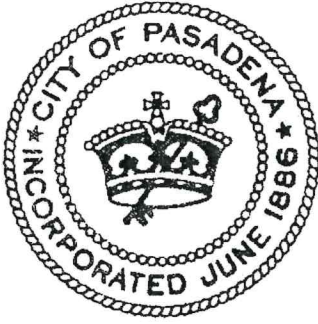




Agenda Report

June 14, 2021

TO: Honorable Mayor and City Council
FROM: Water and Power Department
SUBJECT: **ADOPTION OF THE WATER AND POWER DEPARTMENT'S UTILITY PHYSICAL SECURITY PLAN**

RECOMMENDATION:

It is recommended that the City Council:

1. Find that the proposed action is not a project subject to the California Environmental Quality Act ("CEQA") pursuant to Section 21065 of CEQA and Sections 15060(c)(2), 15060(c)(3), and 15378 of the State CEQA Guidelines and, as such, no environmental document pursuant to CEQA is required; and
2. Adopt the Water and Power Department's ("PWP") Utility Security Plan ("Plan") in compliance with California Public Utilities Commission ("CPUC") Decision D.19-01-018.

BACKGROUND:

In recognition of threat to electric distribution facilities and consequential risk of long-term power outage, California legislature enacted Senate Bill 699 ("SB 699") in 2014. SB699 directed the CPUC to adopt rules to identify and address the physical security risks to distribution systems of electrical corporations.

In response to SB 699, the CPUC has issued new requirements (Decision D.19-01-018) for Investor-Owned Utilities ("IOU") and Publicly-Owned Utilities ("POU") to develop plans that identify and address security risks to distribution facilities including control centers. The CPUC security plan submittal by POUs such as PWP, is due July 10, 2021.

Generally, POUs such as PWP are not within the jurisdiction of the CPUC, however, the CPUC asserts that "Sections 8001-8057, read in light of the Polk decision, make it clear that the CPUC has the authority to apply physical security rules created through this rulemaking to the POUs."

In working with CPUC, California's electric utilities (IOUs and POUs) jointly developed a Straw Proposal for a process to identify facilities that may be at-risk ("Covered Distribution

In working with CPUC, California's electric utilities (IOUs and POUs) jointly developed a Straw Proposal for a process to identify facilities that may be at-risk ("Covered Distribution Facilities") and, if necessary, develop physical security mitigation plans. A Covered Distribution Facility is any distribution facility that falls into one of the following categories:

- Necessary for crank path, black start, or capability essential to the restoration of regional electricity service that is not subject to the California Independent System Operator's operational control and/or subject to NERC's Reliability Standard
- Primary source of electrical service to a military installation essential to national security and/or emergency response services
- Serves installations necessary for the provision of regional drinking water supplies and wastewater services
- Serves a regional public safety establishment
- Serves a major transportation facility
- Serves a Level 1 Trauma Center
- Serves over 60,000 meters

The CPUC required utilities to follow a six-step process in development of their Plans:

- Step 1: Assessment/Plan Development
 - i. Identification of "Covered Distribution Facilities"
 - ii. Risk Assessment/Mitigation Plan Development
 - iii. Develop Mitigation Plan
- Step 2: Independent Third-Party Review and Utility Response
- Step 3: Qualified Authority Validation of the Utility Security Plan
- Step 4: Adoption of the Utility Security Plan
- Step 5: Maintenance of the of the Utility Security Plan
- Step 6: Repeat the Six-Step Process at least once every five years

PWP's Utility Security Plan

In order to comply with the CPUC requirements, PWP has developed a Plan which thoroughly analyzed all PWP distribution facilities.

Step 1: PWP determined that three of its facilities are identified as "Covered Distribution Facilities". The existing physical security and resiliency measures at those facilities have been examined and determined to be adequate in order to mitigate a potential physical threat. Due to public safety and security reasons the Covered Distribution Facilities are not identified in this agenda report.

Step 2: PWP contracted with Cooper Compliance, Incorporated to conduct an independent review as required by the CPUC order. Cooper Compliance reviewed the Plan, determined that the assessment methodology is sufficient, and that the results are accurate and consistent with good industry practices for physical security of critical infrastructure.

Step 3: PWP requested that the Pasadena Police Department ("PPD") review and validate the Plan. The PPD Counter Terrorism Unit Supervisor conducted site inspections at PWP distribution facilities, including the Covered Distribution Facilities, and validated the Plan in addition to providing recommendations to enhance existing fencing, add additional locking devices, perimeter lighting, and numeric access keypads at the Covered Distribution Facilities. PWP is in the process of implementing the recommendations.

The Plan also incorporates the CPUC order requirement that the utility mitigation plans include a detailed narrative explaining how the utility has:

- (1) An asset management program for tracking and locating spare parts stock, ensuring availability and the rapid dispatch of available spare parts;
- (2) A robust workforce training and retention program to employ a full roster of highly-qualified service technicians able to respond to make repairs in short order throughout a utility's service territory; and,
- (3) A preventative maintenance plan for security equipment to ensure that mitigation measures are functional and performing adequately.

The proposed Plan is fully compliant with the CPUC requirements and PWP is committed to appropriately maintaining and updating the Plan (Steps 5 and 6). The Plan is required to be reviewed and updated in intervals of no less than five years. The attached copy of the Plan (Attachment A) has been revised to exclude certain details for security reasons.

PWP respectfully recommends adoption of its unrevised Plan (Step 4) in compliance with CPUC Decision D.19-01-018.

