

PJM Manual 40:

Training and Certification Requirements

Revision: ~~2223~~

Effective Date: ~~January 24, 2019~~ February 24, 2021

Prepared by
Systems Operations Division

PJM © ~~2020~~ 2021



Table of Contents

Approval.....	5
Current Revision.....	6
Introduction.....	7
About PJM Manuals.....	7
About This Manual.....	7
Intended Audience.....	7
References.....	8
Using This Manual.....	8
What You Will Find In This Manual.....	8
Section 1: Training Overview.....	9
1.1 Training Overview.....	9
1.1.1 Member Training Curriculum.....	9
1.1.2 Training for Member Operating/Dispatch Personnel.....	9
1.2 PJM Member Systematic Approach to Training (SAT).....	10
1.3 Training Staff.....	10
1.3.1 Dispatcher Training Subcommittee Representatives.....	11
1.3.2 Member Training Liaison.....	11
1.4 Analysis.....	12
1.4.1 Job Analysis.....	12
1.4.2 Task Lists.....	12
1.4.3 Reliability-Related Tasks.....	13
1.4.4 Task List Maintenance.....	13
1.4.5 Task Modification.....	14
1.5 Development of Training Programs.....	14
1.5.1 Tasks and Objectives.....	14
1.5.2 Initial Training Program (ITP).....	15
1.5.3 Continuing Training Program.....	15
1.5.4 Task Verification.....	16
1.5.5 Certification.....	17
1.6 Implementation of Program Activities.....	17
1.7 Evaluation of Program Activities.....	17
Section 2: Certification Overview.....	19
2.1 Purpose.....	19
2.2 Administration of the Certification Program.....	20
2.2.1 Prerequisites.....	20
2.2.2 Validity, Reliability and Defensibility.....	20
2.2.3 Certification Oversight Group.....	20
2.2.4 Dispute Resolution Procedure.....	20

- 2.2.5 Disciplinary Actions..... 20
 - 2.2.5.1 Grounds for Action..... 20
 - 2.2.5.2 Review..... 20
- 2.2.6 Financing the Certification Program..... 21
- 2.2.7 Additional Resources..... 21
- 2.3 Certification Requirements..... 21
 - 2.3.1 Scope of the PJM TO Operator and Generation Dispatcher Certification Program..... 21
 - 2.3.2 Requirements for Operators and Dispatchers..... 21
 - 2.3.3 Term of Certification..... 22
 - 2.3.4 Recertification..... 22

Section 3: Member Training and Certification Requirements..... 23

- 3.1 Overview..... 23
- 3.2 Entity Training and Certification Requirements..... 23
 - 3.2.1 Transmission Owner Operators..... 23
 - 3.2.2 Market Operation Center Generation Dispatchers 26
 - 3.2.3 Transmission Owner Operators/Generation Dispatchers..... 28
 - 3.2.4 Small Generation Resource Dispatchers 29
 - 3.2.4.1 For entities operating between 20 MW and 75 MW on an aggregate basis:..... 29
 - 3.2.4.2 For entities operating less than 20 MW on an aggregate basis:..... 30
 - 3.2.5 Demand Response Resources..... 31
 - 3.2.6 Energy Storage Resource Operators 31
- 3.3 Compliance Monitoring Process for Training and Certification Requirements..... 32
- 3.4 Waiver of PJM Training and Certification Requirements..... 36
- 3.5 NERC Training Requirements..... 36

Revision History..... 37

Table of Exhibits

Exhibit 1: Overview of PJM Member Systematic Approach to Training (SAT)..... 18
Exhibit 2: Compliance Monitoring Process..... 35

Approval

Approval Date: ~~01/24/2019~~ 02/19/2020
Effective Date: ~~01/24/2019~~ 02/24/2021

Michael J. Sitarchyk, Manager
State and Member Training

Current Revision

Revision 23 (02/24/2021):

- ~~Updates here~~ Periodic Review
- Section 3.2.1: updated language to annual task training requirement to include reference to applicable NERC Standards

Revision 22 (02/20/2020):

- ~~Periodic Review~~
- ~~Updated operator/dispatcher terminology throughout to be consistent~~
- ~~Section 2.3.4: updated language to match language in Section 3.3, Compliance Monitoring Process for Training and Certification Requirements~~
- ~~Section 3.3: updated to reflect changes made to Section 3.2 in revision 21 for ESR~~
- ~~Section 3.4: updated temporary waiver language to allow for more flexibility in addressing compliance with training and certification requirements~~
- ~~Removed Richard Brown as manual owner~~
- ~~Removed Section 4: PJM Operator Training, relocated to an internal procedure~~

Introduction

Welcome to the ***PJM Manual for Training and Certification Requirements***. In this Introduction, you will find the following information:

- What you can expect from the PJM Manuals in general (see “About PJM Manuals”).
- What you can expect from this PJM Manual (see “About This Manual”).
- How to use this manual (see “Using This Manual”).

About PJM Manuals

The PJM Manuals are the instructions, rules, procedures, and guidelines established by the PJM Interconnection, L.L.C. for the operation, planning, and accounting requirements of the PJM RTO and the PJM Energy Market. The manuals are grouped under the following categories:

- Transmission
- PJM Energy Market
- Generation and transmission interconnection
- Reserve
- Accounting and Billing
- PJM administrative services
- Miscellaneous

For a complete list of all PJM Manuals, go to the Library section on PJM.com.

About This Manual

The ***PJM Manual for Training and Certification Requirements*** is one of a series of manuals. This manual describes the PJM Member Systematic Approach to Training (SAT) and outlines the specific training and certification requirements for different entities operating on the PJM systems (e.g., operators and dispatchers at Transmission Owners and Market Operation Centers). This manual also describes the SAT used internally at PJM to develop training and qualification programs for PJM system operators.

The ***PJM Manual for Training and Certification Requirements*** consists of four sections. The sections are listed in the table of contents beginning on page ii.

Intended Audience

The intended audiences for the PJM Manual for Training and Certification Requirements are:

- Applicants to the Operating Agreement of PJM Interconnection, L.L.C.
- PJM Members
- PJM staff

References

There are some other reference documents that provide both background and detail. The ***PJM Manual for Training and Certification Requirements*** does not replace any of the information in these reference documents. These documents are the primary source for specific requirements and implementation details. The references for the ***PJM Manual for Training and Certification Requirements*** are:

- PJM Manual for [Control Center and Data Exchange Requirements \(M-01\)](#)
- PJM Manual for [Transmission Operations \(M-03\)](#)
- PJM Manual for [Pre-Scheduling Operations \(M-10\)](#)
- PJM Manual for [Energy and Ancillary Services Market Operations \(M-11\)](#)
- PJM Manual for [Balancing Operations \(M-12\)](#)
- PJM Manual for [Emergency Operations \(M-13\)](#)
- PJM Manual for [System Restoration \(M-36\)](#)

Using This Manual

Because we believe that explaining concepts is just as important as presenting the procedures, we start each section with an overview. Then, we present details and procedures. This philosophy is reflected in the way we organize the material in this manual. The following paragraphs provide an orientation to the manual's structure.

What You Will Find In This Manual

- A table of contents that lists two levels of subheadings within each of the sections
- An approval page that lists the required approvals and a brief outline of the current revision
- Sections containing the specific guidelines, requirements, or procedures including PJM actions and Market Participant actions
- Attachments that include additional supporting documents, forms, or tables in this PJM Manual
- A section at the end detailing all previous revisions of this PJM Manual

Section 1: Training Overview

Welcome to the *Training Overview* section of the ***PJM Manual for Training and Certification Requirements***. In this section you will find the following information:

- Training Overview
- PJM Member Systematic Approach to Training (SAT)
- Training Staff
- Job Analysis and Task Lists
- Development of Training Programs
- Implementation of Training Program Activities
- Evaluation of Training Program Activities

1.1 Training Overview

1.1.1 Member Training Curriculum

PJM offers a full complement of training courses and materials applicable to many audiences, including operators, dispatchers, power marketers, Load Serving Entities, Curtailment Service Providers, system planners and government and consumer groups. This training is provided to keep current market participants updated on new products and processes, introduce new market participants to PJM and provide focused knowledge on specific aspects of PJM operations.

Additional information about PJM's complete training curriculum can be found at: <https://pjm.com/training/course-catalog.aspx>.

Not all targeted audiences have training or certification requirements in place due to the limited impact they have on reliability. However if the activity of these personnel increases, requirements related to training may become appropriate. The type and nature of the requirements will be based on the operational significance they have on PJM. The different types of operating entities are defined in Section 3 of this manual along with their associated requirements.

1.1.2 Training for Member Operating/Dispatch Personnel

The focus of this section is on Member operating/dispatch personnel who interact with the PJM control room and who carry out operating instructions and tasks in support of the reliable operation of the PJM system. Targeted "Programs" within PJM's overall curriculum are developed for these personnel. These Programs are made up of "Learning Activities" of various kinds (Section 1.6).

The goal is to have continuously improving training programs that will produce the skilled and qualified personnel needed to operate in the highly dynamic environment of a modern Bulk Electric System (BES). The desire is to develop operators who not only know how to follow or carry out procedures, but also have superior analytical skills and situational awareness to better deal with the nearly infinite number of scenarios an interconnected power system is capable of producing.

