entergy

Matthew T. Brown
Associate General Counsel
Entergy Services, LLC
504-576-4645 | mbrow12@entergy.com
639 Loyola Avenue, New Orleans, LA 70113

cc: KB

August 1, 2025

VIA FAX (225) 342-0877 & UPS DELIVERY

Ms. Krys (Kris) Abel
Business Technology Supervisor
Louisiana Public Service Commission
Records and Recording Division
Galvez Building, 12th Floor
602 North Fifth Street
Baton Rouge, Louisiana 70802

RECEIVED BY FAX
AUG 01 2025
LOUISIANA PUBLIC SERVICE COMMISSION

Re: Louisiana Public Service Commission, *Ex Parte. In Re*: After-Action Review of Cleco Power and Entergy Louisiana's May 25, 2025 Outages, Pursuant to General Order Dated April 13, 2017 (Docket No. R-32786). LPSC Docket No. X-37608

Dear Ms. Abel:

I have enclosed an original and three copies of Entergy Louisiana, LLC's ("ELL" or the "Company") May 2025 Load Shed After Action Report, in connection with the referenced matter. Please file this in the record in accordance with the Commission's fax filing procedures and return a date-stamped copy to me in the enclosed, self-addressed envelope. I have enclosed a check in the amount of $25.00 to cover the fax filing fee.

If you have any questions, please do not hesitate to call me. Thank you for your courtesy and assistance with this matter.

Sincerely,

Matthew T. Brown

MTB/lp
Enclosures
cc: Official Service List X-37608 (*via electronic mail*)

entergy

May 2025 Load Shed

After Action Report

August 2025

Our values
safety
teamwork
always learning
integrity
respect

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LOUISIANA PUBLIC SERVICE COMMISSION

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Preface

Entergy[1] conducted a post-event review of the May 25, 2025, Interconnection Reliability Operating Limit (IROL) load shed mitigation planning and response actions. The purpose of this review was to determine areas of strength and areas in which improvements can be made in the planning and execution of Entergy's response to an IROL event.

The areas described as needing improvement are intended to assist Entergy in promoting continuous improvement generally, with specific reference to emergency operations or severe weather events. The areas for improvement are based on best practices. Consistent with its role as an essential service provider, Entergy maintains high standards of performance for operational events, and this report does not attempt to set forth an exhaustive list of the activities and practices that were performed well during the events at issue. Rather, the strengths identified in this Report focus on the actions various employees took under difficult conditions to ensure the reliability of the Bulk Electric System (BES), i.e., to avoid further load sheds or cascading outages.

This Report focuses on the actions and processes of Entergy New Orleans, LLC (ENO) and Entergy Louisiana, LLC (ELL), as their customers were the ones affected by the May 25 load shed event. The Report also focuses on Entergy Services, LLC (ESL), as it implemented the Midcontinent Independent System Operator, Inc.'s (MISO) load shed direction and worked with MISO before and during the load shed event. However, improvements to ESL procedures also will inure to the benefit of the other Entergy Operating Companies and their customers.

[1] The term "Entergy" is used in this Preface to collectively refer to Entergy Services, LLC and all the Entergy Operating Companies, which are separate and distinct affiliate entities.

Introduction

The May 25 load shed event was the second IROL load shed event on an Entergy Operating Company's system since joining MISO. The other occurred on April 24, 2014. Notwithstanding the fact that these are extremely rare events, and even with the significant challenges discussed below that ESL's Transmission Control Center (TCC) and other ELL, ENO, and ESL employees faced, the TCC and other employees acted reasonably and appropriately to ensure the reliability of the BES. This includes the TCC's attempt to alleviate the IROL conditions within 30 minutes. In fact, given our understanding of current rules and standards (which as discussed below the North American Electric Reliability Corporation (NERC) and the six Regional Entities have indicated would benefit from additional guidance), if faced today with the same circumstances as they faced when ESL received MISO's directive to shed load on May 25, ESL, ELL, and ENO would execute the same steps with the same urgency. Nonetheless, there are a number of learning opportunities that should help improve future performance even further.

Unlike the MISO South wide load shed event during Winter Storm Uri in February 2021, the May 25 load shed event was a localized event on the transmission system. The May 25 "Temporary IROL" (which is described further below) resulted from several factors, including planned generator outages across multiple utilities, unplanned generator outages across multiple utilities, and damage to structures of the Nelson-Richard 500kV transmission line that arose from a March 2025 extreme weather event. Forecast errors did not contribute to the May 25 load shed event, and temperatures, although hot for late May, did not contribute significantly. Indeed, the temperatures that day were reasonably consistent with the temperatures that had been forecast in the days leading up to May 25. Finally, there were no trips of Entergy Operating Company generating assets or transmission assets on May 25 that affected the load shed event. As discussed further below, ELL's Washington Parish Energy Center Unit 2 sustained an unplanned outage in the early afternoon of May 25, and returned to service and reached full output about fifteen minutes after the load shed event began – but its outage did not contribute to the need to shed load.

As the Reliability Coordinator, MISO determines whether IROL or emergency conditions exist and directs the actions to take to eliminate those conditions. On May 22, MISO and ESL agreed on a reconfiguration proposed by ESL to address congestion that was expected to arise on the transmission system in southeast Louisiana. Leading up to the time MISO issued the Operating Instruction to shed load on May 25, ESL understood that the reconfiguration was an available option to address the congestion being observed in the area that day. However, shortly before MISO issued the load shed directive, MISO determined that the reconfiguration would not work to eliminate the IROL conditions that arose in MISO's real-time models. Due to the more limited scope of its models, as discussed below, ESL's models continued to show that the reconfiguration would work.

At the direction of MISO, ENO shed 209 MW of load and ELL shed 249 MW. ESL executed the load shed for ELL and ENO customers. Cleco Power LLC (Cleco) also shed load of its customers.

