

NERC Violation ID	Reliability Standard	Req.	Violation Risk Factor	Violation Severity Level	Violation Start Date	Violation End Date	Method of Discovery	Mitigation Completion Date	Date Regional Entity Verified Completion of Mitigation
WECC2017016935	TOP-002-2.1b	R19	Medium	Severe	9/12/2016	9/13/2016	Self-Report	3/18/2017	3/15/2018
<p>Description of the Violation (For purposes of this document, each violation at issue is described as a “violation,” regardless of its procedural posture and whether it was a possible, or confirmed violation.)</p>			<p>On February 6, 2017, PNM submitted a Self-Report stating, as a Transmission Operator, it had a potential noncompliance with TOP-002-2.1b R19.</p> <p>On September 12, 2016 at 11:30 AM, a circuit breaker at one of PNM’s 345 kV switching stations faulted internally, due to a possible insulation failure internal to the breaker. The fault was within two separate zones of protection, one generator step-up transformer and one bus. However, only one of the protection devices operated, as the generator step-up transformer differential protection detected the fault and tripped open the 345 kV lines breakers to clear the fault. The second protective device did not operate due to a previously undetected short circuit in the associated current transformer (CT) cabling. As a result, the next line of protective devices operated to clear the fault for the elements that terminate at the 345 kV switching station, which caused the protective devices to trip locally or at the other end of the lines to clear the fault. The operation of the next line protection devices caused eight Bulk Electric System (BES) transmission lines and three generation units to trip off-line, creating an N-8 contingency.</p> <p>PNM System Operators made multiple attempts to restore two specific 345 kV lines, which would have returned PNM’s system to a “known” operating state. However, efforts to restore those lines over 20-30 minutes proved unsuccessful due to the internally faulted breaker at the 345 kV Station. In tandem with System Operators’ efforts to restore the two lines, PNM Operations Engineers manually calculated a new “known” System Operating Limit (SOL) for the N-8 condition, and at approximately 12:08 PM the new SOL was substituted into the Energy Management System (EMS), approximately 38 minutes after the initial disturbance began.</p> <p>PNM System Operators assumed the custom calculation for one of its Remedial Action Schemes (RAS) would add the RAS contribution to the manually inputted SOL. The custom calculation did not automatically add the RAS contribution, resulting in the SOL being understated by approximately 500 MW. The cause of the error in the custom calculation was that the Energy Management System (EMS) calculation had been updated by the System Operator and was not checked by anyone else. The actual SOL should have been 800 MW + 500 MW (Import Contingency Load Shedding Scheme Remedial Action Scheme contribution in place at the time of the event), equaling 1,300 MW. As a result, the incorrect value was transmitted to the Reliability Coordinator (RC) as a valid SOL. PNM’s Operators were operating above the erroneous 800 MW SOL at the time, and as a result of this error, the RC directed PNM to shed firm load in order to return the system to within what it thought was a valid SOL. PNM followed the directive and shed 100 MW of load at 12:24 PM to achieve the SOL without the RAS contribution, which returned the Facility to its correct SOL and the system to its “known” operating state and acceptable system operating limits. The root cause of the violation was attributed to a lack of controls for the System Operator in the various tasks he was performing, including manually entering the EMS custom calculations and then having the same System Operator checking the calculations. In addition, there was an influx of concurrent post-outage activity being managed. Because the System Operator did not immediately recognize the failure of the EMS custom calculation, he did not communicate the error to the RC in order to stop the shed load directive.</p> <p>The violation began on September 12, 2016, when PNM’s EMS failed to include the contribution of the ICLSS RAS into the SOL and ended on September 13, 2016, when PNM updated its custom calculation formula in its EMS model to include the ICLSS RAS with the SOL.</p>						
<p>Risk Assessment</p>			<p>WECC determined these violations (WECC2017016935 and WECC2017016936) posed a moderate risk and did not pose a serious and substantial risk to the reliability of the Bulk Power System (BPS). In this instance, PNM failed to maintain accurate computer models utilized for analyzing and planning system operations when its EMS failed to include the contribution of a RAS to an SOL in a custom calculation entered into the EMS during a contingency, as required by TOP-002-2.1b R19. The WECC Major Transfer Path was incorrectly showing an exceedance of the SOLs, though there was not an SOL exceedance, which led the RC to inaccurately issue the directive to shed the load. This load shed elevated the risk of the violation and increased the assessed penalty.</p> <p>However, as compensation, PNM invoked contingency reserves from the Reserve Sharing Group, started all available load-side generation, and acquired emergency assistance. Lastly, PNM’s protection system devices successfully acted to clear the faulted equipment, and PNM did not operate above SOLs during the event.</p>						
<p>Mitigation</p>			<p>To mitigate this violation, PNM:</p> <ol style="list-style-type: none"> 1) corrected the custom calculation to include the RAS available load when it is manually substituted into the EMS; 2) hosted face-to-face meetings with the RC to address communications between the work groups; and 3) instituted internal controls to prevent or minimize the possibility of reoccurrence including developing lessons learned for System Operators to address contributing factors which caused the System Operator not to immediately realize the SOL mistake including: <ol style="list-style-type: none"> i. developed lessons learned and best practice approaches for restoration from large outages and captured them in an updated Transmission Procedure; and ii. performed training with key personnel on lessons learned, best practice, and the updated Transmission Procedure. 						