1.2 PJM Member Systematic Approach to Training (SAT)

PJM has designed and implemented a systematic approach to training in conjunction with its Members to meet the unique and specific requirements of operating in the PJM Regional Transmission Organization (RTO). This approach:

- Takes into account the tightly integrated operations between PJM and its Members
- Promotes a consistent approach to operator development and understanding of roles and responsibilities as outlined in PJM Manuals
- Integrates with PJM's pre-existing training and certification requirements
- Leverages the training resources and expertise of PJM and its Members, primarily through the work of the Dispatcher Training Subcommittee (DTS)

The systematic approach to training described in this section is a joint effort between operational and training SMEs at both PJM and the Member Companies. The approach has been designed to comply with the NERC Standard PER-005. However, PER-005 is not applicable to all operating/dispatch personnel with PJM requirements, including some of the non-traditional entities that have become participants in PJM markets and operations. Therefore, not all elements of this approach will apply to every type of operating personnel. The approach is not meant to introduce any new requirements beyond those explicitly outlined in the NERC Standard.

The approach is designed to be agile and flexible. It seeks to streamline administrative tasks wherever possible so that the maximum resources can be used to develop and deliver quality, timely, relevant training to those that need it. It allows for a successive, iterative approach to training development with opportunities for evaluation and refinement. The approach involves collaboration between PJM training staff and the members of the DTS, thus harnessing the collective wisdom of these two groups.

1.3 Training Staff

The PJM Member SAT is implemented by personnel that are knowledgeable in system operations/dispatch and/or instructional capabilities. The central body responsible for this approach is the Dispatcher Training Subcommittee.

1.3.1 Dispatcher Training Subcommittee Representatives

Note:

The DTS is primarily made up of dedicated operations trainers at PJM and Member Companies, many with years of practical operating experience. This group has been operating continuously in PJM since the 1980s and has been instrumental in creating both training and certification programs. PJM considers Member representatives qualified to participate by virtue of their role at the Member Company, along with the Member recommendation that they serve on the DTS.

Because of the extensive collective experience of the group in both operations and instructional capabilities, other individuals with less experience in either operations or instructional capabilities may also participate in the DTS. This arrangement facilitates the continuing development of industry training professionals and also provides the DTS access to fresh perspectives. PJM monitors participation in the DTS along with experience levels to ensure this current criterion remains valid.

The DTS conducts regular meetings where much of the business related to the SAT is completed. Additionally, a select sub group or task force may be formed as needed to perform work on specific projects related to training and certification. In conjunction with PJM, the group will also seek to increase the capabilities of its members and other training professionals by sponsoring “train the trainer” activities to develop instructional capabilities along with practical application of the SAT tools and processes used in PJM.

Transmission Owners are required by the TO/TOP Matrix to participate in the PJM SAT process. Members document their participation through the PJM LMS.

Note:

The PJM Learning Management System (LMS) is the common system of record related to the requirements found in this manual. The ongoing development of this system will be with the goal of streamlining administrative tasks associated with the PJM/Member SAT, assisting with compliance monitoring, and providing clear, consistent reports for evidence during audits.

Note:

Members may choose to utilize the capability of the PJM LMS for elements of their own company specific training programs. However, it's recognized that many members have other corporate systems that contain personnel performance records and other data not related to the requirements of this manual.

Note:

If those systems are also used for the PJM requirements, corresponding records should be created in the PJM LMS. This is necessary for the compliance monitoring process described in Section 3.3. Information on how to do this can be found on the Member Training Liaison website (<http://www.pjm.com/training/member-training-liaison.aspx>).

1.3.2 Member Training Liaison

Any entity identified as having operating personnel with training and/or certification requirements listed in Section 3 of this manual, is required to designate a PJM Training Liaison. Alternate

Training Liaisons may also be named. In some cases, the Member DTS representative will serve as the Training Liaison or alternate. DTS Representatives and/or the Training Liaisons are granted supervisory access to the PJM Learning Management System (LMS) upon request.

The Training Liaison primarily serves an administrative role related to the implementation of training activities along with keeping the PJM LMS up to date with the current status of the Member's operating personnel. Specific instruction related to submitting data on operator status and records of training activity can be found on the PJM Member Training Liaison web page and in the LMS documentation.

For training activities that are not directly facilitated by on-site PJM State and Member Training Department, the Training Liaison serves as the representative for PJM training. He/she is responsible for verifying attendance and participation of operators in the training and ensuring successful completion of any related training assessments and/or evaluations.

Where onsite proctored training assessments are required, the Training Liaison may also serve in this role, maintaining a secure testing environment for the administration of the assessment. This role and standard for a secure test environment must also be carried out for any company or vendor supplied training used to meet the PJM training and re-certification requirements.

For audit purposes, all source data (e.g., attendance sign-in sheets, assessments, evaluations, etc.) for company and vendor supplied training, as well as PJM drill documentation, must be maintained by the member company. Transmission entities must retain this source documentation for a minimum of 36 months. Generation entities must retain this source documentation for a minimum of 72 months.

Additional duties of the Training Liaison include monitoring the training and certification status of his/her operating personnel, as recorded in the PJM LMS, ensuring that company operators are in compliance with PJM training and certification requirements, are informed of their training obligations, and are aware of upcoming relevant training opportunities. The Training Liaison is typically the first point of contact related to any issues regarding operator data found in the PJM LMS.

1.4 Analysis

1.4.1 Job Analysis

The DTS (or a sub group of the DTS) periodically conducts an analysis of common operational tasks performed by PJM Members. PJM manuals and other resources are analyzed to identify the specific tasks performed in support of reliability. These tasks are organized according to the common work groups that perform them and then designated with a common job title descriptive of the operating position and its role.

Note:

Presently, a full job analysis has been conducted for MOC Generation Dispatchers and Transmission Owner Operators. A PJM Member Task List has been created for these positions.

1.4.2 Task Lists

Much thought has gone into determining the proper level at which to write the tasks. Since these tasks will provide the framework for many other elements of the SAT and, depending on the job, may also be used to support certification and/or compliance, they should, as much as possible,

be written so that they are mutually exclusive and jointly exhaustive. That is, they do not overlap but are exclusive of each other. However, taken together or jointly, they represent the full scope of what PJM requires for that job or operating entity.

Each task is referred to as a “Terminal Task”, meaning the end result of its performance will represent a broad but distinct area of competency. The structure of each Terminal Task will generally be; Condition – Action – Criteria. The criteria typically relate to the measures outlined in the PJM manuals.

Two other items are developed under each Terminal Task. These are “Company Specific Tasks” and “Enabling Objectives”. Both of these items support or enable the successful completion of the Terminal Task. The Company Specific Tasks are common to most Member operating entities, but the specific performance of them varies based on the Member’s internal tools and processes. Tasks and Enabling Objectives may be used to develop more specific “Learning Activity Objectives” as will be described in Section 1.5 and 1.6.

Some Members have developed more detailed task lists for their own internal purposes. An evaluation of these lists reveals that many contain lower level steps that can easily be mapped to the Task List. While these lists are utilized by Members in carrying out their responsibilities related to the programs discussed in Section 1.5, for compliance purposes, documentation of program activities is based on the PJM Member Task Lists. The Member is responsible for mapping its list to the Task List, ensuring that there are no gaps.

To review the current Task Lists, please refer to: <https://pjm.com/committees-and-groups/subcommittees/dts.aspx>.

1.4.3 Reliability-Related Tasks

All tasks are reviewed by PJM and the DTS to determine if they are reliability-related. For applicable entities, this designation indicates that the task and related training are subject to the requirements of PER-005.

Note:

A reliability- related task is one that has the potential to impact the level of reliability of the BES (as defined in PJM Manuals) if the task is not performed, or is performed improperly. The DTS determines which specific tasks will be designated as “reliability related”, using this criterion and any other relevant factors.

If needed, individual Member Companies may add their own custom company-specific tasks, above and beyond those covered in the Task List. The Member will submit to PJM details about the additional company specific task for review. The Member Company, along with PJM and the DTS, will make the determination if the custom task is reliability-related. Reliability-related custom company specific tasks will be subject to the requirements outlined in this manual.

1.4.4 Task List Maintenance

Member company representatives are provided with the opportunity to review and comment on both the Transmission Owner Operator Task List and the Generation Dispatcher Task List via the PJM LMS. Any comments received are compiled and either brought to the DTS for general discussion or resolved with the submitter. In addition, PJM may include an agenda item to discuss task updates or changes during a DTS meeting as required.

1.4.5 Task Modification

Note:

For terminal tasks, if PJM, in conjunction with the DTS, determines that an existing reliability-related-task has been changed significantly, or if a new task is identified, the task change will be discussed with the committee. Task changes will require actions related to re-training and task re-verification.

For company-specific tasks, the member makes the determination if there is a change significant enough to merit internal training and task re-verification. They may verify their criteria in conjunction with PJM, who will then trigger a task re-verification in the PJM LMS for their company specific task.

Re-verification of both terminal and company specific tasks are tracked in the PJM LMS. The complete task verification process is discussed in Section 1.5.

Examples of declaring a reliability-related task as new or significantly modified so as to trigger the task verification process includes (but is not limited to) new tools or procedures (or updates) that impact successful task completion. Routine procedure refreshes, tool updates, database updates, grammatical updates or other changes that are insignificant or unrelated to task completion will not require supplemental training or task verification.

1.5 Development of Training Programs

PJM, in conjunction with the DTS, creates both an initial training program and a continuing training program for the Member operating personnel identified in Section 3 of this manual. The initial training program is utilized in the qualification of new operators/dispatchers; the continuing training program is utilized in maintaining that qualification. The specific course names, topics, and other details related to the learning activities that make up each program can be found in the PJM LMS.

As outlined in Section 3, depending on the entity, these programs may include other elements in addition to the successful completion of training, such as a task verification process and/or certification (covered in Section 2 of this manual). For an overview of how these elements fit together, please refer to Figure 1.

