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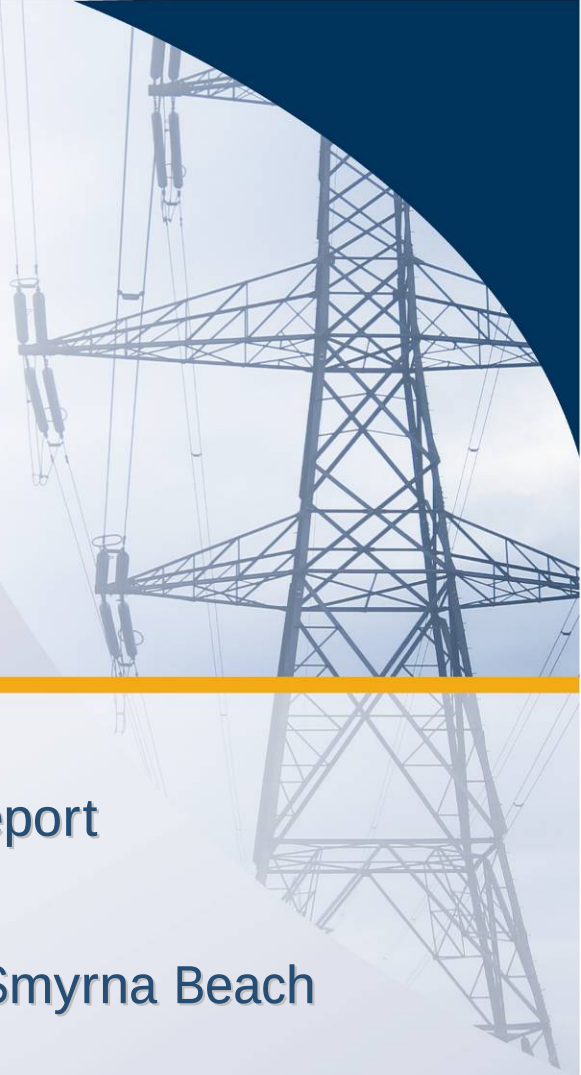

Reliability Readiness Evaluation Report

Balancing Authority/Transmission Operator

Utilities Commission, City of New Smyrna Beach

New Smyrna Beach, Florida

to ensure the reliability of the bulk power system

December 17–20, 2007

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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. Documents related to the program are available at http://www.nerc.com.

The reliability readiness evaluation teams, each led by a NERC staff member and a senior regional representative, include industry volunteers with considerable expertise selected to provide representation from other interconnections, other regions, and neighboring operating entities.

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 Utilities Commission, City of New Smyrna Beach (NSB) representatives on December 17–20, 2007. This report reflects the views and recommendations of the evaluation team regarding the readiness of the NSB to meet its responsibilities as a balancing authority/transmission operator.

Evaluation Team

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Jim Dodge***	Florida Reliability Coordinating Council, Inc. (FRCC)
Richard Gilbert	Lakeland Electric
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Shawn Liggett	Reliability*First* Corporation
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Organization Profile

The Utilities Commission, City of New Smyrna Beach (NSB) is a municipal utility governed by a commission appointed by the elected commission of the City of New Smyrna Beach, Florida. The staff consists of a general manager/chief executive officer and department directors who conduct the operations of the electric, water, and Internet utilities for the city. The electric service area covers approximately 72 square miles in Southeastern Volusia County, of which approximately 34 square miles is within the boundaries of the City of New Smyrna Beach.

NSB has approximately 20 circuit miles of transmission and owns a ring bus with two 115 kV interconnections to Florida Power & Light and one 115 kV interconnection with Progress Energy Florida. NSB owns approximately 69 MW of diesel generation and has an ownership interest in Florida Power & Light's St. Lucie nuclear plant and Progress Energy Florida's Crystal River nuclear plant that, combined, serve approximately 12 percent of NSB's energy requirements. The remaining NSB's requirements are met through purchase power contracts with Progress Energy Florida and Tampa Electric. NSB serves approximately 24,000 customers and had a peak load of 100.2 MW in January of 2003.

