



Spire Inc.
700 Market St
St. Louis, MO 63101

March 25, 2022

Mr. Gregory Ochs
Director, Central Region
Pipeline and Hazardous Materials Safety Administration

RE: CPF No. 3-2022-034-NOA

Dear Mr. Ochs:

Pursuant to your February 25, 2022 letter to me, please see Spire's attached response for the 2021 Control Room Management audit of the Spire STL and NGL Pipelines. I have also attached the revised Control Room Management Plan, Standard Operational Procedures and form GC013, as referenced in the response. If you have any additional questions or comments, please contact me at (314) 349-2972 or Mr. Bob Gardner at (205) 365-7846.

Sincerely,

A handwritten signature in blue ink, reading "Craig R. Hoeferlin", written over a light blue circular background.

Craig Hoeferlin
Vice President, Operations Services and SMS

Enclosures

CC: Mr. Bob Gardner
Mr. Alex Grewach
Mr. Randy Wilson
Mr. David Yonce

1. 195.446 Control room management. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402

Spire CRM Procedure Revision 1.4 3/15/2021 (Spire's CRM Plan) was inadequate because it did not have a procedure for determining a control room. Spire offered a statement in Section 1.2, Application and Scope, that states "the plan applies to any Spire employee working in a Control Room who monitors and controls all or part of the assets listed in section 1.1 through a SCADA system." These assets were Spire STL and Spire NGL. Spire NGL OPID 11032 included an underground storage field that maintains an operator control center to monitor and manage the storage field. Spire STL OPID 39886 had transmission stations with PLC or RTU's that may or may not have been able to manage the flow of gas outside the fence by an individual through manipulating the PLC. These assets were part of both pipelines. Therefore, if they were operated independently, outside of the Control Room direction, they would become control rooms and the individuals would need to be qualified as controllers. Spire needs to amend their procedure to equitably evaluate all such facilities to determine if it is a control room and falls under the requirements for Control Room Management.

Spire Response: The attached CRM Plan has been revised to address this item.

2. § 195.446 Control room management. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (b) Roles and responsibilities. Each operator must define the roles and responsibilities of a controller during normal, abnormal, and emergency operating conditions...

Spire's CRM Plan was inadequate because the procedure did not define the controller's domain of responsibility required by § 195.446(b) as they related to third party operators critical to pipeline operations. Section 1.2 of the CRM Plan identified Spire STL and Spire NGL as the assets being monitored and controlled by the control room. Integral to the pipeline operations are third party operators Phillips at the Hartford Terminal and Conoco-Phillips East Terminal. These third-party terminals function as a holding/storage facilities and product is directed to and from these facilities by the Spire controllers. Additionally, the Catalan Propane Plant (propane vaporization) is connected to the pipeline and direction for vaporization comes from the Utility. The controller's physical 3 domain is not well defined, and the controller's roles and responsibilities related to these third-party assets and how the controller interacts and directs the pipeline operations to and from these facilities. Furthermore, there was no reference to the Spire STL system operated on the same console. The procedure needs to be amended to provide clear roles and responsibilities related to these facilities as well as include the assets of Spire STL into the CRM Plan.

Spire Response: The attached CRM Plan has been revised to address this item.

3. § 195.446 Control room management. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (b) Roles and responsibilities. Each operator must define the roles and responsibilities of a

controller during normal, abnormal, and emergency operating conditions. To provide for a controller's prompt and appropriate response to operating conditions, and operator must define each of the following: (2) A controller's role when an abnormal operating condition is detected, even if the controller is not the first to detect the condition, including the controller's responsibility to take specific actions and to communicate with others;

