

Staff Report

for the Board of Directors' Meeting of April 28, 2021

TO: Board of Directors

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DATE: April 20, 2021

SUBJECT: Nevada Irrigation District Internal Compliance Program 2020
Annual Risk & Compliance Assessment Reports and Self-Certification Requirement Summary

HYDROELECTRIC

RECOMMENDATION:

Receive and file the NID 2020 Annual Risk Assessment Reports and the NID NERC Compliance Assessment Report for 2020 as prepared in accordance with the Nevada Irrigation District Internal Compliance Program.

BACKGROUND:

As authorized by NID Board Policy 9400, the NID Internal Compliance Program (Section 5.4) requires that an Annual Compliance Review and Risk Assessment be performed. A summary of the results are to be presented to the General Manager and the Board of Directors. The Annual Risk Assessment, Compliance Assessment, and Self-Certifications for 2020 are the subject of this agenda item.

Annual Risk Assessment Summary

Organizations with a strong risk management culture have successfully demonstrated that implementation of Internal Risk Controls Systems (IRCS) are integral to anticipate, predict, and govern operational and compliance risk elements. In its effort to implement such an IRCS, the NID Internal Compliance Program requires the NID Reliability Oversight Compliance Committee (ROCC) to commission an annual risk assessment that identifies weaknesses and vulnerabilities in NID hydroelectric reliability, compliance, and security positions.

In late 2020 and early 2021, NID and Grid Subject Matter Experts (GridSME) performed a risk assessment of the NID Hydroelectric Department reliability,

compliance, and security efforts. The risk assessment focused on the following five major components:

- People and Training
- Regulatory Environment
- Operating Environment (such as wildfires and security)
- Infrastructure and Technology
- Electricity Revenue

Results were documented in an Annual Risk Assessment Report (Report) associated with current existing risks and the mitigation efforts deployed by NID.

Although NID has a low inherent risk to the Bulk Electric System (BES) due to its relatively small amount of electrical generation and its location on the Western Interconnection network topology, NID is not without risk to its organization, community, or BES that is evoked by the regulatory, staffing, equipment and external challenges identified in the 2020 Annual Risk Assessment Report.

During 2020, NID Hydro performed well in mitigation of risks identified in the prior year's risk assessment. Significant achievements in 2020 included: response to COVID-19 pandemic to mitigate risk of workforce's potential exposure; reliability of hydroelectric facilities through scheduled maintenance, repairs, and upgrades; vegetation management and wildfire mitigation on conveyance and transmission line facilities; and continued compliance with environmental and electric reliability standards.

With the key risk areas identified in the Report, NID will continue to move forward with risk prioritization, reduction, mitigation and elimination efforts.

Annual Compliance Assessment Summary

Nevada Irrigation District is registered with the North American Electric Reliability Corporation (NERC) as a Generator Owner (GO) and Generator Operator (GOP) in the Western Electricity Coordinating Council (WECC) region. NID is responsible for compliance with NERC and WECC mandatory Reliability Standards as a GO/GOP under the authority of the U.S. Electric Power Reliability Act (and amendments).

In total, approximately 336 Requirements were applicable to NID during 2020 as follows:

- 41 Operations and Planning (O&P) Reliability Standards
 - 226 GO-applicable Requirements
 - 94 GOP-applicable Requirements
- 2 Critical Infrastructure Protection (CIP) Reliability Standards
 - 16 additional Requirements

NID has not identified any acts of potential non-compliance for the 2020 calendar year. The attached NID NERC Compliance Assessment Report provides additional detail on the applicable Requirements subject to enforcement, and NID's actions to maintain compliance.

NERC Reliability Standards continue to evolve and the rate of change continues to increase year by year. Next year, new Standards and Requirements will become enforceable and require implementation activities including; capital investments, operations & maintenance changes, and increased monitoring & reporting. As new/updated Standards become enforceable, the changing compliance environment will impact the maintenance of NID's procedures/programs/processes and will require additional training for District operations, maintenance, and compliance staff.

Self-Certification Requirement Summary

Upon NERC/WECC notification, NID must self-certify its current compliance status with specified NERC Reliability Standards. Self-Certification is an attestation of compliance or non-compliance with specified NERC Reliability Standards for a given time period.

This year, self-certification for the 2020 compliance year was required by NERC via the WECC / NID Compliance Oversight Plan for the following NERC Standards:

- CIP-002
- CIP-003
- MOD-026
- MOD-027
- PRC-001

In addition, NID's Internal Compliance Program requires annual self-assessment for compliance with (all applicable) reliability standards. The attached NID NERC Compliance Assessment for 2020 was prepared to satisfy the requirement of the Internal Compliance Program.

There is no self-certification due in 2022 for the 2021 calendar year. The next NERC/WECC self-certification is due in 2023 for the following NERC Standards during the 2022 calendar year:

- COM-002
- PRC-005
- VAR-002-WECC
- VAR-501-WECC

Preparation of the 2020 Annual Risk Assessment Report and the NERC Compliance Assessment Report for 2020 is in alignment with Goals 1 and 2 of the

District's Strategic Plan by as they support compliance with the rules and regulations that govern District activities.

BUDGETARY IMPACT:

No budgetary impact.

CDK

Attachments: (3)

- NID 2020 Annual Risk Assessment
- NID 2020 NERC Compliance Assessment
- 2020 NERC Self-Assessment & Risk Assessment PowerPoint Presentation

NID Hydroelectric Department 2020 Annual Risk Assessment

02/03/2021

Grid Subject Matter Experts

This report presents the findings of the annual tabletop risk assessment exercise performed by key NID Hydroelectric Department personnel and GridSME.

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Executive Summary

The Nevada Irrigation District's Hydroelectric Department ("NID Hydro" or "the Department") faces a variety of risks that could, individually or collectively, threaten the organization's ability to meet its objectives. This report identifies and assesses the most prominent risks, provides an update on status relative to prior years, and offers recommendations for how NID Hydro can mitigate those risks.

The following five categories were identified during the 2020 risk assessment. The themes are consistent with the previous year's assessment as are the rankings.

1. People and Training
2. Operating Environment (e.g., wildfires)
3. Infrastructure and Technology
4. Regulatory Environment
5. Electricity Revenue

NID Hydro continues to face significant risks in the People and Training category, including a lack of bench strength in certain key areas, talent recruitment and retention, personnel training, and an aging workforce. Compounding this issue is the COVID-19 pandemic and the upcoming 2021 union negotiations. NID Hydro's ability to retain its best people and train its less experienced employees both continue to be a critical risk. If unmitigated, the combination of these personnel risk factors would adversely impact NID Hydro's operations and performance. Bringing the right people into the organization, compensating them with salaries competitive with nearby agencies, training them, building redundancy in a few key areas, and retaining the top performers, are fundamental to managing all other risks.

NID Hydro's operating environment presents high inherent risks. The organization's rural and mountainous operating footprint experiences treacherous conditions in the winter followed by long, dry seasons in the summer and fall. This environment coupled with NID Hydro's high-voltage electrical equipment and aging infrastructure creates numerous risks to NID's people and property. In 2020, NID Hydro responded well to these risks as it experienced no lost time accidents and addressed the highest fire risk areas thanks to the vegetation management program. One other external risk NID must respond to are cyber threats to its business and critical infrastructure. As seen in the recent Solar Winds cyber-attack, a robust cyber security program that includes regular patching, system monitoring, and cyber supply chain risk assessments are essential for municipal governments and industrial control systems.

Prominent regulatory risks facing NID Hydro include the Federal Energy Regulatory Commission (FERC) dam safety requirements, the North American Electric Reliability Corporation (NERC) Reliability Standards, and the associated pace of change and continuous demands of each. The FERC dam safety regulatory oversight continues to increase and managing the volume of work in this area is a challenge. At the very least, the sheer volume of regulatory requirements culminates in a significant strain on NID Hydro resources to stay current on regulatory changes and maintain the associated internal compliance programs.

NID Hydro should continue to take steps to close the gaps addressed in this report. The most prominent areas needing attention and meaningful action include recruiting, hiring, training, and retaining skilled resources to manage NID Hydro's growing infrastructure and regulatory burdens, managing and mitigating operating environment risks, including wildfires and cyber threats, and maintaining the

reliability of an aging infrastructure. There are a multitude of risk factors facing NID Hydro, but all are manageable with the right people and right resources.

Risk Assessment

Failing to identify and manage risk prevents organizations from reaching safety, operations, financial, reliability, and compliance objectives. The effective deployment of strong internal controls, systems, and other risk management tools helps organizations identify latent organizational weaknesses, potential human behaviors that drift from expectations, and external risk factors. Risk management programs are the foundation to a business resiliency plan. This annual risk assessment represents one of many steps NID Hydro takes to maintain an effective internal control system and mitigate risk.

In December 2020, GridSME met with several key NID Hydroelectric Department (“NID Hydro”) management and staff members to discuss and assess current and potential risk factors facing NID Hydro operations. As part of this assessment, GridSME interviewed the Hydroelectric Manager, the Hydroelectric Compliance Administrator, two Senior Hydroelectric System Technicians, the Hydroelectric Generation Superintendent, and the Hydroelectric Maintenance Superintendent. This tabletop risk assessment exercise identified five main risk categories facing NID Hydro listed in order of priority below:

1. People and Training
2. Operating Environment (e.g., wildfires)
3. Infrastructure and Technology
4. Regulatory Environment
5. Electricity Revenue

A variety of specific risks reside within each category. Interdependencies exist among the risk categories, and certain risks can positively or negatively impact other risks. This risk assessment identifies the risks believed to be most probable or most impactful to NID Hydro.

People and Training

Our risk assessment process identified People and Training to be the most probable and impactful risk discussed by the interviewees. Within this category, several risks were identified that could hinder NID Hydro’s ability to recruit, train, and retain the workforce necessary to operate and maintain its hydroelectric infrastructure. These risks include, workplace safety, talent recruitment and retention, personnel training, and succession planning.

Personnel Safety

All of the interviewees view personnel safety as the most important risk facing NID Hydro. Given the remote working environments and unforeseen weather conditions common in the Western Sierras, personnel’s continuous exposure to these elements presents a significant risk. Because of this, NID Hydro operations and maintenance crews make a concerted effort to prepare in advance of incoming storms, deploy the buddy system whenever possible, and take preventive measures.

Another common topic during our interviews and one that every organization has been forced to manage over the course of the last year, is the COVID-19 pandemic. NID Hydro has responded to the pandemic by implementing workplace health and safety measures and protocols to mitigate the risk of its workforce’s potential exposure. In addition to the health and wellness of its employees, COVID-19 poses a risk to NID

Hydro as the organization does not have much depth in certain key operations and maintenance positions. Specifically, the organization is heavily reliant on six operators (one position open, currently) and three technicians. If just a couple employees are unable to work, NID Hydro would be in a vulnerable position, and potentially unable to cover all shifts and unable to effectively operate and maintain NID Hydro's facilities.

It is evident, however, that workplace health and safety is NID Hydro's top priority and its safety record speaks to that. However, consistent with prior years, NID Hydro personnel noted that although they possess knowledge and expertise in general industrial workplace safety, deep expertise on electrical safety is limited within the Department. In addition, NID Hydro believes its safety program could be further improved by having a dedicated safety coordinator focused on the industrial and electrical safety aspects of NID Hydro's operating environment.

Personnel Training

Access to external training continues to be a key risk facing NID Hydro and other water agencies in Northern California. Due to COVID, NID lost access to the PG&E operator onsite training program, which again highlighted NID's vulnerability and heavy reliance on PG&E for its operator training needs. NID Hydro sees a well-trained and prepared workforce as essential to maintaining a culture of safety, its infrastructure, and uninterrupted operations. NID Hydro also recognizes that a well-developed training program must contain both internal and external components. Internal training is necessary to prepare the workforce for the operating environment, procedures, and scenarios unique to NID Hydro. External training is essential for personnel to gain exposure to proven industry best practices, deep technical knowledge and skillsets, external viewpoints, and new developments.

Operations

For its operations personnel, NID Hydro remains heavily dependent on PG&E's hydro operations training program. NID Hydro has a long history of using PG&E's training program to qualify its operators. This training program has been extremely beneficial for NID Hydro and its personnel. Because of this, in 2016, NID Hydro cited the potential loss of an adequate training program as a major risk facing NID Hydro and began taking long-term steps to mitigate this risk since that time.

Absent access to PG&E's training program, NID Hydro would be forced to look for other hydro training programs. Interviewees identified WAPA's Training Center in Boulder, Colorado as the closest replacement to PG&E's operator training program. However, this training is not as in-depth as PG&E's training and would likely lead to a training gap for new NID operators. Therefore, NID Hydro continues to explore longer-term in-house training development options to reduce the organization's dependency on third-party training.

Regardless, given the current ongoing COVID-19 pandemic, NID personnel are unable to attend outside third-party training programs. Access to outside, third-party training programs is a single-contingency risk with considerable downside to NID Hydro. These third-party training programs accelerate operators' learning curve and cuts on-the-job training duration in half, one interviewee noted. What might normally take an operator 18 months to learn and become proficient can be cut in half to nine months when they go through PG&E's operator training program.

This is no small effort, and will take years to develop, but is essential should NID Hydro lose access to PG&E's operations training program. NID Hydro has also had preliminary discussions with neighboring

water agencies (e.g., Placer County Water Agency, Yuba County Water Agency, Merced Irrigation District, etc.) about forming a training partnership to pool resources and form a shared training program. There is mutual interest in this effort, but resources are scarce across the agencies, and NID Hydro cannot not rely on outside agencies to mitigate this risk.

Maintenance

Currently, the NID Hydro Maintenance department (machinists and technicians) relies mostly on external training classes and vendor training programs. In prior years' risk assessments, it was noted that the maintenance department, unlike the operations department, lacks a formal systematic training program, instead relying on a mostly ad hoc approach. In 2017, NID Hydro made a concerted effort to begin developing a structured and systematic training program for the machinists and technicians. This maintenance department training program consists of both third-party and internally provided training courses. NID has made a considerable effort in the past few years to document and formalize this maintenance training program. This program will continue to evolve and mature in 2021 and beyond.

Talent Recruitment and Retention

Consistent with the prior years' risk assessment, talent recruitment and retention remains a significant risk to NID Hydro's continued success. In 2018, 2019, and 2020, the employee turnover rate in the Department was 10.0%, 9.8%, and 6.6%, respectively. NID Hydro lost two hydro operators in 2020 and, most recently, the Compliance Administrator gave notice and left in February 2021. Fear remains that NID Hydro is in a weak position to recruit and retain top talent because its wages are consistently below market and there are nearby competitors for that talent. This risk was raised by all interviewees during our 2020 risk assessment interview process. The District and Employee Union are set to begin contract negotiations in 2021.

In 2020, NID deferred the Union MOU negotiations until 2021 due to COVID. The outcome of these negotiations will be a critical event for NID Hydro in 2021. All interviewees still believe Hydro is highly susceptible to employee turnover if wages remain so far below market averages. A market compensation survey was conducted in 2019 and this will be taken into account during Union MOU negotiations in 2021.

The impact of lower pay rates will become even more impactful as retirements increase and the workforce age and tenure decline. While personnel nearing retirement are disinclined to leave a job simply for better near-term pay, a younger, well-trained workforce are far more prone to seek immediate pay raises simply by changing employer. One interviewee expressed concerns that NID Hydro's below market rates leave the organization vulnerable to being a "training shop" for other nearby water agencies, irrigation districts, and PG&E. In such a scenario, NID Hydro becomes a revolving door for smart, hungry talent that climb the learning curve with NID, only to become too valuable for NID to retain. They leave NID for better paying but comparable positions at other organizations in the surrounding geographic area.

Due to likely retirements and general workforce attrition, NID Hydro is likely to lose a meaningful portion of its workforce over the next five years as approximately 18% of Department staff is currently eligible for retirement. Based on recent turnover statistics and expected retirements, NID Human Resources estimates that an annual turnover rate of approximately 12% should be expected. High employee turnover has the potential to exacerbate other risk factors facing NID Hydro as addressed within this report. These include employee safety, personnel training, equipment maintenance, and regulatory

compliance. These risks become more difficult to manage and become more impactful when organizations lack skilled, experienced, and well-trained people.

Facing the risk of high employee turnover, organizations should not only improve its employee recruitment and retention strategy, but also institute a more robust succession plan. Faced with the real possibility of a 12% employee turnover rate, NID Hydro should place more attention on succession planning at all levels of the department. Succession planning is a tool used to develop the right competencies and leadership attributes at all levels of the organization. In addition, a succession plan also identifies where the lack of bench strength creates single-contingency risks (i.e., surprise departures with no backup).

Should NID Hydro experience increased turnover in the years ahead, which is likely inevitable given retirements, interviewees expressed a concern about NID Hydro's ability to find and recruit experienced and qualified staff. It is believed that the overall workforce is not sufficiently deep in terms of the industrial trades. This external factor places even more emphasis on the importance of well-developed employee retention and succession plans.

Succession Planning

The risk of turnover and a challenging recruiting environment make succession planning a key initiative in maintaining an adequate workforce. The interviewees are all mindful of this need and there are efforts being made to develop the bench strength.

For Hydro Operations specifically, succession planning is a common risk factor mentioned during the interviews. The identification of this risk is an important and necessary first step to mitigating the risk. The risk is two-fold. First, there is a concern that the operations department lacks strong candidates interested in a future leadership role in the department. Second, it is widely believed operators take five years to get their feet under them and move into "experienced" status. Because of the time required for operators to reach "experienced" status, this puts NID Hydro at risk when turnover does occur.

The Hydro Maintenance Department practices back-filling and cross-training to cover vacations. The department is also looking ahead 5 to 10 years and identifying the personnel that will be able to step-up into more experienced and skilled roles. This exercise also influences training program development, which is a critical step in succession planning. To grow its bench strength, NID Hydro must know what skills they need at the next level and the training and on-the-job experience required for personnel to advance in the organization.

Organizational Culture

NID Hydro possesses a strong culture of safety and compliance which continues to mature. In 2020, the organization continued to grow that culture but there is still more room for growth. NID Hydro focuses on correcting legacy "shortcut" and "tribal knowledge" behaviors. This is especially important as the organization faces increasing regulatory burden from FERC and NERC, wildfire mitigation and vegetation management challenges, and emerging cyber security threats. The correct mindset, documentation, and procedures are especially important for NID Hydro as external threats and risks escalate. Diligent documentation and the adherence to well-designed procedures is especially important in an invasive regulatory environment. Of course, improvements in this area are dependent on having sufficient resources to execute the procedures and document the work.

Organizational Structure and Staffing

NID Hydro's Organizational Structure and Staffing stabilized during 2020. NID Hydro was able to recruit and hire a Project Manager to manage the large-scale capital projects' activities, schedules, and budgets.

The Hydro Operations and Maintenance Departments have experienced significant growth in workforce with no associated increase in supervision. The nationally recognized Incident Command System (ICS) suggests that between three and seven subordinates is the appropriate range for supervisors. Five is often recommended as the optimal number. Without any intermediate supervisors, the Hydroelectric Maintenance Superintendent has direct supervision over eleven subordinates and the Hydroelectric Generation Superintendent has direct supervision over eight subordinates. NID Hydro should reevaluate supervision requirements to ensure adequate oversight of staff is maintained.