NSB is registered with NERC as a balancing authority and a transmission operator and is a member of FRCC. Florida Power & Light is an agent of FRCC and performs the function of the reliability coordinator for FRCC members.

Executive Summary

NSB has a culture that places emphasis on providing system reliability for the delivery of power to its customers. This is reflected in the mission statement, goals, and performance measurements monitored by management and in the working relationships within the organization.

The evaluation team recognizes, as positive observations, that the senior management of NSB has increased the emphasis on system reliability in recent years, is making an effort to increase training opportunities for system operators beyond requirements, and ensures all operators attend annual regional training seminars. The team also notes that NSB provides load management programs and tool for the system operators that are easy to use and effective. NSB has placed emphasis on retaining experienced system operators and has developed excellent working relationships and communications between the system operators and their immediate supervision.

The evaluation team makes several recommendations that will assist NSB in improving system operations. Several of the recommendations are related to infrastructure issues and backup control procedures that are discussed in Appendix 1. The team also makes a series of recommendations related to improving the system operators' capability to monitor and control the reactive capabilities of NSB's system, and improving system operation procedures and training in certain areas.

Overall, the evaluation team identified seven positive observations. In addition, the team offers 44 recommendations that, if implemented, will enhance NSB's readiness to operate reliably and maintain the reliability of the bulk power system.

Positive Observations

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

1. NSB strives to exceed the required NERC continuing education training hours (Section 5.1).
2. All system operators attend annual FRCC training seminars (Section 5.1).
3. Senior management has increased emphasis on system reliability (Section 1.1).
4. The voltage reduction and load management programs are user friendly and effective (Section 2.4).
5. The energy management system/supervisory control and data acquisition (EMS/SCADA) graphical display for underfrequency and manual load shedding is clear and promotes effectiveness (Section 2.4).
6. System operators have excellent working relationships and communications with immediate supervision (Section 1.2.5).
7. NSB has placed an emphasis on retaining trained and experienced system operators (Section 1.2.4).

Recommendations

The evaluation team offers the following recommendations:

1. Confidential information on physical security redacted from public report. See discussion in Appendix 1.
2. Confidential information on physical security 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.
4. Confidential information on power supply for control facilities redacted from public report. See discussion in Appendix 1.
5. Confidential information on power supply for control facilities redacted from public report. See discussion in Appendix 1.
6. Confidential information on power supply for control facilities redacted from public report. See discussion in Appendix 1.
7. Confidential information on power supply for control facilities redacted from public report. See discussion in Appendix 1.
8. Confidential information on computer systems and support redacted from public report. See discussion in Appendix 1.

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12. Confidential information on computer systems and support redacted from public report. See discussion in Appendix 1.
13. Confidential information on computer systems and support redacted from public report. See discussion in Appendix 1.
14. Review, at least annually, the planning studies of FRCC and adjoining electric utilities for possible impacts on the NSB system during contingencies beyond the NSB system (Section 4).
15. Train system operators on system operating limits, including the limiting elements for all NSB facilities, to enhance operator response to potential events (Section 5.1).
16. Determine the reactive capability of all NSB generating units to provide operators with added situational awareness capabilities (Section 2.4).
17. Provide system operators additional training concerning the use of NSB generators for voltage control (Section 5.1).
18. Evaluate the value of adding EMS/SCADA control for capacitor banks installed on 23 kV systems, and implement findings (Section 2.4).
19. Develop EMS/SCADA displays that allow system operators to monitor reactive load and reactive reserves (Section 2.4).
20. Provide and maintain current copies of NSB operating procedures, the FRCC Handbook, NERC standards, and emergency contact information at the backup control center (Section 2.2.3).
21. Confidential information on plans for loss of control facilities redacted from public report. See discussion in Appendix 1.
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23. Confidential information on plans for loss of control facilities redacted from public report. See discussion in Appendix 1.
24. Confidential information on plans for loss of control facilities redacted from public report. See discussion in Appendix 1.
25. Confidential information on plans for loss of control facilities redacted from public report. See discussion in Appendix 1.
26. Confidential information on plans for loss of control facilities redacted from public report. See discussion in Appendix 1.

