



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION IV  
1600 E. LAMAR BLVD  
ARLINGTON, TX 76011-4511

October 17, 2016

Mr. William F. Maguire  
Site Vice President  
Entergy Operations, Inc.  
River Bend Station  
5485 U.S. Highway 61N  
St. Francisville, LA 70775

SUBJECT: RIVER BEND STATION - NRC EXAMINATION REPORT 05000458/2016301

Dear Mr. Maguire:

On September 15, 2016, the U.S. Nuclear Regulatory Commission (NRC) completed an initial operator license examination at River Bend Station. The enclosed report documents the examination results and licensing decisions. The preliminary examination results were discussed on September 15, 2016, with you and other members of your staff. A telephonic meeting was conducted on October 6, 2016, with Mr. S. Durbin, Operations Training Superintendent, who was provided the NRC licensing decisions. A telephonic exit meeting was conducted on October 12, 2016, with yourself and other members of your staff.

The examination included the evaluation of three applicants for reactor operator licenses, two applicants for instant senior reactor operator licenses, and two applicants for upgrade senior reactor operator licenses. The license examiners determined that all seven applicants satisfied the requirements of 10 CFR Part 55 and the appropriate licenses have been issued. There were no post examination comments submitted by your staff. The enclosure contains details of this report.

Additionally, the NRC identified one finding involving procedure quality with ten examples that was evaluated under the risk significance determination process as having very low safety significance (Green). Because of the very low safety significance and because it was entered into your corrective action program, 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 violation or the significance of the non-cited violation, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, D.C. 20555-0001, with copies to the Regional Administrator, U.S. Nuclear Regulatory Commission, Region IV, 1600 E. Lamar Blvd., Arlington, TX 76011-4511; the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555-0001; and the NRC Senior Resident Inspector at the River Bend Station. In addition, if you disagree with the cross-cutting aspect assigned to the finding in this report, you should provide a response within 30 days of the date of this inspection report, with the basis for your disagreement, to the Regional Administrator, Region IV, and the NRC Senior Resident Inspector at the River Bend Station.

W. Maguire

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In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice and Procedure," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of 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/**

Vincent G. Gaddy, Chief  
Operations Branch  
Division of Reactor Safety

Docket No. 50-458  
License No. NPF-47

Enclosure:  
Examination Report 05000458/2016301  
w/Attachment: Supplemental Information

cc w/encl: Electronic Distribution

W. Maguire

- 2 -

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice and Procedure," a copy of this letter and its enclosure will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of 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).

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Letter to William F. Maguire from Vincent G. Gaddy, dated October 17, 2016

SUBJECT: RIVER BEND STATION - NRC EXAMINATION REPORT 05000458/2016301

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**U.S. NUCLEAR REGULATORY COMMISSION**

**REGION IV**

Docket: 050000458

License: NPF-47

Report: 05000458/2016301

Licensee: Entergy Operations, Inc.

Facility: River Bend Station

Location: 5485 U.S. Highway 61N  
St. Francisville, LA 70775

Dates: August 22, 2016 - October 12, 2016

Inspectors: K. Clayton, Chief Examiner, Senior Operations Engineer  
J. Kirkland, Senior Operations Engineer  
M. Hayes, Operations Engineer  
N. Hernandez, Reactor Inspector

Approved By: Vincent G. Gaddy  
Chief, Operations Branch  
Division of Reactor Safety

Enclosure

## SUMMARY

ER 05000458/2016301; 08/22/2016 – 10/12/2016; River Bend Station; Initial Operator Licensing Examination Report.

NRC examiners evaluated the competency of three applicants for reactor operator licenses, two applicants for instant senior reactor operator licenses, and two applicants for upgrade senior reactor operator licenses at River Bend Station.

The NRC developed the examinations using NUREG-1021, "Operator Licensing Examination Standards for Power Reactors," Revision 10. The written examination was administered by the licensee on September 30, 2016. NRC examiners administered the operating tests on September 12-15, 2016. The examiners determined that all seven of the applicants satisfied the requirements of 10 CFR Part 55 and the appropriate licenses have been issued.