Several factors contributed to the inability to shed load on a granular feeder level basis utilizing ELL's and ENO's respective load shed procedures and tools as designed following Winter Storm

Uri. These factors also contributed to ESL's, ENO's, and ELL's inability to prepare internal and external stakeholders–including customers, regulators, and elected officials–for the load shed. First, in part due to the procedures used by MISO to study potential Temporary IROLs in real time, ESL had very limited time to comply with MISO's Operating Instruction to shed load. Second, the Operating Instruction MISO provided was vague. Historically, Operating Instructions include specific grid assets to include in a load shed, but MISO did not include that information in its May 25 load shed instruction. Third, as NERC and the six Regional Entities (including the SERC Reliability Corporation (SERC)) have observed in a report, the process, timeline, and other workflow requirements for an IROL are an area on which clearer guidance is needed. Fourth, MISO did not issue conservative operations or utilize the Energy Emergency Alert process prior to the directive to shed load on May 25.

The following are the areas where opportunities exist for improvement, as determined in the course of this post-event review.

- **Internal IROL Process and Training and Execution of Load Sheds** – opportunities to strengthen ENO's, ELL's, and ESL's load shed procedures to address IROL scenarios, internal notifications, and critical customer applications. Update and improve internal communications and processes for IROL load shed events.

- **Public Communications** – opportunities to improve timely notification to external stakeholders and opportunities to improve View Outage, Mobile App, and myEntergy.com. While maintaining the reliability of the BES always must be the first priority when IROL conditions arise, and acknowledging that advance notice to external stakeholders and to the public of load shed events may not always be feasible, such communications are important when load shed occurs or may occur.

- **MISO Process Integration** – opportunities to enhance the coordination with MISO for load sheds.

This Report is intended to address the conditions ELL, ENO, and ESL faced before and on May 25, how those conditions affected their performance, and how they responded to the conditions they faced. Each of the recommendations in this Report reflect areas where ELL, ENO, and ESL may be able to improve; they are not intended to address any improvements MISO may choose to undertake. ELL, ENO, and ESL will coordinate with MISO on the proposed recommendations.

The List of Recommendations Section of this Report includes a complete list of all recommendations. The Performance Analysis Section explains the analysis performed, and the reasons for those recommendations.

Timeline

The following sequence of events occurred related to the May 25 load shed. All dates are in 2025, and all times are Eastern Standard Time (which aligns with the Central Daylight Time that was in effect in south Louisiana at the time of the event).

- **March 24** - The Nelson – Richard 500kV line incurred damage to structures due to severe weather, and went into forced outage on March 24, 2025. The line was fully repaired and returned to service on May 27, 2025.
- **May 21** – River Bend nuclear plant shut down for an unplanned outage due to a leak in the reactor's cooling system.
- **May 22** – The TCC sent an e-mail to MISO addressing potential constraints in the Amite South area, along with reconfiguration options to alleviate those constraints. Based on studies performed by the Transmission Operations team, it suggested a mitigation plan to MISO that would reconfigure the system to redirect power flow through the region. MISO agreed with the proposed reconfiguration option.
- **May 25 3:03 am** – ESL discussed the proposed reconfiguration option with MISO, and MISO confirmed that the reconfiguration option was valid.
- **May 25 12:56 pm** – MISO stated on a call with the TCC that the reconfiguration "relieves the constraint entirely. At that point in time, we don't even have to shed load."
- **May 25 3:59 pm** – via phone call, MISO informed ESL Transmission Operators that MISO was declaring a Transmission System Emergency. MISO did not request any action at that time and did not indicate that the previously discussed reconfiguration proposal was not effective.
- **May 25 4:04 pm** – MISO requested ESL operational personnel to study and review the reconfiguration solution again to compare results in preparation for potential implementation.
- **May 25 4:20 pm** – By a phone call from MISO to the Transmission Operators at the TCC in Jackson, Mississippi, MISO issued a directive to ELL and ENO to "shed 500 MWs of load in the Slidell and New Orleans areas until further notice." MISO did not specify that the load shed was to respond to IROL-like conditions or to emergency conditions following an IROL study. The TCC's real-time models did not show the necessity for load shed with the reconfiguration option implemented.
- **May 25 4:25 pm** – The TCC called MISO and inquired about implementing the reconfiguration. For the first time, MISO stated that the reconfiguration plan would not work. It is now ESL's understanding that MISO's real-time models showed that the reconfiguration plan would not work due to concerns with voltage levels.
- **May 25 4:33 pm** – ESL began to shed load on behalf of ELL and ENO. Consistent with standard practices, the Distribution Operations Center (DOC) initially began the load shed process. The TCC relayed MISO's instruction verbatim to the DOC. Due to the lack of specificity in MISO's load shed instruction, ESL was not able to identify the specific load shed protocols to activate. The DOC stated they could not shed load in the Slidell area as it is under the control of Cleco. Accordingly, the ESL Transmission Operations team identified ELL and ENO load in the New Orleans area as the load to be shed in compliance with MISO's locational directive. The TCC instructed the DOC to continue with the Operating Instruction in the New Orleans area. The DOC stated that they did not have 500 MW in the load shed tool, but they would start shedding load.
- **May 25 4:39 pm** – 75 MW of load had been shed from the distribution system. Because the load shed at the distribution level was not resulting in enough load shed fast enough, the TCC instructed the DOC to discontinue shedding load at the distribution level. The TCC began opening circuit breakers to shed load at the transmission level.

- **May 25 4:53 pm** – MISO notified ESL that the line contingency fell below 125% post-contingent overload. Although MISO did not declare a Temporary IROL to ELL, ENO, or ESL on May 25, MISO since has specified that the May 25 load shed was a Temporary IROL event. It is Entergy's understanding that 4:53 pm would be the end of the classification as a Temporary IROL. Entergy does not know the time that the Temporary IROL started.
- **May 25 5:50 pm** – MISO began allowing the restoration of ELL and ENO load. MISO restoration instructions continued until 7:37 pm.
- **May 25 6:03 pm** – The TCC began restoring load on behalf of ELL and ENO. ESL, ELL, ENO, and Cleco worked cooperatively with MISO to open and close breakers at the transmission level to restore load.
- **May 25 6:18 pm** – The reconfiguration solution described above was implemented to assist with the restoration of load.
- **May 25 10:41 pm** – All ELL and ENO load was restored.
- **May 26 10:45 am** – MISO declared Conservative Operations for the MISO South region. The reconfiguration solution remained in place and helped ensure that load shed was not required on May 26.

Performance Analysis

Planned and Unplanned Outages

Planned Generator Outages

ELL and ENO generally schedule generation outages to take place between late January and late May in the spring and between early September and early December in the fall. These timing windows reflect periods when loads tend to be lower and weather conditions tend to be more moderate.

