

**Balancing Authority
Reliability Readiness Evaluation Report**

**Wisconsin Public Service Corporation/
Upper Peninsula Power Company
Green Bay, Wisconsin**

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Introduction and Evaluation Process

The North American Electric Reliability Corporation (NERC) Reliability Readiness Evaluation and Improvement Program is one of the commitments of NERC and the industry to strengthen the reliability of the North American bulk power system. The program conducts independent evaluations of balancing authorities, transmission operators, reliability coordinators, and other key entities that support the reliable operation of the bulk power system to assess their preparedness to meet their assigned reliability responsibilities. The evaluations identify strengths and areas for improvement in an effort to promote excellence in operations among these organizations.

Since its inception in 2004, NERC and the industry have been working collaboratively to enhance the program. The evaluation process is based on fundamental aspects of reliability: culture, operations, maintenance, planning, and training. The document [*NERC Readiness Evaluation Procedure*](#) describes and defines the process used for reliability readiness evaluations. This document and other documents related to the program are available at <http://www.nerc.com/~rap/>.

The reliability readiness evaluation teams, each led by a NERC staff member and a regional co-leader, include industry volunteers with considerable expertise selected to provide representation from other interconnections, other regions, and neighboring operating entities. The teams also typically include representatives from the Federal Energy Regulatory Commission (FERC) staff.

The public version of the reliability readiness evaluation report contains the majority of the evaluation team's findings. Any discussion of findings pertaining to critical infrastructure will be contained in Appendix 1, a confidential appendix to the report that is sent privately to the evaluated entity and is not included in the public version of the report.

An evaluation team met on-site with Wisconsin Public Service Corporation/Upper Peninsula Power Company (WPS/UPPC) representatives on August 6–9, 2007. This report reflects the views and recommendations of the evaluation team regarding the readiness of the WPS/UPPC to meet its responsibilities as a balancing authority.

Evaluation Team

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Organization Profile

Wisconsin Public Service Corporation (WPS) and Upper Peninsula Power Company (UPPC) are subsidiaries of Integrys Energy Group.

The WPS service territory primarily covers northeastern and north central Wisconsin and a small portion of Michigan's Upper Peninsula. WPS is interconnected with We Energies, Alliant Energy, Xcel Energy, and Madison Gas and Electric at 345, 138, 115, 69 and 24.9 kV through 55 synchronous metering points.

WPS's peak load of 2,587 MW occurred July 17th 2006 at 1400 CDT. The company-owned generating capacity of 1,976 is supplemented with 1,083 MW of firm purchased capacity. The WPS generating fleet fuel mix is 58% coal, 37% natural gas, 3% hydro, 1% wind, and 1% diesel.

The UPPC service territory primarily covers the northwestern and central parts of Michigan's Upper Peninsula. UPPC is interconnected with We Energies at 138 and 69 kV through 20 synchronous metering points.

UPPC's peak load of 178 MW occurred July 17th 2006 at (hour ending) 1500 EDT. UPPC owns 71 MW of generating capacity with an additional firm capacity purchase of 139 MW. The UPPC generating fleet fuel mix is 56% fuel oil and 44% hydro.

WPS and UPPC have merged a number of work practices. The abbreviation WPS/UPPC will be used for to discuss joint functions, while WPS or UPPC will be used for items related to each specific company. The WPS/UPPC balancing area is part of the Midwest Independent Transmission System Operator (MISO) reliability coordinator area, and the American Transmission Company (ATC) owns and operates the transmission system in the WPS/UPPC service territory.

WPS/UPPC has the following two operating areas and responsibilities:

1. System operating/distribution dispatch (Distribution Operations Center)
Monitoring and checkout of tie-line data, system frequency, and area control error; participation in MISO regional calls; capacity and energy emergency plan implementation; system restoration; generator plant reactive monitoring and control; and load shedding on the distribution system
2. Energy supply and control (Energy Supply and Control center)
Develops load forecast and controls generating units/interchange to meet load generation balance (area control error), maintains operating reserve requirements, and responds to reserve-sharing requests and implementation, and implements demand side management programs

WPS and UPPC are each registered with NERC as a balancing authority, a distribution provider, a generation owner/operator, a load serving entity, a purchasing-selling entity, and a resource planner. Each company is a member of the MRO regional council of NERC.

