



**Ascendant Energy Solutions** helps Generator Owners and Operators (GO/GOP) stay *auditably compliant* with NERC Reliability Standards through independent gap analyses and ongoing compliance program support.

This checklist provides a structured tool – in both a one-page summary and a detailed multi-page format – to assess your facility’s compliance across all NERC regions.

Use this checklist to identify any **gaps** in your NERC compliance and document your action plans.

### **One-Page Summary: Key NERC Compliance Focus Areas (GO/GOP)**

- **Protection Systems & Maintenance:** Ensure all **Protection System** devices (relays, instrument transformers, DC supply, etc.) are covered under a documented **Protection System Maintenance Program** per **PRC-005**. All required maintenance/testing must be performed within defined intervals, with records retained. Also confirm any relay **misoperations** are analyzed and corrected (per **PRC-004**) to prevent recurrence.
- **Personnel Training & Certification:** Verify that plant operating personnel receive training on **Protection Systems operations** (as required by **PER-006** for GOPs) and are familiar with their roles in maintaining reliability. Training should cover protective relay functions, RAS schemes, and associated equipment so operators understand what could trip the unit and why. Also ensure training on communication protocols (e.g. three-part communication per **COM-002**) and document all training completions (with rosters, dates) for audit evidence.
- **Operational Communication & Coordination:** Confirm that **operating personnel use three-part communication** for oral directives during emergencies (per **COM-002-4**) – i.e. instructions are issued clearly, repeated back, and confirmed. Maintain evidence of communication protocol training and a process to corrective any communication deficiencies. Ensure adherence to all reliability coordinator or dispatcher directives (per **TOP-001**), including timely reporting of any operational issues. **Voltage/VAR control** must be managed per **VAR-002**: keep each generator’s Automatic Voltage Regulator in service and follow the TOP’s voltage schedule at all times, notifying the TOP of any sustained voltage deviations >30 minutes.
- **Emergency Preparedness & Response:** Have up-to-date **emergency plans** for your facility. If you own any **Blackstart Resources**, maintain formal procedures for unit start and energization (EOP-005) and training/drills for staff (at least 2 hours every 2 years). Ensure blackstart capability is tested regularly and results are documented. Implement an **Event Reporting** process (per **EOP-004**) to promptly report disturbances or incidents to NERC and the Regional Entity. Incorporate new **extreme weather** preparedness requirements (e.g. **EOP-012** effective 2024 for cold weather) into your plans, including fuel assurance, staffing, and coordination for severe conditions.
- **Facility Equipment & Modeling Data:** Verify that **facility interconnection requirements** are documented and available (applicable if you function as a TO for your tie-lines – see **FAC-001**). For any new or modified generator installations, **coordinate studies** with the Planning Coordinator to assess impacts (per **FAC-002**) before changes are energized. Ensure your **facility ratings** (generator, GSU, etc.) are calculated using sound engineering (FAC-008) and provided to the TP. Perform all required **model verification tests** on your generation equipment: e.g.



annual or periodic tests of real and reactive capability (**MOD-025**) to provide accurate data for planning models, and perform model validation for generator excitation and governor controls (**MOD-026/027**) by comparing simulation models to actual response. Submit up-to-date steady-state and dynamic modeling data to your Planning Coordinator as required (**MOD-032**).

- **Documentation & Internal Compliance Program:** Keep **evidence and documentation** for all the above: maintenance logs, test records, training certificates, communication checklists, procedures, etc. NERC standards require retention of compliance data (typically for the current and previous audit periods) – **organize records** so they are readily accessible. *(For example, each Generator Operator must “keep data or evidence” to show compliance with EOP-005 requirements and others.)* Ensure you have an internal process for tracking each standard’s requirements (e.g. a compliance calendar for tasks like relay testing due dates, model submissions, etc.). Regularly perform **internal audits or gap assessments** (with your team or independent experts) to catch and fix issues before any official compliance audit. A strong culture of compliance – where employees proactively report and address potential non-compliances – will greatly reduce the risk of violations.