Other Factors	<p>WECC reviewed PNM’s internal compliance program (ICP) and considered it to be a mitigating factor in the penalty determination. PNM has an ICP which demonstrates a strong culture of compliance. PNM’s ICP has a well-established program including systematic preventive measures, operational level procedures, internal controls, and corporate policies.</p> <p>WECC considered “above and beyond” actions and investments made by PNM in an effort to prevent recurrence of this issue and proactively address and reduce reliability and cyber security risk due to similar issues. PNM has initiated a System-Wide Transmission Protection Standardization and Upgrade Project in a multi-year effort that officially began in 2018 and is expected to be completed in 2023 at a total cost of over \$50M. This significant project addresses issues associated with PNM’s aging and non-standardized transmission protection system that not only enhances the management and security of the new CIP protection system devices, but the overall reliability of the system and associated Operations and Planning compliance. This above and beyond action is effectively a redesign and deployment of PNM’s protection system which is well beyond what would be considered a typical action of a similarly situated utility. The project was not undertaken as the result of a mitigation plan. Rather, it was the result of PNM’s systematic, post-event root cause analysis and corrective action planning program.</p> <p>WECC considered PNM’s TOP-002-2.1b R19 compliance history. WECC determined that NERC Violation ID WECC200810312 should not serve as a basis for aggravating the penalty because the cause and the circumstance of the previous violation is different than the current issue.</p>
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WECC2017016936	TOP-004-2	R4	High	Severe	9/12/2016	9/12/2016	Self-Report	3/31/2017	3/15/2018
Description of the Violation (For purposes of this document, each violation at issue is described as a “violation,” regardless of its procedural posture and whether it was a possible, or confirmed violation.)			<p>On February 6, 2017, PNM submitted a Self-Report stating, as a Transmission Operator, it had a potential noncompliance with TOP-004-2 R4.</p> <p>On September 12, 2016 at 11:30 AM, a circuit breaker at one of PNM’s 345 kV switching stations faulted internally, due to a possible insulation failure internal to the breaker. The fault was within two separate zones of protection, one generator step-up transformer and one bus. However, only one of the protection devices operated, as the generator step-up transformer differential protection detected the fault and tripped open the 345 kV lines breakers to clear the fault. The second protective device did not operate due to a previously undetected short circuit in the associated current transformer (CT) cabling. As a result, the next line of protective devices operated to clear the fault for the elements that terminate at the 345 kV switching station, which caused the protective devices to trip locally or at the other end of the lines to clear the fault. The operation of the next line protection devices caused eight Bulk Electric System (BES) transmission lines and three generation units to trip off-line, creating an N-8 contingency.</p> <p>PNM System Operators made multiple attempts to restore two specific 345 kV lines, which would have returned PNM's system to a “known” operating state. However, efforts to restore those lines over 20-30 minutes proved unsuccessful due to the internally faulted breaker at the 345 kV Station. In tandem with System Operators' efforts to restore the two lines, PNM Operations Engineers manually calculated a new “known” System Operating Limit (SOL) for the N-8 condition, and at approximately 12:08 PM the new SOL was substituted into the Energy Management System (EMS), approximately 38 minutes after the initial disturbance began.</p> <p>PNM System Operators assumed the custom calculation for one of its Remedial Action Schemes (RAS) would add the RAS contribution to the manually inputted SOL. The custom calculation did not automatically add the RAS contribution, resulting in the SOL being understated by approximately 500 MW. The actual SOL should have been 800 MW + 500 MW (ICLSS RAS contribution in place at the time of the event), equaling 1,300 MW.