However, MISO recently implemented a seasonal capacity construct that has imposed new rules and considerations that Load Serving Entities (LSEs), including ELL and ENO, must manage in determining the timing of generation outages. For example, a resource that has cleared the MISO Planning Resource Auction and has a planned outage that exceeds 31 days in a single season will require replacement capacity for each day beyond 31 days or will be subject to a non-compliance penalty for each planned outage day beyond 31 days in a season. Considering the material cost effect on their respective customers of procuring replacement capacity or incurring a non-compliance penalty, ELL and ENO (and various other LSEs) have responded to this rule change by seeking to schedule planned generation outages such that they span two seasons. The need to bridge MISO seasons to mitigate cost effects on their customers has caused ELL and ENO to begin and end generation outages outside of the above-described windows more frequently.

The following ELL generation resources were on planned outages on May 25, 2025: Waterford 3, Ninemile 4, Perryville 1, and Perryville 2. In the case of Waterford 3, it was offline for a planned nuclear refueling and maintenance outage. The timing of the planned nuclear outage was to

ensure that this important unit is on the grid during the summer months, when there is extreme heat and loads are at peak levels. Nuclear units must be shut down periodically to safely remove and replace spent fuel. For Waterford 3, such refueling outages are required every 18 months. The other three units also were offline on scheduled maintenance outages to be ready for the summer season. The availability of Waterford 3 and Ninemile 4 could have helped prevent or reduce the scale of the load shed event.

All of ELL's planned outages were required to be submitted to and reviewed by MISO. MISO coordinates and assesses the effect of all generator outage schedules in its Reliability Coordinator area, and coordinates with the Generator Owners or Generator Operators to recommend a schedule that maintains system security and minimizes adverse effects on available transmission capacity levels. If a conflict is found between planned generation schedules, MISO will request re-scheduling if study results indicate a reasonable expectation of, among other things, (a) an Emergency, (b) an inability to maintain the transmission system within system operating limits using normal (non-emergency) operating procedures or to restore the transmission system to normal operating conditions following a single contingency with the use of normal (non-emergency) operating procedures, or (c) the potential for credible contingencies to significantly affect transmission system reliability of metropolitan areas. If the applicable parties do not agree to reschedule a planned generator outage, MISO will direct a rescheduling. *E.g.,* MISO Outage Operations Business Practice Manual, BPM-008-r23, Section 4.3 (Sept. 1, 2024). Here, MISO did not ask ELL to delay or otherwise reschedule the generation outages ahead of the load shed event.

Several non-Entergy generators in southeast and south-central Louisiana also were in planned outages on May 25.

Unplanned Generator Outages

ELL's River Bend nuclear plant was subject to an unplanned outage on May 21, the result of a leak in the reactor's cooling system. The leak was repaired and River Bend returned to service on May 26.

ELL's Little Gypsy 3 generation unit was on an unplanned outage on May 25. The outage began on April 1 and was due to turbine vibration issues.

Washington Parish Energy Center Unit 2 sustained an unplanned outage in the early afternoon of May 25. It returned to service and reached full output approximately fifteen minutes after the load shed event began. Due to this generation unit's location relative to the transmission constraint, its outage did not contribute to the need to shed load.

Several non-Entergy generators in southeast and south-central Louisiana also were in unplanned outages on May 25.

Transmission Outages

The Nelson – Richard 500kV transmission line was on forced outage on May 25. This forced outage was a continuing result of damage to structures from a severe weather event in March 2025. The forced outage adversely affected the ability to import power into the Amite South load pocket and the greater southeast Louisiana area. The line was fully repaired and returned to service on May 27, 2025.

It is ESL's understanding that no other planned or unplanned transmission outages contributed to the load shed event.

IROLs

An IROL is defined in the NERC Glossary of Terms as a "System Operating Limit [('SOL')] that, if violated, could lead to instability, uncontrolled separation, or Cascading outages that adversely impact the reliability of the Bulk Electric System." SOLs are defined as "[a]ll Facility Ratings, System Voltage Limits, and stability limits, applicable to specified System configurations, used in Bulk Electric System operations for monitoring and assessing pre- and post Contingency operating states."

IROLs are used in the operations horizon as operating limits in combination with outage coordination and other operating plans to ensure bulk power system reliability. Each IROL has a mitigation time (referred to as an "IROL Tv," or time to violation), which is the maximum time an IROL can be violated before risk to the interconnection or other Reliability Coordinator areas becomes greater than acceptable. This maximum time limit is usually 30 minutes, but the Reliability Coordinator can reduce that time if it determines circumstances warrant such a reduction.

As the Reliability Coordinator for the Entergy Operating Companies, MISO establishes any IROLs that apply to the Operating Companies' systems. The Reliability Coordinator has the highest level of authority for reliable operation of the BES. Per NERC standards, Operating Instructions given by the Reliability Coordinator must be followed for the real-time operation of the BES.

Reliability Coordinators generally establish IROLs in advance of real-time operations. *E.g.*, FAC-014, Requirement R1. NERC Reliability Standards require Reliability Coordinators to determine these IROLs based on established methodologies. The standards also require Reliability Coordinators to communicate the IROLs to affected parties, including affected Transmission Operators (TOP) such as ESL, ELL, and ENO, so those parties can prepare to address IROL conditions. For example, under FAC-014-3, Requirement R5.3, a Reliability Coordinator must provide each affected TOP within its Reliability Coordinator area the value of each IROL established by the Reliability Coordinator in an agreed upon time frame necessary for the TOP to include the IROL in its operations planning, real-time monitoring, and real-time assessments. Reliability Coordinators also must analyze planned operations and develop next-day operating plans to address potential SOL and IROL exceedances, and to inform affected entities, such as the TOP, of their role in such plans. *E.g.*, IRO-008-3, Requirements R2-R3.

The triggers and methodologies for IROLs vary greatly among Reliability Coordinators, as documented in the July 2024 ERO Enterprise Joint IROL Activity Report prepared by NERC and the six Regional Entities (NERC IROL Report). MISO, like other Reliability Coordinators, has performed the IROL analyses and determined the IROLs in its Reliability Coordinator area. MISO's IROLs are at flowgates identified in the protected MISO Procedure SO-RA-NOP-01. For such pre-defined IROL's, the applicable TOP can pre-develop a mitigation plan it can use to resolve the IROL conditions within the time required.