Regardless of the elements used in each program, the foundation for developing all training is the Task List identified in Section 1.4. This section will explain how that list is used to systematically develop programs. A description of all the typical elements that may be part of the PJM Member SAT are given below, along with delineating the areas for which PJM and Member training organizations each have responsibility.

All training developed by Member companies must be developed utilizing the Task List in accordance with a systematic approach to training. Members may use the PJM Member Systematic Approach to Training or their own internal approach, provided that this internal approach is developed in harmony with the documentation requirements and principles of the PJM Member SAT.

1.5.1 Tasks and Objectives

Whether initial or continuing, all programs are based on the Task Lists for each job or operating entity. These tasks are written in a format that clearly defines the measurable performance a

learner will be able to demonstrate at the conclusion of training. Taken together, they provide the framework for the development and description of a training program. The enabling objectives and tasks under each terminal task may be used to further guide the design and development of learning activities of many kinds (Section 1.6).

To assist in this, more detailed and specific “Learning Activity Objectives” may be developed from the Task List. In general, these objectives should state what the learning is meant to accomplish, providing clear guidance in the development of whatever materials or methods will be used. One or more of these Learning Activity Objectives may be sequenced together to comprise a “Learning Activity”.

These additional learning objectives are for training development only and are not meant to be subject to any regulatory requirements or those outlined in this manual. This is to preserve the elements of the Task List at the proper level to maintain the clarity necessary for the ongoing implementation and evaluation of the overall programs. While Members may choose to create and use these more detailed Learning Activity Objectives as part of their training materials, PJM will not require that these lower level details are documented in the PJM LMS, but only the Learning Activity’s linkages to the source elements found on the Task List. Forms and other information related to documenting Learning Activities can be found on the Member Training Liaison website.

1.5.2 Initial Training Program (ITP)

The initial training program covers all tasks. PJM and Member training staff each have responsibility for the development and delivery of the initial training program.

PJM develops learning activities or courses that cover all of the common terminal tasks and common enabling objectives. Detailed information related to the PJM provided portion of the ITP is found in the PJM LMS and at: <https://pjm.com/training/member-training-liaison.aspx>

An operator’s/dispatcher’s completion of this part of the program is tracked in the PJM LMS.

PJM also develops training on more introductory or fundamental topics. Participation in these training activities is at the discretion of the Member. Depending on their individual learners needs, this training may be used as prerequisites to the Initial Training Program.

The Member Company is responsible for the development of learning activities that cover all applicable company specific tasks. Members shall document this training in the PJM LMS, providing the proper linkages between the learning activity and the relevant task.

1.5.3 Continuing Training Program

All operating entities have continuing training requirements. Specific requirements are found in Section 3.

The learning activities that make up the continuing training program may vary from year to year, but are based on the entity’s Task List. PJM and the DTS determine which tasks should be included, either annually or at other intervals. Such decisions may be based on:

- Standard requirements
- PJM/DTS observations
- Trainee assessment results
- Updates or changes in operating criteria

- Program/Course evaluations (Section 1.7)

Both PJM and Training Staff at Member Companies share responsibility for the Continuing Training Program.

As in the initial program, PJM develops learning activities that cover the applicable common terminal tasks and common enabling objectives.

Training staff at the Member Company is responsible for developing learning activities that cover all applicable company specific tasks.

All training associated with the continuing training program is documented in the LMS with associated links established between the training activity and the applicable terminal and/or company specific tasks.

At times, elements of the Initial Training Program (ITP), including topics on fundamentals and theory may be utilized in the Continuing Training Program as refresher training.

1.5.4 Task Verification

Entities that require task verification are identified in Section 3 along with further details about this process.

In general, all applicable operators must be verified on the reliability-related terminal tasks and all reliability-related company specific tasks that are assigned to them. Only tasks that are designated as reliability-related are subject to this process. The task verification process for an operator must be completed prior to him/her taking on independent shift duties.

As noted in Section 1.4, any time the DTS determines that a task has been modified, all operators must be re-verified on the modified task within six months of its modification.

Each Member is responsible for performing the task verification of its operators. This includes verification on both the common terminal tasks as well as the company specific reliability-related tasks.

Note:

One method of verifying the minimum proficiency on a task is direct observation by a qualified assessor of the operator successfully performing the task (either in a real-time or simulated environment). When this is not feasible, a combination of the following may be used:

Successful completion of relevant training or certification

AND

Verbal questioning by a qualified assessor, OR

Assessment check-off lists, OR

Other means to assure the assessor that the task can be properly completed

PJM and NERC Certifications can support verification of proficiency, but alone do not indicate verification of sufficient capability to perform the task.

The Member Company will designate who may serve as a qualified assessor for its operators. The assessor should be proficient in the tasks they are assessing others on.

All task verifications (including those triggered by task modifications) must be entered into the Task Tracking Module of the LMS.

A Member Company may internally use slightly different job titles or divide the identified tasks among several different positions. To manage this, Members can create company specific job profiles in the LMS Task Tracking Module and assign the specific tasks that apply to the profiles that they have created.

Additionally, the Member Company may find that some common tasks do not apply to its operations and may choose to “opt out” of those tasks. Any Member desiring to opt out of any task must notify PJM and explain the reasons for the exemption. These cases are reviewed annually to verify that any approved “opt out” provisions remain valid.

1.5.5 Certification

Certification may be required as part of the initial qualification process. Additional information on the PJM TO Operator and Generation Dispatcher Certification Program can be found in Section 2 of this manual. If an operating entity has personnel with certification requirements, they will be listed in Section 3.

1.6 Implementation of Program Activities

The above training Programs are made up of courses and individual learning activities that can be very varied in nature. They include:

- In-person instructor-led training
- Virtual instructor-led training
- Online asynchronous training available 24/7
- Simulations and exercises
- System Restoration, Emergency Procedure Drills and Grid Security Drills
- Annual Spring Seminar
- Member On the Job Training (OJT)
- Online ‘Just in Time’ (JIT) training modules on operational updates

Records of completion for required training activities are stored in the LMS and serve as documentation of the implementation of program activities. Additionally, specific details about all PJM provided training can be found in the LMS along with schedules and links for registration. All required training will be clearly designated as such in the LMS.

Where possible and appropriate, PJM has its operationally focused training approved through the NERC Continuing Education Program.

1.7 Evaluation of Program Activities

PJM evaluates each learning activity that is delivered. This is primarily done by an evaluation form filled out by the participants, but also includes instructor observations and the results of student performance on any assessment instruments used.

Ongoing evaluation is also performed by the DTS. Aggregate evaluation data is provided to the DTS and feedback and suggestions for improvement are solicited.

Note:

PJM, in conjunction with the DTS, performs at least one formal evaluation of the initial and continuing training program annually.

Each Member is also required to perform and document with PJM an annual evaluation of its portion of the training programs.

These evaluations are managed and documented through the PJM LMS.

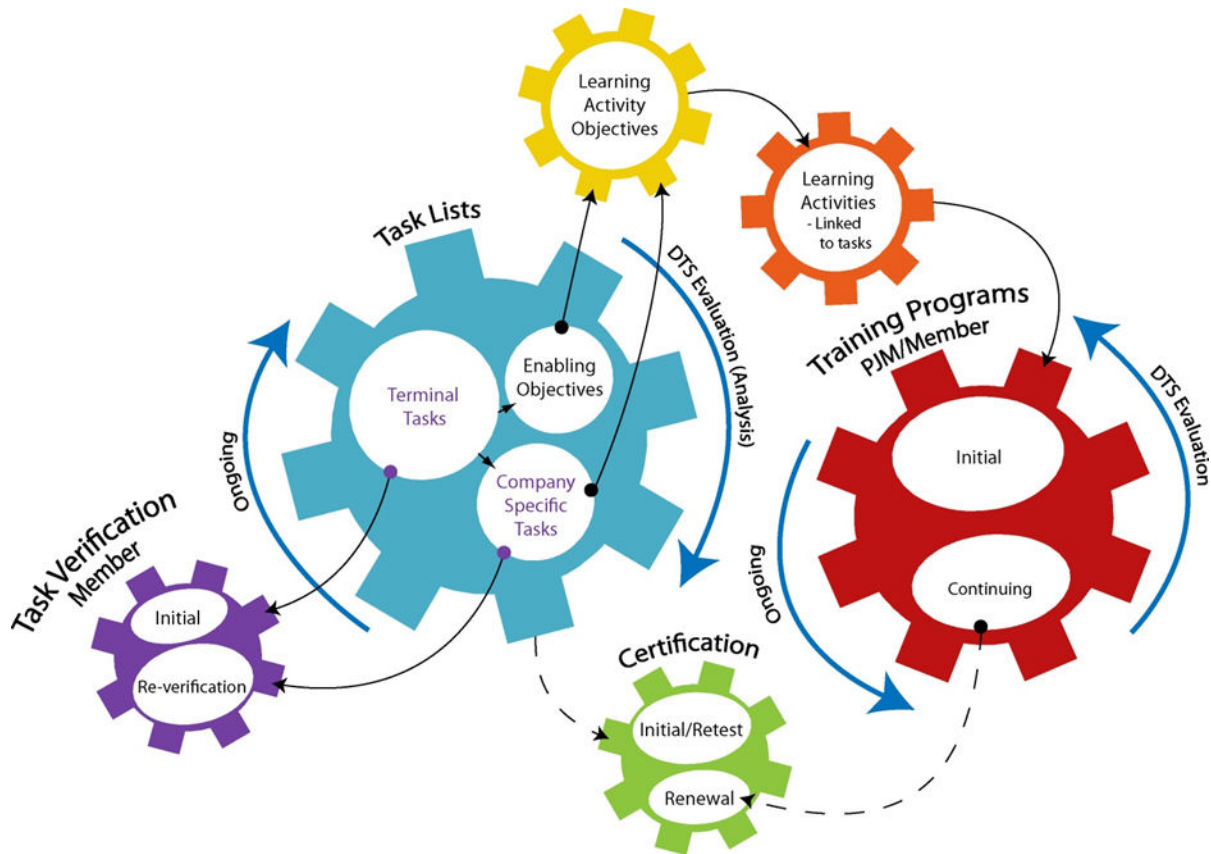


Exhibit 1: Overview of PJM Member Systematic Approach to Training (SAT)

Section 2: Certification Overview

Welcome to the *Certification Overview* section of the ***PJM Manual for Training and Certification Requirements***. In this section you will find the following information:

- Purpose and Scope of the Certification Program
- Requirements and prerequisites
- Term of Certification and Recertifying
- Administration of the Certification Program

2.1 Purpose

Certification focuses on defining required competencies for a work group and recognizing individuals who possess these competencies. The PJM Certification Program provides the public and governmental entities with a measure of confidence in the capabilities of personnel within the PJM Regional Transmission Organization (RTO) to maintain the reliability of the bulk electric system and the energy markets. In addition, the Certification Program provides assurance to PJM and its members that personnel in the PJM RTO have a demonstrated knowledge of PJM real time operating requirements and business rules.

