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Department of Commerce
Division of Public Utilities

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MEMORANDUM

To: Utah Public Service Commission

From: Division of Public Utilities

Philip Powlick, Director
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Subject: **In the Matter of:** the Investigation into the rules, standards or procedures other states have adopted to ensure safe, reliable and adequate utility service and facilities. Docket No. 08-999-07.

Date: November 3, 2008

Purpose

The Utah Public Service Commission (Commission) requested an investigation into what rules, standards, or procedures other states have adopted in order to ensure safe, reliable, and adequate utility service and facilities. The focus of this memorandum is on electric service providers. This memorandum also addresses the enabling statutes of those other states that have adopted such rules, standards, or procedures. Attachments provide examples of state statutes and administrative rules, as well as links to each state's commission statutes and administrative rules.

Executive Summary

This memorandum is in response to a request from the Utah Public Service Commission (Commission) to the Division of Public Utilities (Division) to investigate what rules, standards, or

procedures other states have adopted in order to ensure safe, reliable, and adequate utility service and facilities. This report focuses on electric service providers. In addition, the Commission wanted to examine the enabling statutes and any related penalties of those other states that have adopted such rules, standards, or procedures and to compare them to Utah Code Section 54-3-1.

Given our review of the available statutes and administrative rules in other states, the Division determined that there is a wide disparity among the states in the level of clarity and issue coverage in their administrative rules. The Division focused on those states that 1) provide clear rules that are correlated with unambiguous measures and standards; and 2) comprehensively address a broad range of service quality issues.

This memorandum concludes with several recommendations to the Commission, such as further investigation and detailed study of the administrative rules for key states.

Issue in Brief

To compare electric service quality rules in other states with the service quality practice in Utah, the Division identified seven primary categories in which to organize service quality issues. These categories are: 1) facility installation practices and standards; 2) reliability measures and standards; 3) power quality measures and standards; 4) inspection and maintenance (preventative and corrective) programs to maintain acceptable reliability levels; 5) interconnection requirements; 6) vegetation management; and 7) reporting requirements. These broad categories are designed in such a way so that every component of service quality falls into one of these categories. The Division used these categories to separate state rules into three qualitative groups: Group 1, Group 2, and Group 3. A detailed description of how this grouping was determined is found in the "Assessment of State Administrative Rules Information" section below. A brief description of each of these seven categories is given below.

Facility installation, practices, and standards deal with how the delivery facilities are installed and what standards they have to meet. It specifically addresses the design requirements that the delivery facilities have to meet. Generally all states require that delivery facilities should be installed in

conformity with the National Electric Safety Code (NESC). An example of a facility installation rule is found in Iowa Administrative Code 199, Chapter 20 at:

> 199—20.5(476) Engineering practice.
>
> 20.5(1) *Requirement for good engineering practice.* The electric plant of the utility shall be constructed, installed, maintained and operated in accordance with accepted good engineering practice in the electric industry to assure, as far as reasonably possible, continuity of service, uniformity in the quality of service furnished, and the safety of persons and property.
> 20.5(2) *Standards incorporated by reference.* The utility shall use the applicable provisions in the publications listed below as standards of accepted good practice unless otherwise ordered by the board.
> *a.* Iowa Electrical Safety Code, as defined in IAC [199], Chapter 25.
> *b.* National Electrical Code, ANSI/NFPA 70-2005.
> *c.* American National Standard Requirements for Instrument Transformers, ANSI/IEEE C57.13.1-1981 (R1999); and C57.13.3-1983 (R1991).
> *d.* American National Standard For Electric Power Systems and Equipment Voltage Ratings (60Hertz), ANSI C84.1-2006.
> *e.* Grounding of Industrial and Commercial Power Systems, IEEE 142-1991.
> *f.* IEEE Standard 1159-1995, IEEE Recommended Practice for Monitoring Electric Power Quality or any successor standard.
> *g.* IEEE Standard 519-1992, IEEE Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems or its successor standard.
> *h.* At railroad crossings, 199 IAC 42.6(476), "Engineering standards for electric and communications lines."