There are no pre-defined IROLs on the Entergy Operating Companies' transmission systems. In their normal configuration, the Operating Companies' systems do not require them.

Unlike other Reliability Coordinators, pursuant to MISO procedure SO-P-EOP-00, MISO has a practice of designating "Temporary IROLs" in real-time when a real-time contingency analysis indicates a post contingent loading in excess of 125% of emergency thermal ratings. "Temporary IROL" is not a NERC-defined term. It instead is a MISO-specific practice. *E.g.*, NERC IROL Report at 3 ("None of the Reliability Coordinators establish IROLs in real time, except for one Reliability Coordinator [*i.e.*, MISO] that establishes what it calls a 'temporary IROL.'"). Under this practice, when MISO's models show an exceedance of 125% of an emergency rating, MISO attempts to complete a study within 15 minutes to assess whether a contingency will result in instability, uncontrolled separation, or cascading outages. MISO calls a Temporary IROL if the study results in cascading for the next N-1 contingency resulting in the loss of more than 1,000 MW of load. If MISO cannot complete the study within 15 minutes, it declares an emergency and the incident is treated like an IROL exceedance. If the study indicates no risk of instability, uncontrolled separation, or cascading outages, then MISO treats the condition as an SOL exceedance.

For a Temporary IROL, the TOP does not have the opportunity to develop a pre-defined plan to address the IROL, e.g., it is not able to include the IROL in its operations planning, real-time monitoring, or real-time assessments. The same is true for an emergency that is declared when MISO cannot complete the IROL study within 15 minutes.

The NERC IROL Report states that "more guidance is needed around IROL-like conditions" such as Temporary IROLs. *Id.* at 26; *see also id.* at 3 ("recommendations focus on the need for more guidance around IROL-like conditions"). Among other things, the report recommends that the applicable Electric Reliability Organization consider "addressing operational expectations during IROL-like conditions either through outreach and guidance documents or through modifications to the Reliability Standards." *Id.* at 26. The NERC IROL Report also observes that there is a lack of clarity and consistency among Reliability Coordinators about what an IROL is, when it needs to be established, what it means to exceed one and, critically, how TOPs should respond. *Id.* at 35 (noting that SOL requirements provide "consistent and clear meaning for Transmission Operators," but that "[t]he same cannot be said about the IROL 'workflow' requirements.").

Despite the lack of clarity in responding to such conditions, when planned generation or transmission outages create potential Temporary IROL conditions, ESL's Operations Readiness

team follows a procedure to verify the IROL, develop a mitigation plan for the IROL, and have the planned outage risk approved.

Analysis

On May 25, MISO declared a Transmission System Emergency that, as ELL, ENO, and ESL learned later, was deemed to be a Temporary IROL. As noted above, an IROL has a mitigation time (IROL Tv), which usually is 30 minutes. Here, the total mitigation time exceeded 30 minutes.

Two NERC Reliability Standards are of particular relevance related to the failure to clear the Temporary IROL condition within 30 minutes: IRO-009 and TOP-001. IRO-009, Requirement R3, states that "[e]ach Reliability Coordinator shall act or direct others to act so that the magnitude and duration of an IROL exceedance is mitigated within the IROL Tv, as identified in the Reliability Coordinator's Real-time monitoring or Real-time Assessment." TOP-001, Requirement R12, states that "[e]ach Transmission Operator shall not operate outside any identified Interconnection Reliability Operating Limit (IROL) for a continuous duration exceeding its associated IROL Tv."

IRO-009 applies to Reliability Coordinators, i.e., to MISO. It does not apply to ELL, ENO, or ESL, which are not Reliability Coordinators. On the other hand, ELL, ENO, and ESL are TOPs, and thus TOP-001 applies to them.

Entergy does not believe that a temporary IROL is an "identified IROL" under TOP-001, to which an IROL Tv would apply for TOP compliance purposes. It would be impractical from a compliance standpoint to expect a TOP to meet a 30-minute compliance obligation under the MISO-specific framework when MISO declares IROL conditions in real-time, i.e., when it declares a Temporary IROL. As discussed above, and as Entergy understands in fact occurred here, MISO can use 15 minutes performing an IROL study after its models show an exceedance of 125% of an emergency rating. This leaves extremely limited time to implement any load shed that MISO may direct to address the Temporary IROL. On top of that, for a Temporary IROL the TOP is not able to include the IROL in its operations planning, real-time monitoring, or real-time assessments. In other words, unlike for an IROL, for a Temporary IROL the TOP will not have a pre-defined plan it can implement.

Applying a Tv to ELL, ENO, or ESL is particularly unreasonable when, as here, (a) MISO did not clearly indicate that it was implementing the Temporary IROL process, giving ESL no starting point for when any Tv clock started and (b) MISO did not specify grid assets to include in the load shed. MISO instead directed ELL and ENO to "shed 500 MWs of load in the Slidell and New Orleans areas until further notice." As a result, before beginning to shed load, the TCC needed to determine the load to shed and how best to do so. The TCC's criteria for doing so are discussed below.

There thus is no basis to conclude that ESL, ELL, or ENO violated NERC Standards IRO-009 or TOP-001. Nor has Entergy identified any other violations of NERC standards.

That being said, as the NERC IROL Report states, "more guidance is needed around" Temporary IROLs. NERC IROL Report at 26. Among other things, the report recommends that the applicable

Electric Reliability Organization consider "addressing operational expectations during IROL-like conditions either through outreach and guidance documents or through modifications to the Reliability Standards." *Id.* In short, the application of NERC's standards to Temporary IROLs is not clear, which can lead to considerable confusion. In light of these facts,

- To provide greater clarity around Temporary IROLs, ELL, ENO, and ESL will pursue the guidance suggested in the NERC IROL Report.
- Until such time as more clarity is provided around Temporary IROLs and NERC standards, if it again is faced with a Temporary IROL, ESL will use reasonable efforts to address the IROL conditions within 30 minutes of the time the condition arose, if known, or such other time specified by MISO.