Regulatory Environment

Regulatory risks facing NID Hydro continue to build with FERC Dam Safety as a significant contributor to NID Hydro's current regulatory burden. The fallout from the February 2017 Oroville Emergency Spillway incident has greatly increased regulatory scrutiny and dramatically increased the demands on NID Hydro. Complying with regulatory requirements is mandatory and keeping up with changes, maintaining sufficient documentation, and responding to regulator inquiries demands significant attention and resources. Effective January 1, 2020, new, more onerous NERC CIP requirements also became enforceable. These new requirements involve technical cyber security controls that require constant attention and expertise. Consequently, the risk of misstep poses operational, financial, and reputational risks to NID. Aside of the new CIP requirements, many of the new NERC standards that were scheduled to be implemented and enforceable in 2020 were moved to 2021 due to COVID-19.

In addition to FERC and NERC, NID Hydro is regulated by the California Legislature, the California Energy Commission (CEC) (e.g., rules regarding how traditional hydroelectric power generation will be treated or viewed by load-serving entities and in the energy markets), the California and Federal Environmental Protection Agencies (EPA), and the Occupational Safety and Health Administration (OSHA), among others.

All forms of regulatory compliance place a heavy burden on NID Hydro and stretches its resources thin. The organization can expect the burden to increase in the years ahead. Maintaining compliance requires the organization's full attention, as well as a system of documented processes, procedures, and internal controls. Most importantly, the regulatory burden requires NID Hydro to build and sustain a culture of compliance lived daily by its people. The organization leverages this annual risk assessment to inventory and assess the organization's regulatory compliance burden and assess whether sufficient resources exist to meet that burden. Based on this risk assessment, GridSME believes that NID Hydro's resource capacity to meet the organization's regulatory compliance burden is not sufficient due to three primary drivers. These three drivers are:

1. Increased FERC oversight and scrutiny;
2. A growing infrastructure footprint (addressed in the Infrastructure and Technology section below); and
3. An evolving NERC compliance burden specifically related to CIP cyber security control requirements.

FERC Regulatory Compliance

Perhaps the biggest regulatory risk facing NID today includes decisions or initiatives at FERC, such as reliability, security initiatives, dam safety, environmental, compliance, and re-licensing. FERC scrutiny and oversight dramatically increased beginning in 2017. At nearly the same time as the Oroville Dam spillway failure in February 2017, FERC's scrutiny of NID Hydro's activities began to increase. FERC reacted in an extreme manner and now requires NID Hydro to notify the Commission before performing a maintenance event, no matter the nature of the activity. In the past, NID Hydro would identify a maintenance need and address the issue, as soon as possible. Now, NID Hydro must notify FERC, and allow FERC to review and ask questions during a 60-day review window. This not only slows down reaction time to operations and maintenance needs, it also consumes administrative resources and requires those resources to react very quickly to minimize FERC review delays. Given the increased FERC scrutiny, record-keeping and document retention are more important than ever before.

NID is also working through a re-licensing of the Yuba-Bear project that encompasses Chicago Park, Dutch Flat, Bowman, and Rollins. License issuance triggers a relatively quick timeline to perform necessary studies to complete the licensing process. In its current state, NID does not have the staffing levels required to handle this effort. It is estimated that one-to-two new compliance staff and one-to-two new maintenance staff would be needed to complete the re-licensing of the project. This is a risk that should be mitigated and planned for leading up to the kickoff of the process.

The culmination of regulatory reaction and aging infrastructure has placed a significant strain on NID Hydro operations, maintenance, and administrative resources to keep-up with regulator demands and increased project workload. NID Hydro recently added an Assistant Engineer and Project Manager position and both have made significant contributions, but the Department is still thin on resources to handle the increasing workload. NID Hydro lacks depth and bench strength behind its Senior Engineer of Dam Safety. Resources in this area are especially important as NID continues its FERC relicensing efforts.

NERC Regulatory Compliance

Compliance and reliability risks associated with the NERC Reliability Standards, the Western Electricity Coordinating Council (WECC) Regional Standards, and their collective enforcement has the full attention of NID Hydro. To address its NERC obligations, NID Hydro's Internal Compliance Program (ICP) directs the organization to perform a risk assessment annually. NERC and WECC are very focused on identifying and reducing risks to the Bulk Electric System (BES) and recommend that registered entities conduct regular risk assessments.

As the power grid evolves (e.g., increased intermittent renewable generation, the proliferation of storage, the retirement of many conventional generators, changing distribution system characteristics, ever-increasing cyber threats), NERC and the Regional Entities (e.g., WECC) are working diligently to keep pace. This results in an ever-changing set of Reliability Standards constantly in-flux. NID Hydro's registration as a Generator Owner (GO) and Generator Operator (GOP) makes applicable and enforceable 273 Reliability Standard Requirements and sub-Requirements.¹ That presents 273 opportunities to "trip-up" and experience a compliance event, such as a compliance exception or compliance violation.

¹ A NERC Reliability Standard contains one or more individual Requirements and sub-Requirements applicable to certain NERC functional registrations, such as a GO or GOP.

Complying with the currently enforceable Standards and Requirements is a significant undertaking. Adding to that burden are changes to the Reliability Standards and associated Requirements. Table 1 and Figure 1 below depict the total number of changes since NID Hydro's registration with NERC in 2014. From NID's registration until now, there have been 1,224 cumulative changes to the Requirements applicable to NID Hydro's GO and GOP functional registrations. Years ago, NERC began talking about achieving a "steady state" with the Reliability Standards. As seen in Table 1 below, the Standards were hardly in a steady state until 2018 when activity did, at least temporarily, slow. 2018 saw a dramatic decrease in the number of Standard changes compared to prior years. However, activity picked up again in 2019 and 2020, and more changes are expected in 2021.

	2014	2015	2016	2017	2018	2019	2020	2021 Sched.
Requirements that became Enforceable	68	70	134	120	5	21	42	52
Requirements that became Inactive	114	99	222	118	27	47	41	44
Total Changes	182	169	356	238	32	68	83	96
Total Cumulative Changes	182	351	707	945	977	1,045	1,128	1,224

Table 1: NERC Reliability Standard Requirement Changes, GO & GOP

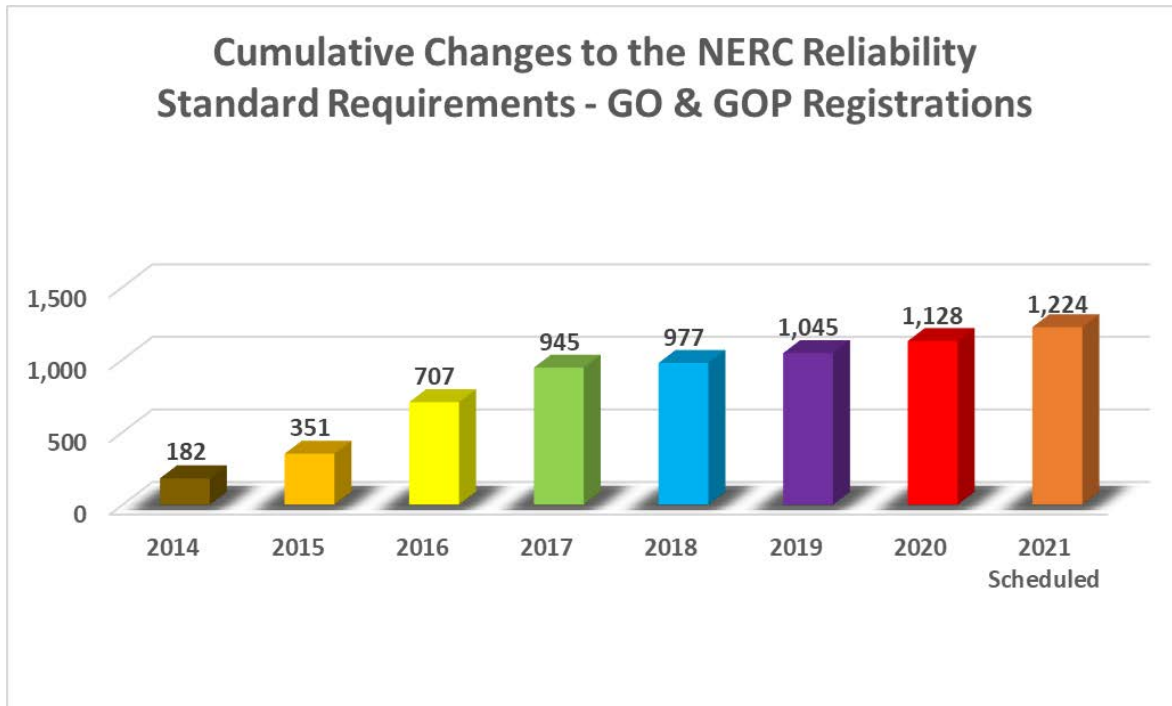


Figure 1: Cumulative Changes to NERC Reliability Standard Requirements²

Specific NERC regulatory risks identified and discussed during our risk assessment include:

² www.nerc.net/standardsreports/standarddetailexcelexport.aspx

- The volume and constant changes to the NERC Reliability Standard Requirements
- Rate-of-change of the NERC Reliability Standard Requirements
- NERC Standard revisions with short compliance windows (e.g., VAR-501-WECC-3 in 2017)
- Standard Requirements ambiguity and lack of clear guidance from NERC and WECC, in some cases
- PER-006-1 Training for Personnel: To ensure that personnel are trained on specific topics essential to reliability and to support Real-time operations of the Bulk Electric System.
- PRC-027 Protection and Control Reliability Standard: new Standard requiring entities to perform a protection system coordination study, communicate the study with the interconnecting utility, and create a method for how NID updates their protection settings.
- PRC-004-6 Protection and Control Reliability Standard: Revision of requirement R4 that required entities to perform investigative actions into Misoperations.

Risk of Compliance Violations

A compliance violation often results in penalties that could, by law, exceed \$1 million per violation per day. In reality, actual penalties for compliance violations do not approach this level but are material, nonetheless. Table 2 below provides examples of penalties levied in 2020 by FERC, NERC, and the Regional Entities for violations of GO and GOP-applicable Reliability Standards.

Examples of NERC Penalties Levied in 2020³

Reliability Standard Violated	Reliability Standard Name	Nature of Violation	Penalty Amount
CIP-002 through CIP-011	Critical Infrastructure Protection (CIP)	34 violations of the CIP Reliability Standards. The violations are the result of a combination of causes, including implementing new assets, tools, and processes, inadequate training of staff, unclear responsibilities, inadequate planning, and process gaps.	\$450,000
PRC-005	Transmission and Generation Protection System Maintenance and Testing	The RE submitted a self-report stating it was in violation of PRC-005-1 R2 as it had not maintained or tested relays on its generators.	\$375,000
FAC-009 and VAR-002	Establish and Communicate Facility Ratings and Generator Operation for Maintaining Network Voltage Schedules	The RE had deficiencies in its established Facility Ratings for its solely and jointly-owned Facilities. The established Facility Ratings did not include all applicable Facilities, nor did they include all required series Elements. Also, the RE	\$231,000

³ https://www.nerc.com/pa/comp/CE/Pages/Actions_2020/Enforcement-Actions-2020.aspx

Reliability Standard Violated	Reliability Standard Name	Nature of Violation	Penalty Amount
		exceeded the voltage schedule bandwidth provided by the Transmission Operator (TOP).	
FAC-008	Facility Ratings	The RE had 22 instances in which its field verifications identified Facility Ratings that altered the Facility's most limiting applicable Equipment Rating. The resulting Facility Ratings for these 22 Facilities were inconsistent with its Facility Rating methodology.	\$192,000
FAC-009 and VAR-002	Establish and Communicate Facility Ratings and Generator Operation for Maintaining Network Voltage Schedules	The RE had deficiencies in its established Facility Ratings for its solely and jointly-owned Facilities. The established Facility Ratings did not include all applicable Facilities, nor did they include all required series Elements. Also, the RE exceeded the voltage schedule bandwidth provided by the Transmission Operator (TOP).	\$153,000
FAC-008	Facility Ratings	Registered Entity (RE) submitted a self-report on the violation of FAC-008-1. The RE failed to properly consider relay thermal limits in its Facility Rating Methodology.	\$125,000
PRC-005	Transmission and Generation Protection System Maintenance and Testing	The RE failed to maintain documentation of its Protection System maintenance activities.	\$70,000
FAC-008	Facility Ratings	The RE did not explicitly describe which of its transmission Facilities were jointly owned, thus it did not describe how it rated its jointly owned transmission Facilities with its neighboring entities in its Facility Ratings methodology.	\$26,000
VAR-002	Generator Operation for Maintaining Network Voltage Schedules	The RE discovered it did not notify its Transmission Operator (TOP) of a status change on the alternative voltage controlling device, within 30 minutes of the change.	\$22,000

Table 2: Examples of 2020 Reliability Standard Violations and Penalties

Often, compliance violations cost far more than the amount of the NERC penalty. Violations also require entities to allocate considerable resources to report, negotiate, and mitigate the non-compliance event. Other indirect costs to compliance violations include reputational costs, increased regulatory scrutiny (e.g., more frequent spot checks and a shorter audit cycle), and a less forgiving regulator during future compliance events.

For NID, a recent example of a NERC compliance challenge occurred as the result of a Standard revision, VAR-501-WECC-3, that became enforceable on July 1, 2017. This revised Standard included a new Requirement that requires a GO replacing its excitation system to also install a Power System Stabilizer (PSS) within 180 days of excitation system replacement. This Standard was approved by FERC just two months prior, came into effect very quickly, and required NID Hydro to immediately update its maintenance and capital investment plans. These changes also necessitated the expenditure of a material amount of capital and the addition of an outage in the first quarter of 2018 to activate the PSS capability on the Dutch Flat #2 unit. NID successfully responded to this new Standard Requirement and installed the PSS capability at Dutch Flat #2 in February 2018. But at a cost to its other standard maintenance obligations due to limited staff resources.

In 2020, NID did not experience any NERC self-reports or notice of potential violations. Looking ahead to 2021, a few of the currently known key NERC compliance activities this year include:

- Annual review and sign-off of NID's BES Cyber System identification review and CIP Senior Manager (CSM) approval completed on August 19, 2020
 - Completion must occur by August 31, 2020 but recommend performing by May 31, 2020
- The new CIP-003-8 (April 1, 2020) Requirements require documented physical and cyber controls, including proactive management of Transient Cyber Assets (TCA) and Removeable Media (RM).
 - Ongoing monitoring and management of TCA/RMs is critical
- Respond to WECC's biennial self-certification request for COM-002 and PRC-005
- Implement a PER-006 Personnel Training program
- Continued management and execution of the PRC-005 Protection System Maintenance Program
- Updating procedure and attestation documentation for scheduled Standard and Requirement revisions
- Associated CFR Matrix updates, coordination, and execution with PG&E
- Compliance with CAISO generator modeling and data submittal requirements, specifically a response for Rollins Hydro is due October 1, 2021; non-NERC jurisdiction but CAISO Tariff-enforceable

In addition to these activities that are known and predictable, there are many routine reporting and administrative activities that NID Hydro will continue to perform. It is likely that 2021 will also see regulatory inquiries and data requests, additional Reliability Standards changes, and O&M events that require compliance responses.

In particular, the increasing technical nature of CIP requirements on low impact BES Cyber Systems, which NID owns, requires diligent management and oversight. The low impact CIP requirements now include the continuous management of a TCA/RM program. What this means is each external Cyber Asset needs to be scanned and evaluated for the existence of malicious code before it can be connected to Chicago Park and Dutch Flat 2's BES Cyber Systems. In addition, the NID supervisory control and data acquisition

(SCADA) system network firewalls should be monitored and periodically evaluated for vulnerabilities to ensure access is allowed and restricted in accordance with known and documented firewall rules. These activities are a continuous requirement NID must routinely perform to maintain compliance with CIP-003. The performance of the base CIP controls, as well as best practice industrial control system (ICS) cyber security controls that go beyond CIP Requirements, are being evaluated by NID Hydro personnel.

The speed-of-change, the constant need to monitor NERC activity, and the importance of taking timely action culminate in a significant inherent risk to NID Hydro's compliance program. To address this ever-present risk, in 2014, NID Hydro implemented a formal Internal Compliance Program (ICP) carried-out by the Reliability Oversight Compliance Committee (ROCC) which meets quarterly to review recent NERC developments, review activities, and plan action items for the upcoming quarter(s). NID Hydro added a Hydroelectric Compliance Tech II in 2018 and hired a new Compliance Administrator in 2019. These two resource additions gave NID Hydro the much needed resources to update and maintain the compliance program. However, given the many other demands placed on the NID Hydro compliance resources, outside resources are still needed to help maintain the compliance program. In addition, NID Hydro's Compliance Administrator left the organization in February 2021 and NID Hydro is conducting a search to fill the position.

Operating Environment

While facing numerous and potentially significant inherent risks, NID Hydro continues to make a concerted effort to actively manage its risk profile. Organizations with strong risk management cultures and well-designed and implemented internal controls can effectively anticipate and mitigate risk. Given the size and complexity of NID Hydro's operations, the consequences of unmanaged risk can be catastrophic.

The annual risk assessment identified a variety of risks that reside within the Department's equipment and technology infrastructure and threats from external forces. To maintain the reliability of its aging infrastructure, NID Hydro implemented a Capital Improvement Plan in 2017 to strengthen the planning and capital budgeting process for major projects anticipated over the next 5 to 10 years. If not well-planned and executed, these projects have the potential to adversely impact NID Hydro's ability to meet its operating and financial objectives. By systematically and thoroughly planning projects, NID Hydro gives itself the opportunity to identify and mitigate risks early. Long-term strategic planning also allows NID Hydro to respond to evolving risks throughout a project's lifecycle. The pending addition of the Deer Creek Powerhouse and associated South Yuba Canal adds another significant piece of infrastructure that must be maintained and operated.

The remote and rural nature of NID Hydro's operating environment presents many inherent risks. These include personnel safety, severe weather, the physical security of the infrastructure, wildfires, and vegetation management. This was made evident in 2017 and 2019 as extremely wet winters and springs took their toll on the terrain in and around NID Hydro's footprint. In addition, the growing threat of cyber-attacks on the U.S. power grid and those generators connected to it presents an ever-present risk to NID Hydro.

Wildfires and Vegetation Management

Although NID Hydro's infrastructure was fortunate to avoid wildfires in recent years, the risk of sustained damage from one or more wildfires is ever-increasing with each passing year. In addition, and as

demonstrated by PG&E's equipment, perhaps the biggest risk is NID Hydro's equipment starting a wildfire. The wilderness surrounding NID Hydro's infrastructure poses two risk factors. The first is the ever-present wildfire risk during the annual dry season in the summer and fall. The second risk factor is vegetation management to both mitigate the risk of igniting a wildfire and to minimize the impact to NID facilities if a wildfire occurs in the nearby area.

Vegetation management remains very important and very challenging. The interviewees identified this as an area where NID Hydro made even more headway in 2020. Heading into 2020, the Department had identified several critical vegetation management projects. The Department was diligent in identifying maintenance areas, sourcing vendors, managing the third-party coordination and approval process, and then completing the work. Examples of areas vegetation management performed were the areas around and under powerlines and around powerhouses. Still, NID Hydro has substantial vegetation management work that needs to be done so they must continue diligent work to ensure the organization stays ahead of constantly emerging vegetation management risks.