Executive Summary

The evaluation team found no significant operational problems and concluded that the WPS/UPPC has adequate facilities, processes, and procedures to perform the balancing authority functions necessary to maintain the reliable operation of the bulk power system. WPS/UPPC system operators, management, and support staff are highly knowledgeable and competent.

WPS/UPPC corporate management places a high priority on safety and reliability. Corporate and operations management personnel attend and participate in several committees of the MISO, MRO, ATC, and Edison Electric Institute (EEI) to discuss reliability issues. The company sets high expectations for its employees, and the company goals include safety, system reliability, and compliance. In addition to corporate goals, the company has departmental and individual goals. Individual goals are reviewed with employees in feedback sessions and one-on-one reviews. System reliability is at the top of the list in the organization's budgetary process. WPS/UPPC has used outside consultants to benchmark the organization for improving system performance. WPS/UPPC also supports system reliability by indicating that it completed all the previous recommendations from its NERC reliability readiness audit performed in 2004.

WPS/UPPC has a highly effective shift turnover process for its system operators, and the organization recognizes the benefits of having all its system operators and key staff being NERC certified. In addition, the evaluation team observed good communication among system operators, between system operators and management, and between system operators and support groups.

One key recommendation identified by WPS/UPPC that will enhance the current training program is to add a staff person with the primary responsibility for developing and providing training to Distribution Operations Center and Energy Supply and Control system operators and staff.

Overall, the evaluation team identified eight positive observations. The team offers five recommendations that, if implemented, will enhance WPS/UPPC's readiness to operate reliably and maintain the reliability of the bulk power system. The recommendations are listed in order of importance.

Positive Observations

The evaluation team noted the following positive observations during the reliability readiness evaluation process:

1. Confidential information on computer systems and support redacted from public report. See discussion in Appendix 1.
2. Confidential information on computer systems and support redacted from public report. See discussion in Appendix 1.
3. Confidential information on power supply for control facilities redacted from public report. See discussion in Appendix 1.

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4. High levels of communications exist at WPS/UPPC among system operators, between system operators and management, and between system operators and support groups (Section 1.2.5).
5. WPS/UPPC has a highly effective shift turnover process for its system operators (Section 2.1).
6. WPS/UPPC recognizes the benefit of all system operators and key staff personnel being NERC certified (Section 2.2.1).
7. WPS/UPPC issues its letter of authority to each system operator (Section 2.2.3).
8. Confidential information on power supply for control facilities redacted from public report. See discussion in Appendix 1.

Recommendations

The evaluation team offers the following recommendations:

1. Enhance the current training program (Section 5.1):*
 - a. Add a staff person with the primary responsibility of developing and providing training to Distribution Operations Center and Energy Supply and Control staff.
 - b. Expedite, to the extent possible, the development of the formal training program for Distribution Operations Center.
 - c. Add a formal board of review process for system operator qualifications for the Distribution Operations Center to enhance the initial training of system operators.
2. Confidential information on plans for loss of control facilities redacted from public report. See discussion in Appendix 1.*
3. Provide an external frequency display in the control room independent of the EMS to provide system operators a backup source in the event of an EMS failure (Section 2.1).
4. Develop and implement a formal agreement between Distribution Operations Center and Energy Supply and Control identifying the roles and responsibilities of each center (Section 2.1).
5. Expedite, to the extent possible, the development of a formal documentation process to enhance document controls (Section 2.2.3).

*Jointly identified by the company and lead evaluator as a key recommendation

Discussion

The reliability readiness evaluation team examined the following key areas during the evaluation. The detailed discussion that follows provides the foundation for the recommendations and the positive observations that the team identified. The report uses the generic term “system operator” to refer to all on-shift operating personnel responsible for executing the functions necessary to operate reliably and maintain the reliable operation of the bulk power system. This term will be used for the discussions unless additional specificity is required, such as the *balancing* system operator, or *transmission* system operator.

