RPS APRM System Logic, Revision 32  
 2.2.31.1, Att. 8, Temporary Modification to Disable RFP Flow Switches while Performing Maintenance on TBCCW Heat Exchangers, Revision 15  
 3.M.3-17.1, Raychem or Taping of 1000 Volt and Under Cables and/or Wires, Revision 17  
 3.M.3-51, Electrical Termination Procedure, Revision 20EN-DC-336, Plant Health Committee, Revision 8  
 EN-FAP-EP-010, Severe Weather Response, Revision 1  
 EN-FAP-EP-012, Severe Weather Recovery, Revision 0  
 EN-FAP-OM-020, Comprehensive Recovery Plans, Revision 0  
 EN-FAP-OU-104, Refueling Outage Scope Identification and Control, Revision 3  
 EN-FAP-OU-105, Refueling Outage Execution, Revision 3  
 EN-FAP-WM-002, Critical Evolutions, Revision 1  
 EN-HU-104, Engineering Task Risk and Rigor, Revision 5  
 EN-HU-106, Procedure and Work Instruction Use and Adherence, Revision 3

EN-LI-102, Corrective Action Program, Revision 24  
 EN-LI-118, Cause Evaluation Process, Revision 20 and 21  
 EN-LI-118-01, Event and Causal Factor Charting, Revision 2  
 EN-LI-118-06, Common Cause Analysis (CCA), Revision 4  
 EN-LI-118-08, Failure Modes Analysis, Revision 2  
 EN-LI-118-11, Why Staircase, Revision 0  
 EN-LI-121, Trending and Performance Review Process, Revision 17  
 EN-NS-221, Security Organization, Standards, and Expectations, Revision 6  
 EN-OE-100, Operating Experience Program, Revision 21  
 EN-OE-100-02, Operating Experience Evaluations, Revision 1  
 EN-OP-111, Operational Decision-Making Issue (ODMI) Process, Revision 11  
 EN-OP-116, Infrequently Performed Tests or Evolutions, Revision 12  
 EN-OP-122, Operational Decision-Making Issue Precursor Process, Revision 0  
 EN-OU-103, Long Range Outage Planning, Revision 3  
 EN-PL-187, Safety Conscious Work Environment (SCWE) Policy, Revision 1  
 EN-PL-190, Maintaining a Strong Safety Culture, Revision 2  
 EN-TQ-104, Engineering Support Personnel Training Program, Revision 18  
 EN-TQ-127, Supervisor Training Program, Revision 14  
 EN-WM-101, On-Line Work Management Process, Revision 11  
 EN-WM-104, On-Line Risk Assessment, Revision 9  
 EN-WM-105, Planning, Revision 13  
 EN-WM-109, Scheduling, Revision 7  
     NOP98A1, Procedure Process, Revision 36  
 W10112, Pilgrim Line Outage Risk Mitigation Procedure, Revision 0

#### Drawings

M1H20-4, Elementary Diagram Residual Heat Removal System, Revision 9, Sheet 16  
 M1H10-10, Elementary Diagram Residual Heat Removal System, Revision 16, Sheet 6  
 M1H8-10, Elementary Diagram Residual Heat Removal System, Revision 20, Sheet 4  
 E415, Schematic Diagram Recirculation System, Revision 16  
 M1H9-12, Elementary Diagram Residual Heat Removal System, Revision 21, Sheet 5  
 M1H7-12, Elementary Diagram Residual Heat Removal System, Revision 21, Sheet 3  
 M1H5-1-15, Elementary Diagram Residual Heat Removal System, Revision 18, Sheet 1  
 M1H6-9, Elementary Diagram Residual Heat Removal System, Revision 19, Sheet 2  
 E112, Schematic Diagram Reactor Feed Pump System, Revision 14  
 E115, Schematic Diagram Reactor Feed Pump System, Revision 12, Sheet 1  
 E115, Schematic Diagram Reactor Feed Pump System, Revision 4, Sheet 2  
 E1, Single Line Diagram Station, Revision 24, Sheet 1  
 SE155, Station Electrical Single Line Composite Diagram 4.16 kV & 480V AC, Revision 73,  
     Sheet 2  
 SE155, Station Electrical Single Line Composite Diagram 4.16 kV & 480V AC, Revision 33,  
     Sheet 3  
 SE155, Station Electrical Single Line Composite Diagram 4.16 kV & 480V AC, Revision 26,  
     Sheet 4