As many of NID Hydro's projects reside on federal land, this creates unique challenges for maintaining the vegetation. To carry-out an effective vegetation management program like it did in 2020, NID Hydro must navigate federal and state rules and regulations. Some of its infrastructure resides on land owned by the Bureau of Land Management (BLM), and some owned by the Forest Service. Both BLM and Forest Service approval and compliance is a continuous obstacle for NID Hydro and slow to overcome. Although obvious needs exist to proactively manage vegetation around its infrastructure, NID Hydro must be diligent about the process to gain timely approvals and cooperation from third parties. This creates just as much of an administrative burden for NID Hydro as it does a physical maintenance burden. Having sufficient workforce resources to timely identify, manage, and address vegetation risks is critical for NID Hydro.

In addition, the treacherous terrain and access barriers pose significant challenges to staying on top of NID Hydro's vegetation management efforts. Seasonal factors often limit when most vegetation management field activities can be performed, as well. The culmination of all factors requires prudent monitoring and management of the areas surrounding NID Hydro's infrastructure. Even with diligent vegetation management practices, it is almost inevitable that a wildfire will threaten NID Hydro's infrastructure. This was evident in 2015 when the Lowell Fire burned 4,000 acres in close proximity to Chicago Park. Also in December 2020, an abandoned camp fire ignited a small brush fire near an NID powerhouse during a very dry fall.

Physical Security

Given NID Hydro's remote infrastructure, it has experienced many threats to its physical security and this is not likely to change. To address this risk, Hydro has taken many steps to improve the physical security of its infrastructure. This includes installing all new lock cores in 2016 and card readers in the powerhouses in 2019.

Cyber Security

Cyber-attacks on public agencies, industrial control systems, and the power industry are becoming more prevalent. The power grid is now a prominent, high-value target. Whether it is enemy state and terrorist motivations, monetary gain (e.g., ransomware), or simply "because I can" motivations, cyber-attacks are a real threat to the security of power grid operators and power generators. Examples of cyber-attacks in recent years include the Iranian "hactivist" group intruding a New York dam's SCADA system in 2013, the

December 2015 hack of Ukraine's power grid which caused a major blackout, and the second, even more sophisticated December 2016 cyber-attack on Ukraine's power grid. In early 2020, a natural gas compressor station was the victim of a spear-phishing attack that spread from the organization's business network and compromised its control system impacting operations and causing significant financial damage. More recently at the end of 2020, a cyber-attack was detected involving Solar Winds' Orion Monitoring and Management Software commonly used across U.S. ICS and the power sector at large. This cyber event breached upwards of 250 U.S. Governmental Agencies. The attackers stole user data and highly classified information. Russian hackers appear to be the culprit of this attack.

Consistent with prior years' risk assessments, NID Hydro interviewees are very mindful of the cyber risks facing the industry and NID Hydro's infrastructure. Recent cyber-attacks on critical infrastructure throughout the world have made the risk very apparent. There is no doubt nations hostile to the U.S. and independent malicious hackers are targeting the cyber assets that generate electricity and operate the power grid. The inoperability of NID's assets would result in downtime, lost revenue, increased operating expenses from the required response, and reputational damage. Hydro assets are certainly a target, not only because of their contributions to power grid operations and reliability, but also because of the magnitude of destruction possible if the assets were compromised and misused.

NID Hydro's SCADA upgrade completed in 2019 presents new inherent security risks to NID Hydro. The upgrade also presents an opportunity to design and install effective internal controls that protect the assets from cyber threats. NID Hydro must continue developing and implementing new policies, processes, procedures, and controls that address certain key activities that are fundamental to securing the Department's critical infrastructure. These activities include:

1. Access management;
2. Change management;
3. Backup, incident response, and disaster recovery;
4. Network monitoring, logging, and review;
5. Patch management; and
6. Periodic cyber vulnerability assessments.

Performing these activities is especially challenging for NID given the limited resources within the Department and the NID organization. The activities listed above require a diverse skillset, broad experience, discipline, and focus. NID is currently short the (staff) resources required to maintain a secure operating environment and hardened infrastructure. Currently, NID Hydro relies on the Grass Valley Information Technology (IT) department which itself is short on resources and unable to effectively support NID Hydro. The inability to effectively manage IT systems at NID Hydro can lead to cyber vulnerabilities and non-compliance with NERC standards if left unattended.

To ensure it has adequate and redundant staffing around SCADA system network management and cyber security, NID Hydro will need to recruit and hire personnel with this experience and skillset or outsource these functions. This is an area that NID Hydro should closely look at and evaluate the most cost-effective long-term solution to manage its SCADA system and protect its critical infrastructure.

Supply Chain Risks

Cyber security risks in the utility supply chain are receiving increased focus and attention. On May 1, 2020, President Trump signed an executive order (EO) halting the installation of bulk-power system (BPS)

equipment "designed, developed, manufactured, or supplied, by persons owned by, controlled by, or subject to the jurisdiction or direction of a foreign adversary." The EO intended to mitigate well known and long-standing cyber security supply chain risks. As seen with the 2020 Solar Winds security breach, there is no doubt that cyber supply chain risks pose a real threat to the reliable operation of the U.S. power grid. The industry has been discussing how to address these risks since 2016 when FERC directed NERC to "develop a new supply chain risk management standard that addresses risks to information systems and related bulk electric system assets."

DOE Prohibition Order Information

The May 2020 Executive Order (#13920) declared, "threats by foreign adversaries to the security of the BPS constitute a national emergency." To address this threat, the order mandated that the Department of Energy (DOE) put forth guidance for the electric industry to mitigate this threat. On December 17, 2020, the DOE released the Prohibition Order Securing Critical Defense Facilities.

The Prohibition Order specifically prohibits transactions to procure goods or services that may impact the Bulk Power System (BPS) from any person or company that is from or has ties to China.

The Prohibition Order includes specific mandates for in-scope entities:

- Perform a risk assessment on existing equipment originating from China within their environment consistent with the Prohibition Order and EO. Assessments are recommended on assets including, but not limited to:⁴
 - Blackstart units
 - Critical substations which are covered under NERC CIP-014 requirements
 - Facilities serving critical loads
 - Associated primary and alternate cranking paths used for bulk power system restoration.
- Mitigate any discovered risks.
- Review load shedding and system restoration plans for adherence to Section 3 of the Prohibition Order.

The order is only applicable to the following list of equipment:

1. Power transformers with low-side voltage rating of 69 thousand volts (kV) or higher and associated control and protection systems like load tap changer, cooling system, and sudden pressure relay.
2. Generator step-up (GSU) transformers with high-side voltage rating of 69 kV or higher and associated control and protection systems like load tap changers, cooling systems, and sudden pressure relays.
3. Circuit breakers operating at 69 kV or higher.
4. Reactive power equipment (reactors and capacitors) rated 69 kV or higher.
5. Associated software and firmware installed in any equipment or used in the operation of items listed in 1 through 4.

⁴ NID does not own assets included on this list.

DOE Prohibition Order and Executive Order Status

As of January 21, 2020, the EO and PO were suspended by the Biden Administration and requested the new DOE review the topic and provide recommendations on how to proceed. Despite the suspension and non-enforcement of the EO and PO, as a best practice, it is recommended entities prepare for the impending increased scrutiny and supply chain requirements. Specifically, CIP low impact cyber supply chain requirements are currently being drafted. To prepare for the increased regulatory requirements, as well as to mitigate cyber security risks, organizations like NID should perform an assessment of their cyber supply chain risks, procurement practices, and include country of origin in all cyber supply chain assessments and procurement activities.

Potential Impacts to NID and the NERC Reliability Standards

The new DOE is likely to recommend that FERC, and consequently NERC, make additions to the existing version of CIP-013 and to include cyber supply chain Requirements in the CIP low impact revisions being drafted. The current version of CIP-013 went into effect on October 1, 2020, but only applies to medium and high impact BES Cyber Systems, which means almost all generators, as well as the distribution system, are exempt from the Standard.

The updated guidance from FERC and NERC regarding supply chain risks does not affect NID directly other than it requires entities to avoid sourcing from specific enemy states. While CIP-013-1 is not currently enforceable on NID, NID Hydro should use the 2020 EO's updated guidance as motive to perform an overall assessment of its cyber security supply chain posture.

NID Actions to Address Cyber Security Risks

Cyber supply chain risks must be a consideration for any future procurement of electrical and programmable equipment. While evaluating NID Hydro's supply chain risk is an important activity to perform, cyber supply chain risks should not be NID Hydro's priority until it first implements and continuously monitors more foundational cyber security controls.

A framework for fundamental cyber security controls is the [Center for Internet Security \(CIS\) Top 20 Critical Security Controls \(CSC\)](#).⁵ This framework is a great starting point for an organization to evaluate the state of its cyber security posture. It is worth noting that cyber supply chain risk management controls are not present on the "Top 20 Critical Security Controls (CSC)" list. This is not to say that supply chain risk management is not extremely important for the reliable operation of critical infrastructure, just that there are many other fundamental controls that should be implemented first and foremost.

When NID Hydro is ready to turn its attention to supply chain cyber risk management, a few resources are listed below that offer guidance.

- [North American Transmission Forum \(NATF\) CIP-013-1 Implementation Guidance](#)⁶
- [Cyber Security Supply Chain Risk Management Plans Implementation Guidance for CIP-013-1](#)
- [NIST Best Practices in Cyber Supply Chain Risk Management](#)
- [DOE Cyber Security Procurement Language for Control Systems](#)
- [NERC FAQ Supply Chain – Small Group Advisory Sessions](#)

⁵ <https://www.cisecurity.org/controls/>

⁶ <https://www.natf.net/docs/natf/documents/resources/supply-chain/natf-cip-013-1-implementation-guidance.pdf>

Infrastructure and Technology

For multiple reasons, NID Hydro's infrastructure and technology present high inherent risks. First, the age of the infrastructure requires constant maintenance. Because of this, NID has heightened its focus and efforts in several areas, including project planning, a computerized maintenance management system, electrical documentation, spare parts, and its technology. The second driving risk factor is NID's planned addition of the Deer Creek Powerhouse (DCPH) Project to its portfolio in 2021.

Aging Infrastructure

Although the industry has seen well-maintained hydro generation facilities perform reliably for nearly a century, NID Hydro's infrastructure does present a significant risk for multiple reasons. First and most obvious, older equipment is more susceptible to reliability issues and require more frequent maintenance intervals. Second, drawings of older equipment are often inaccurate, which makes for difficult and time-consuming troubleshooting efforts. Third, the nature of the older equipment means troubleshooting is labor intensive, as compared to modern generation plants that are mostly digital. The culmination of these factors presents a major risk to NID Hydro's financial health should the availability and reliability of its equipment be compromised.

Consistent with prior years' risk assessments, interviewees expressed an appreciation for the organization's commitment to reinvesting in and maintaining its infrastructure. The NID Hydro personnel greatly appreciate the organization continuously investing capital in infrastructure maintenance and improvement projects. When a proposed project's benefit exceeds its cost, project funding is obtained.

Project Planning

To keep pace with the aging infrastructure, maintaining NID Hydro's historical reliability levels requires constant investment, project planning, and execution. Absent a well-planned and executed maintenance program supported by a CMMS, the continued high availability of NID Hydro's generation assets is doubtful. The size of NID Hydro's infrastructure and the high volume of projects necessitates thorough and focused planning. NID Hydro's maintenance program has a risk assessment process fundamentally built into it. NID Hydro personnel are adept at identifying infrastructure risks and maintenance or replacement solutions to address those risks. Given the continuous high volume of projects on NID Hydro's docket, project planning must be thorough, focused, and well-orchestrated. To address this need, in 2017, NID Hydro transitioned away from an ad hoc planning process and instituted a formal planning process that considers input and risk assessments from maintenance and operations crews to support long-range project planning needs. NID Hydro refers to this as its Capital Improvement Plan.

The Capital Improvement Plan was implemented to proactively develop detailed and focused project plans. The process identifies the total life-cycle cost of each asset, and maps project schedules, staffing workload, and costs over the next 5 to 10 years. With this initiative, NID Hydro intends to increase the maturity of its project planning process so that projects are proactively identified and planned in detail. As part of the Capital Improvement Plan process, a review takes place at least annually prior to the annual NID Hydro budget season.

Electrical Documentation

Inadequate electrical system documentation remains a risk to NID Hydro's ability to maintain and troubleshoot its infrastructure. This risk is a function of the infrastructure's age as few as-built drawings were retained many decades ago, and what was retained is sometimes found to be inaccurate. In 2017,

NID Hydro began taking steps to address this risk by hiring a contractor to review, validate, and update electrical documentation at the Bowman PH. In 2018, new electrical drawings were drafted for Chicago Park Powerhouse following the 2017 relay replacement and upgrade. Electrical drawings were updated for Rollins Powerhouse in 2019 and Combie South in 2020. Drawing updates are currently underway for Dutch Flat 2 in 2021. This risk deserves a continued focus and effort to further mitigate downside for the remainder of NID Hydro’s portfolio.

Spare Parts

In prior years, interviewees identified the availability of spare parts as a potential threat to the reliability of the hydro operations. Many system parts have long lead times and are high dollar items. These same parts, if they fail, present single-contingency risks that could leave NID Hydro’s major equipment inoperable for long periods of time. This makes spare parts inventory management a difficult and expensive proposition. Hydro is constantly faced with evaluating the cost-benefit trade-off of stocking expensive, long lead time spare parts. In 2017, NID Hydro improved its risk profile in this area by purchasing redundant protection relays for Chicago Park Powerhouse, and a backup exciter for Chicago Park and Dutch Flat #2 Powerhouse. Still, interviewees noted that avoidable risks remain in this area, and NID Hydro should continue to closely monitor the health and downside risk of its spare parts inventory. For example, NID Hydro does not have spare generator pole pieces for Dutch Flat or Chicago Park. These generators are set for rewinds and subsequent updating but completion is a few years out. Failure of this magnitude is a major concern because it will result in a long-term outage of the powerhouse and substantial loss of revenue if the generators are not available.

NID Hydro follows the philosophy depicted in Table 3 below when making spare parts purchase decisions. However, due to budget constraints, there are times when a spare parts purchase in the “Long Lead Time” and “Expensive” category is not made. It is that category that poses the largest risk to NID Hydro asset availability long-term.

Spare Parts Inventory Decision Matrix	Lead Time	
	Short	Long
Inexpensive	Consider purchase	Purchase
Expensive	Do not purchase	Further analysis required

Table 3: Spare Parts Purchase Decision Matrix

Technology Changes: SCADA and CMMS Replacement

In 2017, NID Hydro began a complete replacement of its SCADA system and the project was completed in 2019. This SCADA system upgrade reduces NID’s technology and operations risk but introduces new security risks, which is discussed further in the Operating Environment-Cyber Security subsection above.

NID Hydro’s computerized maintenance management system (CMMS), Lucity, identified as a risk in prior years, is inadequate for the needs of NID Hydro’s operations and maintenance requirements. In July of 2019, the NID Board of Directors approved the purchase of a new CMMS called Sedaru. Since that time, NID Hydro has been working on content development and programming with the Sedaru. Several members of the Department are currently beta testing the program and software implementation is expected in 2021. This upgrade is an important tool for documentation and record-keeping purposes, which has never been more important given the current FERC and NERC regulatory environments. The new CMMS will provide increased functionality including unlimited data collection capability, database

structure that limits asset data functionality, asset management tracking and reporting, full visibility of spare parts inventory, and purchase history, including vendor, date, and amount.

NID Hydro does still lack a dedicated warehouse, which presents difficulty for personnel to manage inventory and mitigate single-contingency events. The Department has developed preliminary plans for a new headquarters building and will present those to the Board of Directors for direction in mid-2021. The current plans include a formal, dedicated warehouse to securely store and manage inventory.

NID Hydro Portfolio Growth

NID Hydro's footprint is expected to increase in 2021 with the acquisition of the Deer Creek powerhouse from PG&E. The Deer Creek acquisition is a strategic and critical project for NID. Owning this asset ensures NID remains in control of a critical conduit of the District's water supply. However, this acquisition will further stretch NID Hydro's existing resources and require NID Hydro to hire new positions.

In addition, NID is evaluating the possible construction of two new powerhouses. One at the Loma Rica Water Treatment Plant and a second powerhouse at the existing Rollins Dam. In a short time period, NID Hydro's portfolio could grow from 7 to 10 powerhouses. This growth will place new demands on all NID Hydro resources. Not only do more assets require additional regulatory compliance obligations (e.g., FERC, EIA, CPUC), it also requires additional obligations with the California Independent System Operator (CAISO). CAISO processes and requirements require attention and expertise, often within a short time period. This CAISO burden only increases with each additional generation resource with very little scalability across the portfolio.

Colfax Hydro Headquarters

Given the growing infrastructure footprint, the ever-increasing need to maintain the aging infrastructure, and the heightened regulatory burden, NID Hydro's staffing and inventory needs are increasing. This has already manifested itself with the hiring of new positions in recent years and is likely to continue with the Deer Creek acquisition. The Colfax Hydro field office has run out of available space to house its growing workforce, tools, and equipment. In addition, NID Hydro lacks a formal and adequately-sized warehouse. In 2018, NID Hydro located and acquired a site for a future NID Hydro field office building. Planning and design work for the new site began in 2019 and will continue in 2021 absent a change in direction from NID's Board of Directors.

Electricity Revenue

PG&E Emerges from Chapter 11 Bankruptcy

On January 29, 2019, saddled with approximately \$20 billion in liabilities from recent wildfires its equipment started, PG&E declared Chapter 11 bankruptcy. Under bankruptcy, the utility analyzed the sale of certain assets and liabilities and considered reforming its business model. It also quietly explored its options to unwind some of its above-market power purchase agreements (PPA).⁷ During bankruptcy, the utility disclosed it had 387 PPA's totaling approximately \$42 billion in future payments – not a liability on its balance sheet, but certainly an amount the utility would like to restructure and reduce. Among the PPA's are many with renewable generators signed during the early part of the last decade or prior. Prices for solar PV have dropped dramatically, leaving PG&E in a poor position to compete with Community

⁷ Mullin, Robert, Sangree, Hudson. (2019, January 29). PG&E Wants to Undo Contracts, Revamp Biz in Bankruptcy. Rtoinsider.com.

Choice Aggregators (CCA) for retail customers. As a PPA counterparty to PG&E, these developments grabbed NID Hydro's attention in 2019.

PG&E emerged from bankruptcy on July 1, 2020 without challenging or attempting to terminate its above-market PPA's. It did renegotiate certain PPAs with developers of projects under contract but not yet built. PG&E emerging from bankruptcy and leaving NID's PPAs undisturbed removed a point of uncertainty for NID and its largest electricity revenue source.

General Wholesale Market Trends

PG&E's bankruptcy filing was a reminder of the importance of understanding and monitoring the CAISO wholesale electricity markets. Intermittent renewables (e.g., solar) continue to change the dynamics of the CAISO system. In 2020, wholesale energy prices remained relatively low for much of the year and the well-discussed "duck curve" shape of intraday prices continued to increase.