One finding of very low safety significance (Green) with ten examples is also documented in this report. This finding involves a violation of NRC requirements. The significance of inspection findings is indicated by their color (Green, White, Yellow, or Red), which is determined using Inspection Manual Chapter 0609, "Significance Determination Process." Their cross-cutting aspects are determined using NRC Inspection Manual Chapter 0310, "Aspects within the Cross-Cutting Areas." Violations of NRC requirements are dispositioned in accordance with the NRC Enforcement Policy. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, "Reactor Oversight Process."

### **A. NRC-Identified and Self-Revealing Findings**

#### **Cornerstone: Mitigating Systems**

Green. The team identified a non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," for ten examples of failing to provide appropriate qualitative and quantitative criteria in alarm response procedures, and abnormal operating procedures. The licensee is currently evaluating the scope of these and other procedural inadequacies. These procedure deficiencies were entered into the licensee's corrective action program as Condition Report CR-RBS-2016-06683.

The failure of these ten procedures to have the appropriate qualitative and quantitative criteria to complete these activities was a performance deficiency. The finding was more than minor because it is associated with the procedure quality attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring availability, reliability, and capability of systems needed to respond to initiating events to prevent undesired consequences. Specifically, inadequate procedures could adversely affect the operating crew's ability to take appropriate actions to ensure reactor safety is being maintained. Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, the team determined that the finding was of very low safety significance (Green) because the finding: (1) was not a deficiency affecting the design and qualification of a mitigating structure, system, or component, and did not result in a loss of operability or functionality; (2) did not represent a loss of system and/or function; (3) did not represent

an actual loss of function of at least a single train for longer than its technical specification allowed outage time or two separate safety systems out-of-service for longer than their technical specification allowed outage time; and (4) did not represent an actual loss of function of one or more non-technical specification trains of equipment designated as high safety-significance in accordance with the licensee's maintenance rule program for greater than 24 hours. The finding has a cross-cutting aspect in the area of human performance associated with documentation because the organization did not maintain complete, accurate, and up-to-date documentation for procedure writing and modification [H.7]. (Section 4OA5)

B. Licensee-Identified Violations

None

## REPORT DETAILS

### 4. OTHER ACTIVITIES (OA)

#### 4OA5 Other Activities (Initial Operator License Examination)

##### .1 License Applications

###### a. Scope

NRC examiners reviewed all license applications submitted to ensure each applicant satisfied relevant license eligibility requirements. Examiners also audited two of the license applications in detail to confirm that they accurately reflected the subject applicant's qualifications. This audit focused on the applicant's experience and on-the-job training, including control manipulations that provided significant reactivity changes.

###### b. Findings

No findings were identified.

##### .2 Examination Development

###### a. Scope

The NRC developed the written exam and operating tests in accordance the requirements of NUREG-1021. The NRC examination team conducted an on-site validation of the operating tests.

###### b. Findings

Introduction. The team identified a finding of very low safety significance (Green) involving a non-cited violation of 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," with multiple examples.

Example 1: Four off-normal (abnormal) procedures are missing from the list of available procedures necessary to meet the requirements of Regulatory Guide 1.33, Revision 2. There are currently no abnormal procedures for:

- 1) A partial loss of AC power, specifically for safety and non-safety buses that are important to safety (such as the NJS bus 1J)
- 2) Abnormal containment parameters, such as high containment temperature, high drywell pressure, or high drywell temperature
- 3) Inadvertent reactivity additions, such as cold water addition from an inadvertent start of high pressure core spray pumps
- 4) Abnormal contamination of hydrogen in the main turbine