1. Culture

1.1 General

The corporate organization provides the necessary leadership and management for system operations to sustain high levels of safe, reliable operation.

The WPS/UPPC system operators follow the directives of the ATC system operators and/or the MISO reliability coordinator.

Succession planning is reviewed at the corporate level with operations management but it is not a formal process. The WPS/UPPC incentive goals are the same for all non-union personnel — system reliability, safety, and compliance.

Funding of system reliability improvement initiatives takes priority over other projects. Corporate management reviews, discusses, and establishes all departments’ budgets accordingly and meets with the operating groups of the ATC, EEI, and the American Power Dispatcher Association to discuss reliability issues.

WPS/UPPC is upgrading its energy management system (EMS) system, and the upgrade will include a feature to allow the system operators to design their own displays.

1.2 Organizational Effectiveness

1.2.1 Foundation for System Reliability

The organization’s values and behaviors—modeled by its leaders and practiced by its members—serve to make system reliability a top priority.

WPS/UPPC’s corporate management support of system reliability is a high priority. As mentioned previously, corporate management puts reliability at the top of the list when working on the company’s budget process.

The WPS/UPPC executives set high expectations for the operational excellence. They encourage accountability from employees and provide any needed resources.

1.2.2 Leadership and Management

Managers, by leadership, commitment, and example, establish and reinforce high standards of performance and align the organization to achieve safe, reliable system operation.

WPS/UPPC corporate management participates in several ATC, MRO, and MISO committees. The WPS/UPPC budgetary process includes training needs to meet organizational goals.

The WPS president and chief operating officer meets every Monday with his staff for updates and discussion on generation performance and outages, energy market operations, and overall system operations. WPS executives meet monthly with ATC management to discuss reliability issues that are identified in the transmission planning studies, transmission construction projects, transmission service issues, coordination with WPS/UPPC, and operating performance. WPS executives also attend EEI quarterly executive meetings, for which the agenda includes reliability and industry issues.

1.2.3 Corporate Oversight and Monitoring

Line management is used to strengthen reliability and improve performance. System reliability is kept under constant scrutiny through techniques such as self-assessments, performance indicators, and periodic management meetings.

Senior WPS/UPPC management are informed of situations that impact or may impact system reliability or service to customers and are provided regular updates until the situation is resolved. E-mail lists are used for different issues — including ones involving MISO, FERC, and MRO — to keep key personnel informed.

A process is utilized for the system operators to provide feedback to operations management that includes discussions at the system operator meetings, e-mails to supervisors, and anonymous methods. Corporate executives have had consultants come in and benchmark the company's performance and processes against industry standards and practices.

The Energy Supply and Control system operators are required to meet the NERC control performance standard and the disturbance control standard criteria, and they control the area control error and the net scheduled interchange values. The system operators dispatch the generating units within the MISO requirements, while keeping operating reserves available. The Energy Supply and Control system operators indicated that reliability takes precedence over economics.

1.2.4 Human Resources

Personnel resource needs are anticipated and individuals are systematically recruited, developed, and assigned positions in the system operations organization.

WPS/UPPC noted a low attrition rate but has a process to review day-to-day activity and business planning. The process looks at staffing requirements and skill development to identify and minimize areas of risk. Operations management is aware of people who might be nearing retirement. The managers develop a range of dates when that gap may occur and attempt to

identify a pool of candidates that might be able to do that job. An informal succession plan is reviewed annually within the system operations group.

Performance feedback sessions are held with all employees at WPS/UPPC.

1.2.5 Corporate Communications

System operations communications inform and engage both corporate and system operations employees so they can contribute to the strategic priorities of the organization.

Operations management attends monthly staff meetings and the president's meeting to discuss company goals. A goals' review is performed and discussed in feedback meetings with staff twice per year. In addition, managers attend one-on-one meetings with the president in the quarters where there are no goals' feedback meetings.

The system operators will initiate blast calls to key staff and operations management for system events, during all hours of the day. WPS/UPPC corporate management indicated that this sends an important message regarding the company's position regarding system reliability.