#### Condition Reports (\*denotes NRC identified during this inspection)

CR-PNP-2011-5642	CR-PNP-2013-1325	CR-PNP-2013-4577
CR-PNP-2014-0380	CR-PNP-2014-1669	CR-PNP-2014-2746
CR-PNP-2014-4527	CR-PNP-2014-5795*	CR-PNP-2014-5801*
CR-PNP-2014-6040*	CR-PNP-2014-7830	CR-PNP-2010-4510
CR-PNP-2011-3253	CR-PNP-2011-5012	CR-PNP-2011-5190

CR-PNP-2011-5532	CR-PNP-2011-5591	CR-PNP-2011-5879
CR-PNP-2012-0139	CR-PNP-2012-0183	CR-PNP-2012-0385
CR-PNP-2012-0658	CR-PNP-2012-0766	CR-PNP-2012-1120
CR-PNP-2012-1454	CR-PNP-2012-1558	CR-PNP-2012-1584
CR-PNP-2012-1594	CR-PNP-2012-1731	CR-PNP-2012-2081
CR-PNP-2012-2357	CR-PNP-2012-3801	CR-PNP-2012-4146
CR-PNP-2013-0193	CR-PNP-2013-0271	CR-PNP-2013-0384
CR-PNP-2013-0550	CR-PNP-2013-1184	CR-PNP-2013-1417
CR-PNP-2013-1486	CR-PNP-2013-1845	CR-PNP-2013-1903
CR-PNP-2013-2275	CR-PNP-2013-2594	CR-PNP-2013-3520
CR-PNP-2013-3968	CR-PNP-2013-4162	CR-PNP-2013-4205
CR-PNP-2013-4378	CR-PNP-2013-5208	CR-PNP-2013-5369
CR-PNP-2013-5962	CR-PNP-2013-6264	CR-PNP-2013-6298
CR-PNP-2013-7066	CR-PNP-2013-7927	CR-PNP-2014-2093
CR-PNP-2014-2515	CR-PNP-2014-2852	CR-PNP-2014-2988
CR-PNP-2014-3087	CR-PNP-2014-3108	CR-PNP-2014-3134
CR-PNP-2014-3910	CR-PNP-2014-3931	CR-PNP-2014-4185
CR-PNP-2014-4230	CR-PNP-2014-4247	CR-PNP-2014-4509
CR-PNP-2014-4951	CR-PNP-2014-5625*	CR-PNP-2014-5675*
CR-PNP-2014-5682	CR-PNP-2014-5714*	CR-PNP-2014-5722*
CR-PNP-2014-5729*	CR-PNP-2014-5751*	CR-PNP-2014-5752*
CR-PNP-2014-5772*	CR-PNP-2014-5794*	CR-PNP-2014-5796*
CR-PNP-2014-5802*	CR-PNP-2014-5867*	CR-PNP-2014-5909*
CR-PNP-2014-5976*	CR-PNP-2014-5977*	CR-PNP-2014-6012*
CR-PNP-2014-6044*	CR-PNP-2014-6070*	CR-PNP-2014-6076*
CR-PNP-2014-6083*	CR-PNP-2014-6087*	CR-PNP-2014-6096*
CR-PNP-2014-5696*	CR-PNP-2014-5735*	CR-PNP-2014-5824*
CR-PNP-2014-5826*	CR-PNP-2014-5827*	CR-PNP-2014-6051*
CR-PNP-2014-6067*	CR-PNP-2012-4884	CR-PNP-2014-3573
CR-PNP-2014-5216	CR-PNP-2012-4884	

Learning Organization Documents

LO-PNPLO-2011-00105	LO-PNPLO-2014-00105	LO-PNPLO-2014-00111
LO-PNPLO-2014-00122	LO-PNPLO-2013-00026-7	LO-PNPLO-2013-00026-77
LO-PNPLO-2013-00026-78	LO-PNPLO-2013-00026-79	LO-PNPLO-2013-00026-8

Work Orders

MR 19501568	MR 19700986	MR 19701193	MR 19701780
MR 19800175	MR E9800086	00275489	00311632
00350369	00391533	52420952	52452448
52525177	52569241	52572398	52572594
52574175	52575101	52580464	52582236
00341530	00342515	52190999	52314012
52586743			

Miscellaneous

Condition Review Group Meeting Agenda, dated 11/04/2014  
 Corrective Action Program Recovery Performance Indicators  
 Entergy Operating Experience A2 Report – Pilgrim, dated 11/18/2014  
 Entergy Operating Experience Point of Contact List – Pilgrim, dated 11/05/2014  
 EN-WM-101, Attachment 9.1, dated 11/1/2014 through 11/14/2014