27. Post the letter of authority of the system operators on the wall in the primary control center and the backup control facility (Section 2.2.3).
28. Determine the underfrequency trip set points on all generators and adjust to meet regional requirements, as appropriate (Section 2.4).
29. Develop a formal shift-change procedure to ensure uniform and complete transfer of information between system operators (Section 2.2.3).
30. Confidential information on computer systems and support redacted from public report. See discussion in Appendix 1.
31. Develop a succession plan for key system operations personnel (Section 1.2.4).
32. Develop and implement a document control process, including a method for verifying that the system operators have received and understood changes to procedures, to make sure operators have and use the most up-to-date policies and procedures (Section 2.2.3).
33. Develop a manual load shedding procedure that provides system operators guidance on which loads to shed, and in what order, when system load reduction is the primary concern (Section 2.4).
34. Review existing procedures for evaluating readiness of new system operators, including peer reviews, and update as necessary (Section 5.1).
35. Expedite, to the extent possible, the development and implementation of a full complement of NSB ongoing operations training course modules (Section 5.1).
36. Develop written tests to measure and document system operators' knowledge of NSB's procedures (Section 5.1).
37. Increase the number of qualified trainers to ensure all aspects of the training program can be properly implemented (Section 5.1).
38. Develop a documented yearly training plan for the system operators to help promote appropriate training (Section 5.1).
39. Incorporate training requirements into system operator annual performance goals (Section 5.1).
40. Provide seasonal system assessments to the system operators to help them prepare for notable changes (Section 4).
41. Incorporate lessons learned from system operations into the training program to reduce the possibility of recurring errors (Section 5.2.1).
42. Provide hands-on training annually to the system operators on plans for loss of control center functionality to increase familiarity with emergency procedures and potentially reduce confusion during an evacuation (Section 5.1).*
43. Provide awareness training for the system operators concerning the analysis capabilities of the reliability coordinator (Section 5.1).
44. Provide additional training to system operators about data necessary to properly calculate area control error and how to manually substitute missing or incorrect data to ensure that

the most accurate calculation available is provided to Progress Energy Florida (Section 5.1).

*Identified by the company 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 positive observations 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 *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.

NSB is trying to establish a more formal, process-based management of the organization and is examining each process to determine what needs to be improved. NSB's human resource group is working as a partner with system operations to define the business requirements, develop a framework needed to support system operations activities, and develop the personnel to support the framework. In this development mode, NSB is trying to determine if each employee is properly trained to meet the requirements of the organization.

This process is affecting all of NSB's departments. Part of the process is for the various groups to understand how they affect each other. As an example, the water and wastewater group is the second largest customer of the electric utility group, so they are discussing system reliability and how it affects the water and wastewater group.

NSB has been working on improving the professionalism of the organization by formalizing procedures and putting in place a code of ethics. The connection among NSB's vision statement, goals, and system operations is a work in progress; the goals and performance measurements of system operators are not yet linked to the corporate vision and goals. The evaluation team considers the recent emphasis senior management is placing on system reliability to be a positive observation.

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.

NSB has a vision statement, goals, and measures to support a culture that places emphasis on providing reliable service to its customers. NSB has also developed a strategic plan that incorporates the values of the organization and has completed a cultural assessment that examined both the formal and informal power structures. This effort identified a need for

additional formal training for many parts of the organization. NSB also found that past cost cutting had limited maintenance and training activities as well as its exposure to the rest of the industry.

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.

NSB is developing a formal performance measurement system. System operations developed goals for the year, and a series of measures are being developed relating to the performance of system operators. The performance plan will include financial incentives to be paid based on savings achieved from performance improvement. NSB is trying to structure the goals so that each employee can clearly see how his or her performance is related to the performance of all other employees.