Reliability measures and standards include the measures used to estimate the level of reliability that could be expected from the public utility's system. Specifically, it deals with those measures used to estimate the number of times an average customer is expected to be out of power per year the average duration a customer can expect to be out of power per year, supply restoration. Another measure that most of the states use is one that is designed to identify the worst performing circuits. This category also captures whether or not there are standards set for these measures. An example of a reliability rule is found in Delaware's 3007 ELECTRIC SERVICE RELIABLITY AND QUALITY STANDARDS at:

> 3.0 Electric Service Reliability and Quality
> 3.1 Each EDC shall provide reliable electric service that is consistent with pre-restructuring service levels as identified in Section 4….
> 3.2 Each EDC shall install, operate, and maintain its delivery facilities in conformity with the requirements of …
> 3.3 Each EDC shall have targeted objectives, programs and/or procedures and forecast load studies...

> 3.4 Each EDC, in accordance with Section 9, shall submit to the Commission, on or before March 31 of each year, a Planning and Studies….
> 3.5 Each EDC, in accordance with Section 10, shall submit to the Commission, on or before April 30 of each year, a Performance Report …
> 3.6 Each generation company in accordance with Section 10. shall submit to the Commission on or before April 30 of each year, a Performance Report….
>
> 4.0 Reliability and Quality Performance Benchmarks
> 4.1 The measurement of reliability and quality performance shall be based on annual SAIDI and Constrained Hours of Operation measures for each EDC…
>
> 4.2 Each EDC shall maintain their electric service reliability and quality performance measures within the benchmark standard …
> 4.3 For the EDCs, the electric service reliability and quality performance benchmarks are established as follows….
> 4.4 Each EDC shall track and report its annual performance and three-year average performance against benchmark standards in accordance….
> 4.5 Each EDC shall track and report its annual CAIDI, SAIFI, CEMI8 and CELID8 performance in accordance with Section 10.
>
> 5.0 Reliability and Quality Performance Objectives
> 5.1 Each EDC shall establish electric service reliability and quality performance objectives for the forthcoming year. Objectives shall include….
> 5.2 Performance objective measures shall be established to support the maintenance of electric reliability performance

Power quality refers to the characteristics of electric power received by the customer. Power quality problems include, but are not limited to, disturbances such as high or low voltage, voltage spikes or transients, and flickers as well as voltage sags, surges, harmonics, and noise. Utah does not have power quality measures and standards in its service quality practices. Some of the states that the Division reviewed have power quality measures and standards. The Division identified Delaware as an exemplary state because it has clear, comprehensive, and practical power quality measures and standards. An example of a power quality rule is found in Delaware's 3007 ELECTRIC SERVICE RELIABLITY AND QUALITY STANDARDS at :

> 6.0 Power Quality Program
>
> 6.1 Each EDC shall maintain a power quality program with clearly stated objectives and procedures designed to respond promptly to customer reports of power quality concerns.

> 6.2 Each EDC shall consider power quality concerns in the design, construction and maintenance of its transmission and distribution power delivery system components to mitigate, using reasonable measures, power quality disturbances that adversely affect customers' equipment.
> 6.3 Each EDC shall maintain records of customer power quality concerns and EDC response. These records shall be made available to the Commission Staff upon request with 30 days notice

Inspection and maintenance programs deal with the presence or absence of inspection, preventative, and corrective maintenance. All of the states that the Division reviewed have inspection and maintenance program with clear goals to be achieved. An example of a inspection and maintenance program rules is found In Wisconsin Administrative Code Chapter PSC 113 at:

> PSC 113.0607 Appropriate inspection and maintenance: system reliability.
> (1) PREVENTATIVE MAINTENANCE PLAN. Each utility or other person subject to this chapter, including persons who own electric generating facilities in this state who provide service to utilities with contracts of 5 years or more, shall develop and have in place its own preventative maintenance plan. This section is applicable to electric generating facilities as set forth at s. 196.491 (5) ….
> (2) CONTENTS OF THE PLAN.
> (a) Performance standard. The preventative maintenance plan shall be designed to ensure high quality, safe and reliable service, considering: cost, geography, weather, applicable codes, national electric industry practices, sound engineering judgment and experience. (b) Elements of the plan.
> 1. Inspection….
> 2. Condition rating criteria. A rating criteria shall be established to grade the condition of a facility or piece of equipment….
> 3. Corrective action schedule. The results of inspections, assessments and condition rating criteria shall be used to define the schedule for implementing maintenance on the facility or piece of equipment….