List of condition report due date extensions for 11/12/2014 – 11/14/2014  
 List of Condition Reports related to Unsatisfactory Condition Report Closure, dated 11/18/2014  
 List of Open First-Time High Critical Preventive Maintenance Items as of 11/17/2014  
 On-Line Emergent Work Addition/Deletion Approval Form (EN-WM-101 Attachment 9.1),  
 11/01/2014 – 11/07/2014  
 Operational Focus Meeting Agenda, dated 11/04/2014  
 Performance Overview, Pilgrim Nuclear Power Station  
 Pilgrim Corrective Action Program Recovery Plan  
 Plant Health Committee Meeting Minutes, dated 06/09/2014  
 Schedule for Plant Health Committee Review of Single Point Vulnerability Mitigating Strategies,  
 as of 11/18/2014  
 Schedule for presentation of mitigating strategies related to single point vulnerabilities to Plant  
 Health Committee  
 Maintenance Excellence Plan Procedure Review Checklist  
 Maintenance Procedure Review Requirements  
 Pilgrim Maintenance Department Procedures Project Scope, 07/2014  
 Engineering Quality Review Comment Sheet for EC 30944  
 WT-WTPNP-2011-0036, Determine if loss of TBCCW to RFPs should be revised to a  
 temperature based manual trip  
 Plant Design Change 98-38, Replacement of Feed Water Heater Dump Valves, Moisture  
 Separator Drain and Dump Valves and the Condensate Pump Min Flow Valve  
 DRN 13-674, Source Range Monitoring System Revision 24  
 DRN 14-015, Loss of Instrument Bus Y1 Revision 39  
 DRN 14-135, Daily Surveillance Log Revision 217  
 DRN 14-315, Reactor Building Closed Cooling Water System Revision 76  
 DRN 14-317, Loss of RBCCW Revision 34  
 DRN 14-401, Loss of Instrument Bus Y1 Revision 40  
 DRN 14-456, Main Condenser Vacuum System Revision 71  
 DRN 14-458, Loss of Feedwater Heating Revision 22  
 DRN 14-674, 120V AC Safeguard Power Supply Revision 47  
 DRN 14-759, Recirculation Pump(s) Trip Revision 45  
 DRN 14-873, Reactor Cleanup System Revision 120  
 DRN 14-955, Operation during Severe Weather Revision 19  
 Maintenance October 2014 Procedure Use and Adherence Coaching Observations  
 Procedure Use and Adherence WILL Sheets, completed 9/8/14, 9/22/14, 9/30/14 and 10/24/14  
 I&C Procedure Feedback Forms completed in October  
 8.M.2-2.10.2-9, RHR System Reactor Pressure Permissive Loop Selection Logic Functional  
 Test, completed 1/12/2013  
 Maintenance Department Standing Order 2014-001  
 EC 44835, Update Documents to Reflect All Scram Solenoids Wired Backwards  
 CARB Meeting Agenda, dated 9/26/14  
 Master/LCC Procedure No. 1 – Nuclear Plant Transmission Operations, Revision 12  
 PMQR 50076985-01 / 00029164-01  
 PNPS-FSAR, Section 8, Electrical Power System  
 PNPS Technical Specification 3.9, Auxiliary System  
 Strategic Talent Solutions Leadership Assessments  
 Letter No. QA-14-001, dated July 30, 2014  
 Letter No. QA-14-002, dated July 30, 2014  
 Nuclear Safety Culture Monitoring Panel Meeting Minutes dated January 2014

**LIST OF ACRONYMS**

10 CFR	Title 10 of the <i>Code of Federal Regulations</i>
ADAMS	Agencywide Documents Access and Management System
CAP	Corrective Action Program
CAPR	Corrective Action to Prevent Recurrence
CARB	Corrective Action Review Board
CCA	Common Cause Analysis
CCDP	Conditional Core Damage Probability
CR	Condition Report
CRG	Condition Review Group
DPIC	Departmental Performance Improvement Coordinator
Entergy	Entergy Nuclear Operations, Inc.
I&C	Instrumentation & Control
IMC	Inspection Manual Chapter
IP	Inspection Procedure
IR	Inspection Report
kV	Kilovolt
LOOP	Loss of Offsite Power
NCV	Non-Cited Violation
NOV	Notice of Violation
NRC	U.S. Nuclear Regulatory Commission
NSCMP	Nuclear Safety Culture Monitoring Panel
OE	Operating Experience
PI	[NRC] Performance Indicator
Pilgrim	Pilgrim Nuclear Power Station
RCE	Root Cause Evaluation
RFP	Reactor Feed Pump
ROP	Reactor Oversight Program
RRP	Reactor Recirculation Pump
SPV	Single Point Vulnerability
STAR	Stop-Think-Act-Review
SUT	Startup Transformer
UFSAR	Updated Final Safety Analysis Report