- Example 2: Abnormal Operating Procedure AOP-0039, "Hydrogen Deflagration/Leaks in the Off-Gas System," Revision 15, does not contain any guidance for leaking hydrogen out of the main generator, which could cause a deflagration event and possibly injure plant staff near the generator if a leak occurred.
- Example 3: The licensee's Alarm Response Procedure ARP P870-54-E-05, Revision 26, for the gland seal pressure alarm, "STEAM SEAL EVAP STEAM HEADER LOW PRESSURE," contains incorrect values for gland seal pressures. Step 2 of this procedure states to, "Verify tube side pressure on TME-PIEPR-35, SSE TUBE SIDE PRESSURE is less than 65 psig (normal press is 30 to 45 psig)." This is incorrect because the normal pressure range is much higher with a range of 65-80 psig. This creates confusion when operators respond to the alarm because the values in this procedure are incorrect for normal conditions.
- Example 4: Four of the licensee's procedures have actions located in the "Subsequent Actions" Section of the procedure and these actions are immediate actions and should be located in the "Immediate Actions" Section at the top of the corresponding procedure. These sections have requirements delineated within "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants," N18.7-1976/ANS-3.2, Section 5.3.9.1(3), which are specifically linked from the requirements within Regulatory Guide 1.33, Revision 2, and the associated commitment in the licensee Technical Specifications to this regulatory guide. The procedures with missing immediate action steps include the following procedures.
- 1) AOP-0050, "Station Blackout," Revision 55
  - 2) AOP-0004, "Turbine Trip," Revision 27
  - 3) AOP-0008, "Loss of Instrument Air," Revision 38
  - 4) AOP-0007, "Lowering Main Condenser Vacuum/Trip of Circulating Water Pump," Revision 23

Description. For Example 1, several abnormal operating procedures are missing from the list of available procedures necessary to meet the requirements of Regulatory Guide 1.33, Revision 2. On February 1, 2016, during written examination development, the chief examiner reviewed the available abnormal procedures that were available for use in scenario events that require use of an abnormal procedure. During this review, it was discovered that several required procedures were missing. The licensee confirmed to the chief examiner that no abnormal procedure existed for the events listed below.

The first event that required an abnormal procedure is for a partial loss of AC power; in this case for the electrical bus NJS-J, which is a non-safety bus that

powers important equipment. During the preparation week and administration week for the operating test (August 23, 2016, and September 14, 2016), the crews had to use skill of the craft to figure out what was lost during this event and if the alarms on the main control board panels were consistent with the power loss event. During this event, the hydrogen seal oil alarms for the main turbine came in and this caused confusion for the crews. After the scenario was over, the chief examiner discussed this with the licensee to ensure that this alarm was part of the bus loss event, and discussed why the abnormal procedure was necessary and would have helped the crew diagnose the equipment losses and the associated alarms that were annunciating during the scenario. This abnormal procedure would have contained loads lost on the associated bus and, therefore, the applicable alarms could be linked to the power loss event for proper understanding of integrated plant operations. Although the licensee currently has several abnormal procedures for bus losses (loss of DC power, loss of RPS power, and loss of an instrument bus), it does not include the major AC buses, such as the safety buses, or the non-safety buses, such as the NJS-J bus.

The second event that required an abnormal procedure is containment parameters that are being challenged, but are not yet at the values required for emergency operating procedure entry. Several of these containment parameters include high containment temperature, high drywell pressure, or high drywell temperature. During the preparation week and administration week for the operating test (August 23, 2016, and September 14, 2016), several events on the simulator scenarios involved parameters that would have required entry into an abnormal procedure, but were handled with skill of the craft and alarm response procedures instead of an abnormal procedure. Any of these parameters can degrade to the point that would eventually require entry to emergency operating procedures. The intermediate strategy is to have an abnormal operating procedure to attempt to turn the parameter around prior to an actual emergency condition that would require emergency procedure entry. This point is specifically contained within the definition of an off-normal procedure in "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants," N18.7-1976/ANS-3.2. In Regulatory Guide 1.33, Revision 2, it specifically mentions any event that is significant and other expected transients that may be applicable should have an abnormal and/or emergency operating procedure depending on the severity of the event. The boiling-water reactor owner's group designates the emergency procedures and their guidelines for this licensee. Those parameters that fall outside of the immediate entry requirements for emergency procedure entry per the boiling-water reactor owner's group, but have requirements within Regulatory Guide 1.33 because they are a significant event, would require an abnormal operating procedure.