*(The one-page summary above can be used as a quick reference. The following pages provide a **detailed checklist** with specific questions under each program area, along with space to document your facility’s status or gaps.)*

## Detailed NERC Compliance Gap Analysis Checklist (GO/GOP)

**Instructions:** Use the sections below to review each area of NERC compliance. For each checkpoint, mark whether your facility **meets** the requirement, and use the “Notes” column to detail evidence, location of documentation, or any gaps and action plans. This checklist is **region-agnostic** – it covers common requirements across all NERC regions. (Some items may not apply to every Generator Owner/Operator, depending on your facilities and registration; indicate “N/A” as needed.) All references to standards are based on the latest enforceable versions.

### 1. Protection Systems & Maintenance (PRC Standards)

This section covers NERC standards in the PRC (Protection and Control) family, ensuring your protection systems are properly maintained, coordinated, and documented.

**PRC-005: Protection System Maintenance Program** – Is there a **documented** Protection System Maintenance Program (PSMP) covering all applicable BES elements (protective relays, communications, instrument transformers, station batteries, etc.)? Are maintenance activities being performed at or below the **maximum intervals** defined in the standard (e.g. 4-calendar-month, 6-year, or other defined intervals) and have all past due tasks been completed? Evidence to check: maintenance logs, test records, asset list cross-checked to one-line drawings (to ensure no device is omitted).

**PRC-005: Maintenance Documentation** – Are **records** of each maintenance activity and test readily available, including date performed, results, and the person who performed it? (The program



should define these record-keeping requirements. Auditors will expect evidence of each required task or an explanation if an interval was missed.)

**PRC-004: Misoperation Analysis and Mitigation** – Have all **Protection System Misoperations** (relay mis-trips, failure to trip, etc.) been **identified** and analyzed for cause? For any BES relay misoperation, did the GO/GOP develop a **Corrective Action Plan** within 60 days of determining the cause and implement it as required? (Check if any relay or protection misoperations were reported through NERC’s MIDAS or to your Regional Entity. Verify documentation of analyses and that corrective actions were completed.)

**PRC-004: Evidence** – Is there evidence of **misoperation reports** and **actions taken**? (E.g. internal incident reports, root cause analysis documents, relay setting changes, maintenance or repairs performed, and correspondence with the TOP or Regional Entity about the misoperation.)

**PRC-019: Generator Voltage Protection Coordination** – Have you performed the required **coordination study** (at least every 5 years) to ensure that generator controls and protection are properly coordinated? Specifically, do the **voltage regulating limiters** (OEL, UEL) on your generator activate *before* protective relays would trip the unit, and do protection settings prevent equipment damage (i.e. relays trip *before* hazardous conditions exceed equipment capability)? Verify documentation of the latest study (curve overlays of relay trip settings vs. generator capability and limiter curves). Address any required adjustments identified by the study.

**PRC-024: Generator Relay “No-Trip” Settings** – Are generator frequency and voltage protective relays set so that the unit **will not trip** during the defined “**no trip zone**” disturbances? (Verify that your under-frequency, over-frequency, under-voltage, and over-voltage relay set points and delay times meet the ride-through duration criteria in PRC-024 Attachment 1 and 2 for your Interconnection. Documentation: relay setting sheets and any studies showing compliance.)

**PRC-025: Relay Loadability** – If applicable, are load-responsive relays (e.g. overcurrent, distance relays on generator terminals or GSU) set with sufficient margin per **PRC-025** so they do not unnecessarily trip for load current during system steady-state or transient conditions? (Ensure settings allow the generator to deliver at least 115% of its maximum capability without tripping, unless equipment limitations dictate otherwise. Check coordination with the Transmission Owner on relay loadability.)

**Other PRC Standards** – (*Check any others that apply to your facilities.*) For example: **PRC-002 (Disturbance Monitoring)** – If your generator is identified by the PC as requiring Disturbance Monitoring Equipment (e.g. fault recorders, sequence of events recorders), is that equipment in place and configured per PRC-002 requirements? **PRC-027 (Protection Coordination)** – If you share protective zones with a Transmission Owner (e.g. line relays), do you have a process to coordinate relay settings with them and perform periodic reviews? Document any studies or coordination meetings.

*Compliance Tips:* Keep an updated **Protection System inventory** (relays, etc.) and mark each device with next due date for maintenance. Use automated reminders for PRC-005 intervals. Misoperations: even if apparently “no issue,” document the analysis and justification if no action was needed – auditors want to see a deliberate review. For PRC-019/024 studies, maintain engineering reports and, if no changes are needed, document that coordination was verified to be adequate.



