

PJM Configuration Management and Control

Prepared by: PJM Generation Modeling and Dynamic Studies

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Overview of PJM Configuration Management

The objective of PJM’s configuration management process is to ensure that actual field equipment, system models used for planning and operations, and governing commercial agreements remain fully aligned at all times. Reliability and security studies are only valid when these three elements are consistent. Any deviation, whether from unreported equipment changes, outdated modeling, or misaligned agreements, creates risk to system reliability and operational decision-making.

Configuration Management Principles

Configuration control can be conceptualized as a balanced system in which physical equipment, modeling data, and contractual agreements must remain synchronized as illustrated in Figure 1. If one element changes without the others being updated and evaluated, the balance is lost, potentially resulting in unreliable or unanalyzed system conditions. Consequently, generation owners may not implement changes that affect modeling data before PJM approval. Any change with modeling implications must be communicated and studied in advance to preserve alignment and reliability.

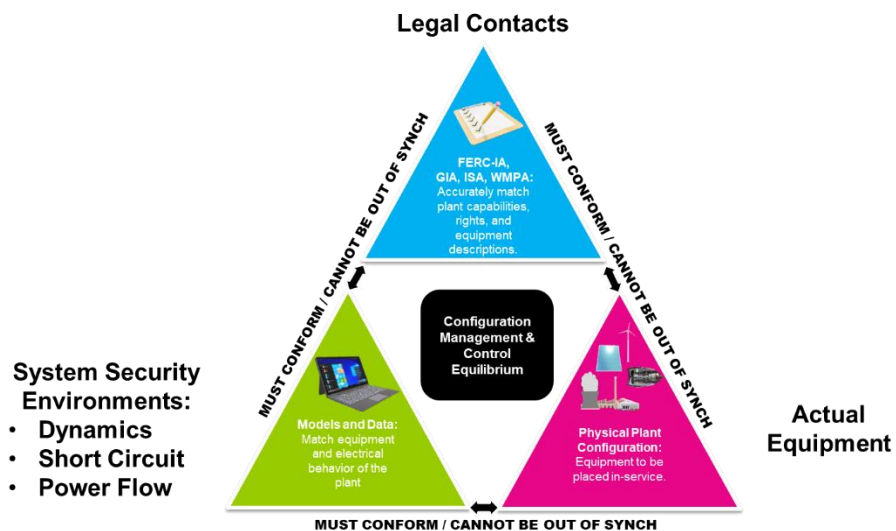


Figure 1: PJM Configuration Management

Reliability models used by PJM Operations are sourced from Planning’s models, and both environments rely on validated and vetted data. Models cannot be accepted or updated without evaluation, as undetected errors could lead to incorrect operational

actions or flawed planning conclusions. Therefore, even purely modeling-related changes must be evaluated through a study process prior to implementation.

Required Process for Plant and Model Changes

When a generation owner proposes a physical plant modification that impacts dynamic, short-circuit, or power flow modeling, a formal “necessary study” must be initiated. This study includes submission of all relevant technical information to allow PJM to assess reliability and security impacts. PJM evaluates whether the proposed models are acceptable, usable, secure, and compliant with NERC requirements. In parallel, the governing agreement must be reviewed and updated to ensure the equipment description, configuration, and associated rights remain accurate.

Once the study is approved and the agreement updated, the generation owner may implement the physical change. After implementation, final “as-built” or “as-left” modeling reflecting actual field settings must be submitted and studied again to verify continued reliability. This final submission is processed under MOD-026/027 (MOD-026-2) requirements. Importantly, any physical change that affects modeling requires two studies: one prior to implementation for approval and one after completion to validate final conditions.

For modeling-only changes, including those driven by MOD-026/027 (MOD-026-2) obligations, the same principle applies. Proposed modeling changes must be reviewed through a necessary study before being officially submitted and adopted. This ensures the revisions are NERC-compliant, technically sound, and compatible with PJM’s planning and operations analysis platforms.

Integration of NERC Standards into PJM Processes

PJM integrates multiple NERC standards into a unified configuration management framework. MOD-032 establishes an annual process in which PJM publishes approved modeling data for in-service facilities and generation owners certify its accuracy or identify discrepancies. MOD-026 and MOD-027 (MOD-026-2) govern excitation, governor, and plant control modeling, ensuring that models realistically represent actual unit behavior and comply with NERC acceptability requirements.

Addressing Gaps in Configuration Control

While NERC compliance establishes minimum requirements, compliance alone does not guarantee configuration control. For example, NERC allows extended timelines, up to 365 days after commercial operation or 180 days following a modification, for final modeling submittals, and MOD-032 updates occur annually. These timelines could allow

plants to operate for extended periods with unanalyzed or outdated modeling, which is not acceptable from a reliability perspective.

PJM's tariff addresses this gap by requiring approval of any facility modification prior to implementation. Although historically referred to informally as "necessary studies," these requirements have always existed within PJM's interconnection agreements and have recently been formalized. When combined with NERC standards, tariff requirements complete a balanced and enforceable configuration management framework.