The PJM Certification Program is comprised of three credentials:

- PJM Generation Dispatcher
- PJM Transmission Owner Operator
- PJM Markets (voluntary)

The certification exams are revised on a periodic basis to reflect changes in operating procedures in effect on the PJM system. Certification exams are developed and revised in accordance with the current versions of the Task Lists in effect at the time of exam revision. Due to the fact that certification exam development is cyclic in nature and Task List maintenance is on-going, there may be times when the certification content outlines and the Task Lists do not match.

The PJM certification exams are validated, objective, multiple choice exams administered by a computer testing service at designated locations. The PJM Exam Working Group developed the certification exams and assists in periodically reviewing and maintaining them to ensure they are current.

The PJM Candidate Bulletin details the application and testing procedures and requirements. The bulletin also contains information on the Content Outlines, other key documents, and the fee schedule.

2.2 Administration of the Certification Program

2.2.1 Prerequisites

There are no training or work experience requirements that candidates must satisfy before they can apply to sit for the PJM certification exam. However, completion of one or more PJM training programs for system operators is highly recommended.

2.2.2 Validity, Reliability and Defensibility

The PJM Certification Program was developed and is operated in accordance with the “good practices” of the National Commission for Certifying Agencies (NCCA). Following these “good practices” ensures that the program conforms to EEOC guidelines, is legally defensible and is fairly administered to all candidates.

Assistance of a consultant skilled in the development of certification exams has been secured on a continuing basis to guide, advise, and perform selected tasks to ensure that the PJM Certification Program remains valid, reliable and legally defensible.

2.2.3 Certification Oversight Group

The Certification Oversight Group (COG) is charged with ensuring that the PJM Certification Program is kept fair to all and free from undue influence in order to protect against actual or perceived bias toward candidates or their employers, and that the Certification Program is valid and legally defensible. The COG also participates in the PJM Certification Dispute Resolution Process.

2.2.4 Dispute Resolution Procedure

A non-binding dispute resolution procedure is available to address complaints and challenges regarding the certification exams, and related application and test administration processes. As backup to PJM Certification Dispute Resolution, a complainant not satisfied with the results of Certification Dispute Resolution can submit his/her case to the PJM Alternate Dispute Resolution Committee.

2.2.5 Disciplinary Actions

In the event that an individual acts inconsistent with the expectations of the PJM Certification Program, disciplinary actions may be required. The purpose of the Disciplinary Action Procedure is to protect the integrity of the PJM credentials.

2.2.5.1 Grounds for Action

The following may be grounds for disciplinary action:

- Intentional misrepresentation of information provided to PJM or the test administrator for the purposes of initial certification or credential maintenance
- Any form of cheating during a certification exam, including but not limited to: use of unauthorized reference materials or sharing details of exam questions with others

2.2.5.2 Review

In the event of alleged misconduct, the PJM COG will review the details of the case, including information provided by the applicable candidate/credential holder. If the misconduct is

substantiated and significant, disciplinary actions up to and including the revocation of the PJM credential may result.

2.2.6 Financing the Certification Program

The PJM RTO funds the operation and maintenance of the Certification Program. All individuals who take the examination pay a modest fee to cover the cost of sitting for the exam.

2.2.7 Additional Resources

For additional information about the PJM Certification Program, including the Candidate Bulletin, Content Outlines for the exams and the Certification Dispute Resolution Procedure, please go to: <https://pjm.com/training/certification.aspx>. If you have questions about the certification program, please call PJM Member Relations at (610) 666-8980.

2.3 Certification Requirements

The following section focuses specifically on the PJM Transmission Owner Operator and PJM Generation Dispatcher credentials, for which there are associated certification requirements. For more information about the voluntary PJM Markets credential, please refer to: <https://pjm.com/training/certification/resources-markets.aspx>

2.3.1 Scope of the PJM TO Operator and Generation Dispatcher Certification Program

There are two relevant certification programs for operators: the NERC System Operator Certification Program and the PJM TO Operator and Generation Dispatcher Certification Program. The goal of the NERC certification program is to ensure a minimum qualification for operators operating across the entire North American bulk power system. If applicable, NERC certification requirements for entities operating in PJM can be found in Section 3 of this manual.

Whereas the scope of the NERC program is broad so as to encompass the skills common to all operating areas within North America, PJM developed its own certification program to more specifically focus on the tasks and procedures required for the reliable operation of the PJM system.

The scope of requirements for operators/dispatchers in the PJM RTO is based on the daily operations-related knowledge and skills needed to implement procedures for normal, emergency and restoration conditions. All operators/dispatchers must understand and be able to implement these procedures as presented in the PJM Manuals to ensure reliable operation of the PJM RTO. In addition, operators/dispatchers must understand basic operating concepts in order to perform the referenced tasks.

The results of a Job Analysis have determined that there are two discrete sets of tasks performed by operators/dispatchers in the PJM RTO. A Transmission Content Outline details the common tasks performed by operators who operate transmission facilities. A Generation Content Outline details the common tasks performed by dispatchers of generation facilities. Therefore, there are two PJM certification examinations: Transmission and Generation.

2.3.2 Requirements for Operators and Dispatchers

The PJM Certification Program applies to operators, dispatchers, or other individuals who:

- operate or dispatch on the PJM system,
- are in direct communication with the PJM System Operator, and

- perform daily operations-related functions at the direction of the PJM System Operator during normal, emergency and/or system restoration states.

System personnel performing these tasks may be at a Transmission Owner (TO) control center, a Market Operations Center (MOC), or other location. The requirement to obtain a PJM credential is ultimately determined by who is performing the identified PJM tasks and not the location from which they perform them. For instance, in some cases, PJM generation dispatch instructions and communications occur directly between PJM and personnel at a plant control room. Even though these personnel are not located at an MOC, they interact with PJM and are responsible for performing generation dispatch tasks. Therefore they are required to obtain the Generation Certification (unless they qualify as a Small Generation Resource Dispatcher – See Section 3.2.4)

Refer to Section 3 of this manual for specific requirements related to PJM certification. Although operators and dispatchers are the only group on the PJM system required to be PJM certified, other participants including marketers and generation control room operators are encouraged to sit for the PJM Certification exam due to their impact on reliability. Opportunity to sit for either of the PJM Certification exams is open to all.

2.3.3 Term of Certification

PJM certificates are valid for three years.

2.3.4 Recertification

There are two ways a PJM Generation or PJM Transmission credential can be renewed:

1. Retest

Before the certificate for a PJM certified operator/dispatcher expires, apply for, take and pass the same PJM certification exam for which he/she holds a valid certificate.

2. Continuing Education Hours (CE Hours):

On a rolling three year basis, complete at least 140 hours of NERC approved CE training related to the PJM credential which has been recorded in the PJM (LMS). Of the 140 CE hours required to renew, 30 CE hours must be approved for the category of Simulation. If an operator/dispatcher has more than the required 140 CE hours at the time of the request for renewal, PJM will allow up to 30 CE hours to be carried over to the next 3 year period. No hours will be carried over in any of the CE category classifications (e.g., Simulation, Standards, or EOP hours). Those who fail to get credit for 140 CE hours, of which 30 CE hours must be for Simulation, must apply for, take, and pass the appropriate PJM exam before their current certificate expires.

Specific requirements for maintaining a PJM certification are outlined in Section 3 of this manual. Failure to renew a certification prior to the certification date of the credential will be subject to the compliance monitoring process described in Section 3.3. Mitigation plans developed to address such lapses in certification will be reviewed on a case-by-case basis and may include remedial actions such as supplemental training activities or retesting. Please note that an individual with an expired PJM certification must be removed from his/her shift responsibilities until such time that he/she comes into compliance with those requirements.

Section 3: Member Training and Certification Requirements

Welcome to the Training and Certification Requirements section of the **PJM Manual for Training and Certification Requirements**. In this section you will find the following information:

- Overview
- Requirements outlined by entity:
 - Training and certification requirements for TO Operators
 - Training and certification requirements for MOC Generation Dispatchers
- Training and certification requirements for Transmission Owner Operators and Generation Dispatchers
 - Training requirements for Small Generation Resource Dispatchers
 - Training requirements for Demand Response Resources
 - Training requirements for Energy Storage Resource operators
- Compliance monitoring process for training and certification requirements
- Process for requesting a temporary waiver of PJM training and certification requirements
- NERC training requirements

3.1 Overview

This section addresses the different operating entities and positions that interact with PJM operations, performing tasks or carrying out operational instructions and directives at PJM's request. The type and nature of these requirements are based on the operational significance each type of entity has on the Bulk Electric System (BES).