COUNCIL POLICY CONSIDERATION:

PWP's Plan is consistent with the City Council's strategic goals to maintain fiscal responsibility and stability, and to ensure public safety.

ENVIRONMENTAL ANALYSIS:

The proposed action is not a project subject to CEQA in accordance with Section 21065 of CEQA and State CEQA Guidelines Sections 15060(c)(2), 15060(c)(3), and 15378. The adoption of the proposed Utility Physical Security Plan is an organizational and administrative action that would not cause either a direct physical change in the environment or a reasonably foreseeable indirect physical change in the environment. Therefore, the proposed action is not a "project" subject to CEQA, as defined in Section 21065 of CEQA and Section 15378 of the State CEQA Guidelines. Since the action is not a project subject to CEQA, no environmental document is required.

FISCAL IMPACT:

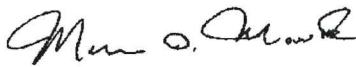
There is no fiscal impact as a result of adopting the Plan. There will be no anticipated impact to other operational programs or capital projects as a result of this action.

Respectfully submitted,



GURCHARAN S. BAWA
General Manager
Water and Power Department

Prepared by:



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Assistant General Manager
Water and Power Department

Approved by:



STEVE MERMELL
City Manager

ATTACHMENT A – PWP Utility Physical Security Plan (public version)

CITY OF PASADENA WATER & POWER UTILITY SECURITY PLAN

**PUBLIC REPORT ON PWP'S PHYSICAL SECURITY PLAN
FOR DISTRIBUTION-LEVEL FACILITIES**

June 14, 2021

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I. OVERVIEW

A. GOAL OF UTILITY SECURITY PLAN

Ensuring the safety of its facilities is a top priority for The City of Pasadena, Water and Power Department ("PWP"), and PWP prioritizes safety in all aspects of its design, operation, and maintenance practices. The overarching goal of this Utility Security Plan is to describe PWP's risk management approach toward distribution system physical security, with appropriate consideration of resiliency, impact, and cost.

PWP recognizes the importance of securing the safety and reliability of its electric system and, therefore, PWP voluntarily participated in the California Public Utilities Commission's (CPUC) Physical Security proceeding and has undertaken this assessment. In the spirit of continued voluntary cooperation, PWP offers the following in response to CPUC Decision 19-01-018.

B. DESCRIPTION OF PWP

Pasadena is an ethnically diverse community that is home to more than 140 thousand people making it the 183rd-largest city in the United States. As the ninth largest city in Los Angeles County, Pasadena is one of the primary cultural center of in the San Gabriel Valley. The City covers approximately 22.5 square miles, with an average of ten residents per acre. The median age of its residents is approximately 36.9 years. There are over 100,000 jobs in a wide variety of industries in the City of Pasadena. Pasadena is the home for the Rose Bowl and annual Rose Parade.

PWP's power delivery system consists of three (3) receiving stations and eleven (11) distribution substations, twenty-seven 34-kV subtransmission lines, and 117 distribution feeders operating at 17-kV and 4-kV. There are 54 power transformers and approximately 300 circuit breakers.

About 75% of PWP's distribution system lines are installed in underground conduits. The sub-transmission system ties the supply of power from the east and west ends of Pasadena to distribution substations throughout the city. PWP-owned generation consists of five generators totaling approximately 200 MW; two 220-kV Southern California Edison (SCE) lines interconnects PWP electric system to the California Independent System Operator ("CAISO") at the main PWP Receiving Station. PWP can import up to 336MW per a signed contract between PWP and SCE utilizing three 220-kV/34-kV power transformers.

C. RESULTS OF UTILITY SECURITY PLAN ASSESSMENT

After evaluating all distribution-level facilities in PWP's service territory, PWP decided to assess all twelve (12) distribution level facilities under its control. These consist of nine (9) distribution substations, one (1) receiving station and two (2) combined receiving and distribution substations. Out of these facilities, only three were identified and evaluated as "Covered Distribution Facilities" per the joint IOU/POU Straw Proposal screening factors and are subject to the need for a risk assessment. For these three covered distribution facilities, PWP performed an evaluation of the potential risk of a potential physical attack and whether existing security and resiliency measures appropriately mitigate identified risk.

After determining the three candidate facilities for risk assessment, PWP developed a scoring method to determine the Risk Index for each of the covered facilities. The Security Index and Resiliency Index were developed by assigning a score between 0-10 to multiple categories as shown in the Risk Assessment section. After the total security and resiliency computation was processed, the Risk Index for each individual facility was calculated as follows

$$Risk\ Index_{Facility\ i} = Security\ Index_{Facility\ i} * Resiliency\ Index_{Facility\ i}$$

PWP determined that the three Covered Distribution Facilities have sufficient existing security and resiliency measures in place to effectively mitigate the identified risks of a successful physical attack.

In addition, Section VI describes additional upgrade and/or replacement plans for the existing electronic surveillance and lighting systems the Covered Distribution Facilities.

An independent evaluation- conducted by Cooper Compliance Inc. as the third party reviewer- found PWP's assessment methodology to be sufficient and the results to be accurate and consistent with good industry practices for physical security of critical infrastructure.

II. BACKGROUND

On April 16, 2013, one or more individuals attacked equipment located within Pacific Gas and Electric Company's (PG&E) Metcalf Transmission Substation, ultimately damaging 17 transformers. These individuals also cut nearby fiber-optic telecommunication cables owned by AT&T and Level Three Communications. In response to the attack, the Federal Energy Regulatory Commission (FERC) directed the North American Electric Reliability Corporation (NERC) to develop new physical security requirements, resulting in the creation of CIP-014.