## 2. Personnel Training & Qualifications (PER Standards)

This section addresses training requirements to ensure operating personnel are knowledgeable and qualified to perform tasks impacting reliability.

**PER-006-1: Generator Operator Training** – Have all personnel **responsible for real-time control** of the generator (e.g. control room operators, plant operators who can affect output) been trained on the **operational functionality of Protection Systems and Remedial Action Schemes (RAS)** at your plant? This training should cover what each protection scheme does, its purpose and limitations, how it might affect generator output, and how to respond to alarms/trips. Verify you have a **training curriculum** or materials (slides, documents) that include these topics and that each relevant employee has completed the training (with dates).

**Training Records** – Do you maintain a **list of all personnel** in these roles, including dates they assumed the role and dates of their training? Ensure that for anyone currently in a control role (and anyone who was in the role since April 1, 2021 when PER-006 became effective), you have evidence of initial training. (No periodic re-training is mandated by PER-006, but best practice is to retrain when Protection Systems change, or on a regular cycle for reinforcement.)

**PER-005 (if applicable)** – (*Note: PER-005 is mainly for system operator training at BA/TOP/RC. Most GO/GOP do not have PER-005 obligations unless performing a BA or TOP function.*) If your organization has local operating personnel who must be certified or trained under a BA's program, ensure those requirements are met. (E.g. if operating a blackstart plant, there may be training under EOP as well.)

**Communications Protocol Training (COM-002)** – Have operators been trained on the required communications protocols for issuing and receiving Operating Instructions? Specifically, they should practice **three-part communication** (repeat-back) for directives and know how to handle misunderstood instructions. Evidence: training session records, policy documents outlining the communication protocol. (This may overlap with PER-006 or internal training programs.)

**Certification and Qualifications** – Do all control room operators possess any required certifications or operator licenses (if required by your region or company policy)? While NERC does not require GO/GOP operators to be NERC-certified (that's required for RC/BA/TOP), some companies choose to have their operators NERC-certified. Document any such qualifications.

*Compliance Tips:* **Integrate training** into onboarding – new operators should receive NERC compliance training (including PER-006 topics) as part of qualification. Keep training **materials and sign-in sheets** on file; auditors may request evidence that the training covered required topics and that each applicable person was trained. Even though PER-006 doesn't require refresh training until systems change, consider annual refresher courses or drills to keep knowledge current. Also, cultivate a culture where operators feel responsible for compliance (e.g. they understand why certain NERC rules – like voltage schedules or communication protocols – are critical).

## 3. Operational Communications & Coordination (COM, TOP, VAR)



In this section, we check practices for real-time operations, communications, and coordination with grid authorities (Transmission Operator, Balancing Authority, etc.).

**COM-002-4: Communication Protocols** – Does your plant have **documented communication protocols** for operations, and are operators following them? Specifically, for any **emergency Operating Instruction** received or issued, operators must use **three-part communication** (speak – repeat – confirm) to reduce miscommunication. Verify that procedures require this and that operators demonstrate it. If an operator does not receive a correct repeat-back when **issuing** a directive, do they know to reissue or take other action (per COM-002 R5)? Likewise, if your operator is the **receiver** of a directive, do they always repeat it back and get confirmation (COM-002 R6). Evidence: operating logs or drill records showing use of 3-part comms, and any internal compliance assessment of communications (COM-002 also expects periodic assessment by certain entities – while GOPs aren’t required to formally self-assess like RC/TOP, it’s good practice to internally review communications for adherence).

**COM-001: Communication Facilities** – (Basic requirement) Do you have at least *two* independent means of communication with the System Operator (TOP and BA)? Common methods are primary phone/radio and a backup phone or satellite phone. Ensure these are tested periodically. Document any telecom outages and that you have backup plans if primary communication fails.

**TOP-001: Operational Responsibilities** – As a GOP, are you receiving and complying with all applicable directives from your **Transmission Operator** and **Balancing Authority**? This includes adhering to dispatch instructions, curtailment orders, or emergency directives. If a directive cannot be followed, do operators immediately inform the issuer and take alternate actions if needed? (Evidence might include dispatcher logs or any occurrences where instructions were issued to your plant.) Also, ensure you report any unexpected outages or limitations of your generator to the TOP/BA promptly as required by TOP standards.