It is important to note that, even in the absence of a Tv for a Temporary IROL, there are time limitations for a TOP to take action. Under NERC standard TOP-001, Requirement R1, "[e]ach Transmission Operator shall act to maintain the reliability of its Transmission Operator Area via its own actions or by issuing Operating Instructions." So, NERC standards require a TOP to implement load sheds in a timeframe required to maintain reliability. IRO-001-4, Requirement R2, also requires each TOP (and the applicable Distribution Provider) to comply with the Reliability Coordinator's Operating Instructions unless such compliance cannot be physically implemented or unless such actions would violate safety, equipment, regulatory, or statutory requirements. Similarly, TOP-001, Requirement R5 requires a TOP to "comply with each Operating Instruction issued by its Balancing Authority, unless such action cannot be physically implemented or it would violate safety, equipment, regulatory, or statutory requirements." MISO is the Balancing Authority for ELL, ENO, and ESL. Thus, if MISO specifies a time requirement for a TOP to shed load, that requirement must be met, unless the action cannot be physically implemented or it would violate safety, equipment, regulatory, or statutory requirements. Finally, as discussed below, ESL's own procedure states that it must take action "as soon as possible" and "immediately" to address IROL conditions and directions to shed load. ELL, ENO, and ESL will continue to satisfy these requirements.

When MISO declares a Temporary IROL, it would be beneficial for MISO to (a) include a clear statement that it has declared a Temporary IROL, or that the IROL study described above could not be completed in 15 minutes, (b) specify the time for implementation of any instruction it provides, and (c) as discussed below, if load shed is directed to resolve the Temporary IROL, identify a list of specific substations that the TOP can choose from to shed load, and load shift factors for those substations or, at a minimum, clearly defined electrical boundaries in which the load shed must occur. Because ESL's real-time models do not include the scope that MISO's real-time models include, MISO is in the best position to identify the substations and load shift factors, or defined electrical boundaries, based on the topology in MISO's system models.

With that information, the DOC can then use its expertise and knowledge of the Entergy Operating Companies' systems to use the rotation load shed tool or manual selection to identify the specific breakers that can best be used to implement the load shed directive. Moreover, the information described above would provide clarity to any entity that is required to implement a load shed instruction, and would allow ELL, ENO, and ESL to weigh all considerations, such as the severity of the system/regional constraints, availability of curtailable customers, ability to use existing load

shed procedures, and ability to provide advance notices (discussed further below). To help drive improvement, ELL, ENO, and ESL will discuss this recommendation with MISO.

Execution of Load Shed

Load Shed Implementation

Prior to Uri, ELL, ENO, and ESL developed load shed plans for known load pockets and planned outages that create load at risk. After Uri, they refined the plans for load pockets to create better separation between the load pockets. Teams also worked to (a) realign the DOC load shed grouping and operational menus to match load pockets and Entergy Operating Companies' areas, (b) update the Transmission Operations Planning map and load pockets, and (c) develop a generation management system load shed tool for use by the real time analysis (RTA) operators.

Each year, ELL, ENO, and ESL classify each distribution feeder into predefined criteria that focus on the criticality of customers to overall public safety. These classifications are used to determine the order customer load will be shed, with critical customers shed last. Load shed (as to any firm load customer of any level of criticality) is always the last mitigation option to address a system issue. If load shed is required, standard practice is for the DOC to implement the load shed, so that the criticality classifications can be used by the rotation load shed tool or by manual selection by the operator when the tool cannot be utilized.

ELL and ENO have customers with interruptible rate contracts that allow for curtailment with specified notice requirements. When there is enough notice to act, the TOP notifies the Entergy Business Center (EBC) of the need to shed load in an area and the EBC directs the interruptible customers to reduce their load. After that, the DOC uses the rotation load shed tool within its Supervisory Control and Data Acquisitions systems to shed load based on criticality and to rotate the customers affected, or sheds load by manual selection.

ELL, ENO, and ESL practice the policies and procedures relating to load shed during end-to-end load shed drills conducted twice each year. The spring drill focuses on local load shed events that could occur as a result of storm damage, and the fall drill focuses on scenarios related to winter weather. The end-to-end load shed drills are designed to exercise all aspects of a response to a situation requiring load shed, including Control Center Operator actions, coordination with MISO, and communications with customers and other stakeholders.

ESL's Operating Procedure for Execution of Load Shed

Section 4 of ESL's Transmission Control Center Operating Procedure RCC-TCC-017 Rev. 00 provides as follows:

- "Following a Contingency or other event that results in an IROL violation, the TOP shall take action to return the transmission system to within IROL limits as soon as possible, and within associated IROL Tv (time to violation)."

- "The TOP shall immediately take all appropriate actions up to and including shedding firm load, or directing the shedding of firm load, in order to mitigate a violation defined in the 'SOL and IROL Violations' section of this procedure."
- "The TOP shall notify the [Reliability Coordinator] of the situation and actions taken to address an IROL or SOL violation."

Analysis

Before it issued the load shed directive, MISO declared a Transmission System Emergency. Also before it issued the directive, MISO stated that it was going to perform an IROL study. Thus, even though MISO did not notify the TCC of an IROL at the time MISO issued the load shed directive, based on the information available to them, the ESL Transmission Operations team reasonably understood that they were facing IROL conditions (a conclusion that later was confirmed by MISO to be accurate). The Operations team therefore implemented Operating Procedure RCC-TCC-017. The team understood that the Operating Procedure required them to take action to attempt to resolve the IROL condition within 30 minutes of the time they received notice to shed load.

As discussed above, Entergy does not believe that an IROL Tv applied to ELL, ENO, or ESL under the facts of May 25. However, as also discussed above, there is considerable confusion around the requirements of Temporary IROLs and the application of NERC standards to them. Given this lack of clarity, Entergy believes that the Operations team correctly attempted to resolve the IROL condition within 30 minutes.

Entergy also believes that ESL, ELL, and ENO complied with the requirements of the Transmission Control Center Operating Procedure. With regard to the first requirement quoted above – "[f]ollowing a Contingency or other event that results in an IROL violation, the TOP shall take action to return the transmission system to within IROL limits as soon as possible, and within associated IROL Tv (time to violation)" – it took 33 minutes from the time the TCC received MISO's notice to shed load to the time the IROL condition was resolved. However, a temporary IROL is not an "identified IROL" to which an IROL Tv applies for TOP compliance purposes.