Interconnection requirements were considered a separate category because some of the states have interconnection requirements in their service quality rules. The interconnection requirements of these states are less than comprehensive. Utah considers interconnection requirements separately from service quality. In Utah the interconnection requirements are considered in Docket No. 07-999-07 – rules for electric power interconnection. Currently a draft set of net metering interconnection rules is being circulated. An example of an interconnection requirement rule is found in Florida Rule Chapter 25-6 at:

> 25-6.065 Interconnection and Net Metering of Customer-Owned Renewable Generation.
> (3) Standard Interconnection Agreements. Each investor-owned utility shall, within 30 days of the effective date of this rule, file for Commission approval a Standard Interconnection Agreement for expedited interconnection of customer-owned renewable generation, up to 2 MW, that complies with the following standards:
> (a) IEEE 1547 (2003) Standard for Interconnecting Distributed Resources with Electric Power Systems;
> (b) IEEE 1547.1 (2005) Standard Conformance Test Procedures for Equipment Interconnecting Distributed Resources with Electric Power Systems; and
> (c) UL 1741 (2005) Inverters, Converters, Controllers and Interconnection System Equipment for Use With Distributed Energy Resources.
> (d) A copy of IEEE 1547 (2003), ISBN number 0-7381-3720-0, and IEEE 1547.1 (2005), ISBN number 0-7381-4737-0, may be obtained from the Institute of Electric and Electronic Engineers, Inc. (IEEE), 3 Park Avenue, New York, NY, 10016-5997. A copy of UL 1741 (2005) may be obtained from COMM 2000, 1414 Brook Drive, Downers Grove, IL 60515.

Vegetation management captures all aspects of transmission and distribution line vegetation management programs. All of the states the Division reviewed have a vegetation management component in their service quality rules. An example of a vegetation management rule is found in Illinois Title 83: Public Utilities, Subchapter c: ELECTRIC UTILIES, PART 411 ELECTRIC RELIABLITY at:

> Section 411.190 Approval of Vegetation Management Programs
> A jurisdictional entity may file with the Commission tariffs describing programs and practices for the control of vegetation designed to maintain or enhance service reliability. Such tariffs, if passed to file or accepted after hearing, shall be deemed standards of the Commission with respect to vegetation management by such jurisdictional entity and shall pre-empt contrary ordinances, rules, and actions of units of local government. A jurisdictional entity will provide notice to municipalities and counties directly affected thereby of the filing, under this Section, of a proposed tariff or supporting materials relating to the need for such a tariff.

Reporting requirements deal with the reports that public utilities are required to file with a state commission that detail the status of the service quality program measures and standards. All of the states the Division reviewed have reporting requirements in their service quality rules. An example of a reporting requirement rule is found in Oklahoma Administrative Code Title 165, Chapter 35 at:

> 165:35-25-20. Annual reliability report

(a) Each utility shall submit an annual reliability report to the Commission by March **1st** of each year, beginning March 1, 2005.
(b) The annual reliability report shall include the following:
(1) A description of all vegetation management….
(2) SAID1 and SAIFl … values….
(3) SAID1 and SAIFl …values computed for each of the utility's regions….
(4) A detailed report for each major event that is not included in the calculation of the reliability indices….
(5) A description of the program the utility has in place for analyzing and improving worst performing circuits….
(6) A description and map identifying the utility's service regions or operations divisions….
(c) The Commission reserves the right to request additional data if necessary.
(d) Limitations to technology**.** Utilities that do not have the technological capability to maintain and compile all such data, shall maintain….

Assessment of State Statutory Information

This section presents an assessment of the statutory information available on service quality standards of the selected states. The Utah code was examined and compared to the statues in other states.