**VAR-002: Voltage and Reactive Control** – **Are you maintaining the generator’s voltage as prescribed by the TOP’s voltage schedule?** Each GOP must operate each generator in **automatic voltage control mode (AVR on)** unless instructed otherwise or during specific exceptions (startup, testing). Verify your operators keep AVR in “Auto” and only switch to manual with proper notifications. Ensure you *know your voltage schedule*: the target voltage (or reactive output) at the point of interconnection and its tolerance band. **If a voltage goes out of band for >30 minutes, do you notify the TOP?** (Per VAR-002, you must inform the TOP of voltage deviations or if AVR is out of service >30 minutes.) Evidence: control room logs, voltage charts, any notifications sent. Also check that operators have visibility of both generator terminal voltage and high-side bus voltage, and conversion if needed.

**Emergency Communications (EOP-002, EOP-003)** – Ensure you have the capability to immediately contact your TOP, BA, and RC in an emergency (loss of supply, etc.) and that operators know the procedure to declare an Emergency (e.g. Energy Emergency or local Emergency per EOP standards). While these EOP standards mainly apply to BAs and TOPs, GOPs should be aware of how to communicate during emergencies (like invoking mutual assistance or load shedding instructions).





*Compliance Tips:* Conduct periodic **communication drills** with your operators – simulate an emergency directive and practice the three-part communication. Document these drills as evidence of protocol adherence. Maintain an up-to-date contact list for your TOP, BA, RC in the control room (and test backup channels like satellite phones). For **voltage control**, post the voltage schedule in the control room and consider alarms if voltage strays from schedule. GOPs have been fined for not knowing or following their voltage schedule – emphasize this in operator training. A simple internal check: pick random days and review SCADA logs for voltage; if outside schedule band, ensure there’s a log entry of TOP notification.

#### 4. Emergency Preparedness & Response (EOP Standards)

This section reviews your readiness for emergencies, including system restoration, reporting disturbances, and extreme weather preparedness.

**EOP-005: Blackstart Capability (if applicable)** – If your generator is designated as a **Blackstart Resource** (able to start without external power), have you met all requirements? This includes having a **written Blackstart Resource plan/agreement** with the Transmission Operator that spells out roles and responsibilities (per EOP-005 R13); **documented procedures** for starting the unit and energizing a bus (R14); a maintenance and testing program for blackstart equipment (R16) with records of periodic testing; and providing test results to the TOP/RC upon request (within 30 days). Ensure any changes in your blackstart unit’s capabilities are reported to the TOP within 24 hours (R15). Also, have you provided at least **2 hours of training every two years** to operators responsible for blackstart-up (R17), and participated in any required restoration drills or exercises (R18)? Maintain copies of training materials and drill participation as evidence.

**EOP-005: Blackstart Drill/Tests** – When was the last Blackstart capability test or drill? (EOP-005 requires verification of the blackstart plan through analysis, simulation or testing at least once every 5 years for TOP – ensure you’ve supported your TOP in that effort, and internally you should test your unit start if possible.) Note in “Status” the date of last test and any issues found.

**EOP-004: Event Reporting** – Do you have an **event reporting procedure** to identify and promptly report qualifying events to NERC and the Regional Entity? Examples of reportable events include protection system misoperations, emergency declarations, system blackouts or load shedding, cyber or physical security incidents, etc. Ensure your team knows the threshold for reporting (per EOP-004 Attachment 1) and that reports (OE-417 or portal submissions) are made within the required timeframe (often within 24 hours for most events). Check: have there been any events at your facility in the last few years that required reporting? If yes, did you file the report and keep a copy?

**EOP-011 / EOP-012: Extreme Weather & Operating Emergencies** – With new standards coming into effect, verify your **Operating Plan for Extremes**. EOP-011-2 requires Generator Owners/Operators to have plans for operating under extreme cold or hot weather, fuel shortages, etc. **EOP-012** (effective late 2024) will introduce specific requirements for ensuring generating units can perform under extreme cold weather. Have you reviewed these requirements (e.g. freeze protection measures, staffing plans, communication protocols during extreme events) and assessed any gaps? Document any **freeze protection plan** or equipment upgrades made (heat tracing, insulation, etc.), and training or drills for extreme conditions.