Moreover, due to the limited notice and the vague Operating Instruction provided by MISO, ESL was not able to utilize its standard load shed procedures and tools. In particular, the lack of specificity in MISO's load shed instruction, directing ELL and ENO to shed load "in the Slidell and New Orleans areas," rather than identifying specific grid assets to include in the load shed, meant that ESL was not able to identify the specific load shed protocols to activate. Once it became clear that load needed to be shed at the transmission level, ESL Transmission Operators needed to identify locations within the greater New Orleans area that they knew would provide relief efficiently. The locations they selected were based on three criteria: (a) obtaining the maximum relief on the constrained transmission line, (b) selecting transmission breakers to open based upon the MW that could be shed on each line in order to accomplish the required result, and (c) avoiding load shed in areas that would make the problem worse. The TCC team concentrated on identifying transmission loops that could be opened without further degrading the reliability of the BES, affecting key tie-lines, or limiting generation output. The team used engineering expertise and judgment to curtail the least amount of load possible while complying with MISO's directive. Making those determinations and shedding load within 30 minutes would be extremely difficult, but they exceeded that time by only 3 minutes from their notice. The facts here differ sharply from a pre-

defined IROL, where a TOP can pre-develop a mitigation plan it can use to resolve the IROL conditions within the time required, i.e., within the applicable Tv.

With regard to the second requirement – "[t]he TOP shall immediately take all appropriate actions up to and including shedding firm load, or directing the shedding of firm load, in order to mitigate a violation defined in the 'SOL and IROL Violations' section of this procedure" – ESL took action to return the transmission system to within IROL limits as soon as possible, and the TCC and DOC immediately took all appropriate actions. Specifically, at 4:20 pm, MISO issued the directive to ELL and ENO to "shed 500 MWs of load in the Slidell and New Orleans areas until further notice." After calling MISO to discuss the reconfiguration option, ESL began to shed load at 4:33 pm. So that the criticality classifications can be used, it is standard operating procedure to start load sheds at the distribution level. The DOC thus started the load shed. At 4:39 pm the TCC learned that the DOC had shed 75 MW of load. Because the load shed at the distribution level was not resulting in enough load shed fast enough, the TCC instructed the DOC to stop shedding load. The TCC Shift Supervisor and RTA Operator took aggressive action to develop and execute the larger load-shed effort within the parameters discussed in the immediately preceding paragraph. At 4:53 pm, MISO notified ESL that the line contingency fell below 125% post-contingent overload, ending the classification as a Temporary IROL.

With regard to Operating Procedure RCC-TCC-017's requirement that the TOP notify the Reliability Coordinator of the situation and actions taken to address an IROL or SOL violation, the Transmission Operations team notified MISO on May 22 of potential constraints in southeast Louisiana. Based on studies the Transmission Operations team performed, it suggested a mitigation plan to MISO that would reconfigure the system to redirect power flow through the region. Prior to and up to the load shed event, the Transmission Operations team's studies indicated that this reconfiguration would alleviate the potential post-contingent overloads observed on May 25. It was not until 4:25 pm on May 25 that ESL learned that MISO's models showed the reconfiguration plan would not work. Throughout the day on May 25, ESL coordinated with the Reliability Coordinator (MISO), including through the load shed and restoration of load.

While there were no violations of NERC standards by ESL, ELL, or ENO, and they complied with applicable internal procedures, there are opportunities to improve existing load shed procedures to provide additional clarity for IROL events. A number of factors adversely affected ESL's performance during the load shed event.

- Performance was affected by vague Operating Instructions from MISO. MISO historically has provided specific Operating Instructions for load sheds. Here, however, MISO did not do so. MISO instead issued a directive to ELL and ENO to "shed 500 MWs of load in the Slidell and New Orleans areas until further notice."
- NERC procedures require the TCC to forward MISO's load shed order to the DOC verbatim. The DOC is required to act upon that order as directed by MISO. Uncertainty around ESL's ability to question a vague Operating Instruction from the Reliability Coordinator led to vague Operating Instructions being further communicated to the DOC, without further guidance.
- A lack of a formal internal communication plan specific to IROL and dynamic events hampered performance.
- The fact that internal procedures assume DOC execution of load shed affected performance.

To address these shortcomings, the following actions will be undertaken to drive improvements:

- Update existing procedures to address how to execute load sheds when non-specific Operating Instructions are given, and provide additional training for those scenarios.
- Obtain clarity from SERC regarding the ability to question a vague Operating Instruction and to advise the DOC on how to implement an Operating Instruction. Entergy believes that, while NERC Standard IRO-001-4, Requirement R2 requires TOPs to comply with Reliability Coordinator Operating Instructions unless compliance with those instructions "cannot be physically implemented or unless such actions would violate safety, equipment, regulatory, or statutory requirements," nothing in the standard prevents ESL from asking for more detail in real-time or questioning the directive. The NERC Project 2014-03 Standard Drafting Team explained that "there is nothing in the requirements that says that the responsible entity cannot question the instruction after verifying through three-part communications." Moreover, the standards do not prevent the TOP from advising distribution entities in their territory on how to implement an Operating Instruction. Nonetheless, additional guidance from SERC regarding the extent to which ESL can question a vague Operating Instruction or the TCC can advise the DOC on implementing an Operating Instruction will ensure continued compliance with NERC standards in the future.
- Align the TCC load shed internal communication procedure to the process utilized by the DOC.
- Create proactive internal communication triggers for IROL and dynamic events.
- Work with MISO to help ensure that, whenever possible, load shed directives identify a list of specific substations from which the TOP can choose to shed load, and load shift factors for those substations, or, at a minimum, clearly defined electrical boundaries in which the load shed must occur.

Moreover, ELL, ENO, and ESL will develop protocols to call on interruptible customers when tight conditions are forecast. Some interruptible customers have longer lead time notices, and those will be factored into the protocol.

Public Communications

ELL and ENO have plans entitled "Power Shortfall Communications Plan" (Updated February 13, 2025). These plans define external customer communication procedures for a power shortfall event. They address two specific scenarios: (a) a MISO directed system-wide shortfall (or energy emergency), which addresses a circumstance where there is a regionwide shortage of generating capacity, and (b) a local load at risk event, where transmission limitations or other circumstances limit the ability to serve load in a specific area within the region.