Utah Code 54-3-1[1] requires the Public Utilities to, among other things, provide and maintain adequate and efficient services in a just and reasonable manner. The statute is lacking clarity and details as to what constitutes adequate service and maintenance. The Commission does not have any service quality rules that specify the reliability standards, power quality, or maintenance of facilities for any of the public utilities that fall under its jurisdiction.

The Division reviewed the statutes of those states[2] that the Division, using its own selection criteria, thought had relatively comprehensive reliability rules and standards (service quality rules standards). In its review the Division also was looking for enabling statutes for the rules adopted by the various

[1] 54-3-1 "…Every public utility shall furnish, provide and maintain such service, instrumentalities, equipment and facilities as will promote the safety, health, comfort and convenience of its patrons, employees and public, and as will be in all respects adequate, efficient, just and reasonable.

[2] States with best rules: Delaware, District of Columbia, Florida, Illinois, Iowa, Ohio, Oklahoma, and Wisconsin. States with the second most comprehensive rules: Alaska, Arkansas, Maine, Montana, Oregon, Tennessee, Texas, Vermont, and Missouri.

commissions. Generally the statutes for these states require the same quality of service and maintenance of facilities. The statutes indicate that all public utilities should provide just and reasonable service, instrumentalities, equipment, and facilities that promote the safety and health of its patrons, employees and the public. Though some of the statutes of these states are as vague as that of Utah, the utility commissions of these states developed and adopted comprehensive rules that specify the minimum reliability and maintenance standards, and, in some cases power quality standards, the public utilities are required to maintain.

Assessment of State Administrative Rules Information

This section presents an assessment of the administrative rule information available on service quality standards for selected states. Administrative rules from other states were reviewed and compared, although the focus was on 17 states with the "best" or "good" administrative rules.

When looking for the states with high service quality standards, reliability is an important category. Even if a state was lacking in other categories, greater detail on reliability issues was the most critical area examined in choosing the top states. A detailed description of interruptions and restoration, and their corresponding reporting requirements, provided a qualitative aspect of reliability. It was important that each set of rules described how each electrical company was required to maintain and improve its reliability. The reporting requirements category was also very important. A state requiring a large reporting responsibility suggested that the state commission was able to effectively monitor its electric companies and ensure its citizens reliable and good service quality. Maintenance requirements were one way to evaluate how a state's rules required electrical companies to maintain and improve their reliability. Facility requirements also showed that a set of rules would be able to ensure good service quality. All of the top states also provided at least one rule on power quality. Acceptable power quality is an important component of reliability.

When looking at the service quality definitions each set of rules provided, the Division had quantitative measures, such as how many terms were defined, and qualitative considerations, such as how descriptive the definitions were. A good set of definitions is required to ensure that there are no gray areas in a set of rules. One of the best sets of definitions was located in the Delaware rules. The Delaware rules were unusually well-organized and should service as an example. It is found at

Title 26 Public Utilities, 3007 Electric Service Reliability and Quality Standards. The structure of the Delaware service quality administrative rule is provided as a good example.

Structure of Delaware's 3007 Electric Service Reliability and Quality Standards	
1.0	Purpose and Scope
2.0	Definitions
3.0	Electric Service Reliability and Quality
4.0	Reliability and Quality Performance Benchmarks
5.0	Reliability and Quality Performance Objectives
6.0	Power Quality Program
7.0	Inspection and Maintenance Program
8.0	Delivery Facility Studies
9.0	Planning and Studies Report
10.0	Annual Performance Report
11.0	Major Event Report
12.0	Prompt Restoration of Outages
13.0	Penalties and Other Remedies
14.0	Outage Management System (OMS)
15.0	Reporting Specifications and Implementation
Source: http://regulations.delaware.gov/AdminCode/title26/3000/3007.shtml#TopOfPage	

When selecting states, the Division began with the PacifiCorp states. When looking at the PacifiCorp states, only Oregon had more then one administrative rule on service quality. The remaining PacifiCorp states had very little, if anything, on any of the seven broad categories. California's administrative rules were only on legal proceedings. Washington's administrative rules provided rules on reporting, but because their Commission is also over transportation, the overall size of their rules made it very difficult to find anything very detailed. Idaho's only contribution to service quality administrative rules was a very large section on power quality. Wyoming is currently in the process of drafting service quality rules.