At the state level, Senator Jerry Hill authored SB 699 (2014), directing the CPUC to "consider adopting rules to address the physical security risks to the distribution systems of electrical corporations." In response to SB 699, the CPUC's Safety and Enforcement Division, Risk Assessment and Safety Advisory Section (RASA) prepared a white paper proposing a new requirement for investor-owned utilities (IOUs) and publicly owned utilities (POUs) to develop security plans that would identify security risks to their distribution and transmission systems and propose methods to mitigate those risks. The CPUC hosted a series of workshops to better understand the state of utility physical security protections and to seek input on refining their proposal.

In order to support a statewide improvement of how utilities address distribution level physical security risks, the California Municipal Utilities Association (CMUA), which is the statewide trade association for POUs, coordinated with the state's IOUs to develop a comprehensive Straw Proposal¹ (Joint IOU/POU Straw Proposal) for a process to identify at-risk facilities and, if necessary, develop physical security mitigation plans. As a member of CMUA, PWP staff participated in the development of the Joint IOU/POU Straw Proposal through a CMUA working group as well as through direct meetings with the IOUs. The Joint POU/IOU Straw Proposal set out a process for the following: (1) identifying if the utility has any high priority distribution facilities; (2) evaluating the potential risks to those high priority distribution facilities; (3) for the distribution facilities where the identified risks are not effectively mitigated through existing resilience/security measures, developing a mitigation plan; (4) obtaining a third party reviews the mitigation plans; (5) adopting a document retention policy; (6) ensuring a review process established by the POU governing board; and (7) implementing information sharing protocols.

RASA filed a response² to the Joint IOU/POU Straw Proposal that recommended various modifications and clarifications, including a six-step process. Additionally, RASA recommended that the utility mitigation plans include: (1) an assessment of supply chain vulnerabilities; (2) training programs for law enforcement and utility staff to improve communication during physical security events; and (3) an assessment of any nearby communication utility infrastructure that supports priority distribution substations.

¹ Straw Proposal available at:

https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/Safety/Risk_Assessment/physicalsecurity/R1506009-Updated%20Joint%20Straw%20Proposal%20and%20Cover%20083117%20Filing.pdf.

² SED Response available at:

https://www.cpuc.ca.gov/uploadedFiles/CPUCWebsite/Content/Safety/Risk_Assessment/physicalsecurity/Final%20Staff%20Recommendation%20for%20Commission%20Consideration%20010318.pdf.

In early 2019, the CPUC approved Decision (D.) 19-01-018, which adopted the Joint IOU/POU Straw Proposal as modified by the RASA proposal, with additional clarifications and guidance. D.19-01-018 clarified that where there is a conflict between the Straw Proposal and the RASA proposal, then it is the rule in the RASA proposal that controls.³

D.19-01-018 asserted that the POU should utilize the Utility Security Plan process described therein. PWP is following the process and issuing this report at this time to reflect its existing commitment to safety and to protecting its ratepayers' investment by taking reasonable and cost-effective measures in an effort to safeguard key assets of its distribution system.

³ D.19-01-018 at 43, footnote 58 ("Should there be any question of which shall predominate should there be any incongruity or conflict between a utility or SED RASA recommended rule, the SED RASA rule shall apply.").

III. PLAN DEVELOPMENT PROCESS

A. PHYSICAL SECURITY PRINCIPLES

PWP has taken a risk-based approach toward distribution system physical security, with appropriate considerations of resiliency, impact, and cost. This approach, consistent with the Joint IOU/POU Straw Proposal, identified several principles to guide the development of PWP's security plan. These principles are the following:

1. Distribution systems are not subject to the same physical security risks and associated consequences, including threats of physical attack by terrorists, as the transmission system.
2. Distribution utilities will not be able to eliminate the risk of a physical attack occurring, but certain actions can be taken to reduce the risk or consequences, or both, of a significant attack.
3. A one-size-fits-all standard or rule will not work. Distribution utilities should have the flexibility to address physical security risks in a manner that works best for their systems and unique situations, consistent with a risk management approach.
4. Protecting the distribution system should consider both physical security protection and operational resiliency or redundancy.
5. The focus should not be on all Distribution Facilities, but only those that risk dictates would require additional measures.
6. Planning and coordination with the appropriate federal and state regulatory and law enforcement authorities will help prepare for attacks on the electrical distribution system and thereby help reduce or mitigate the potential consequences of such attacks.

B. Utility Security Plan Development Process

PWP utilizes a multi-step process to develop a Security Plan that is consistent with the Joint IOU/POU Straw Proposal and D.19-01-018. The relevant six steps of that process are the following:

STEP 1: ASSESSMENT/PLAN DEVELOPMENT

PWP prepares a Draft Utility Security Plan through the process set forth in Steps 1A, 1B, and 1C.

STEP 1A: IDENTIFY COVERED DISTRIBUTION FACILITIES

PWP evaluates all distribution-level facilities in its service territory that are subject to its control to determine if any of these facilities meet D.19-01-018's definition of a "Covered Distribution Facility" using the seven factors identified in the Joint IOU/POU Straw Proposal.

STEP 1B: PERFORM RISK ASSESSMENT

For every individual Covered Distribution Facility identified pursuant to Step 1A, PWP performs an evaluation of the potential risks associated with a successful physical attack on that facility, and whether existing grid resiliency, back-up generation, and/or physical security measures appropriately mitigate identified risks.