</p> <p>As a result, the incorrect value was transmitted to the Reliability Coordinator (RC) as a valid SOL. PNM's Operators were operating above the erroneous 800 MW SOL at the time, and as a result of this error, the RC directed PNM to shed firm load in order to return the system to within what it thought was a valid SOL. PNM followed the directive and shed 100 MW of load at 12:24 PM to achieve the SOL without the RAS contribution, which returned the Facility to its correct SOL and the system to its “known” operating state and acceptable system operating limits.</p> <p>The TOP-004-2 R4 violation began on September 12, 2016 at 12:01 PM, 30 minutes after the contingency N-8 event began and PNM had not yet restored the system and ended on September 12, 2016 at 12:24 PM when it restored the system, for a total of 24 minutes.</p> <p>The root cause of the TOP-004-2 R4 violation was attributed to PNM’s topology processor providing an incorrect status indication regarding the bus, due to an incorrect breaker indication which prevented the System Operator from being able to identify where the fault occurred in a timely manner, leading to the re-energization of the faulted breaker in an attempt to restore the system to a known operating state.</p>						
Risk Assessment			<p>WECC determined these violations (WECC2017016935 and WECC2017016936) posed a moderate risk and did not pose a serious and substantial risk to the reliability of the Bulk Power System (BPS). In these instances, PNM failed to restore operations to respect proven reliable power system limits within 30 minutes during an unknown operating state, when the N-8 contingency event began and PNM had not yet restored the system, as required by TOP-004-2 R4. The WECC Major Transfer Path was incorrectly showing an exceedance of the SOLs, though there was not an SOL exceedance, which led the RC to inaccurately issue the directive to shed the load. This load shed elevated the risk of the violation and increased the assessed penalty.</p> <p>However, as compensation, PNM invoked contingency reserves from the Reserve Sharing Group, started all available load-side generation, and acquired emergency assistance. Lastly, PNM’s protection system devices successfully acted to clear the faulted equipment and PNM did not operate above SOLs during the event.</p>						
Mitigation			<p>To mitigate this violation, PNM has:</p> <ol style="list-style-type: none"> 1) returned the system to within “known” operating limits; 2) instituted internal controls to prevent and detect future issues including: <ol style="list-style-type: none"> i. developed lessons learned and best practice approaches for restoration from large outages and captured them in an updated Transmission Procedure; ii. performed training with key personnel on lessons learned, best practice and the updated Transmission Procedure, the causal factors of the instant issue and Human Performance Considerations. A procedure based on the lessons learned has been integrated in the initial training program required for all System Operators, and the lessons learned from the related event have been added to the annual protective relay training to ensure that operators are aware of the lessons learned from this event; 						

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WECC2017016936	TOP-004-2	R4	High	Severe	9/12/2016	9/12/2016	Self-Report	3/31/2017	3/15/2018
			3) pursued work with the EMS vendor to improve topology processing issues and improve situational awareness, specifically PNM: <ul style="list-style-type: none"> i. implemented local logic in an effort to improve situational awareness; ii. added the logic to the Energy Management System (EMS) for all remote terminal units (RTUs) such that a calculation detects when an RTU goes offline and it will flash a message to the Operator at the bus when the data was affected by going offline; and 4) created a breaker indicator alarm as an enhancement to its topology processor to improve PNM’s situational awareness.						