After reviewing the PacifiCorp service territory states, the Division examined the MidAmerican Energy Company states. Iowa and Illinois both have a very good set of service quality rules. Neither Nebraska nor South Dakota have much information on service quality in their rules.

Identification of Group 1 States

Beyond the PacifiCorp and MidAmerican Energy states, the Division then turned to other states. By searching each commission's website, the Division reviewed excellent sets of rules for the District of Columbia, Delaware, Florida, Ohio, Oklahoma, and Wisconsin. Each of these states had detailed requirements on reliability, power quality, reporting requirements, and maintenance, which are the key areas for ensuring service quality. In addition, these states often had something on facility installation practices and standards, interconnection requirements, and vegetation management as well. These states, along with Iowa and Illinois were labeled Group 1, because they were the "best" states with the highest quality service quality rules.

Identification of Group 2 States

The Division also found that Alaska, Arkansas, Maine, Missouri, Montana, Tennessee, Texas, and Vermont covered most of the areas Group 1 had covered, but with less detail. These states, along with Oregon, were labeled Group 2, because while they still had a good set of service quality rules, they were not at the same level of scope or detail found in the Group 1 states. Several states we looked at had little to no service quality requirements, the majority of these states were discarded, unless they were PacifiCorp or MidAmerican states, and then they were labeled Group 3. It is also important to note that many, but not all states were examined, and that this type of state rating and comparison may occasionally be subjective.

PacifiCorp Service Quality Rules and Customer Guarantees

On its website PacifiCorp indicates that it follows a set of service quality rules and customer guarantees. These rules and guarantees are not formally statutes or administrative rules of the states PacifiCorp operates in. Instead they are rules and guarantees PacifiCorp follows based upon agreements with the states it serves. The Division found that states operating under Pacific Power and Light had similar Company rules, while states operating under Rocky Mountain Power had similar Company rules. Also, Pacific Power and Light states had more Company rules then Rocky Mountain Power states. All states have customer guarantees that the Company agreed to as part of MidAmerican Energy Holdings Company (MEHC) Acquisition commitments. In Utah, Rocky

Mountain Power is bound to these guarantees by the Acquisition Order they agreed to when MEHC purchased PacifiCorp from Scottish Power.

Yes/No Matrix for Selected States

To summarize and compare the vast amount of information contained in service quality administrative rules across dozens of state, the Division created a matrix with the seven broad service quality categories as the columns and the states on the rows. The first task was to assign a "Yes" or a "No" to each state and each category. An assignment of "Yes" meant that the state at least mentioned the category in its administrative rules. A "No" determination meant that the category was not in the state's administrative rule at all. It is important to note, however, that a "Yes" determination did not have to meet a very high standard: a definition of a term or at least some brief mention. (For visual clarity, only "Yes" is shown in the matrix; blank cells represent a "No.")

The "Yes/No matrix" is the easiest way to quickly compare service quality characteristics across the states. It summarizes vast information in a binary "Yes/No" way that is easy to read. Nevertheless, the "Yes/No" approach is not detailed. For example, a state with one term in a definition would receive a "Yes," while a state with extensive, detailed language covering a category would also receive a "Yes."

Categories	A	B	C	D	E	F	G
PacifiCorp Service Territory							
3 California	Yes						
3 Idaho			Yes				
2 Oregon	Yes	Yes	Yes	Yes	Yes		Yes
3 Washington	Yes	Yes	Yes	Yes			Yes
3 Wyoming							
MidAmerican Energy Company Service Territory							
1 Illinois		Yes	Yes	Yes	Yes	Yes	Yes
1 Iowa	Yes	Yes	Yes	Yes	Yes	Yes	Yes
3 Nebraska							
3 South Dakota							Yes
Other States							
1 DC		Yes	Yes	Yes		Yes	Yes
1 Delaware	Yes	Yes	Yes	Yes			Yes
1 Florida	Yes	Yes	Yes	Yes	Yes		Yes
1 Ohio	Yes	Yes	Yes	Yes		Yes	Yes
1 Oklahoma	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1 Wisconsin	Yes	Yes	Yes	Yes		Yes	Yes
2 Alaska	Yes		Yes	Yes	Yes		Yes
2 Arkansas	Yes		Yes	Yes		Yes	Yes
2 Maine	Yes		Yes	Yes	Yes		Yes
2 Missouri	Yes	Yes	Yes	Yes	Yes		Yes
2 Montana	Yes	Yes		Yes			Yes
2 Tennessee	Yes	Yes	Yes	Yes			Yes
2 Texas		Yes					Yes
2 Vermont	Yes	Yes	Yes	Yes	Yes		Yes