In the third quarter of 2020, CAISO did experience historically significant reliability risks and market volatility that many grid planning experts have been warning about for years. On Friday, August 14, 2020, CAISO issued a Stage 3 emergency, the first it had declared in 19 years. A Stage 3 emergency means CAISO had to drop firm load to avoid losing the system. This occurred during a significant heat wave that impacted much of the west. Throughout August and parts of September, CAISO issued a series of warnings and emergencies and market prices reflected this uncertainty with extreme volatility and price spikes in the energy and ancillary service markets. These events are a reminder that California is pushing reliability limits as it transitions to renewable resources, while retiring, perhaps prematurely, conventional generation. August's market price volatility is reflected in Figures 2 and 3 below.

Intermittent renewable penetration, natural gas constraints, and conventional generation retirements will continue to increase the intraday volatility of wholesale electricity market prices. The installed cost of intermittent renewables, namely photovoltaic (PV) solar, and energy storage technologies, namely lithium-ion batteries, continue to decline as well. The abundance of solar PV in California suppresses midday wholesale electricity market prices many days of the year and drives down PPA prices across the country, particularly in California. PPA prices did begin to show a floor in 2020 and all-in bundled PPA prices may have finally bottomed out after a drastic decline over the past decade.

In addition to generally low but volatile wholesale electricity market prices, distributed generation (e.g., rooftop solar), behind-the-meter battery storage technologies, and the evolution of CCAs are reducing most utilities' (e.g., PG&E and municipal utilities) load profile. These factors are resulting in stagnant load growth, docile wholesale electricity market prices, localized over-generation situations, and an increase in generator curtailments. The culmination of these factors led to a very saturated and highly competitive electricity market in the latter part of the last decade.

However, as renewable mandates continue to increase, load-serving entities and CCAs are actively pursuing the procurement of carbon-free resources, including hydroelectric generation resources. Although average prices remain low, price volatility continues to increase. Another favorable trend for flexible and dispatchable generation are higher average ancillary service (e.g., spinning reserves, regulation up, and regulation down) prices, which remained strong in 2020. Off-takers are eager to add resources to their portfolio that are renewable and carbon-free, as well as dispatchable and flexible. Hydro resources with storage capacity and the ability to shape intraday production is the perfect resource for California's energy future.

Chicago Park and Dutch Flat #2 are both under long-term power contracts with PG&E with contract expiration approximately 12 years out. NID Hydro's smaller plants are entering new PPAs or will be in the next few years, and these electricity market forces will shape the future economics of those projects. The markets are in flux and although prices were generally weak in recent years, the emerging factors mentioned above are reasons to be optimistic about the future direction of prices. Unlike Chicago Park and Dutch Flat #2, which are not under a volume-based PPA, many of NID Hydro's smaller run-of-river hydro generators will likely be under volume-based PPAs in the years ahead leaving the organization vulnerable to drought conditions and low market prices. This is important to note as Northern California experienced a historic and prolonged drought in the mid-2010s, followed by two near-record precipitation years. It is evident that NID Hydro will not always be able to rely on snowpack for power generation. As the current power contracts begin to expire and NID Hydro re-contracts its power under market-driven and quantity-based structures (i.e., per MWh basis), drought conditions could pose a significant financial risk to NID Hydro.

To mitigate the impact of drought conditions and low market prices on NID Hydro's electricity revenue, NID should continue to look ahead and evaluate how it can adapt to this changing environment. The evolving power grid dynamics incentivizes NID Hydro to consider operating its hydro resources under different operating profiles in the future, including a more flexible and dispatchable profile. Figure 1 below presents 2020's average hour-by-hour CAISO day-ahead (DA), fifteen-minute market (FMM), and five-minute market (5MM) wholesale electricity prices in the Northern California area. As can be seen, the disparity between high and low prices continues to increase with the lowest pricing consistently experienced in the middle of the day (i.e., peak solar PV generation). Figure 2 shows energy and ancillary service prices by month in 2020, illustrating the price spikes in August during the heat wave that caused the system to run low on resources and imports driving up prices. To California, these price spikes are reminders of the need to reduce its dependency on gas and to develop a diversified portfolio of resources. These reliability and market price spike events do present an opportunity for hydro to increase its role and importance in California's energy portfolio. NID Hydro is contemplating how, and by how much, it can vary its generators' production and water flows intraday, provide ancillary services, and shift more generation and water flow into peak demand and price hours.

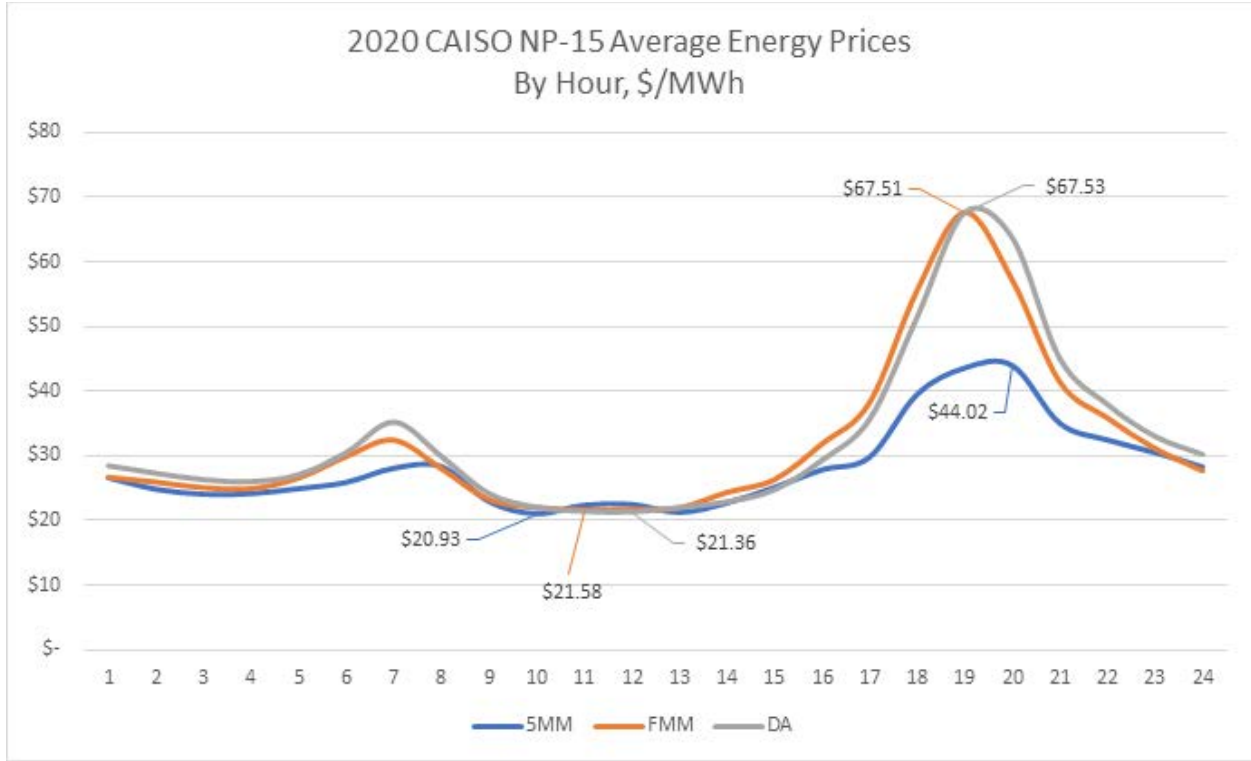


Figure 2: CAISO North Path 15 (NP-15) 2020 Average Electricity Prices by Hour

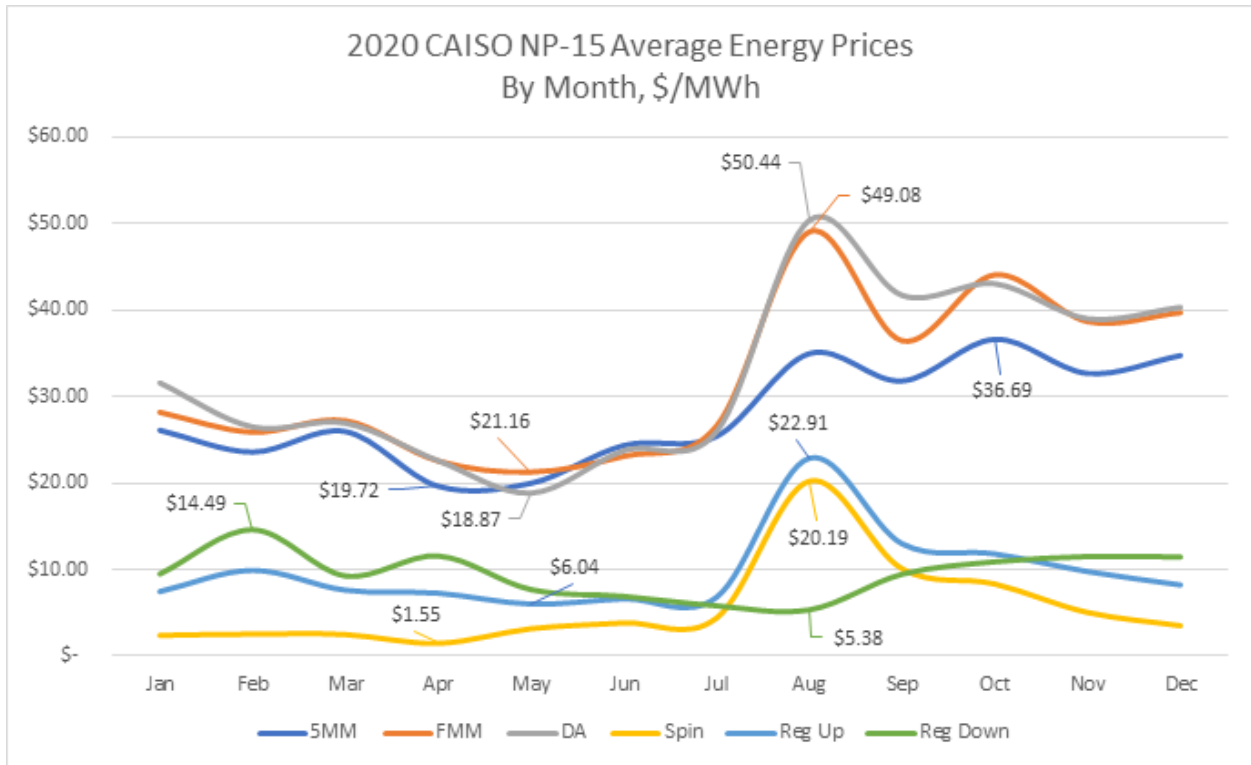


Figure 3: CAISO NP-15 2020 Average Electricity Prices by Month

Hydro generation has many advantages over traditional fossil fuel generation and intermittent renewable generation – the two technologies that shape wholesale market prices today. These advantages are presented in Table 4 below.

Criteria	Existing Hydro	Intermittent Renewables	Natural Gas
Capacity Factor	✓	X	✓+
Effective Load Carrying Capability (ELCC)	✓	X	✓+
Ability to Offer Ancillary Services	✓	X	✓
Dispatchable	✓	X	✓
Project Viability & Financing	✓	X	✓
Renewable	✓ ⁸	✓	X
Zero-GHG	✓	✓	X

Table 4: Hydro Advantages vs. Competing Generation Technologies

For these reasons, hydro is a good renewable and zero-carbon electricity supply partner to California’s municipal utilities and its growing population of CCAs. In 2019, NID Hydro was successful in re-contracting the Combie South Powerhouse, entering into a PPA for power sales from Deer Creek, and entering a partnership agreement with NCPA for Scheduling Coordinator and control center services for the Combie South and Deer Creek Powerhouses.

Internal Risk Control System – The Continuous Process

Risk management is a mixture of art and science. NID Hydro is making a concerted effort to implement a variety of policy and procedure-level controls throughout the department. This is evident with the ICP and ROCC activities performed by NID Hydro personnel, enhanced CIP policies and controls, as well as this annual risk assessment process. NID Hydro’s proactive efforts to implement cyber security policies and controls over its new SCADA system is also evidence of a maturing internal control environment.

Recommendation and Conclusion

To mitigate the impact and minimize the likelihood of the inherent risks facing the NID Hydroelectric Department, the Department should continue to mature its risk management program. Based on the risks identified in the risk assessment tabletop exercise and summarized in this Risk Assessment report, a summary of the recommendations for risk mitigation are shown in Table 5.

To mitigate the impact and minimize the likelihood of the inherent risks facing NID Hydro, the organization should continue with its efforts to improve the maturity of its risk management program. Disciplined and strategic organizations take proactive steps to identify and manage risk. For example, strategic organizations often begin with the single-contingency risks that have potentially devastating impacts on the organization and develop control measures to mitigate those risks. Fundamental to this is a documented management system that enables the organization to identify, control, and monitor its risk elements. To do so effectively requires a systematic approach to catalog risks and the associated internal controls that actively manage those risks. Ideally, these internal controls reside at all levels of the

⁸ Assuming RPS-eligible small hydro less than 30 MWs.

organization. They are deployed not only as control activities by front line managers and personnel, but also as management control measures to monitor, communicate, and assess risks throughout the organization. The culmination of these risk management practices results in an organization with a strong control environment originating with a strong “tone at the top.”


Category	Ongoing Risk Reduction Measures	Key Recent Activities and Updates
People and Training	<ul style="list-style-type: none"> ▪ Support and promote external training opportunities for staff, although these options are currently limited due to COVID ▪ Internally develop and/or externally locate an alternative hydro operations training program, including more on-the-job training ▪ Continue research and development of a hydro maintenance training program, including more on-the-job training ▪ Support the formal compensation review and recommended wage and benefit adjustments ▪ Coordinate asset management program needs with organizational structure and staffing needs. ▪ Continued focus on succession planning in all areas of NID Hydro ▪ Cyber security trainings held more frequent than required by NERC 	<ul style="list-style-type: none"> ▪ A market compensation was performed in the first quarter of 2019, and a small incremental wage increase was provided to employees in 2020. The 2019 compensation study will be considered during Union MOU negotiations in 2021.
Regulatory Environment	<ul style="list-style-type: none"> ▪ Continue growing staff competencies and bench strength around regulatory compliance. Areas include reliability, NERC/FERC, dam safety, and environmental compliance. ▪ Revise and update the CFR between NID and PG&E to appropriately allocate changing responsibilities. ▪ Scope, plan, and budget the FERC implementation compliance requirements. ▪ Continue diligent execution of NID’s PRC-005 Protection System Maintenance Program. ▪ Review and update of the Chicago Park and Dutch Flat #2 Facility Ratings (FAC-008) evidence 	<ul style="list-style-type: none"> ▪ Implemented updated and expanded policies and plans for CIP-003 v8 ▪ Updated PRC-005 Protection System Maintenance Program documentation, including the Master Equipment List. ▪ Performed PRC-027 protection system coordination study for NID and PG&E interconnected facilities for increased reliability ▪ Generator testing scheduled for 5-year NERC compliance and CAISO modeling requirements
Operating Environment	<ul style="list-style-type: none"> ▪ Continued investigation of NID’s non-dam infrastructure at-risk of extreme weather and/or seismic activity 	<ul style="list-style-type: none"> ▪ Completed Vegetation Management Plan for Hydroelectric Department Facilities

Category	Ongoing Risk Reduction Measures	Key Recent Activities and Updates
	<p>damage and incorporate mitigations and/or repairs into maintenance plan</p> <ul style="list-style-type: none"> ▪ Continue vegetation management efforts around NID facilities. ▪ Evaluate adequacy of current resources dedicated to management of Hydro’s current and future IT and SCADA system ▪ Develop operational model to include regulatory and customer system requirements with operational strategy to support potential future energy market pricing opportunities and flexible dispatch contract requirements 	<ul style="list-style-type: none"> ▪ Issued and completed multiple contracts for vegetation management were in 2020. Additional contracts are planned for 2021. ▪ Implemented vegetation control adjacent to Infrastructure, where permitted, and continued navigating Federal permit processes for future vegetation control projects. ▪ Purchased and installed standby generators at several locations to respond to PG&E Public Safety Power Shutoff events.
Infrastructure and Technology	<ul style="list-style-type: none"> ▪ Capital Investment Program (CIP) – Continue to implement, evaluate and revise the CIP process to improve efficiency and effectiveness of major project execution ▪ Enhance asset management program risk assessment procedures to support project prioritization, planning, and budgeting. ▪ Incorporate methods of physical and cyber security hardening ▪ Implement plans identified in the communication infrastructure study to provide improved, efficient, and effective control and operations ▪ Continue efforts to improve and maintain a healthy inventory of spare parts ▪ Continue corrosion control monitoring of penstocks 	<ul style="list-style-type: none"> ▪ Implemented the Capital Improvement Plan process. ▪ New Hydroelectric Department Field Office Facility design underway. ▪ Electrical drawing updates completed at Bowman, Chicago Park, Rollins, and Combie South Powerhouses. ▪ Installation of a fire suppression system at Chicago Park Powerhouse is underway, Dutch Flat 2 planning in progress ▪ Revised, updated, and/or validated electrical system documentation (e.g. as-built drawings) and implement electrical document change policy ▪ Card access for physical security upgrades added at BES facilities ▪ Addition of underwater ROV for inspections ▪ Recruited and hired a project manager. ▪ Improved physical security at multiple powerhouses.
Electricity Revenue	<ul style="list-style-type: none"> ▪ Research and develop power market optimization options for NID’s small plants to transition to upon current contracts’ expiration. ▪ Evaluate potential new technologies and/or strategies that allow more efficient operations in an evolving market and maximize hydropower’s 	<ul style="list-style-type: none"> ▪ Successfully transitioned Combie South Powerhouse to new Power Purchase Agreement ▪ Capital improvement projects to add metering and telemetry completed. ▪ Alternative technologies, such as battery storage, solar, pumped storage, net zero energy, and others

Category	Ongoing Risk Reduction Measures	Key Recent Activities and Updates
	positive impact to NID and the community. <ul style="list-style-type: none"> ▪ Coordinate energy marketing strategies with NID sustainability policy efforts. 	under investigation and in coordination with a sustainability policy.

Table 5: Summary of Risk Mitigations by Category

In accordance with the Nevada Irrigation District Internal Compliance Program, this 2020 Risk Assessment Report was commissioned by the Nevada Irrigation District Reliability Oversight Compliance Committee (ROCC), and its results shall be presented to the Nevada Irrigation District General Manager and Board of Directors.

DocuSigned by:

CBB7D46AE5F84EA...

4/16/2021

Greg Jones, ROCC Managing Director of Compliance

Date



Nevada Irrigation District NERC Compliance Assessment

Assessment Prepared on:

March 22, 2021

Prepared By:

Grid Subject Matter Experts

Annual report on compliance with the NERC and Regional Reliability Standards applicable to Nevada Irrigation District for 2020.

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EXECUTIVE SUMMARY

Site Overview

Nevada Irrigation District (NID) is comprised of two NERC-registered generating Facilities: Dutch Flat 2 operating at 24.57 MW and Chicago Park operating at 39.00 MW. Both projects are in Nevada County, CA. NID registered as a Generator Owner (GO) and Generator Operator (GOP) in the NERC Compliance Registry on May 15, 2014. NID interconnects with Pacific Gas & Electric and resides in the CAISO Balancing Authority Area.