3.2 Entity Training and Certification Requirements

3.2.1 Transmission Owner Operators

Transmission Owner (TO) Operators are defined as operators who participate in the real time operations of the PJM system by operating under the direction of PJM, their local transmission facilities and performing other transmission-related real time duties of a TO as found on the PJM Transmission Owner (TO) Operator Task List.

Initial Training:

TO Operators must successfully complete the PJM sponsored Initial Training Program (ITP) and all open and required Just-in-Time training modules prior to independently participating in real time operations. The initial training may be completed either in-person or online through the PJM LMS.

PJM continues to provide a variety of both introductory and more advanced training on operational and PJM specific topics that may be used by Members to help qualify new TO Operators or to provide a refresh for incumbent operators. However, these courses are not considered mandatory prerequisites to the Initial Training Program.

Each TO is responsible for providing initial training to new operators related to their reliability-related company specific tasks and any other training needed to prepare the operator for the task verification process described below and in Section 1.5.4 of this manual. Members should document their company provided training in the PJM LMS with associated links to the common and company specific TO tasks. This can be accomplished via the Training Activity Forms found on the Member Training Liaison webpage. However, PJM considers the company initial training as complete when the operator's capability to perform each applicable task has been verified in the PJM LMS.

PJM Transmission Certification:

New TO Operators (including TO Operators whose company is integrating into PJM) must obtain a PJM transmission certification prior to independently operating on the PJM system. An uncertified operator may participate in on-the-job training, as defined in that company's training program, under the direct, in-person supervision of a PJM/NERC certified operator.

NERC Certification:

PJM requires any TO Operator who is required to be PJM transmission certified to also be NERC certified. These operators are required to obtain the NERC Transmission Operator Certification, the NERC Balancing, Interchange and Transmission Operator Certification, or the NERC Reliability Operator Certification. The NERC Transmission Operator Certification is recommended as it is more applicable to the functions performed by TO Operators. Operators currently certified at the Reliability Operator or Balancing, Interchange and Transmission Operator level may maintain their certification at this level or convert their certification to a Transmission Operator certificate. The Balancing and Interchange Operator Certification will not be acceptable for TO Operators to meet this requirement.

Any new TO Operator must be NERC Certified prior to taking independent shift responsibilities. New operators in a "training mode" without a NERC certification must be working under the direct supervision of a PJM/NERC certified operator and cannot take independent direction from PJM.

Renewal of NERC certifications will follow the existing NERC process. This process will be between NERC and the certified operator through the NERC System Operator Certification and Continuing Education Database (SOCCED). The Training Liaison will provide PJM with each of his/her operators' NERC certification information for entry into the PJM LMS.

Task Verification:

Each TO must verify the capability of each TO Operator to perform each applicable reliability-related task contained within their Task List at least one time. This verification must be completed prior to the new TO Operator assuming independent shift duties. For more detailed information about the verification process, refer to Section 1.5.4 of this manual.

Annual Continuing Training:

Note:

For the purpose of this requirement, “annual” is defined on a calendar year basis (January – December) beginning the year that an operator assumes shift responsibilities.

It is recognized that various situations can occur related to measuring annual and other requirements. These include new operators not starting at the beginning of the year, variations in operator shift schedules and the timing of certain annual training conducted from year to year.

PJM monitors compliance with the requirements on an annual and monthly basis. However, as noted above, requirements not met within a 12 month period do not necessarily constitute an exception.

Each individual case will be evaluated in accordance with the guidelines of this manual and if necessary a mitigation plan will be put in place.

Beginning the first full calendar year that an operator assumes shift responsibilities in real time PJM operations (with the exception as noted above), he/she shall complete at least 32 hours, per calendar year, of emergency preparedness training by the following or its equivalent:

- Attendance at the annual PJM Operator Seminar (Note: The annual PJM Operator Seminar is a large component of the PJM Continuing Training Program. Since much of the content involves important updates and preparation for the summer peak season, it is highly recommended that all TO operators attend this event each year.)
- Completion of PJM sponsored emergency preparedness activities, including drills, table-top exercises, simulations and instruction delivered either in-person or online through the PJM LMS
- Completion of company sponsored emergency preparedness activities, including drills, table-top exercises, simulations and other training linked to the company specific tasks. (Note: This training should be documented in the PJM LMS utilizing the appropriate Training Activity Forms found on the Member Training Liaison webpage. This will allow the LMS to generate useful task to training reports that can be used by PJM and the member for the evaluation phase of the SAT.)

Operators who have less than one full year of service at the end of the calendar year shall complete a pro-rated amount of emergency preparedness training according to the following schedule:

- Individuals who were operators for 3 calendar quarters shall complete at least 24 hours of emergency preparedness training during that calendar year
- Individuals who were operators for 2 calendar quarters shall complete at least 16 hours of emergency preparedness training during that calendar year
- Individuals who were operators for 1 calendar quarter shall complete at least 8 hours of emergency preparedness training during that calendar year
- Individuals who were operators for less than one full calendar quarter have no minimum training requirement for that calendar year

As outlined in Section 1 of this manual, PJM will work in collaboration with the DTS to determine the relevant tasks and training topics that will be included in the annual PJM/Member continuing

training program, based on applicable NERC Standard requirements and an evaluation of training needs. Specific topic/task requirements for a given year will be reviewed with the DTS and assigned and tracked in the PJM LMS.

When appropriate, members of the DTS shall adjust the training content covered in their company specific continuing training programs to address specific, individualized needs of their operators. This content includes training on the company specific tasks identified in an evaluation of training needs.

Company Sponsored Equivalent Training:

As outlined in Section 1 of this manual, Member TOs have systematically developed training programs related to their company specific tasks which may also include similar training identified in the PJM sponsored training courses. Member Company sponsored training activities may be accepted as equivalent training for the continuing education requirement if they:

- are identified as acceptable emergency operations preparedness activities
- are properly documented as being linked to a PJM and/or company specific task

Such company training may also be approved through the NERC Continuing Education Program, although this is not required for equivalency.

Vendor Sponsored Equivalent Training:

Additionally, there may be third party suppliers of relevant, quality training. These training courses will be considered for equivalency if they meet the criteria of the NERC Continuing Education Program (CEP), have been developed in harmony with a systematic approach, and are properly documented as being linked to a terminal and/or company-specific task.

PJM reserves the right to review training documentation and the systematic approach to training used in the development of any learning activity prior to granting equivalency.

PJM initial training requirements cannot be met by equivalent training. Additionally, the annual continuing training program may include requirements to complete certain PJM online “Just in Time” (JIT) Training modules on important changes to operations. These requirements must be satisfied by completion of PJM sponsored training and associated assessments.

3.2.2 Market Operation Center Generation Dispatchers

Market Operation Center (MOC) Generation Dispatchers are defined as dispatchers who participate in the real time operations of the PJM system by dispatching generation and performing other generation-related real time duties as found on the PJM Generation Dispatcher Task List. In some cases personnel responsible for these tasks are at locations other than a traditional MOC. For instance, in some cases, PJM generation dispatch instructions and communications occur directly between PJM and personnel at a plant control room. Even though these personnel are not located at an MOC, they interact with PJM and are responsible for performing generation dispatch tasks. Therefore they are required to meet the following PJM requirements (unless they qualify as a Small Generation Plant Dispatcher – See Section 3.2.4).

Initial Training:

Newly hired MOC Generation Dispatchers must successfully complete the PJM sponsored Initial Training Program (ITP) and all open and required Just-in-Time training modules within six

(6) months of being deemed qualified by their company to begin operating on the PJM system. The initial training may be completed either in-person or online through the PJM LMS.

PJM Generation Certification:

New MOC Generation Dispatchers (including MOC Generation Dispatchers whose company is integrating into PJM) will have a maximum of six (6) months to become PJM generation certified after being deemed qualified by their company to begin operating on the PJM system. During this six (6) month period, if the dispatcher is dispatching on the system without a PJM generation certification, he/she must work under the direct supervision of a PJM certified generation dispatcher, either in person or via an on-call arrangement.

For new entities, at least one dispatcher must be PJM Generation certified dispatcher prior to that entity beginning operations in PJM.

Continuing Training:

All MOC Generation Dispatchers with at least one full calendar year of shift responsibilities in real time PJM operations shall complete at least 18 hours per calendar year of refresher, operations and markets updates, or emergency preparedness training.

The following or its equivalent is satisfactory for meeting this requirement:

- Attendance at the annual PJM Operator Seminar (Note: The annual PJM Operator Seminar is a large component of the PJM Continuing Training Program. Since much of the content involves important updates and preparation for the summer peak season, it is highly recommended that all Generation Dispatchers attend this event.)
- Completion of PJM sponsored refresh, operations and markets updates, or emergency preparedness activities, including drills, table-top exercises, simulations and instruction
- Completion of company sponsored emergency preparedness activities, including drills, table-top exercises, simulations and other training linked to the company specific tasks. (Note: This training should be documented in the PJM LMS utilizing the appropriate Training Activity Forms found on the Member Training Liaison webpage. This will allow the LMS to generate useful task to training reports that can be used by PJM and the member for the evaluation phase of the SAT.)

As outlined in Section 1 of this manual, PJM will work in collaboration with the DTS to determine the relevant training topics that will be included in the annual PJM/Member continuing training program, based on an evaluation of training needs. Additionally, DTS members are also responsible for addressing any of the individualized training needs for operators at their company.