Spire's CRM Plan was not adequate to define the controller's role when an abnormal operating condition was detected, even if the controller was not the first to detect the condition, including the controller's responsibility to take specific actions and to communicate with others as required by § 195.446(b)(2). Section 4.3.2 of the CRM Plan addressed Abnormal Operating Conditions roles, responsibilities, and authority for controllers when an abnormal condition was detected either by the controller or from another source (field/public). The procedure references SOP #12 which was incorrect. It should have been SOP #10, Abnormal Condition Report, which gave direction on when and how to fill out the report, how the report got distributed, as well as when to elevate information to higher levels within the organization. The procedure and SOP did not provide details when the controllers should log into their logbook and what they should record during an Abnormal Operation (AO) event. The operator identified this as an expectation of controllers, but it is not covered in procedure. There was no requirement for supervisory review of AO, nor a timeline for such a review once a controller completed the form described in SOP #10. There was no detail of who determines the cause or whether further action was required to prevent recurrence. Additionally, Step 7 of the SOP required the controller to self-report if the controller or control room contributed to the AO. If the answer is "yes", the system will prompt a review of the controller's fatigue level by the Manager of Gas Control using form 4 GC006. Depending upon an individual to self-report is not adequate. An independent review of AO needs to be completed to determine if the controller's actions contributed. The procedure needs to be amended to define the controller's role when an abnormal operating condition was detected, even if the controller was not the first to detect the condition, including the controller's responsibility to take specific actions and to communicate with others.

Spire Response: The attached CRM Plan and Standard Operational Procedures have been revised to address this item.

4. § 195.446 Control room management. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (b) Roles and responsibilities. Each operator must define the roles and responsibilities of a controller during normal, abnormal, and emergency operating conditions. To provide for a controller's prompt and appropriate response to operating conditions, and operator must define each of the following: (3) A controller's role during an emergency, even if the controller is not the first to detect the emergency, including the controller's responsibility to take specific actions and to communicate with others;

Spire's CRM Plan was not adequate because it did not define the controllers' authority and responsibility to make decisions, take actions, and communicate with others upon being notified of, upon detection of, and during an emergency or if a leak or rupture is suspected, as required by § 195.446(b)(3). Section 4.3.3 of the CRM Plan did not address the Spire NGL system in an emergency. The procedure only described actions for Spire STL emergencies, such as referencing the Spire STL Pipeline Emergency Plan and Procedure and the Spire STL Pipeline Emergency Call Checklist. The procedure also referenced SOP #12, which was incorrect. It should have been SOP #8, Emergency Procedures HVL. This procedure was a partial cut and paste from the Laclede Pipeline emergency procedure. This procedure described the role of the Gas Control Supervisor, which was not a role in the Control Room. There was a section that appeared to be related to underground storage emergencies that directed persons to contact central dispatching or the control room. There was also

SOP #17, UGS Propane System Emergency Shutdown (ESD), which provided 4 steps for the controller to shut down the system via ESD. This SOP was not referenced in the Emergency Plan section 4.3.3. Also, there were no steps for communicating or documenting this event. The procedure needs to be amended to include the controllers' authority and responsibility to make decisions, take actions, and communicate with others upon being notified of, upon detection of, and during an emergency or if a leak or rupture is suspected. This must include both Spire STL and Spire NGL.

Spire Response: The attached CRM Plan and Standard Operational Procedures have been revised to address this item.

5. a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (b) Roles and responsibilities. Each operator must define the roles and responsibilities of a controller during normal, abnormal, and emergency operating conditions. To provide for a controller's prompt and appropriate response to operating conditions, and operator must define each of the following: (3) A controller's role during an emergency, even if the controller is not the first to detect the emergency, including the controller's responsibility to take specific actions and to communicate with others;