NSB's interaction with the industry is primarily through FRCC. At the national level, NSB depends on FRCC, the Florida Municipal Power Association, the American Public Power Association, and other similar organizations to represent NSB's interests.

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.

NSB is working towards improving its assessment capabilities. NSB is tracking distribution metrics, but not metrics on reasons for distribution or transmission failures. The director of system operations is planning to hire an employee to evaluate why failures occur. NSB has added a developmental position in its human resources group to work on employee training and is developing expertise on security-breech issues for its information technology group. A long-term goal is to relieve the director of system operations of the EMS support functions he is presently performing.

NSB has performed incident response training in order to determine how the distribution emergency operations center should be manned. NSB's director of system operations performed a primary role in the training and determination of proper staffing. Other members of NSB's staff have been involved, so the director of system operations can shed responsibilities and focus on fewer issues.

NSB has an incentive program that rewards employees for recommended improvements that provide savings. The rewards are usually direct payments of a percentage of the savings.

1.2.4 Human Resources

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

A part of the new performance management system NSB is implementing involves determining the technical and competency requirements for each position in the organization. This process is expected to lead to a formal assessment of individuals interested in filling a position and provide guidance on the training required. This process is intended to be linked to NSB's succession planning, and the reviews of personnel under the performance plan will assist the managers in selecting candidates who have the right mix of interest and competency to meet the needs of various positions.

NSB's system operations has a personnel turnover rate considerably higher than the average turnover rate of NSB's other functions. NSB is evaluating which employees in system operations may want to retire and is working on mitigating the effect of these potential retirements. NSB has a rehire program that will allow someone to retire under the Florida retirement system and be rehired. NSB is working closely with local high schools and community colleges on recruitment and has developed an educational and transfer program for employees desiring to move into different positions in the company. NSB has increased salaries and benefits to ensure they remain in the middle range of the market. The evaluation team notes the emphasis being placed on retaining trained and experienced system operators as a positive observation. NSB has not completed a formal succession plan for system operations and the evaluation team recommends a plan be developed for key personnel in system operations.

Head count and budgets are issues the general manager/chief executive officer of NSB has to negotiate with both the utilities commission and the city commission. The city commission controls funding of the utility. The utility does control staffing in terms of salary grades and which positions are filled. This has influenced the culture of the utility such that any operator may perform multiple tasks. NSB is considering adding positions to reduce the number of activities being handled by the director of system operations, who is directly involved in training and managing system operators, maintaining computer hardware and software and telecommunications for the control center, performing a key role in backup control functions, and handling other similar operating functions.

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.

NSB publishes and distributes to all employees a monthly company newspaper ("The Pulse") to keep employees informed of policy changes, important human resource announcements, activities in each department, notable accomplishments of groups and individuals, and items of general interest to all personnel.

NSB's general manager/chief executive officer does not hold meetings or communicate directly with the employees of system operations; he does hold meetings with the director of system operations every other week and communicates with him regularly on the telephone and through e-mail messages. The director of system operations is expected to provide all direct communications with the employees of system operations. NSB is developing a formal communications process that will assist the organization in gathering questions and feedback from employees and passing those up through the departments.

The evaluation team suggests that the general manager/chief executive officer consider the need to communicate directly with the system operations personnel periodically to reinforce the importance of the system operators' responsibilities in protecting the reliability of the bulk power system. The system operators have excellent working relationships and communications with their supervisors. System operators are kept informed of important information and provide suggestions for improvements. The evaluation team cites this relationship as a positive observation, as it supports reliable system operations.

2. Fundamentals of Operations

2.1 General

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

NSB's system operators have four electronic display monitors available to monitor NSB's system. The system operators can select the information displayed on each screen. The displayed information includes the status of breakers, loads, and voltages for the entire transmission and distribution system. The system operators also monitor system frequency and area control error. Audible tones and various color schemes are used to differentiate classes of alarms.