STEP 1C: DEVELOP MITIGATION PLAN

If there are any individual Covered Distribution Facilities where the Risk Assessment performed pursuant to Step 1B finds that the existing mitigation and/or resiliency measures do not effectively mitigate the identified risks, then PWP will develop a Mitigation Plan for that Covered Distribution Facility. The Mitigation Plan will use a risk-based approach to select reasonable and cost-effective measures that can either be security focused (e.g., walls or alarms) or resiliency focused (e.g., adequate spare parts).

STEP 2: INDEPENDENT REVIEW

For every Utility Security Plan cycle, PWP will document the results of the identification process, risk assessment, and Mitigation Plan development performed pursuant to Steps 1A, 1B, and 1C. This documentation in combination with narrative description in Section IX, constitutes PWP's Draft Utility Security Plan. The Draft Utility Security Plan is submitted to a Qualified Third Party for Independent Review. The Qualified Third-Party Reviewer will then issue an evaluation that identifies any potential deficiencies in the Draft Utility Security Plan as well as recommendations for improvements. PWP will then modify its plan to address any identified deficiencies or recommendations or will document the reasons why any recommendations were not adopted. The combination of the Draft Utility Security Plan, the non-confidential conclusions of the Qualified Third Party Reviewer, and PWP's responses to the Qualified Third Party Review will constitute PWP's Utility Security Plan.

STEP 3: VALIDATION

PWP will submit its Utility Security Plan to a qualified authority for review. Such entity will provide additional feedback and evaluation of PWP's Utility Security Plan and, to the extent that this entity is authorized, such entity deems the Utility Security Plan as adequate.

STEP 4: ADOPTION

PWP's Utility Security Plan will be presented to and adopted by Pasadena City Council at a public meeting.

STEP 5: MAINTENANCE

PWP will refine and update the Utility Security as appropriate and as necessary to preserve plan integrity.

STEP 6: REPEAT PROCESS

PWP will repeat this six-step process at least once every five years.

IV. IDENTIFICATION OF COVERED DISTRIBUTION FACILITIES (STEP 1A)

As described in Section III, Step 1A of the Utility Security Plan process involves assessing all distribution-level facilities that are subject to the control of PWP to determine which facilities are "Covered Distribution Facilities" subject to the need for a risk assessment. This Section describes the factors that PWP used to evaluate its distribution facilities and the results of its evaluation.

A. IDENTIFICATION FACTORS

The Joint IOU/POU Straw Proposal defines seven screening factors to determine if a facility is a "Covered Distribution Facility." Some factors require additional definitions and/or clarifications in order to be applied to PWP's facilities. The following Table provides the Joint IOU/POU Straw Proposal's Factors as modified/clarified by PWP.

Table IV-1: Identification Factors

Factor	Joint IOU/POU Straw Proposal Description	Additional Clarification
1	Distribution Facility necessary for crank path, black start or capability essential to the restoration of regional electricity service that are not subject to the California Independent System Operator's (CAISO) operational control and/or subject to North American Electric Reliability Corporation (NERC) Reliability Standard CIP-014-2 or its successors	PWP identified one distribution facility that may be utilized –if necessary- as a crank path in order to black start PWP generators at the Power Plant. This facility is not subject to CAISO's control. Furthermore, CIP-014-2 is not applicable to any of PWP facilities.
2	Distribution Facility that is the primary source of electrical service to a military installation essential to national security and/or emergency response services (may include certain airfields, command centers, weapons stations, emergency supply depots)	City of Pasadena does not house any military facility whether it is for the state or national army.
3	Distribution Facility that serves installations necessary for the provision of regional drinking water supplies and wastewater services (may include certain aqueducts, well fields, groundwater pumps, and treatment plants)	An installation provides "regional drinking water supplies and wastewater services" if it is the primary source of drinking water supply or wastewater services for over 15,000 customer accounts for an area with a population of over 100,000.

		PWP provides water services to about 40,000 customers. There are 19 non-regional water installations within the boundaries of Pasadena. These water installations are being served by six different electric PWP distribution facilities. Multiple circuits could be utilized to serve any of these installations. Three out of 19 water facilities could be without power for four (4) hours while the rest of the facilities will stay operational for more than 24 hours. In addition, water installations are interconnected and could support each other. One PWP distribution facility was considered very critical for water facilities in case of prolonged outages.
4	Distribution Facility that serves a regional public safety establishment (may include County Emergency Operations Centers; county sheriff's department and major city police department headquarters; major state and county fire service headquarters; county jails and state and federal prisons; and 911 dispatch centers)	PWP defines "regional public safety establishment" as any of the following: (1) Headquarters of a major police or fire department serving 1.5 million population with at least 1,000 sworn officers; (2) County Sheriff's Department Headquarters; (3) County Emergency Operations Center; (4) County/State Fire headquarters; (5) a California State Prison; (5) a United States Penitentiary; or (6) a Federal Correctional Institute. City of Pasadena has its own Police and Fire departments. Police department has 238 sworn officers stationed only in one building including the 911 Dispatch Center. The Fire department has Eight Stations serving the City of Pasadena and adjacent neighborhoods. No Federal, State or County law enforcement offices are within the borders of Pasadena. One distribution facility was considered as critical for emergency services.
5	Distribution Facility that serves a major transportation facility (may include International Airport, Mega Seaport, other air traffic control center, and international border crossing)	In addition to the facilities listed in the Joint IOU/POU Straw Proposal, PWP defines a "major transportation facility" as any transportation facility that has (1) an average of 600 or more flights per day; or (2) over 50,000 passengers arriving or departing per day. None of the above facilities exists within in the borders of Pasadena. However, PWP serves six LA County Gold Line train stations (none of them is a hub or a major station). Gold Line transports less than 50,000 passengers a day utilizing all of its 27 stations.