**Other EOP Readiness** – Ensure basic emergency preparedness: backup power for critical plant control systems (so you can operate during grid disturbances), blackstart **cranking path** understanding (if you rely on another blackstart unit or provide start-up power to others), load restoration priorities if you have on-site loads, etc. Also verify contacts with local utilities for coordination during widespread outages.

*Compliance Tips:* For **blackstart units**, maintain a dedicated **Blackstart binder** with all EOP-005 materials: agreements, procedures, test records, training logs. Auditors will review this in detail. Conduct annual refresher training on blackstart procedures (even though standard says biennial) to keep operators sharp. For **event reporting**, create an internal checklist that mirrors EOP-004 Attachment 1 criteria so operators know what to flag as reportable. It's better to over-report than under-report. As the industry places focus on **extreme weather**, proactively identify any cold weather vulnerabilities (heaters, fuel deliverability) – not only for compliance but to avoid outages. Document any mitigating measures taken; this will help comply with EOP-011/-012 and also shows a culture of reliability.

## 5. Facility Equipment, Data, and Modeling (FAC & MOD Standards)

This section ensures the physical facility and the data/models you provide meet NERC requirements for reliability.

**FAC-001: Facility Interconnection Requirements** – If you are an **applicable Generator Owner** that has a responsibility to provide interconnection requirements (this usually applies if you own the switchyard or tie-line connecting to the grid), have you **documented and published** your facility interconnection requirements? (This means if another entity wanted to connect to your facility or tie-line, you have a document outlining the technical requirements, analogous to what a Transmission Owner provides. Many GOs may not have this obligation unless acting as a Transmission facility owner.) If not applicable, mark N/A.

**FAC-002: Interconnection Studies** – For any **new generator installations or material modifications** at your plant (e.g. generator uprates, significant equipment changes, or new units), did you coordinate a **reliability impact study** with the Planning Coordinator/Transmission Planner? Evidence: study reports or correspondence. (Even if the change was minor, you should notify the PC/TP to let them determine if a study is needed. FAC-002 ensures no adverse impact from new connections.)

**FAC-008: Facility Ratings** – Do you have a documented **Facility Ratings methodology** for your generator and connected facilities, as required? This typically involves defining the maximum capability of the generator (MVA, MW output under various conditions), the ratings of the GSU transformer, and any tie-line or equipment you own, based on technically sound principles. Ensure these ratings are communicated to the TP and are used consistently in system studies. Check that any changes (like a new cooler or uprate) have been reflected in updated ratings.

**MOD-025: Capability Verification** – Have you performed the required verifications of your unit's **Re and Reactive power capability** per **MOD-025-2**? This standard ensures accurate generator capability data is available for planning models. Typically, you must conduct a reactive capability test (or use historical max output data) to verify the generator can achieve its claimed VAR output (lagging or



leading), and similarly verify max MW output. Verify the last test date and that results were reported to your **Transmission Planner / Planning Coordinator**. Evidence: test reports and confirmation of data submission.

**MOD-026: Excitation System Model Validation** – For generators above the applicability threshold (e.g. >100 MVA in Eastern Interconnect, etc.), have you **validated the generator’s excitation control model** (including AVR and PSS) per **MOD-026-1**? The standard requires comparing model simulations to actual responses to a voltage perturbation to ensure the model accurately represents the generator’s behavior. Check if you performed tests (like step response or disturbance recording) and submitted the model and validation evidence to the TP.

**MOD-027: Governor Model Validation** – Similarly, have you validated the **turbine/governor model** for your generator per **MOD-027-1**? This involves demonstrating that the model of the governor/prime mover matches the unit’s frequency response characteristics. Ensure any required model data was submitted. (Often MOD-026 and MOD-027 tests are done together after commissioning or periodically.)