Generation Owner Responsibilities and Compliance Obligations

Generation Owners are the primary drivers of configuration control, and PJM relies on them to proactively identify and communicate proposed physical, control, or modeling changes. Over the past decade, PJM has observed repeated instances where changes were implemented without prior notification or approval, creating unnecessary reliability and compliance risks. Early identification and communication of intended changes are therefore essential.

Implementing physical or modeling changes without prior PJM coordination and approval is inconsistent with Generator Owner obligations under the applicable Interconnection Service Agreement (ISA or GIA). These agreements require advanced coordination for changes that could affect PJM's planning studies, operational analyses, or reliability determinations.

While operational urgency and outage return objectives are understood, they do not supersede reliability or contractual requirements. PJM strongly encourages proactive planning to mitigate potential impacts. Preparing technical documentation and modeling data in advance—particularly for non-like-for-like equipment replacements—can significantly streamline review and approval timelines. Planning for equipment obsolescence, spare replacements, and pre-approved modeling approaches further reduces risk, downtime, and uncertainty.

When required processes are not followed, PJM may need to take corrective actions to address resulting reliability or compliance concerns. Any such actions are taken in accordance with the PJM Tariff and governing agreements and are intended solely to preserve reliable system operation.

Early communication and proactive coordination remain the most effective means of meeting compliance obligations while minimizing operational, scheduling, and commercial impacts.

Lifecycle Configuration Management

Configuration control applies throughout a generator’s lifecycle (see Figure 2). After interconnection agreement execution, committed data is incorporated into planning models to preserve developer rights. Any changes during construction or prior to commercial operation require study and approval. Upon achieving commercial operation, as-built data must be evaluated to ensure installed equipment performs as expected and any deviations are not material.

During operations, further studies are required for equipment replacements, upgrades, emergency repairs involving non–in-kind components, or modeling corrections driven by performance deficiencies or NERC requirements. Even without physical changes, modeling updates require approval prior to submission.

PJM maintains historical data records across all lifecycle stages and tracks approved changes through necessary studies. Generation owners are expected to conduct testing, verification, and validation consistent with MOD-026/027 (MOD-026-2) requirements for all as-built submittals.

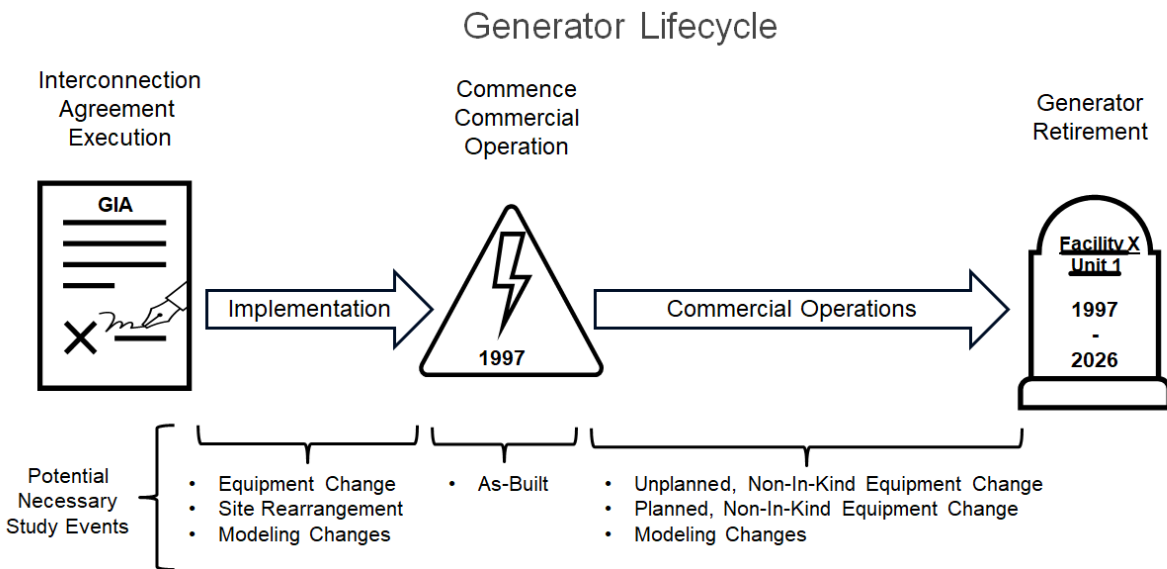


Figure 2: Generator Lifecycle Potential Necessary Study Events

MOD-032 Annual Data Certification

Under MOD-032, PJM annually compiles the highest-quality approved data for each in-service unit and requests certification from generation owners. If discrepancies exist, owners must reference the supporting necessary study and agreement modifications. Once those studies are completed, the updated data can be certified. This process allows PJM to maintain accurate data of record while simplifying annual compliance for generation owners.

Conclusion

PJM's configuration management and control process integrates NERC standards MOD-026, MOD-027, MOD-032, MOD-033, TPL-001, and PJM Tariff requirements into a cohesive framework that ensures reliability through accurate modeling, proactive communication, and disciplined approval processes. Generation owners play a central role in initiating and sustaining this process. Through collaboration, timely submittals, and adherence to both NERC and PJM Tariff obligations, PJM and its stakeholders collectively maintain a secure and reliable electric grid.

Publication/Revision History

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