Spire's CRM Plan was not adequate to address the controller's responsibilities in the event of an emergency per § 195.446(b)(3) for when the control room must be evacuated. Section 4.3.3 authorized the controller to "start the process of moving primary control room operations to Backup Control Room" which then referenced SOP #6, Move Primary Operation to the Backup Control Center. The procedure failed to provide the steps to be taken "if an evacuation of the primary control room, or the building housing the primary control room triggers the use of this procedure." There was unessential information in the middle of the procedure that was not beneficial to supporting the controller to move from the primary to the backup control center, and it ends incomplete stating "if an evacuation of the primary control room, or the building housing the primary control room triggers the use of this procedure, the following steps should be taken." Additionally, it was not clear if an evacuation of the control room always resulted in moving to the backup control center or a temporary move to a safe location for a short period of time. The procedure needs to be amended to address the controller's responsibilities in the event the control room must be evacuated. Some considerations may include factors for determining the need to evacuate, who makes the decision to evacuate and relocate to the backup control center, how is this communicated, and how internal communications are managed during the relocation.

Spire Response: The attached Standard Operational Procedures have been revised to address this item.

6. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402. . . . (b) Roles and responsibilities. Each operator must define the roles and 6 responsibilities of a controller during normal, abnormal, and emergency operating conditions. To provide for a controller's prompt and appropriate response to operating conditions, and operator must define each of the following: (4) A method for recording controller shift-changes and any hand-over of responsibility between controllers...

Spire's CRM Plan was inadequate because the procedure in Section 5.6 did not adequately define the roles and responsibilities of a controller before leaving the console for any reason, as required per § 195.446(b)(4). Spire, when fully staffed, had a fully qualified controller available 24/7 to assist if a controller must step away from the console. Section 5.6 states: "If taking over for less than 30 minutes this can be done by adding a note in the operator logbook located in Clear SCADA. It must consist of the employee number of the controller taking over, along with the date/time. When the controller on duty returns, they must enter a note with their employee number and the date/time they resumed control of the pipeline." The procedure does not mention what is required for the hand-over of responsibility before the controller leaves the console, for example: no unacknowledged, high priority, or safety related alarms in place, whether set points/commands sent must be completed, or whether verbal commands to field personnel are acknowledged. It also did not define the role and responsibilities of the person left to monitor the system when limited shift change had occurred. For example, should the person only monitor the system, take total control of the system, answer phones, call the absent controller if alarms present, etc. The procedure needs to be amended to provide the roles and responsibilities of the controllers before leaving the console for any reason.

Spire Response: The attached CRM Plan has been revised to address this item.

7. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (b) Roles and responsibilities. Each operator must define the roles and responsibilities of a controller during normal, abnormal, and emergency operating conditions. To provide for a controller's prompt and appropriate response to operating conditions, and operator must define each of the following: (5) The roles, responsibilities and qualifications of others who have authority to direct or supersede the specific technical actions of controllers.

Spire's CRM Plan was inadequate because, while Section 4.2 identified that the Manager of Gas Control could Supersede and/or Direct the technical actions of a controller, the procedure did not define the qualifications or requirements of this individual holding the title, as required by § 195.446(b)(5). It also identified a Director of Gas Ops & Control, which is no longer a role in the control room. 7 Additionally, the procedure did not include the responsibilities of those authorized to direct or supersede the technical actions or a controller to implement their authority and document the event. The procedure must be amended to include the qualification elements for those authorized to direct or supersede the technical actions of a controller that are sufficient for those individuals to understand the implications of the scope of potential actions. It must also include the responsibilities of those authorized to direct or supersede the technical actions or a controller to implement their authority and document the event.

Spire Response: The attached CRM Plan has been revised to address this item.

8. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (c) Provide adequate information. Each operator must provide its controllers with the information, tools, processes and procedures necessary for the controllers to carry out the roles and responsibilities the operator has defined by performing each of the following: (1) Implement API RP 1165 (incorporated by reference, see § 195.4) whenever a SCADA system is added, expanded or replaced, unless the operator demonstrates that certain provisions of API RP 1165 are not practical for the SCADA system used;

Spire's CRM Plan was inadequate because section 5.2 of the CRM Plan did not provide definitions or examples of what constitutes "added," "expanded," or "replaced" to determine when API RP 1165 must be implemented per § 195.446(c)(1). The console was originally set up for gas transmission, and then the hazardous liquid system was added. While the gas transmission control room did not have to fully implement API RP 1165 when the liquid was brought over and into the console control room, full implementation was required. Additionally, Spire did not have a procedure to verify that API RP 1165 had been implemented or to maintain compliance for new screens or points added. The procedure needs to be amended to include definitions and examples, as well as a process to audit current screens and new or modified screens going forward.