Other Factors			<p>WECC reviewed PNM’s internal compliance program (ICP) and considered it to be a mitigating factor in the penalty determination. PNM has an ICP which demonstrates a strong culture of compliance. PNM’s ICP has a well-established program including systematic preventive measures, operational level procedures, internal controls, and corporate policies.</p> <p>WECC considered “above and beyond” actions and investments made by PNM in an effort to prevent recurrence of this issue and proactively address and reduce reliability and cyber security risk due to similar issues. PNM has initiated a System-Wide Transmission Protection Standardization and Upgrade Project in a multi-year effort that officially began in 2018 and is expected to be completed in 2023 at a total cost of over \$50M. This significant project addresses issues associated with PNM’s aging and non-standardized transmission protection system that not only enhances the management and security of the new CIP protection system devices, but the overall reliability of the system and associated Operations and Planning compliance. This above and beyond action is effectively a redesign and deployment of PNM’s protection system which is well beyond what would be considered a typical action of a similarly situated utility. The project was not undertaken as the result of a mitigation plan. Rather, it was the result of PNM’s systematic, post-event root cause analysis and corrective action planning program.</p> <p>WECC considered PNM’s compliance history and determined there were no relevant instances of noncompliance.</p>						

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WECC2016016414	PRC-005-1.1b	R2	High	Lower	1/1/2015	2/27/2017	Self-Report	3/18/2017	1/31/2018
Description of the Violation (For purposes of this document, each violation at issue is described as a “violation,” regardless of its procedural posture and whether it was a possible, or confirmed violation.)			<p>On October 26, 2016, PNM submitted a Self-Report stating, as a Generator Owner and Transmission Owner, it had a potential noncompliance with PRC-005-1.1b R2.</p> <p>Specifically, PNM did not provide documentation for maintenance of its three valve-regulated lead-acid (VRLA) batteries, one vented-regulated lead-acid (VLA) battery, two transmission relays, eight battery chargers, and 155 instrument transformers within their maximum maintenance intervals defined in PNM’s Protection System Maintenance Program (PSMP), as required by PRC-005-1.1b R2. The root cause of the violation was attributed to ambiguous instructions related to documenting and retaining evidence of PSMP maintenance tasks. In addition, there was a lack of quality control or inspection of the protection system devices that required preventative maintenance. PNM’s PSMP during this time required visual inspections for the Protection System devices every four months, which are not required under the new version of the Standard. The missed maintenance activities for the 155 Instrument Transformers were missed visual inspections that would not have been required under PRC-005-6. In addition, the missed maintenance activities for the two transmission relays were four calendar-year requirements that, under PRC-005-6, would have only needed to be completed every six calendar years. The first Protection System device was not maintained starting January 1, 2015 and the last missing device was maintained on February 27, 2017.</p>						
Risk Assessment			<p>WECC determined this violation posed a minimal risk and did not pose a serious and substantial risk to the reliability of the BPS. In this instance, PNM failed to provide documentation of maintenance activities for three VRLA batteries, one VLA battery, two transmission relays, eight battery chargers, and 155 instrument transformers as a part of its PSMP, as required by PRC-005-1.1b R2.</p> <p>PNM had weak preventative and detective controls. However, as compensation, PNM was following a stricter timeline for its maintenance and testing for its Protection System devices than is required by the current version of the Standard, reducing the risk by increasing the maintenance and testing activities. Specifically, the missed maintenance activities for the 155 Instrument Transformers were missed visual inspections that would not have been required under PRC-005-6. In addition, the missed maintenance activities for the two transmission relays mentioned above were four calendar-year requirements that, under the current version of the Standard, would have only needed to be completed every six calendar years.</p>						
Mitigation			<p>To mitigate this violation, PNM has:</p> <ol style="list-style-type: none"> 1) completed the required maintenance activities for three VRLA batteries, one VLA battery, two transmission relays, eight battery chargers, and 155 instrument transformers; 2) implemented formal documentation procedure for compliance with PRC-005 with clear instructions; 3) conducted additional outreach including training for Supervisors, Technical Maintenance Engineers, Management Department, Compliance personnel, and other Management; and 4) completed monthly compliance reviews for all the Protection System devices subject to PRC-005. 						
Other Factors			<p>WECC reviewed PNM’s internal compliance program (ICP) and considered it to be a mitigating factor in the penalty determination. PNM has an ICP which demonstrates a strong culture of compliance. PNM’s ICP has a well-established program including systematic preventive measures, operational level procedures, internal controls, and corporate policies.</p> <p>WECC considered “above and beyond” actions and investments made by PNM in an effort to prevent recurrence of this issue and proactively address and reduce reliability and cyber security risk due to similar issues. PNM has initiated a System-Wide Transmission Protection Standardization and Upgrade Project in a multi-year effort that officially began in 2018 and is expected to be completed in 2023 at a total cost of over \$50M. This significant project addresses issues associated with PNM’s aging and non-standardized transmission protection system that not only enhances the management and security of the new CIP protection system devices, but the overall reliability of the system and associated Operations and Planning compliance. This above and beyond action is effectively a redesign and deployment of PNM’s protection system which is well beyond what would be considered a typical action of a similarly situated utility. The project was not undertaken as the result of a mitigation plan. Rather, it was the result of PNM’s systematic, post-event root cause analysis and corrective action planning program.</p> <p>WECC considered PNM’s PRC-005 compliance history in determining the penalty. WECC considered NERC Violation IDs: WECC2014013971, and WECC200810375 to be aggravating factors in the penalty determination.</p>						