6	Distribution Facility that serves as a Level 1 Trauma Center as designated by the Office of Statewide Health Planning and Development.	City of Pasadena serves only one Level 2 Trauma Center (Huntington Memorial Hospital) within its boundaries. No other Trauma Center is within the service area of Pasadena Water and Power. City of Pasadena has its own health department that provide critical services to citizens all year around. These services are essential in fighting the Covid-19 pandemic. No single distribution facility was identified as critical for the operation of Huntington Memorial Hospital since multiple distribution facilities are providing service/back up to the hospital.
7	Distribution Facility that serves over 60,000 meters	None of PWP's Distribution facilities directly serves more than 15,000 customers each. PWP serves approximately 67,000 customers. However, one distribution facility was considered as critical during summer season and for water facilities in case of prolonged outages. The main function of this facility is to distribute power to the other facility. No customers are being served directly from this facility

B. IDENTIFICATION ANALYSIS

In performing this identification analysis, PWP assessed all distribution level facilities under its exclusive control. These consist of nine (9) distribution substations, one (1) receiving station and two (2) combined receiving and distribution substations. PWP is the only entity responsible for operation and maintenance these facilities.

Based on this scope, PWP has identified 12 facilities that are subject to this identification analysis. Of these 12 facilities, three facilities fall within at least one of the categories listed above. These three facilities were evaluated as "Covered Distribution Facilities" per the joint IOU/POU Straw Proposal screening factors and are subject to the need for a risk assessment.

Table IV-2 summarizes the results of PWP's identification analysis. If the final score of any facility is greater than or equal to one (1), then PWP considers this facility as "Covered Distribution Facility." PWP conducted a Risk Assessment analysis for this facility as described in Section V.

Table IV-2: Identification Scores of Covered Distribution Facilities

Substation Name	1. Crank Path, Black Start	2. Military Installation	3. Regional Drinking Water/ Wastewater Services	4. Safety Establishment (Police/ Fire)	5. Transportation Facility	6. Trauma Center Level 1 / Hospitals	7. Over 15,000 Meters	Identification Score
Facility #1								0
Facility #2								0
Facility #3								0
Facility #4								0
Facility #5								0
Facility #6	Yes							1
Facility #7								0
Facility #8								0
Facility #9								0
Facility #10			Yes				Yes	2
Facility #11				Yes				1
Facility #12								0

V. RISK ASSESSMENT (STEP 1B)

A. METHODOLOGY

Pursuant to the process identified in the Joint IOU/POU Straw Proposal and D.19-01-018, PWP will assess the potential risks associated with a successful physical attack on each of the Covered Distribution Facilities identified in Section IV above. For purpose of this analysis, a physical attack is limited to the following: (1) theft; (2) vandalism; and (3) discharge of a firearm. A "successful physical attack" is limited to circumstances where a theft, vandalism, and/or the discharge of a firearm has directly led to the failure of any elements of the Covered Distribution Facility that are necessary to provide uninterrupted service to the specific load identified in Section IV.

In order to perform this risk analysis, PWP evaluates the relative risk that (1) a physical attack on a Covered Distribution Facility will be successful considering the protective measures in place; or (2) that the impacts of a successful attack will be mitigated due to resiliency and other measures in place.

B. MITIGATION MEASURES

D.19-01-018 identifies the specific mitigation measures that a utility should consider when performing this risk analysis. The following table lists these mitigation measures and provides PWP's additional clarifications that are necessary to apply these measures to the PWP's territory.

Table V-1: Mitigation Measures

Measure	D.19-01-018 Description	Additional Clarification
1	The existing system resiliency and/or redundancy solutions (e.g., switching the load to another substation or circuit capable of serving the load, temporary circuit ties, mobile generation and/or storage solutions).	No additional clarification.
2	The availability of spare assets to restore a particular load.	No additional clarification.
3	The existing physical security protections to reasonably address the risk.	DHS personnel surveyed PWP distribution facilities in 2018 and provided a report on each facility. These reports provided commendations and recommendations. PWP launched an upgrade project to improve security facilities at each of the distribution facilities per DHS recommendations.
4	The potential for emergency responders to identify and respond to an attack in a timely manner.	Each facility is evaluated based on the likelihood that a law enforcement officer would generally be able to arrive at the Covered Distribution Facility within 15 minutes of a report from the public of a break-in or attack, or of PWP notifying the law enforcement agency of triggering of an alarm at the facility.

5	Location and physical surroundings, including proximity to gas pipelines and geographical challenges, and impacts of weather.	PWP evaluated this element based on the proximity of the Covered Distribution Facility to populated areas and the extent to which the interior of the facility is shielded from view and access due to walls, vegetation, or other physical obstructions. PWP removed or is in the process of removing vegetation that may facilitate breaching into any of the distribution facility.
6	History of criminal activity at the Distribution Facility and in the area.	PWP evaluated the property crime rates in the immediate vicinity of the Covered Distribution Facility and compared those crimes rates to property crime rates for the county and the state to determine if the area is subject to a higher than average incidence of property related crimes.
7	The availability of other sources of energy to serve the load (e.g., customer owned back-up generation or storage solutions).	Police Department including the 911 dispatch center, Emergency Operation Center and each of the fire stations within the service area of PWP each has a backup generator. Each of the Trauma Center, Cal Tech, the City College, the convention center, and the Rose Bowl has a back-up generator for their critical loads.
8	The availability of alternative ways to meet the health, safety, or security.	No additional clarification.
9	Requirements served by the load (e.g., back up command center or water storage facility).	No additional clarification.