Spire Response: The attached CRM Plan has been revised to address this item and an audit is in progress.

9. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (c) Provide adequate information. Each operator must provide its controllers with the information, tools, processes and procedures necessary for the controllers to carry out the roles and responsibilities the operator has defined by performing each of the following: (2) Conduct a point-to-point verification between SCADA displays and related field equipment when field equipment is added or moved and when other changes that affect pipeline safety are made to field equipment or SCADA displays;

Spire's CRM Plan was inadequate to support conducting a thorough point-to-point verification required by § 195.446(c)(2). Section 5.3 of the CRM plan references SOP #2 for "the procedure for the point-to-point verification and full documentation of all point to-point verification." SOP #2 provided some high-level directions on how to complete a Point-to-Point in the Clear SCADA system. It directed to use form GC002 if "[t]he Point to Point functionality does not work in Clear SCADA." The SOP also provided instruction in the event verification of a point failed. However, there was no requirement to document the failure other than to indicate NA or report to the Manager of Gas Control. It did not include a procedure to perform a successful verification after the issue is resolved. SOP #2 procedure directs the controller to open the P2P file in SCADA and enter the value or condition provided by the field operator. SCADA auto populates the SCADA value. A records review identified that auto populated value or condition was different, at times, than what the field indicated. Verification should provide the same result between the field and SCADA. The procedure also requires a field operator to set up an alarm condition and then the controller is directed to document the alarm description and if the alarm is received. However, the set point when the alarm is triggered was not required, nor the alarm priority or any other alarm properties. The SOP procedure required checking "all points on SCADA screens for any given station." However, there is no instruction for how to identify all the screens or document they were checked. The procedure needs to be amended to provide more instruction to support a more thorough verification and documentation of point-to-point checks.

Spire Response: The attached Standard Operational Procedures have been updated to address this item.

10. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (c) Provide adequate information. Each operator must provide its controllers with the information, tools, processes and procedures necessary for the controllers to carry out the roles and responsibilities the operator has

defined by performing each of the following: 9 (4) Test any backup SCADA systems at least once each calendar year, but at intervals not to exceed 15 months...

Spire's CRM Plan was inadequate to verify a thorough test of the SCADA backup control center per § 195.446(c)(4). The process did not provide clear and complete guidance on the steps to move to and return from the backup center. It did not provide instruction on what facility functions and equipment needed to be checked at the backup center as well as the function of SCADA screens, commands, alarms and digital and analog points. The procedure did not include methods or tools to document the checks. The procedure also did not include testing the function of the primary and secondary servers fail over for both the control room and backup center. The procedure needs to be amended to provide instructions to facilitate more thorough testing of the backup control center and servers.

Spire Response: The attached Standard Operational Procedures have been updated to address this item.

11. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (d) Fatigue mitigation. Each operator must implement the following methods to reduce the risk associated with controller fatigue that could inhibit a controller's ability to carry out the roles and responsibilities the operator has defined: (1) Establish shift lengths and schedule rotations that provide controllers off-duty time sufficient to achieve eight hours of continuous sleep;

Spire's CRM Plan was inadequate because it did not explain the different shift schedules or establish a process to track all hours of service for all qualified controllers as required in § 195.446(d)(1). Controllers are salaried and the schedules are geared toward ensuring the controllers work the appropriate number of pay hours at the end of the year. The control room manager approved the pay card/time sheets but did not track all actual hours worked, separately, for compliance with hours of service and the appropriate rest periods. Additionally, the manager of the control room, a qualified controller, has not been tracking his hours of service. The procedure needs to be amended to define all shift schedules for controllers and include a process to track all hours worked to manage operator defined hours of service and related rest periods.