## Summary of Pilgrim Loss Of Offsite Power (LOOP) events due to Winter Storms (with Switchyard Flashovers)

**Feb 6, 1978 (Nor'easter/Blizzard: "Blizzard of 78")** - The reactor automatically scrammed when heavy snowfall caused electrical breakers in the 345 kilovolt switchyard to **flashover** and trip.

Feb 6, 1978 - The reactor automatically scrammed from 24 percent power when high winds and ice buildup caused all transmission lines to fail (causing a LOOP). .

**Feb 13, 1983 (Nor'easter/Blizzard) [LER 1983-007 LOOP]** - With the reactor shut down, there was a LOOP. Feb 13, 1983 - High winds caused salt accumulation on electrical equipment that led to an electrical fault and a LOOP lasting about 1 minute. (records not on NRC webpage: "**salt accumulation and electrical fault**" suggests **flashover**)

Feb 15, 1983 - The unit was connected to the electrical grid to end a 48.2 hour forced outage.

**Oct 30, 1991 (Nor'easter/Hurricane: "Perfect Storm") [LER 1991-024 Loss of Preferred and Secondary Offsite Power Due to Severe Coastal Storm While Shutdown]** - The operators shut down the reactor when a severe storm blew seaweed into the intake structure, clogging the circulating water pumps, and causing a loss of condenser vacuum.

Oct 30, 1991 - Weather-related LOOP lasting 120 minutes (switchyard **flashover** reported in LER)

**Dec 13, 1992 (Nor'easter/Blizzard) [LER 1992-016 Automatic Scram Resulting From Load Rejection at 48 Percent Reactor Power]** - The reactor automatically scrammed on a generator load rejection caused by **flashovers** in the switchyard due to salt deposits during a severe storm.

Dec 18, 1992 - The unit was connected to the electrical grid to end a 116.4 hour forced outage.

**Mar 13 1993 (Nor'easter/Superstorm/Blizzard: "Storm of the Century") [LER 1993-004 Automatic Scram Resulting From Load Rejection at 100 Percent Reactor Power]** - The reactor automatically scrammed on a generator load rejection caused by **flashovers** in the switchyard due to wind-packed snow during blizzard conditions.

Mar 13, 1993 - Weather related LOOP lasting 1 minute.

Mar 17, 1993 - The unit was connected to the electrical grid to end a 84.5 hour forced outage.

**Dec 19, 2008 (Nor'easter/Blizzard) [LER 2008-006 Automatic Scram Resulting from Switchyard Breaker Fault during Winter Storm; LER 2008-007 Momentary Loss of all 345kv Off-Site Power to the Startup Transformer from Switchyard Breaker Fault]** - The reactor automatically scrammed when a winter storm caused icing in the main switchyard. (switchyard **flashover** reported in 1/26/15 Supplemental Inspection Report)

**Feb 8, 2013 (Nor'easter/Blizzard: "Nemo") [LER 2013-003 LOOP Events due to Winter Storm Nemo]** - The reactor automatically scrammed at 9:17 pm when a blizzard caused LOOP. (switchyard **flashover** reported in 1/26/15 Supplemental Inspection Report)

Feb 9, 2013 - Workers restored offsite power to the site at 6:09 pm.

Feb 10, 2013 - Offsite power to the site was lost at 2:02 pm.

Feb 12, 2013 - Workers restored offsite power to the site at 4:05 am.

Feb 15, 2013 - The reactor was connected to the electrical grid at 10:39 pm to end a 169.37 hour forced outage.

**Jan 27, 2015 (Nor'easter/Blizzard: "Juno")** Forced Outage due to LOOP during winter storm Juno. Switchyard **flashovers**.

Feb 8, 2015 - Restarted to 79%; Reached 100% on Feb 10, 2015.

### Precautionary Shutdown

**Feb 15, 2015 (Nor'easter: "Neptune")** Precautionary shutdown in advance of Nor'easter Neptune and an anticipated LOOP.

Feb 18, 2015 - Restarted to 18%; Complications delayed ramp up; Reached 100% on Feb 22, 2015.