C. RISK ASSESSMENT

Based on the process described in the Joint IOU/POU Straw Proposal and the direction provided in D.19-01-018, PWP has determined that of the three Covered Distribution Facilities were identified in Section IV, the existing programs and measures effectively mitigate the risks of a physical attack for the three Covered Distribution Facilities. Due to its criticality in delivering power to City of Pasadena specially during hot weather conditions, PWP included Facility #10 in this assessment even though it is a receiving station only and it was previously assessed as not subject to NERC's standard CIP-014-2. Facility #10 main function is to distribute power to other facilities and not to serve customer loads directly.

This section provides an outline for PWP's methodology to address existing risk in the distribution facilities. The framework will enable PWP to assign an individual score for each of its covered facilities which can later be used to prioritize maintenance activities and capital expenditures in terms of physical security of distribution facilities.

A Security evaluation along with a Resiliency assessment provides the basis for a Risk-based approach, where Resiliency is related to the ability of PWP system/facility to recover from an incident, Security is associated with the present deterrents to prevent an intruder(s)/attacker(s) from breaching the facility. Risk is measured as the combination of these two metrics.

The objective of developing this methodology is to properly identify and rate the security distribution facilities that may represent the greatest risk to the PWP power system. In order to carry out this process and achieve valuable results, accurate and updated data is required.

Even though every component of the electric system will always have an inherited risk of failure, it is essential for PWP to understand the assets risk level, becoming aware if any failures instance is predictable and have reasonable spare parts to service assets in case of failure. Moreover, cost-effective solutions can be implemented in a timely fashion to avoid –forced or unforced- interruptions of service that could negatively impact public or staff safety not mentioning system reliability.

The ranking list will help determine –if necessary- the number of facilities to be addressed each year.

PROCESS

The key steps to develop the algorithm are summarized below:

- Collect, update, and prepare the data for every distribution facility under analysis.
- Assign factors and modifiers for Security Index calculation.
- Compute the security index based on physical and operating conditions.
- Identify and quantify impact and consequences of loss/failure for each facility.
- Calculate Resiliency Index based on loss/failure effects and impacts.
- Compute Risk Index for each covered distribution facility.
- Identify the facilities in the highest risk category.
- Schedule upgrade, retrofit or maintenance work, projecting required funds on annual basis, and preparing Capital Improvement Programs (CIPs).

This methodology can be applied to any distribution facility and the analysis is expected to produce useful results only if accurate and updated system data is utilized, as well as staff knowledge on the system.

1. SECURITY INDEX

Physical Security is accomplished by performing an assessment of the covered facility and the surrounding premises. Security Index is a measure of precautions taken to deter intruders and restrict their visibility or breach into the facilities, including service interruption to critical customers, and adverse impact on the safety of the public and PWP staff.

The Security Index can be explained as the numerical representation of the facility importance for normal system operation, and the impact to the system if that facility is lost due an attack, theft or vandalism. This metric remains constant until factors affecting it change. Table V-2 provides details on different factors that impact the calculated security index for each facility as modified/clarified by PWP. For simplicity, each security measure was given an equally-weighted score on 10-point scale based on conditions related to this measure as detailed in the following tables.

Security Index results are shown in Table V-2: Security Index for Covered Distribution Facilities. The Security Index for each covered facility is calculated by subtracting the average score from perfect 10 score.

Measure: Fences/ Walls

Fence/Walls Condition	Score
Chain Link Fence Alone	5 points
Chain Link Fence with Outriggers or Barbed Wire	8 points
Masonry/Brick Wall Alone	8 points
Masonry/Brick Wall with Outriggers or Barbed Wire	10 points

Measure: Gates/ Controlled Entry

Gates Condition	Score
Chain Link Gate Alone	5 points
Metal Gate Alone	10 points

Measure: Vegetation Control / Perimeter Clearance

Vegetation/Perimeter Control Condition	Score
No	0 points
Partially	5 points
Yes	10 points

Measure: Electronic Surveillance

Surveillance Condition	Score
No	0 points
Yes	10 points

Measure: Illumination/Motion Sensors

Illumination Condition	Score
No	0 points
Yes	10 points

Measure: Parking Control/Barriers

Parking Control/Barriers Condition	Score
No	0 points
Partially	5 points
Yes	10 points

Measure: Criminal History in Facility Surroundings

Criminal History Condition	Score
Above Average	0 points
At Average	5 points
Below Average	10 points

Measure: Existing Gas Lines /Location Vulnerability

Existing Gas Lines /Location Vulnerability Condition	Score
Existing Gas Lines / Location is Vulnerable	0 points
Existing Gas Lines / Location is not Vulnerable	5 points
No Existing Gas Lines / Location is Vulnerable	5 points
No Existing Gas Lines / Location is not Vulnerable	10 points

Measure: Required Time for a police car to reach any Substation

Time required for a Police car to reach any Substation Condition	Score
More than 15 minutes	0 points
Within 10 minutes	5 points
Within 5 minutes	10 points

Measure: Presence of Critical Customers

Presence of Critical Customers Condition	Score
Two or more Critical Customers	0 points
One Critical Customer	5 points
No Critical Customers	10 points

2. RESILIENCY INDEX

The Resiliency assessment of electrical facility is associated with its ability of the distribution system to minimize the negative impacts of infrequently occurring adverse events such as a terrorist attack, theft or vandalism. Resiliency Index is a measure of preparations taken to restore operations of the electric system/circuit due to any incident in the distribution facilities, including service interruption to critical customers that may impact on the safety of the public or PWP staff.