Company or Vendor Sponsored Equivalent Training:

PJM recognizes that many Member Companies have rigorous training programs that provide similar training identified in the PJM sponsored training courses. Additionally, there may be third party suppliers of relevant, quality training. These training courses will be considered for equivalency if they meet the criteria of the NERC Continuing Education Program (CEP) and contain topics consistent with the PJM and company-specific Task List.

PJM reserves the right to review training documentation and the systematic approach to training used in the development of any learning activity prior to granting equivalency.

PJM initial training requirements cannot be met by equivalent training. Additionally, the annual continuing training program may include requirements to complete certain PJM online “Just in Time” (JIT) Training modules on important changes to operations. These requirements must be satisfied by completion of PJM sponsored training and associated assessments.

3.2.3 Transmission Owner Operators/Generation Dispatchers

Transmission Owner Operators/Generation Dispatchers are defined as personnel who participate in the real time operations of the PJM system by performing both transmission and generation related functions as found on the Transmission Owner Operator and Generation Dispatcher Task Lists.

Initial Training:

Transmission Owner Operator/Generation Dispatchers are subject to the initial training requirements of both the TO Operators and the MOC Generation Dispatchers. Please refer to sections 3.2.1 and 3.2.2 of this manual, respectively, for details.

PJM Transmission and Generation Certification:

Transmission Owner Operators/Generation Dispatchers must be both PJM transmission and PJM generation certified. Since there is no overlap of the content outlines for the certification exams, a combination examination is not available. Please refer to sections 3.2.1 and 3.2.2 of this manual for details on the timeframes associated with the certification requirement.

NERC Certification:

PJM requires any operator performing transmission related functions, who is required to be PJM transmission certified, to also be NERC certified. These operators are required to obtain the NERC Transmission Operator Certification, the NERC Balancing, Interchange and Transmission Operator Certification, or the NERC Reliability Operator Certification. The NERC Transmission Operator Certification is recommended as it is more applicable to the functions performed by these operators. Operators currently certified at the Reliability Operator or Balancing, Interchange and Transmission Operator level may maintain their certification at this level or convert their certification to a Transmission Operator certificate. The Balancing and Interchange Operator Certification will not be acceptable for operators to meet this requirement.

Any new Transmission Owner Operator/Generation Dispatcher must be NERC Certified prior to taking independent shift responsibilities. New operators in a “training mode” without a NERC certification must be working under the direct supervision of a NERC certified operator and cannot take independent direction from PJM.

If a Transmission Owner Operator/Generation Dispatcher allows his/her NERC certification to become suspended or expire (as defined in the NERC System Operator Certification Program Manual), he/she must be removed from his/her operating shift responsibilities until such time that he/she can renew the credential.

Renewal of NERC certifications will follow the existing NERC process. This process will be between NERC and the certified operator through the NERC System Operator Certification and Continuing Education Database (SOCCED).

Task Verification:

Each entity must verify each TO Operator/Generation Dispatchers capability to perform each applicable reliability-related task contained within their Task List at least one time. This verification must be completed prior to the new TO Operator/Generation Dispatcher assuming

independent shift duties. For more detailed information about the verification process, refer to Section 1.5.4 of this manual.

Continuing Training:

TO Operator/Generation Dispatchers are subject to the continuing training requirements of both the TO Operator and the MOC Generation Dispatcher. Please refer to sections 3.2.1 and 3.2.2 of this manual, respectively, for details.

3.2.4 Small Generation Resource Dispatchers

Small Generation Resource Dispatchers are defined as dispatchers located at a generation resource who participate in the real time operations and meet the requirements of this classification. To be eligible for the Small Generation Resource Dispatcher classification the company must meet the following criteria:

- Operates/dispatches a total of 75 MW or less of generation (nameplate capacity) within PJM.
- Does not operate a black-start unit

Requests for this classification should be sent to TrainingSupport@pjm.com.

PJM will review all requests for this classification and notify the entity of its classification status and applicable requirements based on the entity's participation level in PJM and relative impact on the BES. If the request for Small Generation Resource Dispatcher classification is denied, the entity is subject to the training and certification requirements outlined in Section 3.2.2 of this manual. If an entity is approved as a Small Generation Resource Dispatcher, the following requirements apply.

3.2.4.1 For entities operating between 20 MW and 75 MW on an aggregate basis:

Initial Training:

Small Generation Resource Dispatchers must successfully complete the PJM sponsored Initial Training Program (ITP) and all open and required Just-in-Time training modules within six (6) months of being deemed qualified by their company to begin operating on the PJM system. Specific content covered in these courses may be adjusted based on the PJM generation dispatch tasks the entity is responsible for and the training needs of the individual company.

Operator Readiness Exam:

Small Generation Resource Dispatchers must successfully complete an operator readiness exam within six (6) months of being deemed qualified by their company to begin operating on the PJM system. This exam is based on the initial training program and assesses the dispatcher to ensure he/she has a baseline level of knowledge, awareness and familiarity of the content covered in this training.

Anytime during this six (6) month period, if a dispatcher is interacting with the PJM control room without having completed the requirements outlined above, he/she must work under the direct supervision of another dispatcher who has met the requirements, either in person or via an on-call arrangement.

For new entities, at least one dispatcher must pass the operator readiness exam prior to that entity beginning operations in PJM.

Continuing Training:

All Small Generation Resource Dispatchers with at least one full calendar year of shift responsibilities in real time PJM operations shall complete at least 8 hours per calendar year of refresher, operations and markets updates, or emergency preparedness training.

The following or its equivalent is satisfactory for meeting this requirement:

- Attendance at the annual PJM Operator Seminar (Note: The annual PJM Operator Seminar is a large component of the PJM Continuing Training Program. Since much of the content involves important updates and preparation for the summer peak season, it is highly recommended that Small Generation Resource Dispatchers attend this event.)
- Completion of PJM sponsored refresh, operations and markets updates, or emergency preparedness activities, including drills, table-top exercises, simulations and instruction
- Completion of company or vendor sponsored refresh, operations and markets updates, or emergency preparedness activities, including drills, table-top exercises, simulations and other training linked to the company specific tasks. (Note: This training should be documented in the PJM LMS utilizing the appropriate Training Activity Forms found on the Member Training Liaison webpage. This will allow the LMS to generate useful task to training reports that can be used by PJM and the member for the evaluation phase of the SAT).

3.2.4.2 For entities operating less than 20 MW on an aggregate basis:

Initial Training:

Small Generation Resource Dispatchers must successfully complete an initial training module on the requirements and business rules related to PJM markets and operations. Specific content covered in these courses may be adjusted based on the PJM generation dispatch tasks the entity is responsible for and the training needs of the individual company. This training module is available online, through the PJM Learning Management System (LMS) and must be completed, along with all open and required Just-in-Time training modules within six (6) months of being deemed qualified by their company to begin operating on the PJM system.

Anytime during this six (6) month period, if a dispatcher is interacting with the PJM control room without having completed the requirements outlined above, he/she must work under the direct supervision of another dispatcher who has met the requirements, either in person or via an on-call arrangement.

For new entities, at least one dispatcher must meet the above requirements prior to that entity beginning operations in PJM.

Continuing Training:

Small Generation Resource Dispatchers must annually complete a refresher training module on the requirements and business rules related to PJM markets and operations. This training is available online, via the PJM LMS.

Company or Vendor Sponsored Equivalent Training:

PJM recognizes that many Member Companies have rigorous training programs that provide similar training identified in the PJM sponsored training courses. Additionally, there may be third party suppliers of relevant, quality training. These training courses will be considered for

equivalency if they meet the criteria of the NERC Continuing Education Program (CEP) and contain topics consistent with the PJM and company-specific Task List.

PJM reserves the right to review training documentation and the systematic approach to training used in the development of any learning activity prior to granting equivalency.

PJM initial training requirements cannot be met by equivalent training. Additionally, the annual continuing training program may include requirements to complete certain PJM online “Just in Time” (JIT) Training modules on important changes to operations. These requirements must be satisfied by completion of PJM sponsored training and associated assessments.

3.2.5 Demand Response Resources

For the purpose of the training and certification requirements, the Demand Response Resources audience is defined as individuals who serve as an agent of each Curtailment Service Provider (CSP) that is interested in participating in PJM’s Regulation and Synchronized Reserve markets and/or has Load Management (Emergency and Pre-Emergency) Resources. These individuals are in direct communication with Demand Response (DR) customers, advising them to curtail load when advised by PJM.

Initial Training:

Demand Response Resources must complete an initial training module on the requirements and business rules of the Regulation and Synchronized Reserve markets and relevant PJM Emergency Procedures. This training module is available online, through the PJM Learning Management System (LMS) and must be completed, along with all open and required Just-in-Time training modules, within 3 months of the individual beginning participation in Demand Response.

Anytime during this 3 month period that a Demand Response Resource individual is interacting with PJM without having completed the requirement outlined above, he/she must work under the direct supervision of another individual who has met the requirement, either in person or via an on-call arrangement.

For new entities, at least one individual must complete the initial training prior to that entity beginning participation in the PJM markets.

Certification:

At this time, PJM certification is not required for Demand Response Resources.

Continuing Training:

Demand Response Resources must annually complete a brief refresher training module on the requirements and business rules of the Regulation and Synchronized Reserve markets and relevant PJM Emergency Procedures. This training is available online, through the PJM LMS.