Two additional monitors are available to monitor the Florida Transmission Management System (FTMS). The FTMS provides information on transmission and generation outages and is used to report transmission outages, hourly inadvertent, energy schedules, transmission outages, and other data used with the reliability coordinator's state estimation program. The system operators have two personal computers available at their workstations that provide Internet access and allow operators to support a number of applications, including maintaining dispatchers' logs and historical load data. The control room has a transmission system status board with real-time status of breakers for major substations and a large distribution system map. A television set with cable access is available to watch news and weather reports. The system operators also have display monitors for security cameras located at strategic locations.

The system operators have a company radio system for intra-company communications with line crews, generation plant operators, and station crews. The operators also have public telephones, a state hotline, a Voice over Internet Protocol (VoIP) corporate telephone system, and access to cellular phones and a satellite phone for emergency operations.

A room adjacent to the control room houses the EMS/SCADA servers and telecommunication interfaces and an additional workstation and monitor for the senior system operator. An additional room is used by the electrical dispatcher, who takes trouble calls for the distribution system.

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.

NSB's system is a radial transmission load on a ring-bus with interconnections to Florida Power and Light and Progress Energy Florida. The capacity of the interconnections exceeds NSB's system load. This, along with the operational planning for the system and the training and experience of NSB's system operators, supports very conservative operations. Operation of the underlying distribution system is also conservative and carefully monitored by management.

2.2.2 Operational Decision-Making

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

NSB does not have advanced analysis applications to support system operations, but as mentioned above the operating procedures are conservative and the system operators are well trained and experienced in providing safe and reliable system operations.

2.2.3 Operational Alignment

Organizational structure supports safe and reliable system operation.

NSB's system operators have immediate access to a library that includes NSB's operating procedures, manuals, and guides. The manuals and guides provided the system operators the procedures needed for normal and emergency system operations. The documents are maintained by the director of system operations and the lead system operator.

Significant changes in operating procedures are provided to the system operators by the director of system operations with a sign-off sheet. Less important changes are provided through discussions with the director of system operations or in the form of notes included with the daily load forecast and interchange schedule information. The evaluation team recommends that NSB develop and implement a document control process that includes a method for verifying system operators have received and understood changes to procedures.

NSB does not have a formal shift-change procedure. The outgoing operator provides informal information to the incoming operator concerning system conditions and recent changes, and two whiteboards in the control room are used to post information concerning system conditions. A shift checklist is available but not used consistently. The evaluation team recommends that a formal shift-change procedure be developed to ensure that all relevant operating information is exchanged during shift changes.

NSB has a letter stating the authority of the system operators to take all actions necessary to protect the reliability of the bulk power system, but the letter is not posted in the control room or at the backup facility. The evaluation team recommends NSB have the letter prominently posted in the control center and in the substation facility used for backup operations.

NSB does not have a backup control center but does have a transmission substation normally used as a site to perform backup control operations with a laptop computer. The evaluation team recommends that NSB provide and maintain current copies of NSB operating procedures, the FRCC Handbook, NERC standards, and emergency contact information at the backup control site.

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.

NSB is basically a radial transmission load connected to the bulk power network through 115 kV tie lines to a ring bus connected to Florida Power and Light and Progress Energy Florida. NSB does not have a real-time state estimator or real-time contingency analysis capability. The lead system operator provides the next-day and weekly operational planning, including load forecasting and purchased power and interchange schedules.

NSB has the capability to automatically calculate an area control error for its system. The area control error is automatically communicated to Progress Energy Florida, and Progress Energy Florida provides regulation of NSB's area control error under a service contract. NSB's system operators can start and operate peaking generation units, as required, to provide supplemental regulation of NSB's area control error and to provide voltage support for NSB's distribution system.

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.