The third event that required an abnormal procedure is inadvertent reactivity additions, such as cold water addition from an inadvertent start of a high-pressure core spray pump or a reactor core isolation cooling pump. This event can challenge reactor power, reactor level, and reactor pressure, and for the

scenario in question on this examination, it challenged all three because the reactor was at full power. During the preparation week and administration week for the operating test (August 23, 2016, and September 14, 2016), one event on one scenario involved an inadvertent start of the high-pressure core spray pump. This is an event that would have required entry into an abnormal procedure, but was handled with skill of the craft and alarm response procedures instead of an abnormal procedure. This was also an operational event at River Bend Station in the 2005 timeframe. Without timely action it can lead to a reactor scram and potential fuel thermal limit challenges and, therefore, has immediate action step requirements to secure the pump prior to any of these important parameters being challenged from safe values.

The fourth event that required an abnormal procedure is abnormal contamination of hydrogen in the main generator. On February 1, 2016, during operating test development, the chief examiner reviewed the available abnormal procedures that were available for use in scenario events that require use of an abnormal procedure. This event could not be used on this examination as an abnormal event because there was no procedure. Although this event has not occurred at River Bend Station, it was a significant operational event for the South Texas Project Electric Generating Station. It caused permanent damage to the generator and required complete replacement, in part due to lack of procedure guidance for the event.

All of these examples are associated with actual operational events. During these events, abnormal procedures were needed to ensure that the proper priorities were placed on procedure step performance for timely recovery of equipment and, therefore, safe operation of the facility. Additionally, these items are all classified as Abnormal Procedure Events (APE) in the "Knowledge and Abilities Catalog for Nuclear Plant Operators," NUREG-1123, Revision 2. This catalog was developed from the entire licensing and design basis document library for the boiling-water reactor fleet of plants with the industry and NRC for the purpose of ensuring that operators are measured to a common standard for knowledge and abilities. It is updated periodically for significant operational events when they occur. The licensee initiated Condition Report CR-RBS-2016-06683 to address this issue.

For Example 2, Abnormal Operating Procedure AOP-0039, "Hydrogen Deflagration/Leaks in the Off-Gas System," Revision 15, does not contain any guidance for leaking hydrogen out of the main generator, which could cause a deflagration event and possibly injure plant staff near the generator if a leak occurred. On February 1, 2016, during operating test development, the chief examiner wanted to use this event as an abnormal event on a scenario and the licensee informed him that there was no procedure for this or procedure steps for this event in any procedure. The procedure that might have contained these steps deals only with hydrogen from the off-gas system and the potential for deflagration from that type of event, but not from a leak from the main generator. This event could not be used on the operating test because there was not a success path for the applicants without a procedure. The licensee initiated Condition Report CR-RBS-2016-06683 to address this issue.

For Example 3, the licensee's Alarm Response Procedure ARP P870-54-E-05, Revision 26, for the gland seal pressure alarm, "STEAM SEAL EVAP STEAM HEADER LOW PRESSURE," contains incorrect values for gland seal pressures. Step 2 of this procedure states to, "Verify tube side pressure on TME-PIEPR-35, SSE TUBE SIDE PRESSURE is less than 65 psig (normal press is 30 to 45 psig)." This is incorrect because the normal pressure range is much higher with a range of 65-80 psig. This creates confusion when operators respond to the alarm because the values in this procedure are incorrect for normal conditions. During the preparation week, August 24, 2016, this event was being validated as part of a scenario when it was discovered by licensed operators that the values listed in the procedure were incorrect and could lead to confusion during administration. The chief examiner removed the event from the scenario because of this concern. The licensee initiated Condition Report CR-RBS-2016-06683 to address this issue.