3.2.6 Energy Storage Resource Operators

For the purpose of the training and certification requirements, Energy Storage Resources are those facilities that may participate in various PJM markets. These resources may include, but are not limited to: batteries, plug-in hybrid electric vehicles (PHEV), flywheels and compressed air. Energy Storage Resource Operators are those individuals who will interact with PJM Dispatch for any dispatch assignments or emergency procedures.

Initial and Continuing Training:

For entities operating resources that aggregate to:

- Greater than 75 MW
 - o Energy Storage Resource Operators are subject to the training requirements of the MOC Generation Dispatcher. Please refer to section 3.2.2 of this manual for details.
- 75 MW or less
 - o Energy Storage Resource Operators are subject to the training requirements of the Small Generation Resource Dispatcher. Please refer to section 3.2.4 of this manual for details.

Certification:

For entities operating resources that aggregate to:

- Greater than 75 MW
 - o Energy Storage Resource Operators are subject to the certification requirements of the MOC Generation Dispatcher. Please refer to section 3.2.2 of this manual for details.
- 75 MW or less
 - o At this time, PJM certification is not required

3.3 Compliance Monitoring Process for Training and Certification Requirements

Section 1 of this manual describes the various elements and activities involved in implementing the PJM/Member SAT. These represent best practices that help ensure relevant training is implemented in a coordinated manner. However each SAT element does not represent a compliance monitoring point. The specific individual requirements that are monitored for compliance are outlined in Section 3.2 of this manual.

For additional clarity, below is a summary of the personnel requirements against which PJM performs compliance checks on a monthly and annual basis.

TO Operator

- Task verifications and reverifications completed
- Initial Training Program (ITP) completed
- Continuing Training Program requirements met
 - o 32 Hours, per calendar year, Emergency Preparedness Training
 - o Required Just-In-Time Training (by assigned due date)
 - o Fulfillment of Annual Training Tasks (by the end of each calendar year)
- Active NERC and PJM Transmission Certifications

MOC Generation Dispatcher

- Initial Training Program (ITP) completed
- Continuing Training Program requirements met
 - 18 hours of continuing/refresher training per calendar year
 - Required Just-In-Time Training (by assigned due date)
- Active PJM Generation Certification

Small Generation Resource Dispatchers

- **(Operating between 20 MW and 75 MW on an aggregate basis):**
 - Initial Training Program (ITP) completed
 - Operator Readiness Exam passed
 - Continuing Training Program requirements met
 - 8 hours of continuing/refresher training per calendar year
 - Required Just-In-Time Training (by assigned due date)
- **(Operating less than 20 MW on an aggregate basis):**
 - Initial Training Program (ITP) completed
 - Continuing Training Program requirements met
 - Annual refresher training module assigned via the PJM LMS
 - Required Just-In-Time Training (by assigned due date)

Demand Response Resource Operators

- Initial Training completed
- Continuing Training Program requirements met
 - Annual refresher training module assigning via the PJM LMS
 - Required Just-In-Time Training (by assigned due date)

Energy Storage Resource Operator

- **Greater than 75 MW on an aggregate basis:**
 - Energy Storage Resource Operators are subject to the training requirements of the MOC Generation Dispatcher above
- **Less than 75 MW on an aggregate basis:**
 - Energy Storage Resource Operators are subject to the training requirements of the Small Generation Resource Dispatcher above

Any operator or dispatcher that is not compliant with the applicable requirements listed above must be removed from his/her shift responsibilities until such time that he/she comes into compliance with those requirements.

If an exception to any of the requirements is identified, PJM will notify the company's Training Liaison, Member Committee Representative and Compliance contact of the compliance issue. Upon notification of the compliance issue, the Training Liaison will submit to PJM a mitigation plan outlining the steps the company plans to take to resolve the exception and satisfy the training and/or certification requirements. The mitigation plan should conform to the suggested guidelines provided in the notification of the compliance issue.

PJM will evaluate the details and milestones of the mitigation plan that is submitted. If the plan is approved, these milestones will provide the timing of subsequent compliance checks to verify that the details of the plan are being carried out. If the plan is not approved, PJM will request additional information needed to complete the mitigation plan.

PJM will develop a compliance score for each non-compliant company based on the number of months each operator/dispatcher is out of compliance. For companies that have a compliance score of 5 or greater, are consistently out of compliance with the requirements or are non-responsive, PJM Legal will issue a letter to said company warning of a report to FERC of a potential OA/OATT violation. If the company is still out of compliance with the requirements 30 days after the warning letter from PJM Legal, a report will be made to FERC that the company is in violation of the PJM OA/OATT.

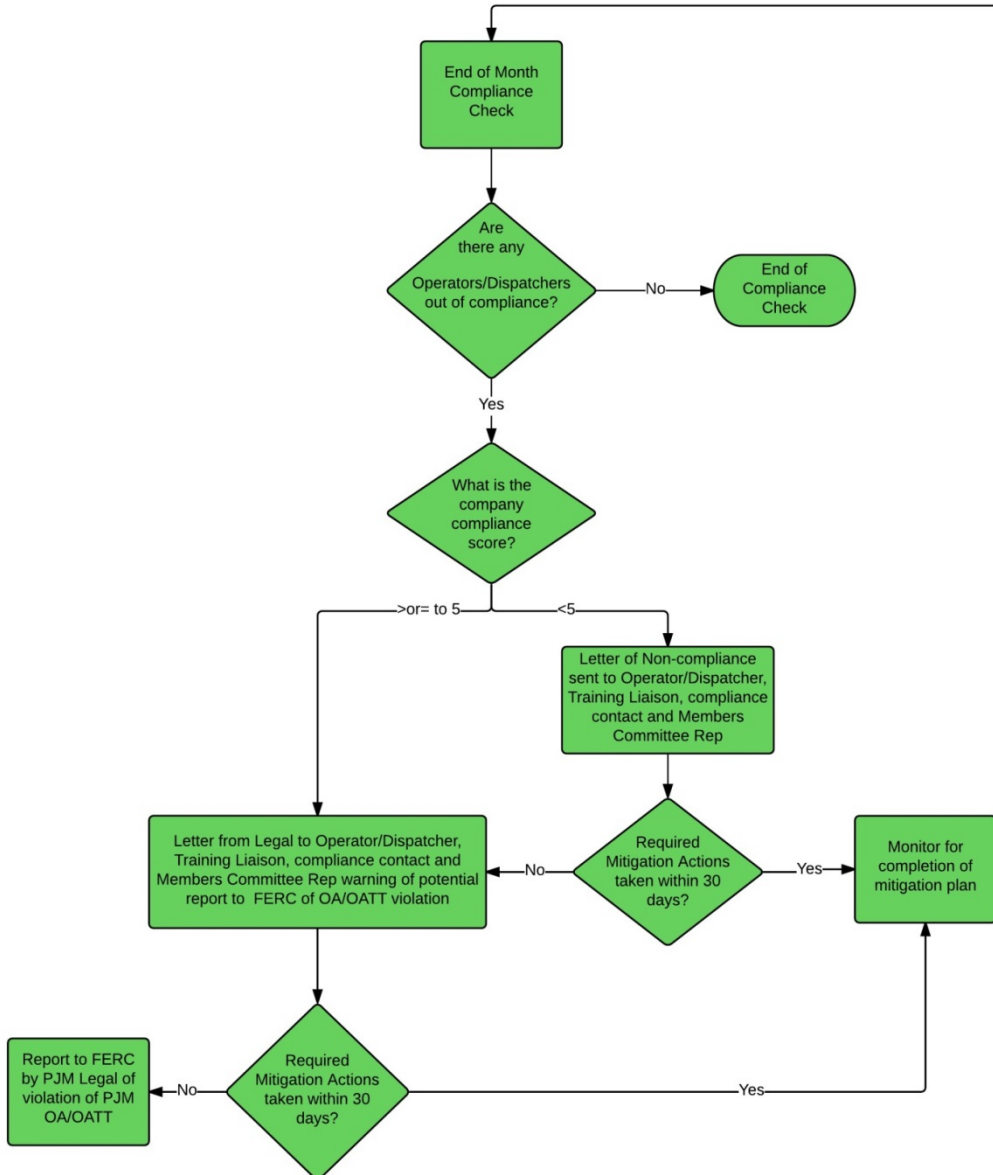


Exhibit 2: Compliance Monitoring Process

3.4 Waiver of PJM Training and Certification Requirements

Situations may arise which can prevent an operator/dispatcher from fulfilling assigned work duties and satisfying the applicable PJM training and certification requirements.

In such cases, the Training Liaison must, on behalf of the operator/dispatcher, submit a letter requesting a waiver from the PJM training and certification requirements with a supporting statement by the entity's manager, or equivalent. The letter must provide a thorough explanation of the circumstances preventing the operator/dispatcher from satisfying the requirements, and should be emailed to TrainingSupport@pjm.com.

PJM will review the request and will provide the Training Liaison with a final determination. The terms of the waiver, if granted, will be suited to the specifics of the case.

The Training Liaison is required to advise TrainingSupport@pjm.com of the date when the operator/dispatcher resumes normal duties and can participate in training activities.

3.5 NERC Training Requirements

The PJM training requirements described in section 3.2 of this manual do NOT replace or supplant any NERC training requirements defined in the NERC standards. The PJM training requirements are in addition to these applicable NERC standards on training and operator qualification.

TO Operator requirements as they relate to PER 005 are outlined in the TO/TOP Matrix.