NID and PG&E agreed to allocate the GOP obligations for NID's two registered generation Facilities under a Coordinated Functional Registration (CFR). A CFR is a type of agreement authorized by the NERC Rules of Procedure "where two or more entities (parties) agree in writing upon a division of compliance responsibility among the parties for one or more Reliability Standard(s) applicable to a particular function, and/or for one or more Requirement(s)/sub-Requirement(s) within particular Reliability Standard(s)."

The current CFR Agreement reaffirms PG&E's role as the Registered GOP for the NID hydroelectric Facilities and limits NID's GOP compliance activities (and associated compliance responsibility) to limited specific activities and circumstances.

Scope

This report represents the annual assessment of NID's compliance with the North American Electric Reliability Corporation (NERC) and Regional mandatory Reliability Standards.¹ This annual assessment is a required recurring compliance activity per the NID internal compliance program (ICP) and is used to apprise Nevada Irrigation District management of the status of compliance with NID's NERC compliance program.

The report summarizes the reliability compliance efforts put forth by the NID compliance team in 2020 and previews the efforts needed in the year ahead and beyond to comply with the NERC and Regional Reliability Standards. The GridSME compliance team conducted this assessment by reviewing the compliance program evidence located in NID's compliance repository in January of 2020.

Highlights

In total, 41 Operations and Planning (O&P) Reliability Standards were applicable to NID as a GO/GOP during 2020. Of those 41 Reliability Standards, 29 contained GO-applicable requirements (226), and 16 contained GOP-applicable requirements (94). Two Critical Infrastructure Protection (CIP) Reliability Standards were applicable to NID as a low impact registered GO/GOP entity, adding an additional 16 requirements to NID's NERC compliance obligations. This equates to a total of approximately 320 requirements applicable to NID during 2020. Overall, as of the date of this assessment, NID has not identified any potential non-compliance events for the 2020 calendar year.

¹ The use of capitalized terms in this document indicates that the term is a defined term from either the [NERC Glossary of Terms Used in Reliability Standards](#) or [Appendix 2 to the NERC Rules of Procedure: Definitions Used in the Rules of Procedure](#).

Findings and Recommendations

The NERC Reliability Standards continue to evolve and the rate of change is not diminishing. NID retained the support of GridSME for extended compliance support during 2020. 2020 was another busy year as new Standards and Requirements became enforceable and required implementation activities by NID. In addition to maintaining compliance, generating evidence, and periodic reporting required for the currently enforceable Standards, GridSME helps NID stay apprised of developments at FERC, NERC, and WECC.

Looking ahead, 2021 Standard retirements, revisions, and newly enforceable additions will all impact the maintenance of NID's procedures/programs/processes and may impose additional training obligations, all of which will be monitored by GridSME in coordination with NID. The following list details the currently known changes that NID must address in 2021 to support readiness for upcoming deadlines.

Upon completion of our NERC Self-Assessment compliance review, GridSME did not note any non-compliance events during the 2020 calendar year. GridSME will work with NID during 2021 to complete or support all documentation, implementation, and training activities needed to address the impending GO and GOP requirement changes.

COMPLIANCE ACTIVITIES - YEAR IN REVIEW

ICP Activities

NID's Quarterly ROCC Meetings

NID's quarterly Reliability Oversight Compliance Committee (ROCC) meetings will continue to play a very useful role in monitoring new developments, implementing changes, and maintaining compliance at NID. The addition of GridSME's extended compliance support will serve to assist NID with the monitoring and maintenance of tasks. While far from easy, NID's efforts to build a culture of compliance puts the organization on the right footing to achieve its reliability goals and minimize its regulatory risk.

Other Compliance Activities

On January 22, 2014, NID adopted an ICP which established the Reliability Oversight Compliance Committee (ROCC). A robust ICP, such as the one established by NID, is strongly encouraged by FERC, NERC, and WECC. These regulators believe that a well-designed and implemented ICP can help Registered Entities prevent, minimize, and mitigate grid reliability issues. Consequently, NERC and WECC therefore assign mitigating credit to entities with effective ICP's, thereby reducing penalty assessments following compliance violations. In compliance with its ICP, NID's ROCC met quarterly in 2020 to discuss NERC and WECC reliability compliance and other associated issues affecting NID. During 2020, the ROCC was comprised of key NID staff including Hydroelectric Manager (Keane Sommers), Assistant General Manager (Greg Jones), Senior Hydroelectric System Technician (Thomas Kluge), the Hydroelectric Compliance Administrator

(Matthew Wheeler), Information Technology Analyst (John Ortiz), Information Technology Supervisor (Kriss Butcher), and the Hydroelectric Compliance Technician II (Tina Konkle).

To assess the current state of NID’s compliance activities, GridSME conducted a tabletop “self-assessment” and review of NID’s compliance with the NERC and WECC Reliability Standards applicable to NID’s registrations. GridSME conducted this self-assessment by reviewing NID’s evidence in December 2020. On December 11, 2020, as part of the annual compliance review for NID’s self-certification of compliance, NID and GridSME reviewed the entirety of NID’s compliance with the Reliability Standards for the 2020 calendar year. The results of this exercise are detailed below.

Self-Reports

NID had no self-reports in 2020.

GENERATOR OWNER RELIABILITY STANDARDS COMPLIANCE

Generator Owner Reliability Standards Applicable to NID

To meet compliance with applicable in-scope Reliability Standards and their requirements, NID maintains documented processes related to the Reliability Standard requirements (e.g., procedures, plans, programs, and policies), signed attestations, supporting technical evidence (e.g. engineering documentation and analysis), and programmatic evidence (e.g. evidence of completed data submittals). Listed below are the NERC and Regional Reliability Standards that are applicable to NID as a registered GO and GOP and for which they maintain evidence of compliance.

Reliability Standard ²	Title	New 2020	Retired 2020
CIP-002-5.1a	Cyber Security — BES Cyber System Categorization		
CIP-003-8 CIP-003-7	Cyber Security — Security Management Controls	4/1/2020 1/1/2020	-- 3/31/2020
EOP-004-4	Event Reporting	--	--
FAC-001-3	Facility Connection Requirements		
FAC-002-2	Coordination of Plans for New Facilities		
FAC-003-4	Transmission Vegetation Management		
FAC-008-3	Facility Ratings		
IRO-010-2	Reliability Coordinator Data Specification and Collection		
MOD-025-2	Verification and Data Reporting of Generator Real and Reactive Power Capability and Synchronous Condenser Reactive Power Capability		
MOD-026-1	Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions		

² Two Standards per row denotes that the Reliability Standard was revised during the compliance period. The most current Standard appears first.

Reliability Standard ²	Title	New 2020	Retired 2020
MOD-027-1	Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions		
MOD-032-1	Data for Power System Modeling and Analysis		
PRC-002-2	Disturbance Monitoring and Reporting Requirements		
PRC-004-5(i)	Protection System Misoperation Identification and Correction		
PRC-004-WECC-2	Protection System and Remedial Action Scheme Misoperation		
PRC-005-6	Protection System, Automatic Reclosing, and Sudden Pressure Relaying Maintenance		
PRC-015-1	Remedial Action Scheme Data and Documentation Special Protection System Data and Documentation		12/31/2020
PRC-016-1	Remedial Action Scheme Misoperations Special Protection System Misoperations		12/31/2020
PRC-017-1	Remedial Action Scheme Maintenance and Testing Special Protection System Maintenance and Testing		
PRC-018-1	Disturbance Monitoring Equipment Installation and Data Reporting		
PRC-019-2	Coordination of Generating Unit or Plant Capabilities, Voltage Regulating Controls, and Protection		
PRC-023-4	Transmission Relay Loadability		
PRC-024-2	Generator Frequency and Voltage Protective Relay Settings		
PRC-025-2	Generator Relay Loadability		
TOP-003-3	Operational Reliability Data		
VAR-002-4.1	Generator Operation for Maintaining Network Voltage Schedules		
VAR-501-WECC-3.1	Power System Stabilizer (PSS)		

CIP-002-5.1a: Cyber Security – BES Cyber System Categorization

The purpose of CIP-002-5.1a is “to identify and categorize BES Cyber Systems and their associated BES Cyber Assets for the application of cyber security requirements commensurate with the adverse impact that loss, compromise, or misuse of those BES Cyber Systems could have on the reliable operation of the BES. Identification and categorization of BES Cyber Systems support appropriate protection against compromises that could lead to misoperation or instability in the BES.”

R1: CIP-002-5.1a R1 requires the identification and documentation of high, medium, and low impact BES Cyber Systems, if any, according to Attachment 1 of the Standard.

NID initially performed the identification and categorization in 2014, modified and updated the categorization in 2015, and again in December 2016. Effective July 1, 2016, the date the CIP

version 5 Standards became effective, NID had identified the existence of only low impact BES Cyber Systems at its two BES assets (Dutch Flat and Chicago Park). This identification is documented within NID's CIP-002-5.1a procedure.

R2: CIP-002-5.1a R2 requires the entity to review and update, if necessary, the identifications made in R1 at least once every 15 calendar months and obtain the CIP Senior Manager's approval of the identifications. The 2020 review was conducted in May 2020. This review noted no changes to the categorization of NID's BES assets and they remain low impact BES Cyber Systems. NID's CIP Senior Manager (Keane Sommers) approved the identifications. NID completed the 2020 review of identifications made in R1 and obtained CIP Senior Manager approval on August 21, 2020. The next approval is due on or before November 19, 2021.

CIP-003: Cyber Security – Security Management Controls

The purpose of CIP-003-8 is "to specify consistent and sustainable security management controls that establish responsibility and accountability to protect BES Cyber Systems against compromise that could lead to misoperation or instability in the Bulk Electric System (BES)." Portions of CIP-003-6 became enforceable on July 1, 2016. Requirements R1.2 and R2 became enforceable on April 1, 2017. As a Registered Entity with only low impact BES Cyber Systems, R1.2, R2, R3, and R4 became enforceable to NID during 2018. CIP-003-7 which added requirements around Transient Cyber Assets and Removable media became enforceable on 1/1/2020 and a fine-tuning of the new requirements became enforceable with CIP-003-8 on 4/1/2020.

R1: CIP-003-8 and its sub-requirement R1.2 requires NID as an entity with only Low Impact Cyber Assets to review and obtain CIP Senior Manager approval once every 15 calendar months for one or more cyber security policies that address:

- Cyber security awareness;
- Physical security controls;
- Electronic access controls for Low Impact External Routable Connectivity;
- Cyber Security Incident Response;
- Transient Cyber Assets and Removable Media malicious code risk mitigation; and
- Declaring and responding to CIP Exceptional Circumstances.

In 2019, NID prepared for and implemented an updated CIP-003 policy and associated plans that address the technical security control requirements for physical access, electronic access, and transient cyber asset and removeable media management required by CIP-003-7 and CIP-003-8. The CIP Senior Manager signed-off on these new CIP-003 policies and plans in December 2019 ahead of the initial January 1, 2020 and subsequent April 1, 2020 enforcement dates.

R2: NID performed a Cyber Security Incident Response Plan (CSIRP) tabletop exercise on February 25, 2020. NID added the next testing date to their compliance calendar to ensure testing occurs on or before February 28, 2023 (within the required 36 calendar month timeframe).

Additionally, R2, Attachment 1 requires the performance of a cyber security awareness activity once every 15 calendar months.

NID carried-out quarterly cyber security awareness activities for its personnel in 2020, except for the second quarter which is skipped due to COVID events impacting NID personnel. Skipping the cyber security awareness event for the second quarter is not a compliance issue as the requirement is only once per 15 calendar months.

Each quarterly cyber security awareness topic covered a recent cyber security event, lessons learned from the event, and key takeaways for how NID can protect itself from similar attacks. Overall, each quarterly cyber security awareness touch point strengthens in personnel's minds the importance of staying alert and diligent in protecting NID's critical cyber assets.

Based on the date of the last cyber security awareness distribution (November 2020), NID will need to conduct its next cyber security awareness activity on or before February 29, 2022 to ensure the 15-calendar month requirement is met. In 2021, NID plans to continue delivering to its personnel quarterly cyber security awareness topics.

R3: CIP-003-8 R3 requires NID to identify a CIP Senior Manager and document any changes within 30 calendar days of the change. NID has met R3 by designating Keane Sommers as the CIP Senior Manager. There were no changes to this designation in 2020.

R4: CIP-003-8 R4 requires a documented process if the CIP Senior Manager were to delegate CIP Senior Manager authority where allowed by the CIP Standards. Keane Sommers did not delegate any CIP Senior Manager authority during 2020.

EOP-004 – Event Reporting

The purpose of EOP-004-4 is, “to improve the reliability of the Bulk Electric System by requiring the reporting of events by ‘Responsible Entities.’”

Under the CFR Agreement with PG&E, NID is responsible for EOP-004-4 as it pertains to its own Facilities and operations. Based on GridSME's review at the time this report was prepared, NID has indicated compliance with this standard for the 2020 calendar year.

R1: EOP-004-4 R1 requires NID to have an event reporting Operating Plan in accordance with Attachment 1 of EOP-004-4. NID remained compliant with R1 by maintaining its Event Reporting Operating Plan. There were no Reportable Events, suspected or otherwise, in 2020 that required the initiation of NID's plan.

R2: EOP-004-4 R2 requires NID to report events per their Operating Plan within 24 hours of recognizing an event meeting the threshold for reporting. Since there were no Reportable Events identified during 2020, NID remained compliant with R2.

NID continues conducting contact validation annually as a best practice to ensure its Event Reporting Plan stays current.

FAC-001-3 – Facility Interconnection Requirements

The purpose of FAC-001-3 is “to avoid adverse impacts on the reliability of the Bulk Electric System, Transmission Owners and applicable Generator Owners must document and make Facility interconnection requirements available so that entities seeking to interconnect will have the necessary information.”

FAC-001-3 applies to GOs “with a fully executed Agreement to conduct a study on the reliability impact of interconnecting a third party Facility to the [GOs] existing Facility that is used to interconnect to the Transmission system.” In 2020, NID did not enter into an Agreement to study the reliability impact of interconnecting third party Facilities to NID’s existing Facilities. Therefore, FAC-001-3 (R2) was not applicable to NID during 2020. For the 2020 calendar year, NID created an FAC-001-3 attestation stating this, which has been executed by Keane Sommers.

FAC-002-2 – Facility Interconnection Studies

The purpose of FAC-002-2 is “to study the impact of interconnecting new or materially modified Facilities on the Bulk Electric System.”

FAC-002-2 applies to GOs “with a fully executed Agreement to conduct a study on the reliability impact of interconnecting a third party Facility to the [GO’s] existing Facility that is used to interconnect to the Transmission system.”

NID did not enter into an Agreement to study the reliability impact of interconnecting third party Facilities to NID’s existing Facilities; therefore, FAC-002-2 (R2 and R5) did not apply to NID during 2020. For the 2020 calendar year, NID has documented non-applicability with an FAC-002-2 attestation signed by Keane Sommers.

FAC-003-4 – Vegetation Management

The purpose of FAC-003-4 is “to maintain a reliable electric transmission system by using a defense in-depth strategy to manage vegetation located on transmission rights of way (ROW) and minimize encroachments from vegetation located adjacent to the ROW, thus preventing the risk of those vegetation related outages that could lead to Cascading.”

NID does not own any Facilities in the Applicability criteria for FAC-003-4. NID has documented this in an attestation signed by Keane Sommers.

FAC-008-3 – Facility Ratings

The purpose of FAC-008-3 is “to ensure that Facility Ratings used in the reliable planning and operation of the Bulk Electric System is based on technically sound principles.” These Facility Ratings, in turn, are used to develop System Operating Limits.

R1, R6, R2: FAC-008-3 requires NID to document the determination of its Facility Ratings (R1, R6), and have a documented methodology for determining its Facility Ratings from the step-up transformer up to the point of interconnection (R2). NID documented its Facility Ratings and implemented its Facility Ratings methodology in July 2013. Pertaining to R2, NID did not make any modifications to its Facility Ratings methodology in 2020. NID has plans to review and update its Facility Ratings and methodology in early 2021.

R7, R8: During 2020, NID did not receive any requests from third-party entities pertaining to its Facility Ratings, nor was NID scheduled to provide information to third-party entities in 2020.

IRO-010-2 – Reliability Coordinator Data Specification and Collection

The purpose of IRO-010-2 is “to prevent instability, uncontrolled separation, or Cascading outages that adversely impact reliability, by ensuring the Reliability Coordinator has the data it needs to monitor and assess the operation of its Reliability Coordinator Area.”

R3 through R3.3: IRO-010-2 R3 requires GOs and GOPs to submit data to their Reliability Coordinator (RC) as per the RC’s documented data specifications. NID has executed an attestation stating it has not had any affirmative duties under IRO-010-2 and predecessor Standard versions. Additionally, per Peak Reliability’s Reliability Coordinator Data Request and Specifications for Data Provision, GOs do not have direct data provisioning requirements under the Standard. Further, PG&E has agreed, per the CFR, to be the responsible party to perform the GOP requirements under IRO-010-2 on behalf of CP and DF2.

MOD-025-2 – Verification and Data Reporting of Generator Real and Reactive Power Capability and Synchronous Condenser Reactive Power Capability

The purpose of MOD-025-2 is “to ensure that accurate information on generator gross and net Real and Reactive Power capability and synchronous condenser Reactive Power capability is available for planning models used to assess Bulk Electric System (BES) reliability.”

R1, R2: MOD-025-2 R1 requires a GO to verify the Real Power capability of its facilities and submit a completed Attachment 2 form to its Transmission Planner (TP), which is PG&E, within 90 calendar days of verification. Similarly, R2 requires a GO to verify and complete Attachment 2 regarding the Reactive Power capability of its facilities.

In November 2016, NID performed staged testing at CP and submitted the data to PG&E (as the TP), thereby making NID 50% compliant with MOD-025-2 R1 and R2 at the end of 2016. To maintain compliance with MOD-025-2 in 2017, NID was required to perform the MOD-025-2 staged testing and meet R1 and R2 for DF2 by July 1, 2017, at which time NID needed to meet the 60% phased-in compliance implementation timeline requirement.

To meet the 60% phased-in compliance requirement, NID performed the remaining MOD-025-2 staged test at DF2 in April 2017. The Attachment 2 data was compiled, and the report prepared and submitted to PG&E shortly thereafter, making NID 100% compliant with MOD-025-2 at that time.

In February 2018, a Power System Stabilizer (PSS) was installed on DF2. NID determined via the installation vendor that MOD-025-2 testing was not required as the PSS installation did not change real or reactive power capability by more than 10%.

The next testing and submittal date for MOD-025-2 for Chicago Park is on or before 11/8/2021. It is recommended that plans are put in place to test the facility 3-6 months prior to submission date to allow for a third-party vendor to perform the testing. The next testing and submittal date for Dutch Flat 2 is on or before 10/5/2022. It is recommended that plans are put in place to test the facility 3-6 months prior to submission date to allow for a third- party vendor to perform the testing.