The Resiliency Index can be explained as the numerical representation of the facility importance during the operation of electric system, and the impact to the system if that facility is lost due an attack, theft or vandalism. This metric remains constant until factors

affecting it change. Table V-3 provides the factors that impact the calculated resiliency index for each facility as modified/clarified by PWP. For simplicity, each resiliency measure was given an equally-weighted score on 10-point scale based on conditions related to this measure as detailed in the following tables.

Resiliency Index results are shown in Table V-3: Resiliency Index for Covered Distribution Facilities. The Resiliency Index for each covered facility is calculated by subtracting the average score from perfect 10 score.

Measure: Circuit Ties within Substation Services Areas

Ties with Adjacent Circuits from Same Substation	Score
One Tie	5 points
Two Ties	8 points
Three or more Ties	10 points

Measure: Circuit Ties within Adjacent Substation Services Areas

Ties with Adjacent Circuits from Different Substation	Score
One Tie	5 points
Two Ties	8 points
Three or more Ties	10 points

Measure: Availability of Mobile /Free Standing Transformer

Availability of Mobile /Free Standing Transformer	Score
No	0 points
Yes	10 points

Measure: Availability of Back up Generation / Battery Storage to Serve Critical Customers

Availability of Back up Generation / Battery Storage to Serve Critical Customers	Score
No	0 points
Yes	10 points

Measure: Availability of Contracts with Vendors for Engineering Services or Spare Parts

Availability of Contracts with Vendors for Engineering Services and/or Spare Parts	Score
No Contracts for Engineering Services nor Spare Parts	0 points
Availability of Contracts for either Engineering Services or Spare Parts	5 points
Availability of Contracts for both Engineering Services or Spare Parts	10 points

Measure: Availability of PWP Emergency Responders

Availability of PWP Emergency Responders	Score
No	0 points
Yes	10 points

Measure: Availability of Mutual Aid Agreements on Local, State and National Levels

Availability of Mutual Aid Agreements	Score
Local Level	5 points
Local and State Levels	8 points
Local, State and National Levels	10 points

Measure: Ability to Remotely Isolate/ Restore Services

Ability to Remotely Isolate/ Restore Services	Score
None	0 points
Partially	5 points
All equipment	10 points

Measure: Ability to Provide Services Under N-1 Conditions

N-1 Reliability	Score
No	0 points
Partially – Excluding periods of extreme heatwaves	5 points
All Times including periods of extreme heatwaves	10 points

Measure: Presence/Readiness of Backup Dispatch /Command Center

Presence of Critical Customers Condition	Score
No	0 points
Partially	5 points
All Times including periods of emergency state	10 points

Table V-2: Security Index for Covered Distribution Facilities

Substation Name	Fences/ Walls	Gates	Vegetation Control/Perimeter Clearance	Electronic Surveillance	Illumination / Motion Sensors	Parking Controls /Barriers	Criminal History	Gas Lines /Location Vulnerability	Time for PD to reach any Substation	Critical Customers	Security Index
Facility #6	8	6	8	10	10	5	5	5	5	0	3.80
Facility #10	8	8	7	10	10	5	5	5	5	0	3.70
Facility #11	8	8	5	10	10	5	5	5	5	6	3.30

Table V-3: Resiliency Index for Covered Distribution Facilities

Substation Name	Ties Within Substation Service Area	Ties with Circuits from an Adjacent Substation	Mobile /Free Standing Transformer	Back up Generation / Battery Storage	Vendors on Contract (Parts or Services)	PWP Emergency Responders	Mutual Aid Agreements	Ability to isolate/ restore remotely	N-1 Reliability	Backup Dispatch /Command Center	Resiliency Index
Facility #6	10	10	0	0	5	10	10	0	10	10	3.50
Facility #10	10	0	0	0	5	10	10	0	10	10	4.50
Facility #11	10	10	0	0	5	10	10	0	10	10	3.50

3. RISK INDEX

After the Security and Resiliency computation process is finished, a Risk Index for each individual facility is calculated, as follows:

$$Risk\ Index_{Facility\ i} = Security\ Index_{Facility\ i} * Resiliency\ Index_{Facility\ i}$$

Asset management systems usually represent risk calculation in a matrix, where the horizontal and vertical axis represent the Resiliency and Security scores between 1 and 10, respectively. The cells inside the matrix are the resulting risk index between 1 and 100, as shown Table V-4.

Table V-4: Distribution Facility Risk Index Matrix (Security x Resiliency)

Security Index	10	10	20	30	40	50	60	70	80	90	100
	9	9	18	27	36	45	54	63	72	81	90
	8	8	16	24	32	40	48	56	64	72	80
	7	7	14	21	28	35	42	49	56	63	70
	6	6	12	18	24	30	36	42	48	54	60
	5	5	10	15	20	25	30	35	40	45	50
	4	4	8	12	16	20	24	28	32	36	40
	3	3	6	9	12	15	18	21	24	27	30
	2	2	4	6	8	10	12	14	16	18	20
	1	1	2	3	4	5	6	7	8	9	10
		1	2	3	4	5	6	7	8	9	10
		Resiliency Index									

After performing the risk calculation, the covered distribution facilities under analysis are grouped in categories based on their risk scores, as depicted in Table V-5.