With respect to external communications, ELL's and ENO's primary objective in any load shed event is to provide timely, accurate, and consistent information to customers and key stakeholders, along with informing public expectations about electric service restoration. However, although they issued extensive public notifications after the safety of the electric grid was secured, due to the specific nature of the May 25 event, ELL and ENO were not able to use their existing communication plans before the load shed. Prior to the event, ESL understood that the

reconfiguration plan it had discussed with MISO would be sufficient to ensure that load would not need to be shed. Moreover, MISO provided extremely limited advance notice of the need to shed load. MISO did not issue a conservative operations warning prior to the load shed and did not use the EEA process. That process is a system of alerts used by grid operators, including MISO, to signal that the electric grid is facing a serious threat to its reliability. EEAs are issued to prompt steps to maintain grid reliability when available supply and operating reserves are in danger of not meeting demand.

Analysis

Maintaining the reliability of the BES always must be the first priority when IROL conditions arise. Failure to prioritize operational demands or delaying execution of operational steps to allow time to initiate external communications could lead to cascading outages and widespread blackouts. However, public communications are important when load sheds occur or may occur.

Current response plan procedures do not adequately and clearly address the unique facts presented on May 25. As a result of these inadequacies, there were delays in notifying and mobilizing key teams responsible for executing customer outreach and response. The shortcomings are evidenced by the fact that ELL and ENO received communications and concerns from external stakeholders before critical internal teams were aware of the events.

Issues with public communications arose for the following reasons:

- The TCC had to focus fully on executing MISO's load shed order, rather than performing internal notifications. The TCC needed to take immediate and rapid action to ensure the reliability of the BES.
- The TCC currently does not trigger external stakeholder communications. Instead, stakeholder communications depend on a MISO trigger.
- Key customer systems, including View Outage, Mobile App, and myEntergy.com, experienced degradation due to customer traffic associated with the outages immediately following the start of the load shed event. Unlike past scenarios, which involved scenarios that developed more slowly over time, the facts here involved sudden load sheds and sudden attempts by large numbers of customers to seek information.

To improve communications, ELL and ENO will modify their communications plans to address circumstances in which they face limited notice (or potentially no notice) of a load shed event. The following actions have been identified to drive improvements:

- Eliminate MISO notification dependence by establishing an alternate ESL/Entergy Operating Company-specific internal communication trigger from the TCC capable of serving as a predictor for dynamic events.
- Evaluate and establish an internal notification process to critical internal teams.
- Establish an expectation that Corporate Communications, External Affairs, and the Integrated Customer Organization activate upon receipt of notifications and implement their respective emergency response plans.
- Modify existing plans, procedures, and messaging templates to include the IROL scenario related to customer communications, external stakeholder communications, and customer operations.

- Provide training on response procedures, expectations during an event, and updated process flow.
- Conduct drills on procedures.
- Ensure process modifications have full alignment with any improvements or modifications MISO implements to its notification process following its after-action review of the May 25 load shed event.
- Review and enhance load shed messaging to address IROL and dynamic event scenarios.
- Improve the capability of key customer systems to handle high capacity, short time-frame scenarios.

System Models and Coordination

ESL has procedures that determine when to perform an IROL study. Prior to May 25, ESL's models showed that congestion on the system was to be expected on that day, but the models did not show that the conditions for an IROL study would be met. ESL developed a reconfiguration option to address the congestion should it arise and presented that option to MISO on May 22. MISO agreed with the reconfiguration option and continued to agree with the option as late as the afternoon of May 25. The discussions of the reconfiguration plan were done through informal coordination.

Like ESL, MISO has procedures that determine when to perform an IROL study. MISO must perform such a study if a flowgate is showing an overload in excess of 125% of its emergency thermal ratings. On May 25, MISO's models began to show conditions that required the performance of an IROL study. Under MISO's process, it calls a Temporary IROL if the study results in cascading for the next N-1 contingency resulting in the loss of more than 1,000 MW of load. Because MISO's study process led to a solution that went unsolved, MISO declared a Temporary IROL.

ESL's real-time model did not show the same conditions as MISO's. That is, ESL's model did not show the need for an IROL study. This difference arose because ESL's model has equivalenced topology for neighboring utilities, while MISO's model has full topologies for all balancing authorities in its territory. MISO's models are broader than ESL's, and more detailed outside of the Entergy Operating Companies' systems, in light of MISO's role as Reliability Coordinator for all of the MISO region, including MISO South. That being said, Entergy now believes that given the level of congestion on Cleco facilities and the effects the congestion can have on ELL or ENO facilities, ESL should attempt to increase the visibility of Cleco facilities in ESL's models.

In light of these differences in ESL's and MISO's models, the following actions will be taken:

- Enhance ESL's state estimator model to include additional facilities in Cleco for monitoring capability and develop criteria for inclusion of external facilities within the model.
- Develop a process that will enhance collaboration with MISO for the utilization of reconfiguration plans for observed or expected dynamic events. When it submits a reconfiguration proposal to MISO, ESL will ask that it be tested when submitted.
- Establish formal touchpoints with MISO and Local Balancing Authorities for coordination during times of wide area congestion.
- Seek MISO participation in load shed drill processes.

- Develop a process for greater coordination with MISO to ensure that MISO has the benefit of Entergy's expertise in managing local reliability.

Finally, NERC standard PRC-023 requires that a relay not trip when loading on the relay is below 150%. It is ESL's understanding that MISO uses a 120% threshold in its IROL models. The purpose of PRC-023 is to prevent tripping during system stress, giving operators time to adjust and operate the system within intended levels. In other words, PRC-023 is intended to address circumstances such as those presented on May 25. ESL will discuss with MISO the basis for MISO's use in its IROL models of a lower threshold than the one provided in NERC standards.