MOD-026-1 – Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions

The purpose of MOD-026-1 is to “verify that the generator excitation control system or plant volt/var control function1 model (including the power system stabilizer model and the impedance compensator model) and the model parameters used in dynamic simulations accurately represent the generator excitation control system or plant volt/var control function behavior when assessing Bulk Electric System (BES) reliability.”

In the Western Interconnection, MOD-026-1 is applicable to individual generating units greater than 75 MVA (gross nameplate rating). Therefore, this Standard and its Requirements are not applicable to NID’s CP and DF2 generators. NID has documented non-applicability with a MOD-026-1 attestation signed by Keane Sommers.

MOD-027-1 – Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions

The purpose of MOD-027-1 is to “verify that the turbine/governor and load control or active power/frequency control model and the model parameters, used in dynamic simulations that assess Bulk Electric System (BES) reliability, accurately represent generator unit real power response to system frequency variations.”

Just the same as MOD-026-1, MOD-027-1 is applicable to individual generating units in the Western Interconnection greater than 75 MVA (gross nameplate rating). Therefore, this Standard and its Requirements are not applicable to NID’s CP and DF2 generators. NID has documented non-applicability with a MOD-027-1 attestation signed by Keane Sommers.

MOD-032-1 – Data for Power System Modeling and Analysis

The purpose of MOD-032-1 is to “establish consistent modeling data requirements and reporting procedures for development of planning horizon cases necessary to support analysis of the reliability of the interconnected transmission system.”

R2: MOD-032-1 R2 requires a GO to provide steady-state, dynamics, and short circuit modeling data to its Planning Coordinator (PC) (CAISO) and Transmission Planner (TP) (PG&E), as scheduled or upon request. The relevant data was last provided to CAISO and PG&E under the WECC Generating Unit Model Validation Policy. For CP, there have been no changes to the unit nor the CP steady-state and dynamic files since that time. NID has made no changes to the CP facility that would necessitate resubmitting or updating the existing model, in accordance with the ISO-PG&E MOD-032-1 Requirements document titled “CAISO & PG&E Joint Transmission Planning Base Case Preparation Process,” dated September 2017.

In late 2018, CP did receive a Transmission Planning Process (TPP) generator model validation data request from CAISO, as the Planning Coordinator. This data request required NID to compile and report on the generator models and model data for CP. This data request was due May 30, 2019. NID responded on time and has since exchanged communications with CAISO to ensure CAISO has the needed information.

The excitation system upgrade in late 2017 at DF2 did necessitate an update to DF2’s steady state and dynamic model data. NID worked on model data updates with its third-party vendors. These

model updates were completed and submitted to CAISO and PG&E in April 2018, within the 180-day data requirement.

DF2's CAISO TPP generator model validation CAISO data request was due February 1, 2021. In November 2020, NID compiled and responded to the DF2 generator model and data request and is awaiting CAISO and PG&E's review and comment.

NUC-001-3 – Nuclear Plant Interface Coordination

The purpose of NUC-001-3 is to “[require] coordination between Nuclear Plant Generator Operators and Transmission Entities for the purpose of ensuring nuclear plant safe operation and shutdown.”

NID does not provide services related to Nuclear Plant Interface, therefore NUC-001-3 is not applicable to NID as a GO.

PRC-004-5(i) – Protection System Misoperation Identification and Correction

The purpose of PRC-004-5(i) is to “identify and correct the causes of Misoperations of Protection Systems for Bulk Electric System (BES) Elements.”

R1 through R6: In the event of a Misoperation, all requirements of the standard are applicable to NID as a GO. For each BES interrupting device operation, NID is required to determine if a Misoperation has occurred. If it is determined that a Misoperation occurred, NID is required to notify affected parties, determine the cause of the Misoperation, and develop and implement a Corrective Action Plan to avoid similar Misoperations in the future. NID is also required to report all Protection System operations quarterly via NERC's MIDAS portal.

NID maintains a detailed log of Protection System operations, and each operation is analyzed to determine its appropriateness. When an operation event occurs, NID prepares a report to document the event, evaluate whether the event was a correct operation or a Misoperation, and then make a determination. The report is then reviewed and approved. These event reports are on file for each operation during 2020.

NID had four (4) Protection System operations during 2020. All were evaluated per NID's procedures and none were determined to be a Misoperation. NID maintains a log of each operation and detailed records supporting its correct operation versus Misoperation determination. NID submitted all other necessary quarterly reports through the MIDAS portal, and all Protection System operations were properly reported via MIDAS.

PRC-004-WECC-2 – Protection System and Remedial Action Scheme Misoperation

PRC-004-WECC-2 is a FERC-approved WECC regional Reliability Standard. The purpose of this standard is to “ensure all transmission and generation Protection System and Remedial Action Scheme (RAS) Misoperations on Transmission Paths and RAS defined in [the Major WECC RAS table] are analyzed and/or mitigated.”

NID is not subject to PRC-004-WECC-2 as the Regional Standard only applies to generators in the WECC region that own RAS equipment that is part of a Major WECC RAS. Even though NID does not own or operate any RAS equipment, NID is still required to submit, and has submitted, the

necessary quarterly reports to WECC via webCDMS. NID has documented non-applicability with a PRC-004-WECC-2 attestation signed by Keane Sommers.

Note: PRC-004-WECC-2 was retired on 1/1/2021, its requirements are now a part of PRC-012-1 which NID has no applicability under.

PRC-005-1.1b – Transmission and Generation Protection System Maintenance and Testing

The purpose of PRC-005-1.1b is “to ensure all transmission and generation Protection Systems affecting the reliability of the Bulk Electric System (BES) are maintained and tested.” PRC-005 is one of the most commonly violated Reliability Standards.

NID’s Protection System Maintenance Program (PSMP) follows the Requirements and associated Tables of PRC-005-6. Therefore, PRC-005-1.1b is not applicable to Chicago Park and Dutch Flat 2. NID maintains an attestation signed by Keane Sommers affirming this fact.

PRC-005-6 – Protection System, Automatic Reclosing, and Sudden Pressure Relaying Maintenance

The purpose of PRC-005-6 is “to document and implement programs for the maintenance of all Protection Systems, Automatic Reclosing, and Sudden Pressure Relaying affecting the reliability of the Bulk Electric System (BES) so that they are kept in working order.” PRC-005-6 went into effect January 1, 2016. PRC-005-6 brought Automatic Reclosing and Sudden Pressure Relaying Devices in-scope for PRC-005. NID’s PSMP was updated in 2016 to include Automatic Reclosing and Sudden Pressure Relaying Protection System relays. In 2020, NID updated its PSMP documentation to improve record-keeping and administration of the program.

R1: PRC-005-6 R1 requires NID to develop and maintain a PSMP.

R2, R4: PRC-005-6 R2 and R4 are applicable to entities using performance-based maintenance intervals in its PSMP. NID has decided to follow a time-based maintenance interval program, therefore, R2 and R4 are not applicable to NID. NID maintains an attestation signed by Keane Sommers affirming this fact.

R3: PRC-005-6 R3 is applicable to entities utilizing time-based maintenance intervals. NID utilizes time-based maintenance intervals, and therefore, is obligated under R3 to perform the minimum maintenance activities within the maximum maintenance intervals provided by the standard.

NID performed all required maintenance activities in 2020, There was one (1) Unresolved Maintenance Issue identified during 2020 relating to an alarm contact for a BES relay not being wired into the SCADA system. A corrective action plan has been put in place and a memo to file was created documenting the instance. Additionally, NID did not identify any monitoring attributes for its Protection Systems, and therefore uses a more conservative, shorter maintenance time interval for unmonitored components.

R5: PRC-005-6 R5 requires NID to correct identified Unresolved Maintenance Issues, should any arise. NID identified one (1) Unresolved Maintenance Issue during 2020, and as stated above, has created a corrective action plan and a memo to file to document the instance.

Due to the complete replacement of CP's relays in 2017, GridSME began working with NID in 2018 to update its PRC-005 component list to reflect the current components associated with NID's PRC-005 PSMP. The component list update was completed in 2019.

NID has done an excellent job of maintaining and testing its Protection Systems in accordance with its PSMP. NID's compliance team maintains an evidence folder of all maintenance and testing activities performed by NID maintenance and operations staff during 2020.

PRC-012-1 Remedial Action Schemes

PRC-012-1 became enforceable on January 1, 2021.

The Purpose of PRC-012-1 is to ensure that Remedial Action Schemes (RAS) do not introduce unintentional or unacceptable reliability risks to the Bulk Electric System (BES). NID does not own any equipment which would identify it as a RAS-entity and thereby trigger applicability for PRC-012-2. It is suggested NID develop an attestation stating such for PRC-012-1.

PRC-015-1 – Remedial Action Scheme Data and Documentation

The purpose of PRC-015-1 is to “ensure that all Remedial Action Schemes (RAS) are properly designed, meet performance requirements, and are coordinated with other protection systems. To ensure that maintenance and testing programs are developed and misoperations are analyzed and corrected.”

NID does not own any Remedial Action Schemes (RAS) and is therefore not subject to this standard. NID maintains attestations signed by Keane Sommers affirming this fact.

Note: PRC-015-1 was retired on 12/31/2020.

PRC-016-1 – Remedial Action Scheme Misoperations

The purpose of PRC-016-1 is to “ensure that all Remedial Action Schemes (RAS) are properly designed, meet performance requirements, and are coordinated with other protection systems. To ensure that maintenance and testing programs are developed and misoperations are analyzed and corrected.”

PRC-016-1 requires that responsible entities perform an analysis of operations that occur on their RAS. NID does not own any RAS and is therefore not subject to this standard. NID maintains attestations signed by Keane Sommers affirming this fact.

Note: PRC-016-1 was retired on 12/31/2020.

PRC-017-1 – Remedial Action Scheme Maintenance and Testing

The purpose of PRC-017-1 is to “ensure that all Remedial Action Schemes (RAS) are properly designed, meet performance requirements, and are coordinated with other protection systems. To ensure that maintenance and testing programs are developed and misoperations are analyzed and corrected.”

This standard is very similar to PRC-005, in that it requires a maintenance and testing plan, but is only for RAS. NID does not own any RAS and is therefore not subject to this standard. NID maintains an attestation signed by Keane Sommers affirming this fact.

PRC-018-1 – Disturbance Monitoring Equipment Installation and Data Reporting

The purpose of PRC-018-1 is to “ensure that Disturbance Monitoring Equipment (DME) is installed and that Disturbance data is reported in accordance with regional requirements to facilitate analyses of events.”

PRC-018-1 sets forth requirements for disturbance monitoring equipment installation and data reporting. NID does not own any disturbance monitoring equipment (DME), has not been requested to install DME, and is therefore not subject to this Standard. NID maintains an attestation signed by Keane Sommers on affirming this fact.

PRC-019-2 – Coordination of Generating Unit or Plant Capabilities, Voltage Regulating Controls, and Protection

The purpose of PRC-019-2 is “to verify coordination of generating unit Facility or synchronous condenser voltage regulating controls, limit functions, equipment capabilities and Protection System settings.”

R1: PRC-019-2 R1 requires NID to coordinate its applicable voltage regulating system controls with the settings of the applicable Protection Systems at least every five years.

R2: PRC-019-2 R2 requires NID to perform the coordination described in R1 upon implementation of systems or settings that will affect the current coordination.

The coordination analysis of CP’s voltage regulating system controls with the settings of the applicable Protection Systems was documented in 2016 by Sage Engineers. The finding of this coordination analysis is that CP relays and in-service limiters were properly coordinated. CP will need to reperform and update this PRC-019 analysis again by July 1, 2021.

In September 2019, relay settings at DF2 were updated. Following this outage, an updated PRC-019-2 analysis was performed for DF2 demonstrating compliance with the Standard. DF2 will need to reperform and update this PRC-019 analysis again by August 31, 2024.

PRC-023-4 – Transmission Relay Loadability

The purpose of PRC-023-4 is to maintain protective relays within the following parameters: “protective relay settings shall not limit transmission loadability; not interfere with system operators’ ability to take remedial action to protect system reliability and; be set to reliably detect all fault conditions and protect the electrical network from these faults.”

PRC-023-4 addresses transmission relay loadability, but only applies to a limited set of generators that have a load-responsive phase protection system(s). NID does not own any of the equipment listed in Attachment A of this Standard, and is, therefore, not an applicable entity for the Standard.

To verify this, in NID has reviewed CAISO’s “CAISO List of Facilities below 100 kV Potentially Subject to PRC-023-4 Transmission Relay Loadability for Compliance with Requirements R6, R6.1, R6.2 of PRC-023-” document as well as “CAISO's List of Facilities at 100 kV to 200 kV Subject to PRC-023-4 Transmission Relay Loadability for Compliance with R6, R6.1, R6.2 of PRC-023-4” dated

12/7/2020 and verified that NID facilities are not listed. Additionally, NID maintains a PRC-023-4 attestation signed by Keane Sommers affirming this fact.

PRC-024-2 – Generator Frequency and Voltage Protective Relay Settings

The purpose of PRC-024-2 is to “Ensure Generator Owners set their generator protective relays such that generating units remain connected during defined frequency and voltage excursions.”

R1 through R4: PRC-024-2’s implementation plan required that GOs meet R1 through R4 for at least 60% of its applicable Facilities by July 1, 2017, at least 80% by July 1, 2018, and 100% by July 1, 2019. Requirements R1 and R2 require a GO to set any frequency and voltage protective relaying to not trip in the “no-trip zone” designated by the Standard. Requirement R3 requires a GO to document and communicate to its PC and TP if it is unable to set its protective relaying to not trip in the “no trip zone,” while R4 requires the GO to provide its trip settings to a PC or TP upon request.

NID contracted with Kyle Baskin during the second quarter of 2016 to assess and document its compliance with PRC-024-2. Mr. Baskin’s report found CP and DF2 to be fully compliant (100% of applicable Facilities completed) with PRC-024 as of the July 1, 2016 enforcement date. There were no PRC-024-2 components added or replaced during 2020. NID maintains a 2020 PRC-024-2 attestation signed by Keane Sommers affirming this fact.

PRC-025-2 – Generator Relay Loadability

The purpose of PRC-025-2 is “to set load-responsive protective relays associated with generation Facilities at a level to prevent unnecessary tripping of generators during a system disturbance for conditions that do not pose a risk of damage to the associated equipment.”

R1: PRC-025-2 has only one requirement, R1, which requires a GO to apply the settings provided in Attachment 1 of the standard to each of their applicable protective relays while maintaining reliable fault protection.

In early 2018, the pickup settings on the DF2 11TA and 11TB relays were modified to meet the requirements of PRC-025. In February 2018, following the 2017 CP relay replacement and upgrade project, Kyle Baskins performed a PRC-025 analysis for CP, and prepared a report documenting his findings. Mr. Baskin’s analysis found that overcurrent or distance pickup changes *are* recommended at CP to meet the requirements of PRC-025.

In 2019, NID first coordinated these recommended changes with CAISO and PG&E. After gaining approval from CAISO and PG&E, NID then updated the CP protective relay settings in September 2019, prior to the PRC-025-2 October 1, 2019 enforcement date.

Also in 2019, NID retained a third-party consultant, RAI, to perform a full review of the PRC-025-2 compliance documentation for both CP and DF2. Following the September 2019 CP relay updates, RAI delivered to NID a report verifying CP and DF2’s compliance with PRC-025-2.

PRC-026-1 - Relay Performance During Stable Power Swings

The purpose of PRC-026-1 is to “ensure that load-responsive protective relays are expected to not trip in response to stable power swings during non-Fault conditions.” PRC-026-1 went into effect January 1, 2018. GO applicable requirements within the Standard are enforceable January

1, 2020; applicability is dependent on notification (annually) from the GO’s Planning Coordinator (PC) pursuant to R1.³

R2: Requirement R2 requires a GO to determine within 12 calendar months of notification from its PC, whether its identified load-responsive protective relay(s) applied to its BES Element meets the criteria in PRC-026-1 – Attachment B (for BES Elements not evaluated pursuant to PRC-026-1 – Attachment B in the last five calendar years). For Generator, transformer, or transmission line BES Elements that trip in response to stable or unstable power swings “due to the operation of its protective relay(s),” Requirement R2.2 requires GOs to “determine whether its load-response relay(s) applied to that BES Element meets the criteria in PRC-026-1 – Attachment B.”

R3: If a GO determines a load-responsive protective relay does not meet the PRC-026-1 – Attachment B criteria as per Requirement R2, Requirement R3 requires the GO to develop a Corrective Action Plan (CAP) within six full calendar months of that determination. The CAP must meet one of the criteria listed in the PRC-026-1 R3 Requirement description.

R4: Requirement R4 requires the GO to implement the CAP developed per Requirement R3, and “update each CAP if actions or timetables change until all actions are complete.”

Based on GridSME’s review at the time this report was prepared, NID has not received notice from its PC that it has BES generation Elements identified pursuant to Requirement R1. An attestation has been created and made effective January 1, 2020 affirming NID’s PC, CAISO, did not notify NID that it has applicable BES Elements applicable to PRC-026-1 and that NID has no compliance obligation pursuant to Requirement R2.1, and subsequent obligations required under R3 and R4.

TOP-003-3 – Operational Reliability Data

The purpose of TOP-003-3 is to “ensure that the Transmission Operator and Balancing Authority have data needed to fulfill their operational and planning responsibilities.”

R5 through R5.3: TOP-003-3 R5 is the only TOP-003 requirement applicable to GOs. It requires that a GO receiving a data specification in Requirement R3 or R4 satisfy the data request obligation using a mutually agreeable format, process for resolving data conflicts, and security protocol. CAISO’s TOP-003-3 Data Specifications procedure 3140, and the associated 3140A attachment (CAISO’s TOP-003 data specifications documents), are applicable to NID as a GO in CAISO’s BA territory. In the CAISO 3140A Operating Procedure Attachment, only request number 6.8.1 applies to a GO. NID meets the data request 6.8.1 as it has provided CAISO with CP and DF2’s connectivity, gross and net MW maximum and reactive capabilities, MVAR minimum and maximum capabilities, a list of units normally on AVR, and voltage setpoints with high and low ranges representing voltage regulation criteria.

³ PRC-026-1 R1: *Each Planning Coordinator shall, at least once each calendar year, provide notification of each generator, transformer, and transmission line BES Element in its area that meets one or more of the following criteria, if any, to the respective Generator Owner and Transmission Owner [See PRC-026-1 R1 for criteria].*

VAR-002-4.1 – Generation Operation for Maintaining Network Voltage Schedules

The purpose of VAR-002-4.1 is to “ensure generators provide reactive support and voltage control, within generating Facility capabilities, in order to protect equipment and maintain reliable operation of the Interconnection.”

R5 and R6: VAR-002-4.1 R5 and R6 requires GOs to provide their Transmission Operator (TOP) and TP with certain information regarding its step-up and auxiliary transformers within 30 calendar days of a request and ensure that transformer tap positions are changed according to the specifications provided by the TOP. In 2020, NID did not received a request from its TOP regarding step-up or auxiliary transformer information. Further, NID did not make changes to transformer tap positions or settings during the year.

VAR-501-WECC-3.1 – Power System Stabilizers (PSS)

The purpose of Regional Reliability Standard VAR-501-WECC-3.1 is “to ensure the Western Interconnection is operated in a coordinated manner under normal and abnormal conditions by establishing the performance criteria for WECC power system stabilizers.”