WPS/UPPC utilizes a load reduction task force for communicating situations regarding system conditions with generation or transmission. System conditions can include load and capacity deficiencies, transmission constraints requiring load relief, or significant storms. The task force includes representatives from operations, engineering, customer relations, marketing, and management.

The system operators feel that they have no problems approaching management about anything, and support personnel are responsive to operator needs. The evaluation team notes as a positive observation the high levels of communication among system operators, between system operators and management, and between system operators and support groups in WPS/UPPC.

2. Fundamentals of Operations

2.1 General

Operations personnel monitor and control the system in a manner that ensures safe, reliable operation.

The WPS/UPPC system operators indicated they are not required to obtain supervisory approval for any reliability issues prior to taking action and have the authority to implement operational plans for which they are responsible. There is no documented or formal agreement between Distribution Operations Center and Energy Supply and Control that defines the roles and responsibilities of the system operators of each group. The evaluation team recommends that WPS/UPPC develop and implement a formal agreement between Distribution Operations Center and Energy Supply and Control to make it clear which organization has ultimate responsibility for the balancing authority functions.

WPS/UPPC's document management system is evolving. Management is looking into how to incorporate compliance management into the document control process by providing a system to

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notify when periodic updates and reviews are required. If the process works well, the critical infrastructure protection standards will be incorporated, followed by all other documents.

WPS/UPPC corporate management embraces lessons learned and have been exploring ways to turn the information into meaningful and positive actions. The lessons learned process includes safety and accident investigations. Management is in the process of developing personnel to perform root cause analysis.

The Distribution Operations Center and Energy Supply and Control both have an effective shift-turnover process for system operators, and the evaluation team notes this as a positive observation. Distribution Operations Center has a logbook and an electronic log for its system operators to record specific events, and a checklist to review at each shift change. Energy Supply and Control has a turnover form for every shift or inter-shift events. Both groups utilize a “must read book” for system operators, who must acknowledge reading the material by initialing a page in the book. In addition, e-mail is used to communicate operational information to the system operators.

Both Distribution Operations Center and Energy Supply and Control provide standards, procedures, and documents to the system operators electronically and in hard-copy formats.

The Distribution Operations Center system operators identify when a change to a procedure is required as they work with field personnel. For example, the system operators might arrive at a point where a job cannot continue until a change is made to the procedure so they can proceed safely. The Distribution Operations Center system operators have an informal corrective action program, available to them for when errors occur; they analyze what was done, what should have been done, and what should be changed to eliminate the error from occurring again. The Energy Supply and Control system operators have a similar program in place.

The operational planning area plans all generating unit outages from the beginning of an outage to the end of an outage with a process that looks several years out. All generating unit outages are communicated to the ATC and MISO in accordance with tariff requirements. Energy Supply and Control does the economic analysis and ATC does the reliability analysis study. The MISO scheduler tool is used to communicate generator outage information to MISO.

Each day, the day-ahead Energy Supply and Control operations planning desk sends a status report on the next-day’s operations to the real-time system operators to prepare for real-time decisions. The report includes any unit deratings, interchange transactions, the load forecast, and the decision of load forecast.

WPS/UPPC provides the following tools to its system operators:

- System visibility
 - Distribution Operations Center has a large static wall board that includes a generator display and a separate off-line generator display. From the generator display, the system operator can access any plant or unit for specific operating data. In addition, the one-line displays show the separation of generation,

transmission, and distribution system by ownership (lines of demarcation between WPS/UPPC and ATC).