**MOD-032: Data for System Modeling** – Are you submitting all required modeling data for your generator and facility to the Planning Coordinator as specified in their data request (at least annually)? This includes steady-state parameters (equipment ratings, transformer data, etc.), *short-circuit* data, and dynamic models (the validated models from MOD-026/027). Ensure you meet the deadlines (usually a yearly data submission). Keep copies of what you submitted, and confirm with the PC that your data is complete.

*Compliance Tips:* Proactively engage with your **Planning Coordinator** – know who they are and their data submission portal or process. Maintain a “**model data folder**” with the latest copies of all your plant electrical models (impedance data, exciter/governor model parameters, etc.). After any equipment change or test, update this folder and send the updates to the PC promptly (don’t wait for the annual cycle if something significant changes). For **facility ratings**, a simple spreadsheet listing each element (generator, transformers, conductors) and their Normal/Emergency ratings can serve as your documentation. Ensure it references engineering sources (OEM curves, IEEE standards) to be “technically justified.” Lastly, if you plan a project (like adding a new generator or retrofitting a turbine), engage the TP/PC early – **FAC-002 studies** can take time, and you want to avoid any last-minute reliability issues.

## 6. Documentation, Monitoring & Program Management

This final section covers overarching compliance management and documentation that spans all standards.

**Document Control** – Do you have a central repository (physical or digital) for all NERC compliance documentation? Ensure that all policies, procedures, manuals, one-line diagrams, evidence files, and compliance logs are **version-controlled** and backed up. Key documents include: current NERC Reliability Standards applicability matrix (which standards apply to your GO/GOP), written policies for compliance, and an internal compliance program document.





**Evidence Retention** – For each applicable standard, are you keeping evidence for the required retention period? (Typically, retention is “current plus previous audit period,” or as specified in each standard’s Measures section.) For example, PRC-005 requires maintenance records since the last audit; PER-006 requires training records for all current operators since the standard’s effective date; EOP-005 requires retention of blackstart training and test records, etc. Verify that older records are archived but accessible. **Tip:** Keep at least **6 years** of critical evidence if space allows, as audit cycles can look back.

**Self-Assessment & Internal Audits** – Do you conduct **regular internal audits or gap assessments** of your NERC compliance? This could be annual self-certifications or engaging an independent team (like AES) to perform a mock audit. List the date of last internal audit and major findings. An effective internal review will check each requirement, review evidence, and interview staff – mimicking a real audit. Address any findings with a corrective action plan.

**Incident Response and Mitigation** – If a potential non-compliance is found (e.g. missed maintenance, late testing, etc.), do you have a process to **document, report, and mitigate** it? NERC’s rules encourage self-reporting. Ensure management is aware to report issues to the Region via the compliance portal, and that a formal Mitigation Plan is developed and tracked. Check if any violations were self-reported in recent years and ensure those items are fully mitigated/closed.

**Continuous Improvement** – Does your organization keep up with **NERC standard changes** and lessons learned? Assign someone to monitor NERC announcements (for example, new standards like EOP-012 or FAC-001 changes) so you can proactively comply. Participate in industry forums or Regional Entity webinars if possible. Regularly update training and procedures to reflect the latest requirements.

*Compliance Tips:* Treat compliance as an ongoing cycle: **Plan – Do – Check – Act**. Use tools like compliance checklists (this document), calendars with reminders, and periodic management meetings to review compliance status. Keep a “compliance evidence index” – a table mapping each Requirement to where the evidence is stored, to speed up audit prep. Finally, foster a **compliance culture**: from plant operators to executives, everyone should understand that reliability and compliance are core to operations (not just an afterthought). A well-run compliance program will not only avoid violations but also improve your operational reliability and efficiency.

## **Next Steps: Ensure Continuous Compliance**

Staying compliant with NERC standards is an ongoing effort that protects both your organization and the Bulk Electric System. This checklist is a starting point for self-assessment. For a deeper evaluation, consider a professional review.

**Ascendant Energy Solutions (AES)** offers full-service compliance support – from in-depth **gap analyses** to tailored **compliance program development** and mock audits. Our team can work with you to address any gaps identified and implement robust controls and training for sustained compliance.



**Contact us for a full audit or for support with a custom compliance program.** We'll help ensure your Generator Owner/Operator compliance program not only meets all NERC requirements but also aligns with your operational best practices, giving you peace of mind and allowing you to focus on reliable generation.