NID owns and maintains PSS. NID installed PSS capabilities on DF2 in February 2018.

R1: VAR-501-WECC-3.1 R1 requires a GO provide its TOP with the GO’s written Operating Procedure or other document(s) describing those known circumstances during which the GO’s PSS will not be providing an active signal to the Automatic Voltage Regulator (AVR). Further, R1 also requires a GO provide the same Operating Procedure or other document to its TOP within 180 days of a new PSS’s Commercial Operation date, or any changes to the PSS operating specifications. NID did not enact any changes to its VAR-501-WECC-3.1 Operating Procedure in 2020.

R3: VAR-501-WECC-3.1 R3 places PSS tuning requirements on the GO. The DF2 PSS was installed in February 2018 and NID was able to meet the R3 tuning requirements. No changes to the PSS occurred in 2020 that required action to maintain compliance with R3.

R4: The enforcement of requirement VAR-501-WECC-3/3.1 R4 in 2017 forced NID into a material capital expenditure and the alteration of an outage in February 2018. R4 requires a GO to install and complete start-up testing of a PSS on its generator within 180 days of either of the following events (phased-in during 2017):

- The GO connects a generator to the BES, after achieving Commercial Operation, or
- The GO replaces the voltage regulator on its existing excitation system, after achieving Commercial Operation for its generator that is connected to the BES.

As the DF2 excitation system was completely replaced in September 2017, R4 became applicable to NID. As DF2 returned from the excitation system replacement outage on October 10, 2017, it had 180 days from that date to replace the excitation system. NID installed the PSS on DF2 on February 22, 2018. Therefore, NID met the 180-day timeframe stipulated in R4. No further events occurred in 2020 that necessitated action to maintain compliance with R4.

R5: VAR-501-WECC-3.1 R5 requires a GO to repair or replace a PSS within 24 months of that PSS becoming incapable of meeting the tuning requirements specified in R3. As the CP and DF2 PSS remained capable of meeting the tuning requirements throughout 2020, NID maintained compliance with R5.

GENERATOR OPERATOR RELIABILITY STANDARDS COMPLIANCE

2020 Reliability Standards Applicable to a Generator Operator

Reliability Standard	Standard Description	CFR Treatment	New 2020	Retired 2020
COM-001-3	Communications	PG&E only	--	--
COM-002-4	Operating Personnel Communications Protocol	PG&E and NID (Normal)	--	--
EOP-005-3	System Restoration from Blackstart Resources	N/A	--	--
IRO-001-4	Reliability Coordination – Responsibilities and Authorities	PG&E only	--	--
NUC-001-3	Nuclear Plant Interface Coordination	N/A	--	--
PER-005-2	Operations Personnel Training	N/A	--	--
PRC-001-1.1(ii)	System Protection Coordination	PG&E and NID (Normal and Partial)	--	--
TOP-001-4	Transmission Operations	PG&E only	--	--
TOP-003-3	Operational Reliability Data	PG&E and NID (R5 Normal for both PG&E and NID w/ individual DR items partial or PG&E-full depending on the DR#)	--	--
VAR-001-5	Voltage and Reactive Control	PG&E only (E.A.17 N/A)		--
VAR-002-4.1	Generator Operation for Maintaining Network Voltage Schedules	PG&E and NID (R1-R3: PG&E Full; R4: Partial)	--	--
VAR-501-WECC-3.1	Power System Stabilizer (PSS)	PG&E and NID (Partial)	--	--

COM-001-3 – Communications

The purpose of COM-001-3 is “to establish Interpersonal Communication capabilities necessary to maintain reliability.”

This standard requires a GOP to maintain Interpersonal Communication capabilities with its BA and TOP. Additionally, if a failure of those capabilities is detected the GOP is required to work with the affected entity(ies) to restore those capabilities. This requirement is to be performed solely by PG&E under the terms of the CFR agreement.

COM-002-4 – Operating Personnel Communications Protocol

The purpose of COM-002-4 is to “improve communications for the issuance of Operating Instructions with predefined communications protocols to reduce the possibility of miscommunication that could lead to action or inaction harmful to the reliability of the Bulk Electric System (BES).”

The standard requires that a GOP train all applicable operating personnel to properly receive “oral two-party, person-to-person” Operating Instructions and, during an emergency, follow three-part communication protocols. Both PG&E and NID separately and wholly maintain compliance to this Standard under the terms of the CFR Agreement. PG&E and NID are both required to comply with COM-002-4 GOP requirements (“Normal”).

R3: COM-002-4 R3 requires NID to conduct initial three-part communication training for each of its operating personnel who can receive an oral two-party, person-to-person Operating Instruction prior to that individual operator receiving an oral two-party, person-to-person Operating Instruction. NID first conducted three-part communication training for all operating personnel in April 2016 in advance of the July 1, 2016, effective date. From that time forward, NID must, and has, delivered three-part communications training to new operating personnel before they begin normal, unsupervised work.

In 2020, NID added one new employee who is an operator. NID logs all training activity delivered to its personnel. The operator received COM-002 three-part communication training on November 25, 2020, prior to performing unsupervised operations. NID’s policy is to supervise new operators for at least six months prior to allowing unsupervised operations, and operators are not permitted to receive Operating Instructions until completion of supervised operations. Since the new operator received three-part communications prior to the end of his six-month supervised work, NID fulfilled its COM-002-4, R3 training obligation.

R6: COM-002-4 R6 requires NID operators that receive an oral two-party, person-to-person Operating Instruction during an Emergency to use three-part communication. Further, those operators must also document and generate evidence that they used three-part communication during such events. Through our discussions with NID personnel, we noted that three-part communication is routinely used by NID operators. NID has compiled evidence to demonstrate that three-part communication was used during events meeting NERC’s “Operating Instruction during an Emergency” requirements. This evidence is in the form of operator logs that denote “3PC” whenever the operator uses three-part communication when speaking with third-party reliability entities, which is essentially all communications with PG&E’s Drum and Sloan

operations centers. Each operator maintains their own log journal and each powerhouse has a station logbook onsite.

EOP-005-3 – System Restoration from Blackstart Resource

The purpose of EOP-005-3 is to “Ensure plans, Facilities, and personnel are prepared to enable System restoration from Blackstart Resources to assure reliability is maintained during restoration and priority is placed on restoring the Interconnection.”

EOP-005-3 addresses system restoration from a Blackstart Resource. Except for R18, the requirements addressing GOPs and Blackstart Resources are not applicable to NID. NID does not own or operate Blackstart units. NID maintains an attestation on file documenting this fact.

R18: EOP-005-3 R18 requires NID to participate in its Reliability Coordinator’s restoration drills, exercises, or simulations as requested by the Reliability Coordinator (RC). NID did not receive a request from its RC to participate in any such drills during 2020, and maintains an attestation signed by Keane Sommers stating that fact.

IRO-001-4 – Reliability Coordination – Responsibilities and Authorities

The purpose of IRO-001-4 is to “establish the responsibility of Reliability Coordinators to act or direct other entities to act.”

R2 and R3: IRO-001-4 R2 and R3 require a GOP to comply with its RC’s Operating Instructions unless such actions would violate safety, equipment, or regulatory or statutory requirements, and for the GOP to notify the RC if it cannot follow the Operating Instruction.

Under the terms of the CFR Agreement, PG&E has accepted full responsibility for the GOP-applicable Requirements in IRO-001-4. Consequently, NID does not need to perform any actions to comply with this Standard.

NUC-001-3 – Nuclear Plant Interface Coordination

The purpose of NUC-001-3 is to “[require] coordination between Nuclear Plant Generator Operators and Transmission Entities for the purpose of ensuring nuclear plant safe operation and shutdown.”

NID does not provide services related to Nuclear Plant Interface, therefore NUC-001-3 is not applicable to NID as a GO/GOP.

PER-005-2 – Operations Personnel Training

The purpose of PER-005-2 is to “ensure that personnel performing or supporting Real-time operations on the Bulk Electric System are trained using a systematic approach.”

R6: PER-005-2 R6 requires a GOP to use a systematic approach to the development and implementation of training to applicable operating personnel. This Standard is applicable to GOP “dispatch personnel at a centrally located dispatch center” who receive direction from the GOP’s RC, BA, TOP, or TO, and who “may develop specific dispatch instructions for plant operators under their control.” PER-005-2 is not applicable to GOP “plant operators located at a generator plant site or personnel at a centrally located dispatch center who relay dispatch instructions without making any modifications.” The PG&E CFR is silent on this Standard meaning NID must

independently address compliance. NID has appropriately documented why PER-005's GOP applicability criteria does not apply to NID personnel. NID maintains a PER-005 attestation signed by Keane Sommers documenting this determination.

PRC-001-1.1(ii) – System Protection Coordination

The purpose of PRC-001-1.1(ii) is to “ensure system protection is coordinated among operating entities.”

NID is currently required to maintain compliance with four PRC-001-1.1(ii) GOP Requirements under the terms of the CFR – R1 (Normal), R2, R3, and R5 (Partial). PRC-001-1.1(ii) R2 and R5 were retired by NERC in 2017.

R1: PRC-001-1.1(ii) requires each GOP be familiar with the purpose and limitations of Protection System schemes applied in its area. To meet this objective, GridSME led training sessions at NID's Colfax office for NID operators on December 16, 2014 and on June 27, 2018. The training reinforced Protection System familiarity for appropriate staff. The training sessions provided an overview of the “Protection and Control” (PRC) family of Reliability Standards, and an overview of relay protection schemes and devices, and Protection System best practices. Further, for any new operators that fall under the scope of R1, NID ensures those personnel become familiar with the purpose and limitations of Protection System schemes applied in NID's area through the completion of the PG&E hydro tech training program. In 2020, NID promoted one new operator to its workforce triggering training that falls under the scope of R1. The new operator received Protection System training on November 25, 2020.

R3: PRC-001-1.1(ii) requires that NID coordinate new Protection Systems and changes to existing Protections with its TOP and host BA. NID implemented relay setting changes at CP and DF2 in September 2019. Prior to implementing these changes, NID notified PG&E of the setting changes and gained PG&E's approval. From there, PG&E is responsible for notifying the TOP and BA, per the CFR.

If NID is called upon to contact PG&E regarding changes to its Protection Systems, or in the presence of generating or operating conditions that may require changes to PG&E's Protection Systems, NID maintains evidence of those instances. Evidence demonstrates that NID is coordinating new Protection Systems, as well as generation and operation changes with PG&E.

TOP-001-4 – Transmission Operations

The purpose of TOP-001-3/4 is to “prevent instability, uncontrolled separation, or Cascading outages that adversely impact the reliability of the Interconnection by ensuring prompt action to prevent or mitigate such occurrences.”

TOP-001-4 requires a GOP to comply with its TOP and BA's Operating Instructions unless such actions would violate safety, equipment, or regulatory or statutory requirements, and for the GOP to notify the RC if it cannot follow the Operating Instruction. This Standard mirrors IRO-001-4, but refers to the TOP and BA rather than the RC.

PG&E has, under the terms of the CFR Agreement, accepted full responsibility for the GOP-applicable Requirements under TOP-001-4. Consequently, NID does not need to perform any actions to comply with this Standard.

TOP-003-3 – Planned Outage Coordination

The purpose of TOP-003-3 is to “ensure that the Transmission Operator and Balancing Authority have data needed to fulfill their operational and planning responsibilities.

R5: R5 through R5.3 are the only Requirements applicable to GOPs under TOP-003-3, and requires a GOP receiving a data specification in Requirement R3 or R4 to satisfy the data request (DR) obligation using a mutually agreeable format, process for resolving data conflicts, and security protocol. CAISO’s TOP-003-3 Data Specifications procedure 3140, the associated 3140A attachment, are applicable to NID as a GOP in CAISO’s BA territory. PG&E and NID are responsible for complying with R5 as per the CFR (“Normal” responsibility for each).

Under the terms of the PG&E CFR, NID has full responsibility for compliance with one and partial responsibility for compliance with six CAISO data request and specification requirements. These CAISO generator data request requirements are generally triggered upon a unit de-rate or outage or an AVR or PSS outage event. Any such events are logged and responded to by NID operating personnel in a timely manner. NID maintains written logs on file of such events.

VAR-001-5 – Voltage and Reactive Control

The purpose of VAR-001-5 is “to ensure that voltage levels, reactive flows, and reactive resources are monitored, controlled, and maintained within limits in Real-time to protect equipment and the reliable operation of the Interconnection.”

The Standard imposes two requirements on Western Interconnection GOP’s in the Equivalent Action Section “E.A.s ” have the same impact as a Requirement and are employed for Regional Variances);. Specifically, E.A. 15 - GOP’s in WECC must convert each voltage schedule provided by the TOP into the voltage set point for the generator excitation system and per E.A. 17, meet certain control loop specifications if control loops are used external to the Automatic Voltage Regulators to manage MVar loading . PG&E is responsible for E.A. 15 under the terms of the CFR.

Per the CFR, NID is responsible for compliance with E.A. 17. NID has documented in an attestation that E.A. 17 is not applicable to NID as no control loops are used to control NID’s hydroelectric Facilities.

VAR-002-4.1 – Generator Operation for Maintaining Network Voltage Schedules

The purpose of VAR-002-4.1 is “to ensure generators provide reactive support and voltage control, within generating Facility capabilities, in order to protect equipment and maintain reliable operation of the Interconnection.”

R1 through R4: VAR-002-4.1 has six Requirements, four of which must be adhered to by GOPs (R1-R4) and two by GOs (R5-R6 - *see also* the VAR-002-4.1 section in the GO Compliance Findings section of this report). Specifically, a GOP must: (R1) operate each generator connected to the interconnected transmission system in the automatic voltage control mode (automatic voltage regulator in service and controlling voltage) with certain limited exceptions; (R2) maintain the generator voltage or Reactive Power schedule (within applicable Facility Ratings) as directed by the TOP; (R3) notify its TOP of a status change on the AVR, power system stabilizer, or alternative voltage controlling device within 30 minutes of the change; and (R4) notify its associated TOP as soon as practical, but within 30 minutes of changes in reactive power capabilities (not including

those conditions listed under R3). Under the terms of the CFR agreement, NID only needs to inform PG&E's Drum Operations Center when an issue arises under R4.

NID has a procedure that memorializes R4. In 2020, there were no events that caused a change in reactive capability other than an AVR status change. CP and DF2's only means of providing reactive power is through their AVRs. NID has an attestation addressing R4 on file.

VAR-501-WECC-3.1 – Power System Stabilizers (PSS)

The purpose of Regional Reliability Standard VAR-501-WECC 3.1 is to “ensure the Western Interconnection is operated in a coordinated manner under normal and abnormal conditions by establishing the performance criteria for WECC power system stabilizers.”

NID owns and maintains PSS. NID installed PSS capabilities on DF2 in February 2018.

R2: VAR-501-WECC-3.1 R2 is the only GOP-applicable Requirement. Requirement R2 requires a GOP to have its PSS in-service while synchronized, except during a component failure, testing of a BES Element affecting or affected by the PSS, a maintenance event, or as agreed upon by the GOP and the TOP. Further, a PSS that is out of service for less than 30 minutes does not create a violation of this Requirement, regardless of cause.

Under the terms of the CFR agreement, PG&E and NID are both responsible for GOP compliance with this standard; PG&E and NID each have partial responsibility for R2 compliance. It is PG&E's responsibility to operate the PSS according to R2, compile the operating data to demonstrate compliance, and notify the TO and NID as soon as practicable if an exception-event occurs. NID is responsible for notifying PG&E if they identify or initiate any of the exceptions noted in the Standard. In 2020, NID did not identify any PSS events that meet the reporting criteria for R2.



POWER YOUR WORLD WITH CONFIDENCE

**2020 NERC Self-Assessment &
Risk Assessment**
April 28, 2021

www.gridsme.com



Annual Assessment Overview

- Our Approach
- Risk Categories Identified
- Key Findings for 2020
 - Including, NERC Annual Self-Assessment
- Look-Ahead & Recommendations



Our Risk Assessment Approach

1. Identify prelim external and internal risks
2. Interview key personnel within NID Hydro
 - a. Follow consistent interview structure
 - b. Listen for high impact & high probability
 - c. Dig into areas of concern
3. Catalog and update external and internal risks based on interviews
4. Assign identified risks to categories
5. Draft Annual Risk Assessment Report



2020 Risk Assessment Categories

People &
Training

Operating
Environment

Infrastructure
& Technology

Regulatory
Environment

Electricity
Revenue



People & Training

Safety

- Most important risk facing NID
- Resilient response to COVID with no interruptions to operations and reliability
- No dedicated Safety Coordinator function at NID Hydro

Training

- Need to identify alternative hydro operator training programs
- Need a formal maintenance training program (internal or external)

Recruiting & Retention

- Support the formal compensation review and wage and benefit adjustments
- Union MOU negotiations in 2021