CATEGORY EXPLANATION

A) Facility installation practices and standards.
B) Reliability measures and standards.
C) Power quality measures and standards.
D) Inspection and maintenance (preventative and corrective) programs to maintain acceptable reliability levels.
E) Interconnection requirements.
F) Vegetation management.
G) Reporting requirements.

Numeric Value Matrix for Selected States

A much richer comparison of service quality standards is apparent with a "Numeric Value Matrix" of the seven broad categories. A scale of zero to three was constructed. "Zero" equated to "No," or not located in the rules or, for that matter, no rules. "One" indicated that a category was in the rules but only in a definition or a brief mention in a rule. "Two" indicated that a category had a rule detailing it, or that it was mentioned in several rules. "Three" indicated that a category had more than one rule detailing it (or if a rule detailing that category was over a page long). Both of these matrixes provided an easy way for the reader to evaluated how important each category was by looking down the columns, and how detailed each state's rules was on service quality by looking across the rows. The numeric value matrix, however, adds an extra dimension the Division maintains is necessary to adequately describe the information. For visual clarity, only "One," "Two," or "Three" is shown. Blank cells represent a "Zero."

Categories	A	B	C	D	E	F	G
PacifiCorp Service Territory							
3 California	1						
3 Idaho			3				
2 Oregon	1	2	2	2	1		2
3 Washington	2	1	2	1			3
3 Wyoming							
MidAmerican Energy Company Service Territory							
1 Illinois		3	3	2	2	3	3
1 Iowa	2	3	1	2	1	2	2
3 Nebraska							
3 South Dakota							1
Other States							
1 DC		3	2	1		1	3
1 Delaware	2	3	2	2			3
1 Florida	2	3	3	1	2		3
1 Ohio	2	3	3	2		1	3
1 Oklahoma	1	3	3	3	1	2	3
1 Wisconsin	1	3	3	3		3	3
2 Alaska	2		3	1	1		2
2 Arkansas	2		3	2		2	3
2 Maine	2		3	2	3		2
2 Missouri	2	1	2	1	3		2
2 Montana	2	2		2			3
2 Tennessee	2	1	2	2			2
2 Texas		3					2
2 Vermont	2	1	1	2	3		3

CATEGORY KEY:

A) Facility installation practices and standards.
B) Reliability measures and standards.
C) Power quality measures and standards.
D) Inspection and maintenance (preventative and corrective) programs to maintain acceptable reliability levels.
E) Interconnection requirements.
F) Vegetation management.
G) Reporting requirements.

NUMERIC RATING KEY:

blank No mention in rules
1 Only brief definition or mention
2 Category had a rule detailing it
3 Lengthy rule or more than one rule for a given category

Conclusions and Recommendations

The Division has looked at various states and has identified the best 17 states, which were then separated into two groups. The states that appear to have the best standards include the District of Columbia, Delaware, Florida, Illinois, Iowa, Ohio, Oklahoma, and Wisconsin. The states that had some good standards included Alaska, Arkansas, Maine, Missouri, Montana, Oregon, Tennessee, Texas, and Vermont.

The Division recommends that the Commission consider the 17 states with the "best" or "good" rules. Delaware, the District of Columbia, and Wisconsin, are excellent examples of detail and completeness that statutes and rules should encompass.

Attachments

Cc: Dave Taylor, Rocky Mountain Power
Michele Beck, Committee of Consumer Services