Spire Response: The attached Standard Operational Procedures have been updated to address this item.

12. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (e) Alarm management. Each operator using a SCADA system must have a written alarm management plan to provide for effective controller response to alarms. An operator's plan must include provisions to: (1) Review SCADA safety-related alarm operations using a process that ensures alarms are accurate and support safe pipeline operations;

Spire's CRM Plan failed include a process that defines safety related points to ensure alarms are accurate to support safe pipeline operations as required by § 195.446(e)(1). Section 7.2 of the procedure identified all pressures and odorizers (for gas only) as safety related points. However, the procedure identified Hi and HiHi pressures, Lo and LoLo pressures, pressure rate of change (ROC) and odorizer pump failure as safety related alarms. Pump failure is considered a Priority 2 high priority safety related alarm, as identified in section 7.3 (example for a Priority 2 alarm). A review of the SCADA Master Data Base identified Calculated Digital

Points on Spire STL for Valve Status, and Gas Detect as Safety Related. The SCADA Master Data Base for Spire NGL Analog Calculated Points identified that a Rate of Change (ROC) designator was not safety related. These points were not defined in the procedure. Spire's definition of safety related alarms provides consideration for other conditions in pipeline operations that were not considered in the procedure. Examples of these alarm conditions not identified in the procedure include communications failure, fire detect, atmosphere, and ESD. The procedure must be amended to include a process for considering all conditions that could be safety related and include them in the procedure.

Spire Response: Spire Response: The attached CRM Plan has been revised to address this item.

13. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (e) Alarm management. Each operator using a SCADA system must have a written alarm management plan to provide for effective controller response to alarms. An operator's plan must include provisions to: (1) Review SCADA safety-related alarm operations using a process that ensures alarms are accurate and support safe pipeline operations;

Spire's CRM Plan was inadequate because it did not provide a sustainable process to review safety-related alarm operations to ensure alarms are accurate and support safe pipeline operations as required by § 195.446(e)(1). Section 7.3 of the plan provided direction for controllers to verbally communicate or mail the control room leadership or SCADA support when they identified inaccurate, malfunctioning, stale, or unreliable alarms or data. The procedure assumes action is taken to correct these alarm and data deficiencies. The procedure does not offer guidance on documenting these messages, who is responsible to follow up, or how the issues will be tracked through correction. Section 195.446(e)(6) requires the operator to address deficiencies identified through the implementation of paragraphs (e)(1) – (e)(6). Without a method and process to track identified alarm and data issues, the operator cannot confirm and ensure alarms are accurate and support safe pipeline operations. The procedure needs to be amended to provide a process for identifying, documenting, correcting, and reviewing safety-related alarm operations to ensure alarms are accurate and support safe pipeline operations.

Spire Response: The attached CRM Plan has been updated to address this item.

14. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (e) Alarm management. Each operator using a SCADA system must have a written alarm management plan to provide for effective controller response to alarms. An operator's plan must include provisions to: (2) Identify at least once each calendar month points affecting safety that have been taken off scan in the SCADA host, have had alarms inhibited, generated false alarms, or that have had forced or manual values for period of time exceeding that required for associated maintenance or operating activities;

Spire's CRM Plan was inadequate because it did not provide sufficient provisions for performing a thorough review, at least once each month of points taken off scan, alarms inhibited, placed in forced or manual and false alarms, as required by § 195.446(e)(2). Missing information was the date the point was taken off-scan, inhibited or forced or manual to determine how long the point has been altered from normal. False alarms were reviewed and addressed on an individual basis, but there was no procedure requirement for summary and

evaluation of points that may be recurring false alarms. There was also no procedure for identifying, reporting, or documenting false alarms.