- Alarms
 - There is an alarm summary display as well as a full alarm set display. The system operators have several options for displaying alarms and can eliminate nuisance alarms. In addition, there is an “inhibit alarm” display for alarms such as scheduled work in progress.
- Frequency
 - WPS/UPPC provides its system operators with WPS/UPPC system frequency from several sources; however, in the event of an EMS failure, frequency information would not be available to the system operators. Therefore, the evaluation team recommends that WPS/UPPC provide a frequency display in the control room independent from the EMS.
- Voltage/reactive reserve
 - A single display is available for monitoring system voltages. The WPS/UPPC generating plants are required by ATC to maintain a voltage range of plus or minus five percent of nominal. ATC handles primary voltage control, with static devices and the generating units operating in a fine-tuning mode to stay at a desired voltage level. ATC monitors the reactive reserves for the WPS/UPPC area.
- Contingency reserves
 - Energy Supply and Control system operators have a reserve summary display indicating spinning and non-spinning operating reserves.
- Load shedding
 - The Distribution Operations Center system operators are responsible for load shedding and are provided load shedding displays in the EMS/SCADA. The displays provide an overview of all feeders available for load shedding and identify feeders that are included in the automatic underfrequency load shedding program. The manual load shedding display allows the operators to select or de-select feeders included in the underfrequency load shedding program, so that operators can prevent overlaps between the two programs.

The WPS relay department analyzes all relay misoperations (transmission engineering is contracted with ATC and includes relay maintenance). WPS relay personnel will contact ATC to obtain approval prior to performing maintenance on transmission relays.

2.2 Operational Focus

2.2.1 Operational Safety

System operation activities are conducted in a manner that maintains high levels of safety and reliability for all system conditions.

At WPS/UPPC, safety is a major priority and is discussed at all meetings. The chief executive officer directs that safety will not be compromised at any time.

The Distribution Operations Center operations management maintains a professional atmosphere in the control room by holding safety and reliability meetings every nine weeks. At the meetings, switching incidents are reviewed, along with any upcoming outages, for specific items that may require operating guides. Management maintains a level of expectations between the system operators and the distribution operators. The Distribution Operations Center system operators attend field crew meetings.

Energy Supply and Control management maintains a professional and safety-oriented atmosphere in the control room. Management provides operators with useful handbooks that explain events from an operator's perspective (Three Mile Island and other areas for operator knowledge). To promote communications, system operators are involved in staff meetings, a daily morning briefing is held after discussion with the power plants, and management holds performance talks with the system operators.

In addition to WPS/UPPC system operators, key management and support staff have attained NERC certification credentials and the evaluation team notes this as a positive observation. The Distribution Operations Center system operators (10) and management (2) are certified with the NERC reliability operator credential. Energy Supply and Control system operators (12), management (1), and staff (3) are NERC certified with the following credentials: reliability operator (6), balancing and interchange operator (9), and balancing, interchange and transmission operator (1).

Distribution Operations Center has two rotations for its system operator staff (system operating supervisors and system operators). One group (six operators) works a six-week rotation schedule, and the other group (four system operators) works a four-week rotation schedule. Both schedules include a 40-hour training week.

Energy Supply and Control has 12 system operators (Energy Supply and Control supervisors), who work in shifts of two on a six-week shift rotation, which includes a 40-hour training week.

WPS/UPPC has no special protection systems installed on its system.

2.2.2 Operational Decision-Making

Operational decisions are reached using a systematic and thorough approach that supports safe, reliable, and efficient system operations.

The system operators (Distribution Operations Center & Energy Supply and Control) are provided with individual letters of authority in addition to the general letter of authority (posted in the Distribution Operations Center control room). Job profiles outline the system operators' roles and responsibilities for both the Distribution Operations Center and the Energy Supply and Control. The Distribution Operations Center utilizes tabletop exercises and the EPRI simulator scenarios to develop system operator analysis skills. Energy Supply and Control assigns required reading, facilitated by its director, to its new system operators from the WPS/UPPC *Industrial Operators Handbook* to develop system operator skills and analysis.

Distribution Operations Center system operators can stop work in progress or not approve work to begin if the work will impact operations for the current system conditions.

ATC has issued a letter of authority to the WPS/UPPC system operators acting as a contractor for ATC.

2.2.3 Operational Alignment

Organizational structure supports safe and reliable system operation.

WPS/UPPC has the following agreements:

- *Distribution-Transmission Interconnection and Generation-Transmission Interconnection* with ATC
- *Regional Transmission Organization Reliability Plan* with MISO
- *Midwest Contingency Reserve Sharing Group*
- Balancing area operations coordinated agreements and/or control area operations coordination agreements with its neighboring systems

WPS/UPPC has an outage coordination agreement for the planned outages of generating units with ATC.