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WECC2018019757	PRC-005-1.1b	R2	High	Lower	1/1/2014	3/15/2018	Self-Report	2/28/2020	TBD
Description of the Violation (For purposes of this document, each violation at issue is described as a “violation,” regardless of its procedural posture and whether it was a possible, or confirmed violation.)			<p>On May 25, 2018, PNM submitted a Self-Report stating, as a Transmission Owner, it was in potential noncompliance with PRC-005-1.1b R2.</p> <p>PNM did not provide documentation of maintenance and testing for two microprocessor relays and one electromechanical relay at one substation with two 115 kV lines, within its PSMP. The microprocessor relay was not maintained according to its six-calendar-year interval with a one-year grace period, and the electromechanical relay was not maintained on a three-calendar-year interval with a one-year grace period. The two microprocessor relays were maintained in 2009 and were not maintained by the due date of December 31, 2015. The electromechanical relay was maintained in 2009 and was not maintained again by the due date of December 31, 2013. The root cause of the violation was attributed to a lack of internal controls to ensure accuracy. Specifically, the relays were not included in the prints and therefore the relay technician did not include them for testing and maintenance. This violation began on January 1, 2014, when PNM did not complete the required maintenance activities for two microprocessor relays and one electromechanical relays, and ended on March 15, 2018, when PNM performed maintenance on all the relays.</p>						
Risk Assessment			<p>WECC determined this violation posed a minimal risk and did not pose a serious and substantial risk to the reliability of the BPS. In this instance, PNM failed to provide documentation for maintenance and testing for two microprocessor relays and one electromechanical relay at one substation with two 115 kV lines as part of its PSMP, as required by PRC-005-1.1b R2.</p> <p>However, as compensation, the two microprocessor relays serve as secondary (redundant) protection for two 115 kV lines that are not part of a WECC Major Transfer Path. Though a failure to maintain the one microprocessor relay on the first 115 kV line could result in the trip of the 115 kV line, it would not result in a loss of load or system generation. In addition, if there were a failure of the second microprocessor relay in addition to the electromechanical relay on the second 115 kV line, it would result in a loss of less than 100 MW of load.</p>						
Mitigation			<p>To mitigate this violation, PNM has:</p> <ol style="list-style-type: none"> 1) completed the maintenance activities for two microprocessor relays and one electromechanical relay at one substation and two 115 kV lines; 2) updated prints to address lack of accurate protection system and controls drawings; 3) corrected errant Cascade entries; 4) established monthly meetings between Protection System and Controls and Technical Maintenance Management Department to discuss issues related to relays upgrades, maintenance evidence, changes to existing set of relays, and Cascade updates; 5) developed and documented the processes for Maintenance Technicians, including contract labor; 6) developed and implemented training to all relevant personnel on the Maintenance Technicians process, focusing on the handoff between relay craft and other departments; 7) verified CIP device inventory matched with the protection system devices in Cascade; 8) completed listing individual relay records in Cascade and eliminated grouping of relay in Packages; this step included separation of 100% of all BES relay packages within Cascade; and 9) updated the protection and controls drawings for the protection system devices in scope. 						
Other Factors			<p>WECC reviewed PNM’s internal compliance program (ICP) and considered it to be a mitigating factor in the penalty determination. PNM has an ICP which demonstrates a strong culture of compliance. PNM’s ICP has a well-established program including systematic preventive measures, operational level procedures, internal controls, and corporate policies.</p> <p>WECC considered “above and beyond” actions and investments made by PNM in an effort to prevent recurrence of this issue and proactively address and reduce reliability and cyber security risk due to similar issues. PNM has initiated a System-Wide Transmission Protection Standardization and Upgrade Project in a multi-year effort that officially began in 2018 and is expected to be completed in 2023 at a total cost of over \$50M. This significant project addresses issues associated with PNM’s aging and non-standardized transmission protection system that not only enhances the management and security of the new CIP protection system devices, but the overall reliability of the system and associated Operations and Planning compliance. This above and beyond action is effectively a redesign and deployment of PNM’s protection system which is well beyond what would be considered a typical action of a similarly situated utility. The project was not undertaken as the result of a mitigation plan. Rather, it was the result of PNM’s systematic, post-event root cause analysis and corrective action planning program.</p> <p>WECC considered PNM’s PRC-005 compliance history in determining the penalty. WECC considered NERC Violation IDs: WECC2014013971, and WECC200810375 to be aggravating factors in the penalty determination.</p>						