Spire Response: The attached CRM Plan, Standard Operational Procedures and Form GC013 have been revised to address this item.

15. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (e) Alarm management. Each operator using a SCADA system must have a written alarm management plan to provide for effective controller response to alarms. An operator's plan must include provisions to: (3) Verify the correct safety-related alarm set-point values and alarm descriptions when associated field instruments are calibrated or changed and at least once each calendar year, but at intervals not to exceed 15 months;

Spire's CRM Plan was inadequate because it did not address the requirement to verify the correct alarm set point values and descriptions when field instruments are calibrated or change as required by section § 195.446 (e)(3). Section 7.4 of the CRM Plan only covered the requirement for annual review of safety related alarm set points and descriptions, but did not address the requirement when field instruments are calibrated or changed. The procedure must be amended to include the requirement to verify the correct alarm set point values and descriptions when field instruments are calibrated or changed, as well as once each calendar year not to exceed 15 months.

Spire Response: The attached CRM Plan has been revised to address this item.

16. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (e) Alarm management. Each operator using a SCADA system must have a written alarm management plan to provide for effective controller response to alarms. A 13 operator's plan must include provisions to: (4) Review the alarm management plan required by this paragraph at least once each calendar year, but at intervals not exceeding 15 months, to determine the effectiveness of the plan;

Spire's CRM Plan to review the alarm management plan to determine effectiveness, as required by § 195.446(e)(4), was inadequate. The procedure in section 7.5 was very high level and described forming a committee to incorporate historical and current operating issues and incidents or near misses that could be addressed by adjusting the plan. The plan established two metrics: average alarms per hour – 6 or fewer, and maximum alarms per 10-minute period – 5 or fewer. It states: "These guidelines allow controllers to respond to appropriate events." The plan also stated it would review historical and current operating issues and incidents or near misses that could be addressed by adjusting the plan. What the operator would glean from this information and how it would be used to determine effectiveness of the Alarm Management Plan was not stated. The operator did not define the criteria for determining effectiveness of the Alarm Management Plan. Therefore, the procedure needs to be amended.

Spire Response: The attached CRM Plan has been revised to address this item.

17. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (e) Alarm management. Each operator using a SCADA system must have a written alarm management plan to provide for effective controller response to alarms. An operator's plan must include provisions to: (5) Monitor the content and volume of general activity being directed to and required of each controller at least once each calendar year, but at intervals not exceeding 15 months, that will assure controllers have sufficient time to analyze and react to incoming alarms...

Spire's CRM Plan was not adequate because it did not provide the content and volume of general activities tasked to the controller to assure controllers have sufficient time to analyze and react to incoming alarms, as required by § 195.446(e)(5). The procedure did not provide a criterion to define sufficient time nor the process to collectively evaluate the activities identified. The procedure needs to be amended to identify the content and volume of general activities tasked to the controller, the shift periods that will be evaluated, process used to evaluate the activities, and the criteria used to assure the controller has sufficient time to analyze and react to incoming alarms.

Spire Response: The attached CRM Plan and Standard Operational Procedures have been revised to address this item.

18. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (f) Change management. Each operator must assure that changes that could affect control room operations are coordinated with the control room personnel by performing each of the following: (1) Implement section 7 of API RP 1168 (incorporated by reference, see § 195.3) for control room management change and require coordination between control room representatives, operator's management, and associated field personnel when planning and implementing physical changes to pipeline equipment or configuration...