WPS/UPPC has a specific letter of authority for each group, Distribution Operations Center and Energy Supply and Control, and the letter is issued to each system operator. Distribution Operations Center has the letter of authority prominently placed in its control room. The evaluation team notes that the issuance of the letter of authority to each system operator as a positive observation.

WPS/UPPC does not delegate any balancing authority functions to others, and no functions are delegated to WPS/UPPC.

Distribution Operations Center's *Emergency Response Center Guides* contain procedures / instructions for the system operators in several areas. The *ES&C Guides* contain system operator procedures / instructions for Energy Supply and Control operators. Energy Supply and Control has a document describing procedure guide development and revisions. Operations management indicated it is developing a process for procedure development and the evaluation team recommends that WPS/UPPC expedite, to the extent possible, the development of a formal documentation process to enhance WPS/UPPC's document controls.

Distribution Operations Center and Energy Supply and Control both utilize a shift turnover process with forms and a checklist for information that should be turned over to the oncoming shift.

2.3 Managing System Configuration

Power system configuration is carefully designed, analyzed, maintained, and controlled throughout the life of the infrastructure, ensuring that system and equipment margins are

understood, considered in decision-making, and managed consistent with design and system requirements.

Transmission seasonal planning studies are the responsibility of ATC. ATC provides WPS/UPPC with information and operating guides for problem areas on the transmission system in the WPS/UPPC footprint. WPS/UPPC has automatic voltage regulators on most of its generating units, and the automatic voltage regulator status is monitored by the EMS. Data are sent through intercontrol center communications protocol (ICCP) to ATC.

WPS/UPPC has no power system stabilizers on any of its generating units.

Generating unit deratings and outages are submitted by Energy Supply and Control into the MISO outage scheduler. ATC and MISO have access to the data. ATC and MISO also see real-time generation data via ICCP. In addition, MISO regional generation dispatchers are notified of outages or deratings by telephone, and a *Unit Outage or Restriction* form is utilized for communicating generating unit outage schedules to ATC.

WPS/UPPC, as a balancing authority, does not include a state estimator or a real-time contingency analysis program in its EMS as an operating analysis tool for its system operators. In addition, the Distribution Operations Center system operators indicated that WPS/UPPC does not have any critical facilities, and transmission congestion is the responsibility of ATC.

Energy Supply and Control controls the load generation balance by the use of automatic generation control information on the system summary display. Unit commitment is done through the bid/offer activity in the MISO market on a day-to-day basis. Primarily, Energy Supply and Control enters the coal units as must-run, which tells MISO the units are on-line. MISO then schedules those units into its system and provides the continuous net scheduled interchange signals.

2.4 Emergency Preparedness

The organization is prepared to manage and mitigate the impact of system emergencies in order to preserve the reliability of the system and to protect the interests of the public.

WPS/UPPC has a load shedding plan (manual and underfrequency load shedding programs) and a capacity and energy emergency plan; WPS/UPPC is included in the ATC's system restoration plan. The capacity and energy emergency plan is implemented by Distribution Operations Center under the direction from MISO under its RT-EOP-002 (maximum generation) procedure for transmission emergencies. The WPS/UPPC system operators have the authority to implement the plan without obtaining supervisory approval.

WPS/UPPC receives day-ahead and real-time sufficiency reports from MISO to determine capacity and energy adequacy. Data are provided to MISO through redundant ICCP network connections.

Procedures are in place for Distribution Operations Center and Energy Supply and Control system operators to respond to the loss of telecommunications or EMS functionality.

ATC has the primary responsibility for initiating and coordinating the system restoration effort in its footprint. WPS/UPPC participates in ATC's annual restoration plan review.

WPS/UPPC corporate management will become involved in any emergency plan and provide support to the system operators in the areas of load reduction, disaster recovery, and business resumption.

WPS/UPPC has plans for continuing operations if either the Distribution Operations Center or Energy Supply and Control become inoperable or uninhabitable. Procedures are available to the system operators for suspected terrorist or a physical sabotage incident.