Beneficial Practices and Accomplishments

The post-event review identified several beneficial practices and accomplishments of note. Positive actions and behaviors include the following:

- Even in the face of significant obstacles, the TCC and other ELL, ENO, and ESL employees acted reasonably and appropriately to ensure the reliability of the BES. This includes the TCC's attempt to alleviate the IROL conditions within 30 minutes.
- The DOC was unable to use the rotation load shed tool to address critical customers, and took action to manually initiate the load shed, which did exclude identified priority customers in the first 75 MW of load that was shed.
- The TCC took aggressive action to take over the load shed from the DOC to prevent potential cascading outages and potential damages to the BES.
- ESL Transmission Operators, utilizing their operating experience, identified locations within the greater New Orleans area that they knew would provide relief efficiently. The team used engineering expertise and judgment to curtail the least amount of load possible while complying with MISO's directive.

This list reflects only a small subset of the beneficial practices and well executed steps during the May 25 load shed event.

List of Recommendations

The following is a complete list of recommendations identified in this Report.

Internal IROL Process and Training and Implementation of Load Shed:

- To provide greater clarity around Temporary IROLs, pursue the guidance suggested in the NERC IROL Report.
- Until such time as more clarity is provided around Temporary IROLs and NERC standards, if again faced with a Temporary IROL, use reasonable efforts to attempt to address the IROL conditions within 30 minutes of the time the condition arose or such other time specified by MISO.
- Recommend to MISO that, when it declares a Temporary IROL, MISO (a) include a clear statement that it has declared a Temporary IROL, or that the IROL study described above could not be completed in 15 minutes; (b) specify the time for implementation of any instruction it provides; and (c) if load shed is directed to resolve the Temporary IROL,

identify a list of specific substations from which the TOP can choose to shed load, and load shift factors for those substations, or, at a minimum, clearly defined electrical boundaries in which the load shed must occur.

- Develop protocols to call on interruptible customers when tight conditions are forecast. Some interruptible customers have longer lead time notices, and those will be factored into the protocol.
- Update existing procedures to address how to execute load sheds when non-specific Operating Instructions are given, and provide additional training for those scenarios.
- Obtain clarity from SERC regarding the ability to question a vague Operating Instruction and to advise the DOC on how to implement an Operating Instruction.
- Align the TCC load shed internal communication procedure to the process utilized by the DOC.
- Create proactive internal communication triggers for IROL and dynamic events.

Public Communications:

- Eliminate MISO notification dependence by establishing an alternate ESL/Entergy Operating Company-specific internal communication trigger from the TCC capable of serving as a predictor for dynamic events.
- Evaluate and establish an internal notification process to critical internal teams.
- Establish an expectation that Corporate Communications, External Affairs, and the Integrated Customer Organization activate upon receipt of notifications and implement their respective emergency response plans.
- Modify existing plans, procedures, and messaging templates to include the IROL scenario related to customer communications, external stakeholder communications, and customer operations.
- Provide training on response procedures, expectations during an event, and updated process flow.
- Conduct drills on procedures.
- Ensure process modifications have full alignment with any improvements or modifications MISO implements to its notification process following its after-action review of the May 25 load shed event.
- Review and enhance load shed messaging to address IROL and dynamic event scenarios.
- Improve the capability of key customer systems to handle high capacity, short time-frame scenarios.

System Models and Coordination:

- Enhance ESL's state estimator model to include additional facilities in Cleco for monitoring capability and develop criteria for inclusion of external facilities within the model.
- Develop a process that will enhance collaboration with MISO for the utilization of reconfiguration plans for observed or expected dynamic events.
- When submitting a reconfiguration proposal to MISO ask that it be tested when submitted.
- Establish formal touchpoints with MISO and Local Balancing Authorities for coordination during times of wide area congestion.
- Seek MISO participation in load shed drill processes.
- Develop a process for greater coordination with MISO to ensure that MISO has the benefit of our expertise in managing local reliability.

- Discuss with MISO the basis for MISO's use of a lower threshold in its IROL models than the one specified under NERC standard PRC-023.

Glossary

TERM	DEFINITION
BES	Bulk Electric System
Cleco	Cleco Corporate Holdings LLC
DOC	Distribution Operations Center
EBC	Entergy Business Center
EEA	Energy Emergency Alert
ELL	Entergy Louisiana, LLC
ENO	Entergy New Orleans, LLC
ESL	Entergy Services, LLC
IROL	Interconnection Reliability Operating Limit
LSE	Load Serving Entity
MISO	Midcontinent Independent System Operator, Inc.
NERC	North American Electric Reliability Corporation
NERC IROL Report	ERO Enterprise Joint IROL Activity Report (July 2024)
RTA	Real Time Analysis
SERC	SERC Reliability Corporation
SOL	System Operating Limit
TCC	Transmission Control Center
Tv	Time to Violation

Service List for X-37608
as of 8/1/2025

LPSC Staff Counsel

Kathryn Bowman, LPSC Executive Counsel

LPSC Staff

Jessica Kayuha, LPSC Utilities Division
Robin Pendergrass, LPSC Auditing Division
Thomas Broady, LPSC Auditing Division

Company : **Entergy Louisiana, LLC**

Lawrence J. Hand Jr.
Entergy Louisiana, LLC
4809 Jefferson Highway
Mail Unit L-JEF-357
Jefferson, LA 70121
Email: lhand@entergy.com
Fax: (504)840-2681; Phone: (504)840-2528

Company : **Cleco Power LLC**

Mark D. Kleehammer
Cleco Power, LLC.
2030 Donahue Ferry Road
Pineville, LA 71360
Email: mark.kleehammer@cleco.com
Fax: (318)484-7685; Phone: (318)484-7716

FAX

To: **Ms. Krys (Kris) Abel**
Company: LPSC
Fax: 2253420877
Phone:

RECEIVED BY FAX
AUG 01 2025
LOUISIANA PUBLIC SERVICE COMMISSION

From:
Fax:
Phone:
E-mail:

NOTES:

To: Krys (Kris) Abel
Fax: 2253420877

Re: LPSC Docket No. X-37608

Please see Entergy Louisiana, LLCÆs May 2025 Load Shed After Action Report, in connection with the referenced matter.

Please send the fax confirmation receipt to 504-576-7531. If the fax does not send successfully, please send receipt to lprisut@entergy.com.

Thank you for your time and assistance.

Linda Prisuta Executive Assistant to
Matthew T. Brown, Associate General Counsel
Entergy Services, LLC
Legal-Regulatory, 639 Loyola Ave., L-ENT-26E, NOLA 70113
T 504-576-4137 | M 504-913-2581
lprisut@entergy.com

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