For Example 4, several of the licensee's procedures have actions located in the "Subsequent Actions" Section of the procedure and these actions are immediate actions and should be located in the "Immediate Actions" section at the top of the corresponding procedure. On February 1, 2016, during written examination and operating test development, the chief examiner noticed that there were several procedures that were missing immediate action steps. Also, during written examination validation in July 2016, licensed operators were frequently commenting that proposed written question topics were minutia because they were in the subsequent actions sections of the applicable procedures. Many of these topics had high importance ratings in the Knowledge and Abilities catalogs, indicating their importance to plant operation and, therefore, required knowledge for operators to demonstrate on the job and during examinations. The chief examiner reviewed several abnormal procedures for events that require the use of an abnormal procedure. These sections have requirements delineated within "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants," N18.7-1976/ANS-3.2, Section 5.3.9.1(3), which are specifically linked from the requirements within Regulatory Guide 1.33, Revision 2, and the associated commitment in the licensee Technical Specifications to this regulatory guide. Several of these procedures were missing immediate action steps, with this section marked as "none." The procedures with missing immediate action steps include the following procedures:

1) AOP-0050, "Station Blackout," Revision 55

During a station blackout condition where an emergency diesel generator is running, but not providing power to its safety bus, the immediate action steps in Procedure AOP-0050 should be to make necessary adjustments (if possible) to place the diesel generator on the bus. In this procedure they are listed as subsequent actions and are so far down the list of procedure steps that the diesel may be secured prematurely without cause or left running but not powering its associated safety bus. Another concern added with this delay is that the safety injection pumps would need to be vented due to extended loss of power to the line fill pumps. This would prolong the period of time that the station was in a station blackout purely because of incorrect procedure step order and lack of priority for immediate action steps. It also unnecessarily risks air entrainment of safety-related

pumps if the generator can be adjusted and placed on the bus quickly. These steps should also be placed at the top of the hard card attachments for all three emergency diesel generator operations, OSP-0053, "Emergency and Transient Response Procedure," Revision 23, for the same reasons. This was a significant operational event during the blackout events in the northeast in 2003. At least one contributing cause of this event was that operators did not recognize and adjust parameters on an emergency diesel generator that were out of specification for auto-closure of the output breaker. The operators shutdown the diesel and kept the plant in a station blackout. The licensee initiated Condition Report CR-RBS-2016-06683 to address this issue.

2) AOP-0004, "Turbine Trip," Revision 27

During a turbine trip event, there are no immediate operator action steps listed for this procedure. Located within "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants," N18.7-1976/ANS-3.2, Section 5.3.9.1(4a), it states that verification of automatic actions are immediate actions steps. For this abnormal procedure, this would include proper verification that the turbine actually trips when required, that all the stop valves go closed, and that the main and exciter breakers trip. These are all verification steps that if they do not occur, the operator is expected to complete the actions manually to make sure that the "sequence of events follow the expected course" within the procedure framework, as discussed in this standard. This standard is linked to Regulatory Guide 1.33, Revision 2, Section C.5, where the regulatory guide states that, "the guidelines contained in the following sections of ANSI N18.7-1976/ANS-3.2 have sufficient safety importance to be treated the same as the requirements (indicated by the verb shall) of the standard," which includes Section 5.3.9.1 (with subsection 4 for immediate operator actions). The licensee initiated Condition Report CR-RBS-2016-06683 to address this issue.

3) AOP-0008, "Loss of Instrument Air," Revision 38

During a loss of instrument air event, there are no immediate operator action steps listed for this procedure. Located within "Administrative Controls and Quality Assurance for the Operational Phase of Nuclear Power Plants," N18.7-1976/ANS-3.2, Section 5.3.9.1(4a), it states that verification of automatic actions are immediate actions steps. For this abnormal procedure, this would include proper verification that the standby compressors start, that outside operators are dispatched to air skids to check for dryer plugging, shift lineups, and/or close valves as necessary in an attempt to stop or turn the event. As mentioned above on previous examples, these are all verification steps that if they do not occur, the operator is expected to complete the actions manually (for those available in the control room) to make sure that the "sequence of events follow the expected course" within the procedure framework, as discussed in this standard. This standard is linked to Regulatory Guide 1.33, Revision 2, Section C.5, where the regulatory guide states that "the guidelines contained in the following sections of ANSI N18.7-1976/ANS-3.2 have sufficient safety importance to be treated the same as the requirements (indicated by the verb shall) of the standard," which includes Section 5.3.9.1 (with subsection 4 for immediate operator actions). The licensee initiated Condition Report CR-RBS-2016-06683 to address this issue.