Succession Planning

- Continued focus on succession planning and improving bench strength

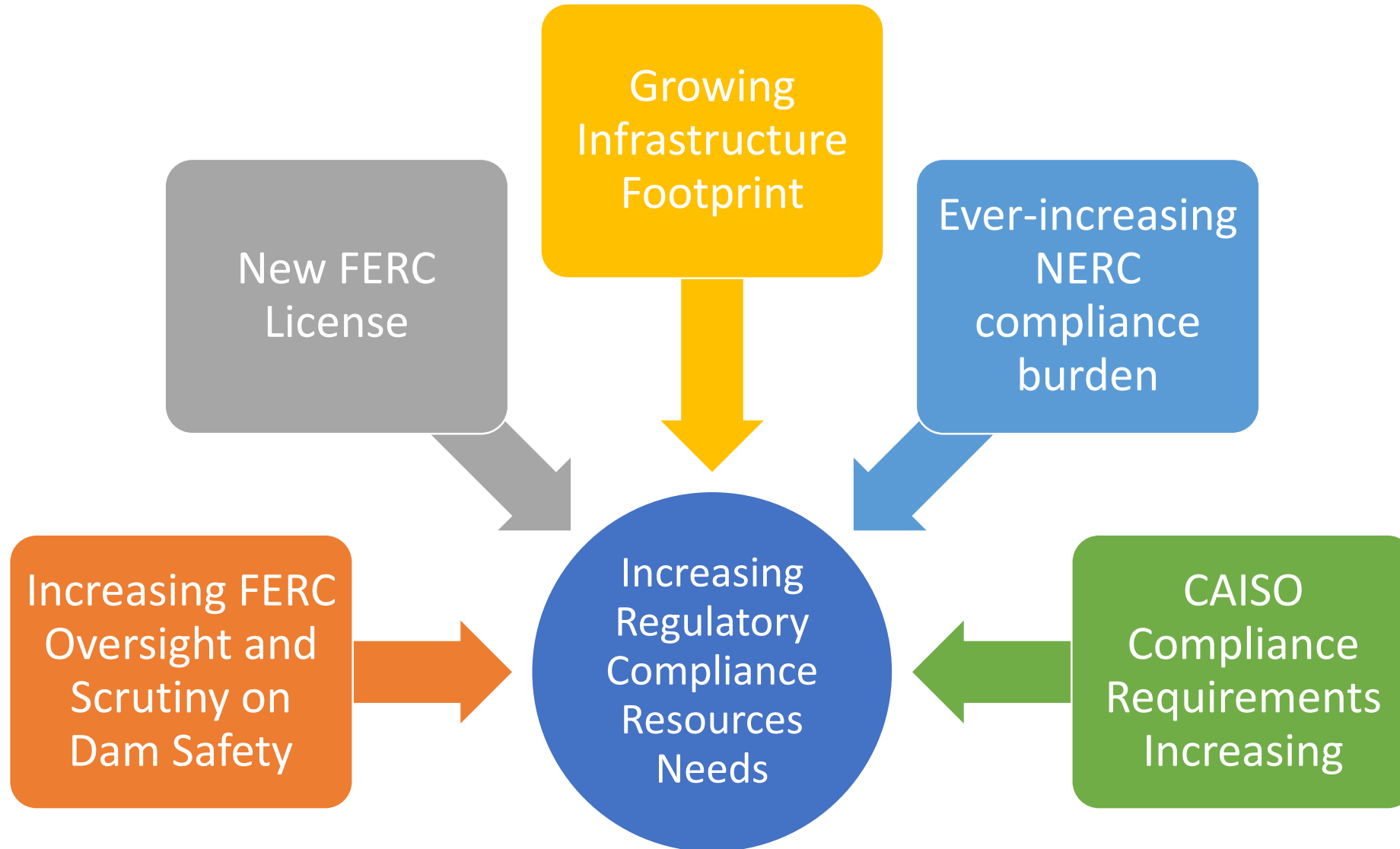


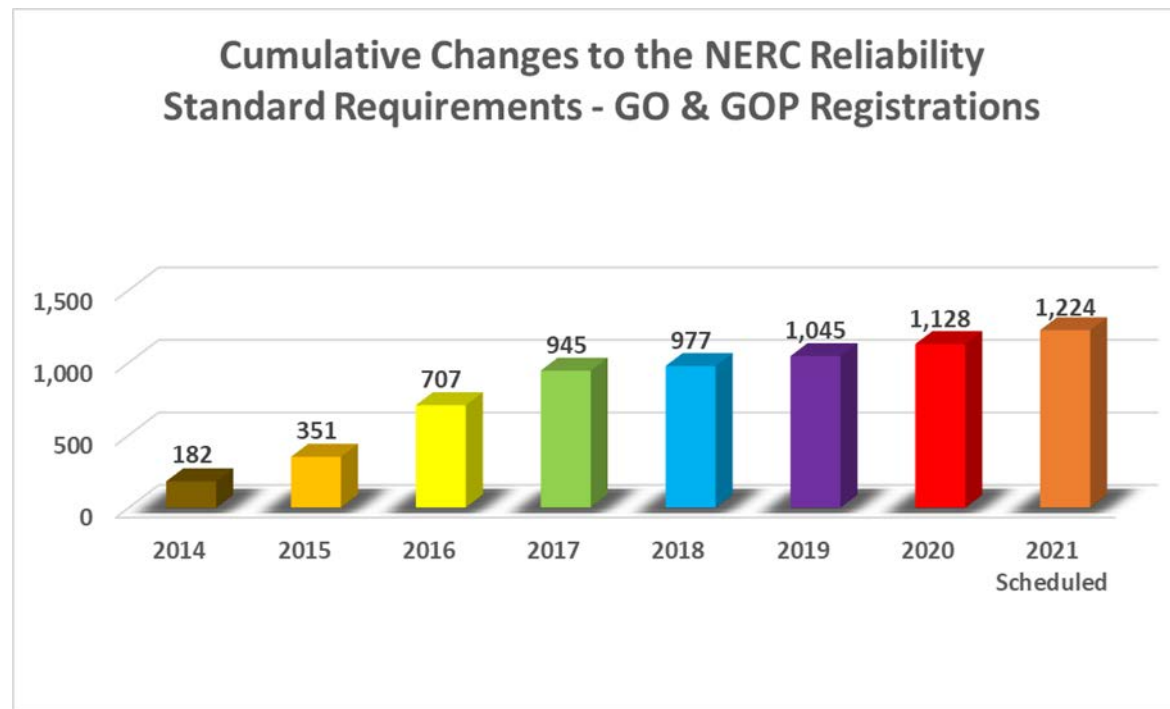
Retention & Turnover

	2018	2019	2020	2021+
Employee Turnover Rate	10.0%	9.8%	6.6%	12% expected

18% of Hydro Department is eligible for retirement **today**

Regulatory Environment





NERC Regulatory Compliance Burden

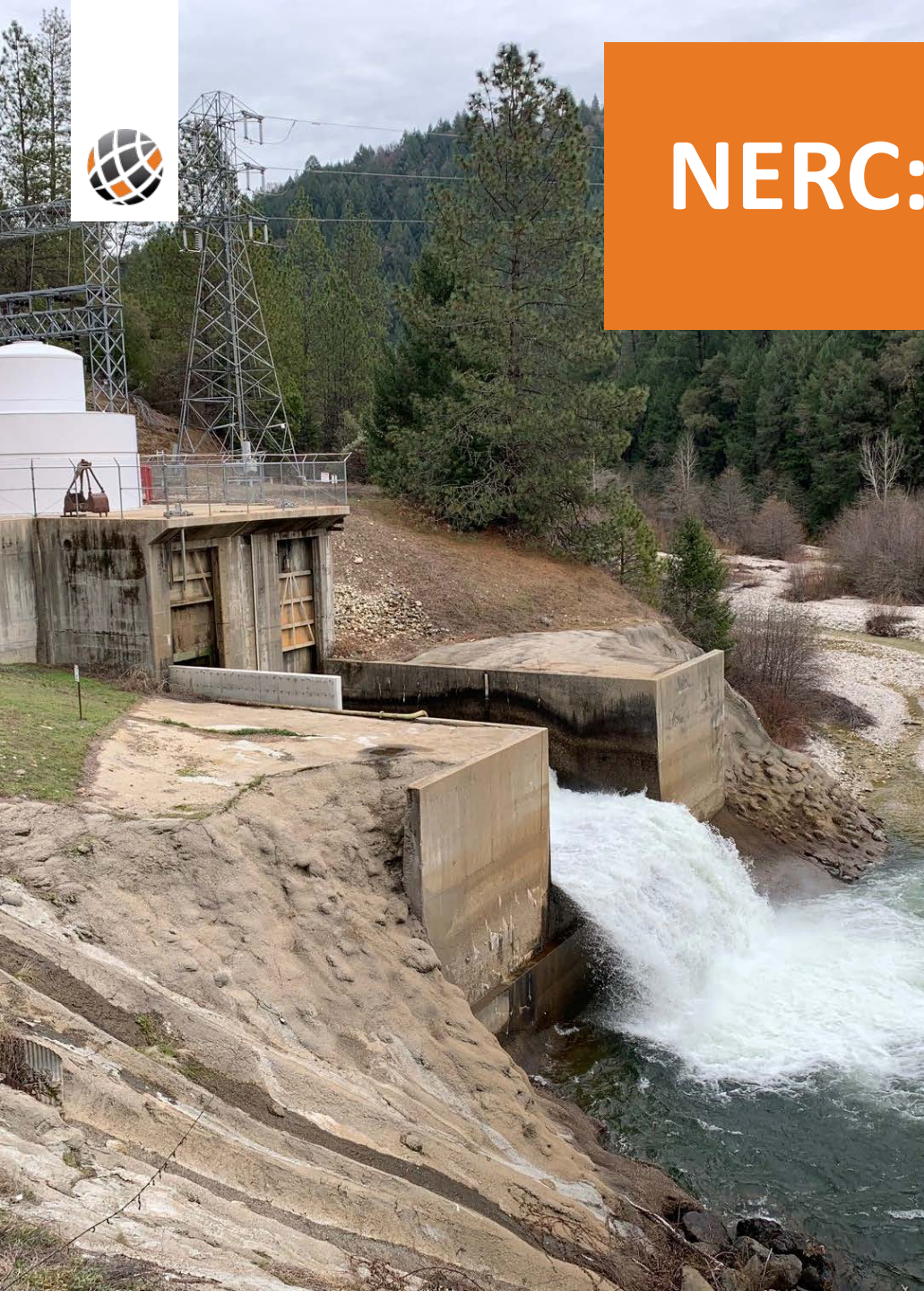
	2014	2015	2016	2017	2018	2019	2020	2021 <i>Sched.</i>
Requirements that became Enforceable	68	70	134	120	5	21	42	52
Requirements that became Inactive	114	99	222	118	27	47	41	44
Total Changes	182	169	356	238	32	68	83	96
Total Cumulative Changes	182	351	707	945	977	1,045	1,128	1,224

Table 1: NERC Reliability Standard Requirement Changes, GO & GOP



NERC: The Cost of Non-Compliance

1. Regulator intrusion and scrutiny
2. Penalties ranging from \$20K to \$500K+
3. Considerable internal time burden and distraction
4. Additional costs for outside counsel and consultants
5. Increased future audit scrutiny and frequency





Commonly Violated Reliability Standards

CIP-002

CIP-003

FAC-008

PRC-005

VAR-002



Annual NERC Compliance Self-Assessment

- Annually, we perform a Requirement-by-Requirement tabletop review with NID's compliance administrators and SMEs
- Applicable to NID in 2020:
 - 41 Reliability Standards
 - Containing 320 Requirements
- No non-compliance findings for 2020

2020 Reliability Standards Applicable to a Generator Owner

1 of 2

Reliability Standard	Title	New 2020	Retired 2020
CIP-002-5.1a	Cyber Security — BES Cyber System Categorization		
CIP-003-8	Cyber Security — Security Management Controls	4/1/2020	--
CIP-003-7		1/1/2020	3/31/2020
EOP-004-4	Event Reporting	--	--
FAC-001-3	Facility Connection Requirements		
FAC-002-2	Coordination of Plans for New Facilities		
FAC-003-4	Transmission Vegetation Management		
FAC-008-3	Facility Ratings		
IRO-010-2	Reliability Coordinator Data Specification and Collection		
MOD-025-2	Verification and Data Reporting of Generator Real and Reactive Power Capability and Synchronous Condenser Reactive Power Capability		
MOD-026-1	Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions		
MOD-027-1	Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions		
MOD-032-1	Data for Power System Modeling and Analysis		

2020 Reliability Standards Applicable to a Generator Owner

2 of 2

Reliability Standard	Title	New 2020	Retired 2020
PRC-002-2	Disturbance Monitoring and Reporting Requirements		
PRC-004-5(i)	Protection System Misoperation Identification and Correction		
PRC-004-WECC-2	Protection System and Remedial Action Scheme Misoperation		
PRC-005-6	Protection System, Automatic Reclosing, and Sudden Pressure Relaying Maintenance		
PRC-012-1	Remedial Action Schemes	1/1/2021	
PRC-015-1	Remedial Action Scheme Data and Documentation Special Protection System Data and Documentation		12/31/2020
PRC-016-1	Remedial Action Scheme Misoperations Special Protection System Misoperations		12/31/2020
PRC-017-1	Remedial Action Scheme Maintenance and Testing Special Protection System Maintenance and Testing		
PRC-018-1	Disturbance Monitoring Equipment Installation and Data Reporting		
PRC-019-2	Coordination of Generating Unit or Plant Capabilities, Voltage Regulating Controls, and Protection		
PRC-023-4	Transmission Relay Loadability		
PRC-024-2	Generator Frequency and Voltage Protective Relay Settings		
PRC-025-2	Generator Relay Loadability		
TOP-003-3	Operational Reliability Data		
VAR-002-4.1	Generator Operation for Maintaining Network Voltage Schedules		
VAR-501-WECC-3.1	Power System Stabilizer (PSS)		

2020 Reliability Standards Applicable to a Generator Operator

Reliability Standard	Standard Description	CFR Treatment	New 2020	Retired 2020
COM-001-3	Communications	PG&E only	--	--
COM-002-4	Operating Personnel Communications Protocol	PG&E and NID (Normal)	--	--
EOP-005-3	System Restoration from Blackstart Resources	N/A	--	--
IRO-001-4	Reliability Coordination – Responsibilities and Authorities	PG&E only	--	--
PER-005-2	Operations Personnel Training	N/A	--	--
PRC-001-1.1(ii)	System Protection Coordination	PG&E and NID (Normal and Partial)	--	--
TOP-001-4	Transmission Operations	PG&E only	--	--
TOP-003-3	Operational Reliability Data	PG&E and NID (R5 Normal for both PG&E and NID w/ individual DR items partial or PG&E-full depending on the DR#)	--	--
VAR-001-5	Voltage and Reactive Control	PG&E only (E.A.17 N/A)		--
VAR-002-4.1	Generator Operation for Maintaining Network Voltage Schedules	PG&E and NID (R1-R3: PG&E Full; R4: Partial)	--	--
VAR-501-WECC-3.1	Power System Stabilizer (PSS)	PG&E and NID (Partial)	--	--



Operating Environment

Wildfires & Vegetation Management

- Risk of NID-caused ignition
- Risk of third-party or lightning caused wildfire damages NID property
- Diligent maintenance relies on heavy interaction and cooperation with the BLM and Forest Service
- Significant progress in 2020 but still a considerable amount of work to be done



Wildfire Mitigation Activities



Before

**Bowman
60kV Line**



After



Wildfire Mitigation Activities



**Bowman
60kV Line**





Operating Environment

Physical Security

- Remote nature leaves facilities vulnerable to break-ins, vandalism, and theft
- Improved physical security access controls installed in 2016, 2019, and 2020 (and ongoing)

Physical Security – DF2 Powerhouse





Operating Environment

Cyber Security

- Ever-present and ever-evolving risk
- Several high-profile attacks on Industrial Control Systems and power grid networks in recent years
- Cyber supply chain risks and new pending regulation
- Steps to mitigate cyber risk



Cyber Supply Chain Risk

- On May 1, 2020, President Trump signed an executive order (EO) halting the installation of bulk-power system (BPS) equipment "designed, developed, manufactured, or supplied, by persons owned by, controlled by, or subject to the jurisdiction or direction of a foreign adversary."
- On January 20, 2021, the EO was suspended by the Biden Administration
- Despite suspension and non-enforcement of the EO, it is recommended entities prepare for the impending increased scrutiny and supply chain requirements
- NID policy-level changes may be required in response to new regulations



Recommended Cyber Security Controls

Get very good at the basics:

1. Access management;
2. Change management;
3. Backup, incident response, and disaster recovery;
4. Network monitoring, logging, and review;
5. Patch management; and
6. Periodic cyber vulnerability assessments

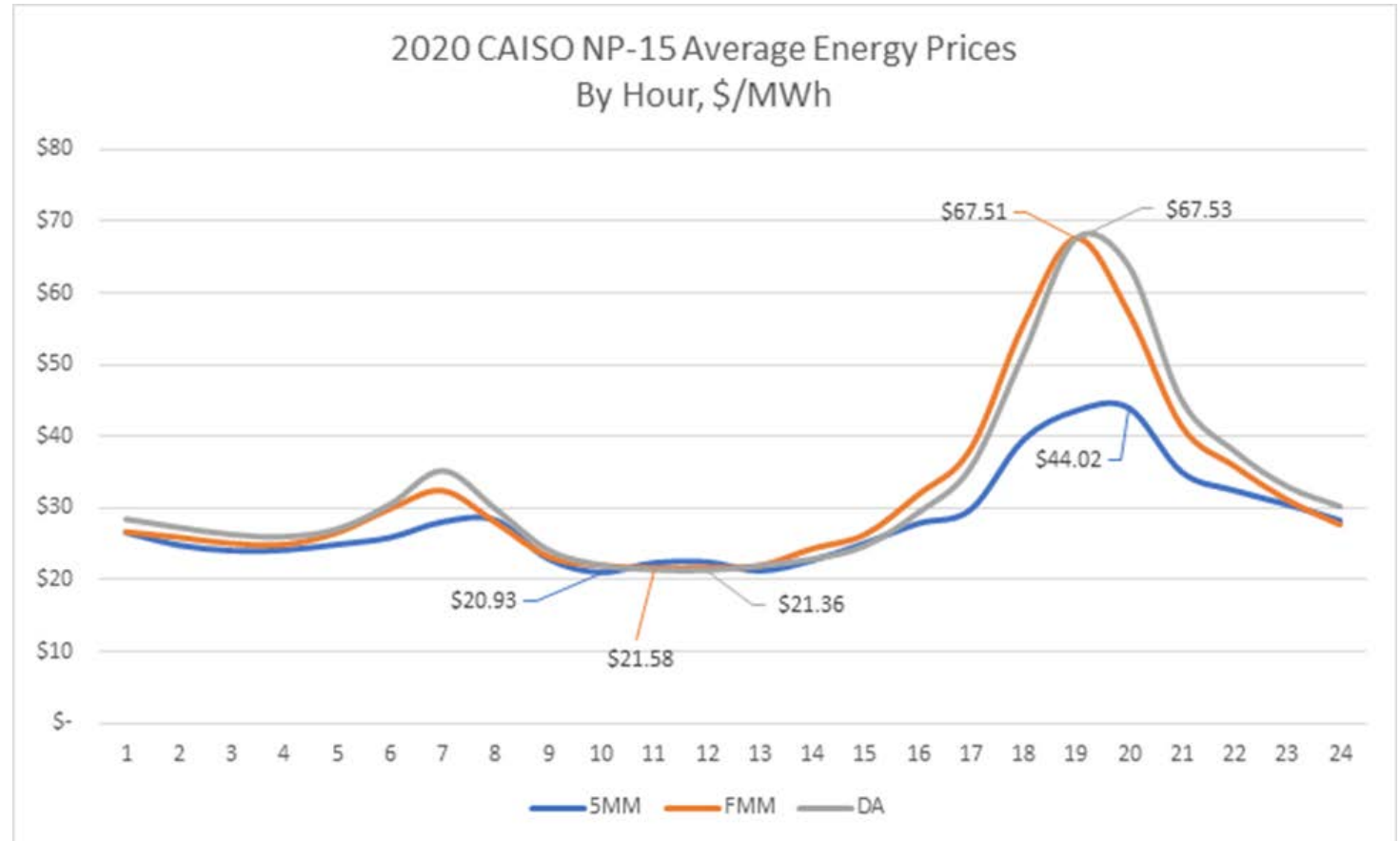
Infrastructure & Technology

- Aging Infrastructure
- Project Planning
- Electrical Documentation
- Spare Parts
- Technology Changes: SCADA & CMMS Investments
- Portfolio Growth
 - Deer Creek
 - Loma Rica
 - 2nd Rollins PH
- New Colfax Hydro HQ



Electricity Revenue & Markets

- Bowman, Chicago Park, Dutch Flat 2, and Rollins under long-term PPAs with ~12 years remaining
- Other NID projects are more vulnerable to market conditions
- The more market exposure NID has, the more its resources will want to be flexible and dispatchable



Summary & Recap



- People & Training remain challenging and NID Hydro's biggest risk
- Growing portfolio footprint increases pressure on resources
- Big strides and risk reductions to Vegetation Management, Regulatory Compliance, and Physical Security
 - But these areas remain resource-constrained
- Cyber Security and IT support remains critical and a gap to close
- Hydro portfolio's energy market value is strong