NSB is a member of the FRCC Reserve Sharing Group but contracts for its reserve requirements. NSB has capacity and energy emergency plans and procedures, including restoration plans, and an automatic underfrequency load shedding program. The load shedding program meets FRCC requirements and will shed 48 percent of NSB's load in six steps from 59.7 Hz to 58.2 Hz. In addition, NSB's system operators have manual load shedding capabilities through the EMS to shed load on over half of NSB's distribution feeders. The operators do not have a manual load shedding procedure but rely on experience to determine which loads to select. The operators do have a display to monitor the manual load shedding. The evaluation team recommends NSB develop a manual load shedding procedure that provides system operators guidance on which loads to shed, and in what order, when system load reduction is the primary concern. The evaluation team understands NSB's system operators are not aware of the underfrequency trip points for NSB's generators, and it was not clear that these trip points had been determined. The evaluation team recommends NSB determine the trip set points on all generators and adjust the set points to meet regional requirements, as appropriate.

NSB has a demand side management program that can be used to reduce up to 5 MW through an automatic system activated by the system operators using the personal computers available in the

control room. The demand side program controls air conditioning and heating loads, and cycles the load reductions.

NSB also has a voltage reduction program that is manually executed by the system operators through EMS displays. The operators monitor and control most of the 115 kV transmission transformer tap positions. The operators do not have monitoring or control capabilities associated with capacitors on the 23 kV systems but can direct field crews to change the status of the capacitors. The evaluation team finds, as a positive observation, the voltage reduction and load management programs to be user friendly and effective; in addition, the EMS/SCADA graphical display for underfrequency and manual load shedding is clear and promotes effectiveness. The team recommends NSB evaluate the value of adding EMS/SCADA control for capacitor banks installed on 23 kV systems and implement the findings.

NSB does not monitor or control automatic voltage regulators on its generators. When needed, the operators can direct the generation operators to adjust the voltage schedule for the generators. The system operators do monitor voltage and reactive power at the generators. NSB has not determined the reactive capability of all of its generating units, and the system operators do not have the capability to monitor reactive reserves. The evaluation team recommends that NSB complete the determination of the reactive capability of all its generating units and develop EMS/SCADA displays that allow the system operators to monitor reactive load and reserves on its system.

3. Fundamentals of Maintenance

3.1 General

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

NSB's director of system operations is the primary person responsible for the maintenance of the computer hardware and software that supports the EMS/SCADA and communications capabilities associated with the control center. System operators notify the director of any problems; if he cannot resolve the problems, he contacts the appropriate vendor for support. Support for communications systems is also available from the NSB information technology group around-the-clock and from local service providers for voice communication circuits.

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.

As mentioned above, the director of system operations is the primary contact person for support on control center equipment and communications. The system operators do have procedures for handling some communications issues, and support is provided around-the-clock.

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.

NSB's system operators approve any schedule work associated with the system control facilities that can impact system operations. The operators ensure that the status of the power system is as safe as possible prior to approving the start of any work activities.

4. Fundamentals of Operational Planning

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

The focus of operational planning at NSB is on its distribution system and its ability to import power to serve its load. NSB has excess transmission capacity to import its needs. This is reviewed annually based on NSB's load growth and the capability ratings of its transmission facilities. NSB does not perform seasonal or near-term contingency studies for its transmission facilities because of the current transmission capacity reserve.

NSB does not have system study models for analysis of transmission operations due to the configuration of its system. NSB's electric system consists of a 115 kV ring bus with radial 115 kV lines feeding a 23 kV distribution system. NSB has tie lines with Florida Power and Light and Progress Energy Florida that terminate on the 115 kV ring bus. Progress Energy Florida and Florida Power and Light are responsible for contingency analysis and facility ratings associated with their transmission lines and the ring bus.

NSB supplies load and generation information to the FRCC load and resource database on an annual basis for area studies. The FTMS is used for day-ahead planning and sharing of information with NSB's reliability coordinator and other interconnected parties. Energy purchase requirements are determined by forecasted load and available transmission. System operators purchase additional energy or start a diesel generator if they can not meet load through contracts.

NSB's system operators receive minimal information on analysis of upcoming operating periods. The results of seasonal analysis by NSB or others are not routinely communicated with the operators. Planning for the next day or next week is performed by the senior system operator or the director of system operations. These plans are not routinely discussed with the system operators unless system conditions are expected to be abnormal.