Revision History

Revision 22 (02/20/2020):

- Periodic Review
- Updated operator/dispatcher terminology throughout to be consistent
- Section 2.3.4: updated language to match language in Section 3.3, Compliance Monitoring Process for Training and Certification Requirements
- Section 3.3: updated to reflect changes made to Section 3.2 in revision 21 for ESR
- Section 3.4: updated temporary waiver language to allow for more flexibility in addressing compliance with training and certification requirements
- Removed Richard Brown as manual owner
- Removed Section 4: PJM Operator Training, relocated to an internal procedure

Revision 21 (12/03/2019):

- Section 3.2:
- Updated Small Generation Plant Dispatchers to Small Generation Resource Dispatchers
- Added lower MW threshold for training requirements to accommodate ESR as well as Small Gen Resources
- Updated Energy Storage Device to Energy Storage Resource
- Updated language for training requirements for ESR operators

Revision 20 was published with current change information in the Revision History that should have appeared in the Current Revision section.

Moved misplaced Current Revision information, which mistakenly appeared in Revision History during publishing on January 24 2019, back into the Current Revision section for Revision 20:

- [Removed testing requirements from Sections 4.4, 4.5, 4.6, and 4.7 and consolidated all requirements in a separate Section 4.2.6.
- Changed OJT Instructor to OJT Trainer
- Added footnote 1 defining Master Dispatcher
- Added footnote 2 defining OTS versus DTS
- Added clarifying language throughout Section 4
- Updated Exhibit 4 “Threat Error Management”]

Revision 20 (01/24/2019):

- Cover to Cover Periodic Review
- Updated co-ownership to Richard Brown
- Section 3: Removed references to legacy training requirements

- Removed testing requirements from Sections 4.4, 4.5, 4.6, and 4.7 and consolidated all requirements in a separate Section 4.2.6.
- Changed OJT Instructor to OJT Trainer
- Added footnote 1 defining Master Dispatcher
- Added footnote 2 defining OTS versus DTS
- Added clarifying language throughout Section 4
- Updated Exhibit 4 “Threat Error Management”

Revision 19 (02/01/2018):

- Cover to Cover Periodic Review
- Added clarifying language to the role of the Dispatcher Training Subcommittee (DTS) in the Task List Review and Program Evaluation – Section 1
- Reorganized Section 2 to accommodate the Markets certification exam
- Added section on disciplinary actions for certification exam – Section 2.2.
- Removed references to the timeframes associated with certification requirements from Section 2.3. Added reference to Section 3 where these are covered in detail.
- Added clarifying language to EOP requirement in Section 3.2.1
- Added clarifying language to the DTS role in determining the annual tasks that are included in the continuing training program in Section 3.2
- Changed MOC and Small Plant Generation Dispatcher continuing training requirement from rolling 3-year requirement to annual requirement in Section 3.2
- Added language to include Load Management Resources in Section 3.2.5
- Removed “beginning in 2012” Section 4.3.1
- Changed requirement for PJM Generation Certification timeline from 1 year to 6 months. Section 4.4
- Removed ExSchedules from list of Master Coordinator related tools. Section 4.4
- Added clarifying language to Simulator Retest process. Section 4.5
- Added clarifying language to Simulator Retest process. Replaced the word “Understand” in Skills and Knowledge section with “Ability to demonstrate knowledge of”. Section 4.6
- Replaced the word “quiz” with “assessment. Section 4.9

Revision 18 (02/01/2017):

- Cover to Cover Periodic Review
- Annual review of PJM Training Plan (Section 4) in accordance with NERC Standard PER-005-2
- Removed references to Daily Review Team in Section 4.9

- Updated PJM Human Performance program skills in Section 4.12.2
- Added Grid Security Drills as another component of the continuing education offerings – Section 1.6
- Added language to reflect how initial training requirements may be completed – Section 3.2
- Added language to include open/required JIT training to Initial Training Requirements - Section 3.2
- Changed the grace period for completing Initial Requirements and Certification Requirements from 12 months to 6 months for MOC Generation Dispatchers and Small Generation Plant Dispatchers – Section 3.2.2 and 3.2.4
- Added clarification to items which are monitored during monthly and annual compliance checks – Section 3.3
- Removed references to Manual 35 as this manual was retired on November 17, 2016.

Revision 17 (02/01/2016):

- Annual review of PJM Training Plan (Section 4) in accordance with NERC Standard PER-005.
- Administrative Change: Updated references from eDATA to Data Viewer.
- Clarifying changes to Section 4.4 describing retesting process for Master Coordinator qualification.
- Minor change to Section 4.7 to remove requirement for weekly self-assessment quiz for Reliability Engineer qualification.
- Added language in Section 3.3 to indicate that a dispatcher/operator must be removed from shift responsibilities if they fail to meet the applicable requirements listed. Removed duplicate language from Section 3.2.1.
- Updated language in Section 3.3 to reflect changes in Compliance Monitoring process and added flow chart.

Revision 16 (10/01/2015):

- Periodic Review
- Section 1: Added additional info related to role of the LMS.
- Updated task management process to reflect current practice.
- Section 2: Added additional clarity for identifying personnel required to be certified.
- Added consistency to use of the terms TO Operator and Generation Dispatcher.
- Removed references to 5 year credential.
- Added reference about certificate renewal requirements & compliance monitoring.
- Section 3: Changed designation of initial required training to ITP (Initial Training Program).

- Added reference to Just in Time Training requirements.
- Modified Small Plant Operator Classification criteria.

Revision 15 (02/27/2015):

- Annual review of Manual and training plans in accordance with NERC Standard PER-005.
- Section 4: Added new section 4.11 on Training of Operations Support Personnel in accordance with PER-005-2.
- Renumbered Section 4.11 PJM Human Performance Program to Section 4.12 and made minor edits.
- Changed Near Miss program to Good Catch program.
- Added Section 4.12.3 on Human Performance Oversight Group.

Revision 14 (02/28/2014):

- Annual review of Manual and training plans in accordance with NERC Standard PER-005.
- General grammatical cleanup.
- Section 1: Changed data retention requirement.
- Section 3: Clarified continuing training requirements for Transmission System Operators.
- Section 3: Clarified initial requirements for new entities.
- Section 4: Clarified classroom training requirements for PJM operators. Replaced Operator Training Simulator (OTS) with Dispatcher Training Simulator (DTS). Performed general wording and grammatical cleanup.
- Added Section 4.11 on the PJM Human Performance Program.

Revision 13 (03/01/2013):

- Annual review of Manual.
- Complete rewrite of Sections 1, 2 and 3 to comply with the requirements of NERC Standard PER-005.
- Clarified training requirements for Training Audiences.
- Section 4 - Added definition of “reliability-related task”. Updated position classroom training requirements for consistency.
- Replaced Appendix 1 with updated version of the Task List.
- Removed Appendices 2, 3, and 4.

Revision 12 (05/01/2012):

- Annual review of Manual.
- Updated task lists in Appendix 3.

- Updated CEH Tracking Process forms in Appendix 4.
- Replaced Local Control Center with Transmission Owner throughout document.
- Added definition of “Annual” in Section 2 as it relates to PJM Training requirements.
- Section 4 – Added Training Advisory Committee and Qualification Board processes. Added section 4.3 on Instructor Qualifications. Updated objectives for each operating position to more closely reflect job tasks. Updated competencies for each operating position.
- Minor miscellaneous edits throughout.

Revision 11 (6/22/2011):

- Annual review of Manual.
- Updated task lists in Appendix 3.
- Removed old deadlines in Section 1.
- Minor changes to MD training plan in Section 4.
- Clarified number of test attempts in Section 4.

Revision 10 (6/23/2010):

- Annual review of Manual.
- Added additional detail to section 1.4 Compliance Monitoring of Certification.
- Added additional clarity to Section 2.6 – Training Requirements for Demand Response Resources Supplying Regulation or Synchronized Reserve.
- Added new Section 2.7 - Training Requirements for Storage Resources Supplying Regulation or Synchronized Reserve.
- Miscellaneous clarifying changes to Section 4.

Revision 09 (1/1/2010):

- Added NERC Certification requirement for Transmission Owner operators.

Revision 08 (10/01/2009):

- Added language for Small Generation Plant Operator Certification Exemptions to Section 1.
- Made changes to Master Dispatcher training in Section 4.

Revision 07 (08/01/2009):

- Modified Certification requirement for TO operators to require certification prior to operator taking shift as of 7/1/2010.
- Added description of Systematic Approach to Training (SAT) method utilized by PJM to Section 4.

- Annual Review of Manual.

Revision 06 (04/24/2009):

- Section 4: Added process for ensuring operator competency following an extended absence.

Revision 05 (02/12/2009):

- Section 4: Revised requirements for PJM Certification for PJM operators. Added section on Shift Supervisor Training Plan.
- Section 1: Revised some PJM Certification requirements – changed term of certification to 3 years from 5 years, changed required CEH credit to renew, added provisions for certifying and within 1 year for TO and GO operators.
- General grammatical changes and clarification made throughout the document.

Revision 04 (11/05/2008):

- Revised requirements for PJM PD completion of PJM classroom courses in Section 4.
- Updated Training Liaison Forms in Appendix 4.
- Minor clarifications and grammatical updates.
- Removed option for PJM-approved CEH credit.
- Annual review of manual.

Revision 03 (01/25/2008):

- Separated the Power Director and Reliability Engineer Training descriptions in Section 4.
- Added references to formal OJT training to MC, GD, PD and RE positions.
- Changed “Power Dispatcher” title to “Power Director”.

Revision 02 (09/10/2007):

- Minor clarifications to the PJM Master Coordinator Initial Training and Qualification Requirements in Section 4.

Revision 01 (07/13/2007):

- Added section on Master Dispatcher Training program for PJM operators.
- Added annual requirement for training on company specific System Restoration plans for TO operators per NERC Standard EOP-005.

Revision 00 (05/16/2007):

- This is the original issuance of the PJM Manual for Certification and Training Requirements.