4) AOP-0007, "Lowering Main Condenser Vacuum," Revision 23

During a lowering main condenser vacuum event, there are no immediate operator action steps listed for this procedure. As mentioned above on previous examples, these are all verification steps that if they do not occur, the operator is expected to complete the actions manually (for those available in the control room) to make sure that the "sequence of events follow the expected course" within the procedure framework, as discussed in this standard. Two items that should be in this section include verification of automatic actions, such as equipment trips at the required set points and group isolations occur at the required set points as designed to protect equipment. Other actions to consider for immediate actions are things such as 1) verify the standby circulating water pump starts (if auto trip of running pump occurred), 2) gland seal verifications, 3) air removal pump trips and auto start features of standby pumps (if available), and 4) reducing reactor power to stay within the proper region of the vacuum curve in a timely manner to prevent damage to the main turbine. The licensee initiated Condition Report CR-RBS-2016-06683 to address this issue.

Analysis. The failure of ten procedures to have the appropriate qualitative and quantitative criteria to complete these activities was a performance deficiency. The finding was more than minor because it is associated with the procedure quality attribute of the Mitigating Systems cornerstone and adversely affected the cornerstone objective of ensuring availability, reliability, and capability of systems needed to respond to initiating events to prevent undesired consequences. Specifically, inadequate procedures could adversely affect the operating crew's ability to take appropriate actions to ensure reactor safety is being maintained.

Using Inspection Manual Chapter 0609, Appendix A, "The Significance Determination Process (SDP) for Findings At-Power," dated June 19, 2012, the team determined that the finding was of very low safety significance (Green) because the finding: (1) was not a deficiency affecting the design and qualification of a mitigating structure, system, or component, and did not result in a loss of operability or functionality; (2) did not represent a loss of system and/or function; (3) did not represent an actual loss of function of at least a single train for longer than its technical specification allowed outage time, or two separate safety systems out-of-service for longer than their technical specification allowed outage time; and (4) did not represent an actual loss of function of one or more non-technical specification trains of equipment designated as high safety significance in accordance with the licensee's maintenance rule program for greater than 24 hours. The finding has a cross-cutting aspect in the area of human performance associated with documentation because the organization did not maintain complete, accurate, and up to date documentation for procedure writing and modification [H.7].

Enforcement. Title 10 CFR Part 50, Appendix B, Criterion V, "Instructions, Procedures, and Drawings," states, in part, "Instructions, procedures, or drawings shall include appropriate quantitative or qualitative acceptance criteria for determining that important activities have been satisfactorily accomplished."

For Example 1 of this violation, contrary to the above, on February 1, 2016, the licensee is missing four abnormal operating procedures that are described in Regulatory Guide 1.33. This regulatory guide requires procedures for combating emergencies and other significant events and it includes a list of events. These events include a loss of electrical power, which is the first instance of a missing abnormal procedure. Another event listed in the regulatory guide that requires an abnormal procedure is expected transients that may occur prior to an emergency procedure entry, and the corresponding procedure missing for this event is when abnormal containment values exist prior to emergency procedure entry requirements. This is the second instance of a missing abnormal procedure. A third event listed in the regulatory guide that requires an abnormal procedure is expected transients that may occur prior to an emergency procedure entry, and the corresponding procedure missing for this event is an inadvertent reactivity addition at power, which has occurred at River Bend Station with an inadvertent high-pressure core spray start. This is the third instance of a missing abnormal procedure. Finally, the fourth event listed in the regulatory guide that requires an abnormal procedure is expected transients that may occur prior to an emergency procedure entry, and the corresponding procedure missing for this event is hydrogen contamination within the main generator. This is the fourth instance of a missing abnormal procedure. This was an actual operational event that occurred at another facility and led to complete destruction of the main generator. Although some of these events have procedure steps in alarm response procedure(s) at River Bend Station, this is not at the required abnormal procedure level and, therefore, does not contain all the necessary qualitative acceptance criteria to accomplish the required activity of ensuring that important activities have been satisfactorily accomplished. To correct this issue, the licensee is working through the corrective action program via the assigned condition report.