Spire's CRM Plan was inadequate because it did not meet the requirement for §195.446(f)(1) and section 7 of API RP 1168 when implementing physical changes to pipeline equipment or configuration that affect control room operations. SOP 2 stated: "[A]ll point-to-points should be completed on the same day as implementation." The operator did not have a development node to design screens and add/modify points; they were designed and developed on a live production SCADA node. When a screen was designed and saved, it became immediately available to a controller even before a point to-point was completed. API 1168 Section 7.3 requires: "Before implementing changes that affect pipeline control room operations, notification and/or training should be provided to ensure the ability to implement the change." Sections 8.3 and 8.4 of the CRM Plan required communication of the SCADA changes to the controller utilizing Form GC001. While SOP 2 stated point-to-points should be completed on the same day as implementation, there were no requirements for training to be completed before implementation or before a controller comes on shift after implementation. There were also no safeguards on the SCADA screen(s) that indicate the points have had a point-to-point verification, even though it is fully available to the controller. The procedure needs to be amended to define the timing of training when implementing physical changes to pipeline equipment or configuration that affect control room operations. Also, because design and development is on a live system and immediately available to controllers, the procedure needs to include a safeguard to alert controllers that the screen(s) and point(s) have not been fully implemented and do not support safe operations of the pipeline.

Spire Response: The attached CRM Plan has been revised to address this item.

19. (a) General. This section applies to each operator of a pipeline facility with a 15 controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (f) Change management. Each operator must assure that changes that could affect control room operations are coordinated with the control room personnel by performing each of the following: (2) Require its field personnel to contact the control room when emergency conditions exist and when making field changes that affect control room operations.

Spire's Operating Procedures were inadequate because they do not require SCADA and field personnel to contact the control room when making field changes that affect control room operations per § 195.446(f)(2). Therefore, the procedures need to be amended.

Spire Response: The attached CRM Plan has been revised to address this item.

20. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (h) Training. Each operator must establish a controller training program and review the training program content to identify potential improvements at least once each calendar year, but at intervals not to exceed 15 months...

Spire's CRM Plan did not include an adequate process to review the training program content as required per § 195.446(h). It did not address the training content to be reviewed, who will perform the review, how content will be evaluated, and how findings will be documented and records maintained. The procedure needs to be amended to provide details for an adequate review of the training program content.

Spire Response: The attached CRM Plan has been revised and the new training program has been created to address this item.

21. (a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (h) Training. Each operator must establish a controller training program and review the training program content to identify potential improvements at least once each calendar year, but at intervals not to exceed 15 months. An operator's program must provide for training each controller to carry out the roles and 16 responsibilities defined by the operator. In addition, the training program must include the following elements: (1) Responding to abnormal operating conditions likely to occur simultaneously or in sequence;

Spire's CRM Plan was inadequate because it did not require training elements related to training controllers to respond to abnormal operating conditions likely to occur simultaneously or in sequence, as required in § 195.446(h)(1). The operator included the training requirement in their New Controller Training Checklist, but did not include it in the procedure training content list. It also did not identify a list of those likely to occur conditions to be used in the training. Therefore, the procedure needs to be amended.

Spire Response: The attached CRM Plan and Standard Operational Procedures have been revised to address this item.

22. a) General. This section applies to each operator of a pipeline facility with a controller working in a control room who monitors and controls all or part of a pipeline facility through a SCADA system. Each operator must have and follow written control room management procedures that implement the requirements of this section. The procedures required by this section must be integrated, as appropriate, with the operator's written procedures required by § 195.402... (h) Training. Each operator must establish a controller training program and review the training program content to identify potential improvements at least once each calendar year, but at intervals not to exceed 15 months. An operator's program must provide for training each controller to carry out the roles and responsibilities defined by the operator. In addition, the training program must include the following elements: (6) Control room team training and exercises that include both controllers and other individuals, defined by the operator, who would reasonably be expected to operationally collaborate with controllers (control room personnel) during normal, abnormal or emergency situations...

Spire's procedure was inadequate because it did not include, in Team Training, the requirement to train in all operational modes (normal, abnormal and emergency) as required in § 195.446(h)(6). It also did not provide topics to be covered in Team Training.; for example: changing roles when an event shifts between the different modes, how to manage with different behavior and communication styles (soft skills). The procedure must be amended to include the required items and modes for the Team Training.

Spire Response: The attached CRM Plan has been revised to address this item.