3. Fundamentals of Maintenance

3.1 General

Maintenance is conducted by skilled personnel to achieve safe, reliable control center equipment and system performance.

The WPS/UPPC relay department coordinates relay maintenance, replacement, and additions with the ATC relay engineers. WPS/UPPC follows MAIN Guide 12, *Disturbance Monitoring Systems*, for disturbance monitoring equipment requirements. (The company is using the MAIN, a former NERC region, guide until the MRO procedure is finalized.)

3.2 Equipment Reliability

3.2.1 Equipment Performance

The organization achieves high levels of equipment reliability. Equipment problems that impact reliability are resolved in a thorough and timely manner.

WPS/UPPC has programs in place that monitor critical applications and critical telecommunications systems. The programs provide notification to the system operators of any failures.

3.2.2 Work Management

Work activities, including corrective, elective, and preventive maintenance, surveillance testing, and modifications, are managed effectively to support safe, reliable operation during both outage and routine periods.

WPS/UPPC has a procedure in place for the system operators to report problems with computer systems and other operator tools. The support group has its own system for tracking investigations and repairs. A change-management system is to review proposed changes to any operating systems. Software modifications are tested on a separate test platform to ensure changes are functioning properly before turning over to system operations.

4. Fundamentals of Operational Planning

Operational planning provides the technical information and support necessary for safe, reliable system operation.

ATC and MISO are responsible for performing system planning model studies and system analysis. ATC is also responsible for determining transmission system limits. WPS/UPPC operations management attends monthly meetings at ATC to look for problems and solutions. New plans for substations are passed to the Distribution Operations Center and reviewed by ATC.

The Energy Supply and Control operations planning staff participates in and supports the MRO Reliability Assessment Committee and subcommittees: the MRO Resource Assessment Subcommittee and the MRO Transmission Assessment Subcommittee.

WPS/UPPC will continue to follow Main Guide 1B *Operating Procedures during Generating Capacity Deficiencies Causing Declining System Frequency or Separation* for its underfrequency load shedding program until the MRO develops a new underfrequency load shedding standard.

Energy Supply and Control is responsible for generating unit commitment with MISO. A MISO scheduling tool is used for the planned generating unit maintenance schedules. An Excel spreadsheet is used for determining operating reserves after scheduled maintenance. In addition, ATC receives the same generator scheduling information for its transmission planning studies. Energy Supply and Control is responsible for responding to calls for operating reserves in the Midwest Contingency Reserves Sharing Group.

Forced generating outages (units that need to come off-line for short repairs or have tripped off-line) are submitted to ATC. ATC evaluates the impact on its transmission system. If ATC allows, the outage information is entered into the MISO outage scheduler for evaluation by MISO. Generating unit deratings are also entered into the MISO Outage Scheduler for analysis by ATC and MISO.

Operating guides are developed by Energy Supply and Control for the real-time system operators when studies indicate the need. The guides are placed in a “must read” binder and online for review by the system operators.

Energy Supply and Control does an after-the-fact review of the summer peak compared to load projections and builds a forecast. Energy Supply and Control goes back and weather-adjusts the candidate days to see if the load projection was high or low. Energy Supply and Control also looks at the capacity number of the units and can request the capacity tests; the generating units can perform tests in winter or summer. Planners may also have to adjust the data for a known fixed derating or a plant limit.

5. Fundamentals of Training

5.1 General

Training in both specific job-related skills and broader technical fundamentals is used to provide highly skilled, knowledgeable personnel for safe, reliable operations, and to achieve performance improvement.

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Distribution Operations Center primarily uses on-the-job training for its new system operators. The new operator is provided a document that describes the milestones he or she must achieve in order to advance in the department. Trainees are provided a list of tasks to complete in sequential order to advance in skills. The operator completes each task under the direction of a training supervisor (NERC-certified system operator). After practicing the task for a minimum of one week, he or she must perform the task without any coaching from an evaluating supervisor (also a NERC-certified system operator). Ongoing training is provided through the Wisconsin System Operator Training and vendor-supplied courses. The curriculum for Wisconsin System Operator Training is created semiannually by a team comprised of members of the participating companies.