For Example 2 of this violation, contrary to the above, on February 1, 2016, Abnormal Operating Procedure AOP-0039, "Hydrogen Deflagration/Leaks in the Off-Gas System," Revision 15, did not contain the necessary qualitative acceptance criteria (procedure steps) to combat an event for leaking hydrogen out of the main generator, which could cause a deflagration event and possibly injure plant staff near the generator if a leak occurred. To correct this issue, the licensee is working through their procedure change process and corrective action program via the assigned condition report.

For Example 3 of this violation, contrary to the above, on August 24, 2016, Alarm Response Procedure ARP P870-54-E-05, Revision 26, for the gland seal pressure alarm, "STEAM SEAL EVAP STEAM HEADER LOW PRESSURE," did not have the necessary quantitative acceptance criteria (procedure step values) to accomplish the required activity of recognizing an improper gland seal pressure event because the normal operating values listed in this procedure are incorrect. To correct this issue, the licensee is working through their procedure change process and corrective action program via the assigned condition report.

For Example 4 of this violation, contrary to the above, on February 1, 2016, four of the licensee's abnormal procedures did not have the necessary qualitative acceptance criteria (immediate action steps) to accomplish the required activity of 1) combating a station blackout, 2) turbine trip, 3) loss of instrument air, and 4) lowering main

condenser vacuum. To correct this issue, the licensee is working through their procedure change process and corrective action program via the assigned condition report.

This violation is being treated as a non-cited violation, consistent with Section 2.3.2.a of the Enforcement Policy. The violation was entered into the licensee's corrective action program as Condition Report CR-RBS-2016-06683 to address this issue. (NCV 05000458/2016301-01, "Inadequate Plant Operating Procedures with Ten Examples.")

c. Other Observations

The licensee currently does not manage or have any banks for scenarios, job performance measures (admin, in-plant, or simulator), or written exam questions. This does not meet NRC requirements, Systems Approach to Training (SAT) process requirements, nor does it meet the National Academy for Nuclear Training objectives. It hampers the development of examination materials, causes excessive overlap of materials if not managed correctly, and does not adequately prepare control room staff for the entire range of events within the program/station design. The simulator is required to be tested on all of these items for just this purpose and licensees should use them for all portions of the training program, not just NRC examinations. The licensee wrote Condition Report CR-RBS-2016-06506 to address this issue.

There were also scheduling issues with the simulator for this initial examination. The simulator was obligated for biennial examinations during the scheduled time committed by the licensee in writing to the NRC for the NRC operating test week validation. Licensees are expected to manage the simulator schedule to prevent overlap of emergency drill exercises, initial examination validation and administration, biennial examination administration, and simulator upgrade projects so that they do not conflict with each other. The limited time on the simulator during validation week prevented the NRC from completing validation of one scenario, so it had to be designated as the spare scenario. The NRC communicated to the licensee that, on future examinations, this may lead to an examination being rescheduled if the simulator is not made available for the time requested to complete proper validation and/or administration. The licensee wrote Condition Report CR-RBS-2016-06506 to address this issue.

.3 Operator Knowledge and Performance

a. Scope

On September 30, 2016, the licensee proctored the administration of the written examinations to all seven applicants. The licensee staff graded the written examinations, analyzed the results, and presented their analysis to the NRC on October 5, 2016.

The NRC examination team administered the various portions of the operating tests to all seven applicants the week of September 12, 2016.



b. Findings

No findings were identified.

All applicants passed the written examination and all parts of the operating test. The final written examinations and post-examination analysis and comments may be accessed in the ADAMS system under the accession numbers noted in the attachment.