The evaluation team recommends that NSB review, at least annually, the planning studies of FRCC and adjoining electric utilities for possible impacts on the NSB's system during contingencies beyond the NSB system. The team also recommends that NSB provide seasonal system assessments to the system operators to prepare them for any anticipated changes in system conditions and changes in the operations of neighboring systems.

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.

NSB has established procedures to use a systematic approach to training, utilizing a demonstration performance method for most in-house specific training topics. The training topics are covered through task-specific modules. The training program addresses the objectives of the modules, resources available to the operator, and methods used to measure competency in each area. The program includes a checklist of topics that all operators are to complete as well as a tracking checklist to maintain as modules are completed.

Initial training is provided primarily through Web-based training from a NERC-approved source (to enable the operator to achieve NERC certification) and on-the-job training (on topics specific to NSB) under the supervision of the director of system operations or the lead system operator. The in-house training deals with NSB system-specific issues, which apply NERC and regional standards to normal, emergency, and restoration conditions.

Continuing training is conducted by NERC-approved sources for operators to receive the NERC approved continuing education hours required to maintain certification. In-house training for NSB specific conditions is conducted by NSB's director of system operations or lead system operator. Training is conducted on shift when sufficient personnel are available for coverage, or on overtime if required. NSB currently uses a commercial Web-based training program that allows the operators to train from their homes and tracks their progress and time involved in training.

NSB's director of system operations determines when a trainee is prepared to assume a shift position without supervision. This is a subjective determination based on skills and knowledge demonstrated by the trainee to the director and feedback from other system operators that have observed the trainee's performance. Trainees are expected to achieve certification within one year. All of NSB's system operators have been hired from within the other divisions of NSB, which has reduced some of the training requirements. NSB's director of system operations has attended train-the trainer classes and a FRCC train-the-trainer course.

The evaluation team notes, as positive observations, that NSB's training program strives to exceed the required NERC continuing education hours training required each year and all system operators have attended FRCC annual training seminars. The team also notes several areas in which it recommends that NSB increase training emphasis. The team recommends NSB provide system operators training on system operating limits, including the limiting elements for all NSB facilities. The team recognizes that NSB generators are not normally operating, but the team recommends NSB provide system operators with additional training concerning the use of NSB generators for voltage control. The team recommends NSB review existing procedures for evaluating the readiness of new system operators to include additional peer reviews and update the procedures as necessary.

The evaluation team recognizes that NSB is in the process of developing additional training modules to provide training on the complete list of topics included in NSB's ongoing training program and recommends NSB expedite the development and implementation of the program. The team understands that NSB is not currently using written tests to check operators' knowledge on the training topics and recommends NSB develop written tests to measure and document system operators' knowledge of NSB's procedures. The team recommends that NSB increase the number of qualified trainers so that the training program does not depend so heavily on the availability of the director of system operations.

The evaluation team recommends NSB develop a documented yearly training plan for the system operators and incorporate training requirements into system operators' annual performance goals. The team recommends NSB provide hands-on training annually to the system operators on plans for loss of control center functionality. The team recognizes that NSB's system operations group performs only limited analysis on the performance of the power system and relies primarily on its reliability coordinator to perform that analysis; however, the team recommends that NSB provide awareness training for its system operators concerning the analysis capabilities of its reliability coordinator. The team recommends NSB provide additional training to system operators concerning the data necessary to properly calculate NSB's area control error, and how to manually substitute values for missing or incorrect data, to ensure that the most accurate calculation available is provided to Progress Energy Florida.

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.

NSB does not have a formal lessons-learned process or human error prevention training program. NSB does investigate the reasons for errors and informally incorporates the lessons learned into operating procedures and conveys results to system operators during meetings and routine discussions. The evaluation team recommends that NSB develop a more formal process that incorporates lessons learned from system operations into the system operator training program. The evaluation team suggests that NSB also consider incorporating human error prevention into the system operator training program.

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.