Energy Supply and Control's training activities are more formalized, and Energy Supply and Control is seeking NERC-approved continuing education provider status. Energy Supply and Control uses an outline, *Operations Fundamentals I*, for on-the-job training of a new system operator in the area of scheduling and generation dispatch operations. During the same period, the new operator studies for his or her NERC certification credentials. After completing *Operations Fundamentals I* and achieving NERC certification, the new operator participates in a board of review, comprised of the director and assistant director of Energy Supply and Control. Upon satisfactory completion of the review, another outline, *Operations Fundamentals II*, is provided to advance to the next level of proficiency. When this outline is completed, the operator must pass another board of review to be considered a qualified system operator allowed to work in an independent position.

Both the Distribution Operations Center and Energy Supply and Control system operator work schedules include a training week, and operators are required to attend training sessions scheduled in the spring and fall. Distribution Operations Center and Energy Supply and Control system operators participate in the ATC system restoration drill (blackstart and system restoration is the responsibility of ATC). In addition, Energy Supply and Control performs tabletop exercises with the Wisconsin System Operator Training, and Distribution Operations Center participates in the MISO system restoration drill. Distribution Operations Center and Energy Supply and Control use the EPRI operator training simulator for its system operator training simulator.

Energy Supply and Control ongoing training consists of NERC-approved continuing education, emergency operations drills, tabletop exercises, and use of the EPRI operator training simulator. Formal training is developed and provided to keep system operators and staff abreast of changes to the operating environment. Professional growth and development is provided to develop skills such as leadership, effective communications, team building, and time management.

To enhance the current training program, the evaluation team recommends that WPS/UPPC add a staff person with the primary responsibility for developing and providing training to Distribution Operations Center and Energy Supply and Control staff; expedite, to the extent possible, with the development of the formal training program for Distribution Operations Center; and add a formal board of review process for system operator qualifications for the Distribution Operations Center to enhance the initial training of system operators.

Load shedding is the responsibility of Distribution Operations Center, and the capacity emergency and transmission emergency procedures are covered at a system operator meeting. Energy Supply and Control is responsible for and receives training for load management and demand-side management procedures and implementation.

WPS/UPPC corporate management encourages lessons learned by discussing at weekly, monthly, and bimonthly meetings. It is the responsibility of the supervisor to ensure that all system operators are brought up to speed on anything new or revised. Management looks at the “must read” book as part of the training system operators receive.

The lessons learned are utilized by corporate management and operations management to identify errors and to prevent them from occurring in the future.

WPS/UPPC incorporates performance criteria into training through the performance feedback process with the system operators. The discussions focus on 1) the basics of the job, 2) the competencies for that job (less than nine), 3) the current issues of the job, and 4) longer-term or career-type goals. If the action plan includes training items that the employee needs, management will address how that will be accomplished.

5.2 Organizational Effectiveness

5.2.1 Human Performance

Personnel select and apply appropriate human error prevention techniques commensurate with the importance of assigned tasks to minimize the frequency and consequences of events.

Distribution Operations Center and Energy Supply and Control system operators hold safety and system reliability as a primary concern. In addition, the company mission statement supports safety and is posted in several areas of the facilities. New Distribution Operations Center system operators go through a qualification process before being able to operate unsupervised on-shift. This process includes feedback from the system operators who have worked with the new system operator and a safety test that must be passed.

WPS/UPPC utilizes a lockout/tag-out procedure for its switching procedure (safety card process) and uses lessons learned to analyze any switching errors and prevent them from reoccurring.

WPS/UPPC has an agreement with ATC to provide field personnel for switching equipment on the transmission system as directed by ATC.

APPENDIX 1: Critical Infrastructure

The following discussion will be presented under private letter to the evaluated entity only and will not be included within the public version of the report.

APPENDIX 2: Entity Participants

The following will be presented under private letter to the evaluated entity only and will not be included within the public version of the report.

APPENDIX 3: Documents Reviewed

The following will be presented under private letter to the evaluated entity only and will not be included within the public version of the report.