The examination team noted one generic weakness associated with applicant performance on the operating tests:

1. Administrative job performance measure on electrical print reading - 6/7 failed this job performance measure

The licensee identified five generic weaknesses associated with applicant performance on the written examinations:

1. Inverter alarm inputs – 5/7 missed Question 21 due to knowledge weaknesses for this topic
2. Pressure Suppression Pressure Limit associated with Heat Capacity Temperature Limit and Emergency Depressurization – 4/7 missed Question 50 due to knowledge weaknesses for this topic
3. Fire outside the main control room actions/reasons - 4/7 missed Question 57 due to knowledge weaknesses for this topic
4. Requirements for problem annunciators - 4/7 missed Question 70 due to knowledge weaknesses for this topic
5. Basis for TS 3.3.1.1 Turbine Stop Valve Closure function – 3/4 missed Question 86 due to knowledge weaknesses for this topic

Copies of all individual examination reports were sent to the facility training manager for evaluation and determination of appropriate remedial training prior to going on shift. The licensee entered the generic weaknesses into their corrective action program as Condition Report CR-RBS-2016-06506 to address this issue.

.4 Simulation Facility Performance

a. Scope

The NRC examiners observed simulator performance with regard to plant fidelity during examination validation and administration.

b. Findings

No findings were identified.

c. Other Observations

Although there were no simulator fidelity violations, there were several observations regarding the overall health of the simulator at River Bend Station:

- 1) Nuisance alarms that come in/out during scenario snaps
- 2) Nuclear Power instrument not updating correctly on a digital screen during a high-pressure core spray inadvertent initiation event
- 3) There are too many workarounds when using the malfunction library (overrides used on most malfunctions for scenario events)
- 4) Backtrack doesn't work well –the power/flow maps and other digital screens lock up when backtrack is used
- 5) Scenario Based Testing (SBT) is a challenge for the licensee – alarms that come in for malfunctions must be verified to be correct for each malfunction used on the simulator each time a scenario is ran for training.

The licensee entered these simulator issues into their corrective action program as Condition Report CR-RBS-2016-06506 and into the simulator corrective action program as Discrepancy Report DR-2016-0108.

.5 Examination Security

a. Scope

The NRC examiners reviewed examination security for examination development during both the on-site preparation week and examination administration week for compliance with 10 CFR 55.49 and NUREG-1021. Plans for simulator security and applicant control were reviewed and discussed with licensee personnel.

b. Findings

No findings were identified.

**4OA6 Meetings, Including Exit**

Exit Meeting Summary

The preliminary examination results were discussed on September 15, 2016, with Mr. W. Maguire, Site Vice President, and other members of the staff. A telephonic meeting was conducted on October 6, 2016, with Mr. S. Durbin, Operations Training Superintendent, who was provided the NRC licensing decisions. A telephonic exit meeting was conducted on October 12, 2016, with Mr. W. Maguire, Site Vice President.

The licensee did not identify any information or materials used during the examination as proprietary.

## **SUPPLEMENTAL INFORMATION**

### **KEY POINTS OF CONTACT**

#### **Licensee Personnel**

W. Maguire, Site Vice President  
S. Vercelli, General Manager, Plant Operations  
J. Reynolds, Senior Manager, Operations  
T. Schenk, Manager, Regulatory Assurance  
P. O'Connor, Manager, Training  
D. Dawson, Operations Shift Manager  
G. Krause, Superintendent, Training  
S. Durbin, Superintendent, Training  
D. Bergstrom, Senior Operations Instructor  
G. Kimich, Senior Operations Instructor  
K. Huffstatler, Senior Licensing Specialist  
D. Williamson, Senior Licensing Specialist

#### **NRC Personnel**

J. Sowa, Senior Resident Inspector

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

#### **Opened and Closed**

05000458/2016301-01   NCV   Inadequate Plant Operating Procedures with Ten Examples  
(Section 4OA5)

### **ADAMS DOCUMENTS REFERENCED**

Accession No. ML16280A435 - FINAL WRITTEN EXAMS (Do not release until 10/10/2018)  
Accession No. ML16280A437 - FINAL OPERATING TEST (Do not release until 10/10/2018)  
Accession No. ML16280A439 - POST EXAM ANALYSIS (Do not release until 10/10/2018)