Table V-5: Risk Categories

Description	Color	Risk Index Interval
Very High Risk Facility	Red	76-100
High Risk Facility	Brown	50-75
Medium Risk Facility	Yellow	26-50
Low Risk Facility	Green	1-25

Facilities inside the red category of the Risk Matrix –if any- will be addressed first. Covered Facilities are listed Table V-6.

Table V-6: Risk Index for Covered Distribution Facilities

Substation Name	Resiliency Index "A"	Security Index "B"	Risk Index (A x B)	Overall Physical Security Result
Facility #6	3.50	3.80	13.30	Low Risk Facility - Passed
Facility #10	4.50	3.70	16.65	Low Risk Facility - Passed
Facility #11	3.50	3.30	11.55	Low Risk Facility - Passed

Finally, replacement rates and schedules need to be defined, to prepare a respective Capital Improvement Program (CIP). The risk tracking approach for asset replacement is essential to mitigate failure of aging infrastructure. It also requires considerable funding, which is why a utility must wisely choose an appropriate upgrade/replacement rate based on available resources, but also considering needs for maintaining safe and reliable energy supply for its customers.

According to the results displayed in Table V-6, the Covered Distribution Facilities (#6, #10 and #11) have existing mitigating measures sufficient to effectively mitigate the identified risks of a physical attack, theft or vandalism. Furthermore, the security mitigation measures are considered for an upgrade for each of PWP facilities including the above three covered facilities as discussed in Section VI.

VI. DISTRIBUTION FACILITIES UPGRADE/REPLACEMENT PLANS (STEP 1C)

Pursuant to the process identified in the Joint IOU/POU Straw Proposal and D.19-01-018, PWP has determined that for the Covered Distribution Facilities that are subject to PWP's control, the existing mitigation measures do effectively reduce the risk of a physical security attack. This section of the Plan briefly describes the proposed additional upgrade and/or replacement projects for each of the Covered Distribution Facilities.

Table VI-1: Security Mitigation Projects

#	Facility Name	Estimated Completion for Proposed Projects	Scope of Project
1	Facility #10	FY2022	1. Add a keypad entry to control house 2. Add lights point upward to distract attackers 3. Enhance fencing and lighting at the south west corner of the facility
2	Facility #6	FY2023	1. Enhance or add more padlocks to the facility gates 2. Enhance the fencing at the west side of the facility 3. Add the privacy screens wherever missing
3	Facility #11	FY2024	1. Control/trim vegetation on the west side of the facility 2. Enhance the fencing of existing walls at the west side of the facility

VII. INDEPENDENT EVALUATION AND RESPONSE (STEP 2)

A. REQUIREMENTS FOR A QUALIFIED THIRD-PARTY REVIEW

D.19-01-018 specifies the following criteria for a Qualified Third-Party Reviewer:

Independence: A Qualified Third-Party Reviewer cannot be a division of the POU. A governmental entity can select as the third-party reviewer another governmental entity within the same political subdivision, so long as the entity has the appropriate expertise, and is not a division of the POU that operates as a functional unit, i.e., a municipality could use its police department as its third-party reviewer if it has the appropriate expertise.

Adequate Qualifications: A Qualified Third Party Reviewer must be an entity or organization with electric industry physical security experience and whose review staff has appropriate physical security expertise, which means that it meets at least one of the following: (1) an entity or organization with at least one member who holds either an ASIS International Certified Protection Professional (CPP) or Physical Security Professional (PSP) certification; (2) an entity or organization with demonstrated law enforcement, government, or military physical security expertise; or (3) an entity or organization approved to do physical security assessments by the CPUC, Electric Reliability Organization, or similar electrical industry regulatory body.

B. IDENTIFICATION OF THIRD-PARTY REVIEWER

PWP has selected Cooper Compliance Corporation as its Third-Party Reviewer. Cooper Compliance has staff members who qualify to conduct security plan reviews per requirements and qualifications stated above.

The Third-Party Reviewer served as the Nuclear Weapons Safety Officer and Nuclear Weapons Security Officer for a nuclear-powered strategic missile submarine from 1998 through 2001. In those roles, he was responsible for ensuring the entire ship's security, and conducted assessments of threats and deployed personnel as needed to mitigate any perceived threats. He conducted staff training and qualifications for armed security personnel and coordinated his ship's security with other entities.

He gained additional physical security threat mitigation training and experience when stationed aboard a nuclear-powered attack submarine from 1992 through 1995, which made numerous overseas port calls, including Saudi Arabia, United Arab Emirates, Bahrain, Singapore, Australia, and Canada.

Additionally, he conducted physical security and threat assessment reviews for a fleet of 30+ gas turbine power plants across the US and Canada over the last several years (2017-2020).

Most recently, he conducted a similar CPUC Security Plan review for the City Of Glendale.

C. PUBLIC RESULTS OF THIRD-PARTY EVALUATION

An independent evaluation was conducted by Cooper Compliance. He found the assessment methodology to be sufficient and the results to be accurate and consistent with good industry practices for physical security of critical infrastructure.

The reviewer commended PWP on the amount of preparation and research above and beyond what was required for this plan. He noted that it was obvious that PWP had taken physical security and the resiliency of their system seriously for many years, and not just in response to CPUC's decision.

D. PWP RESPONSE

PWP accepts the evaluation results provided by the independent third-party evaluator.

VIII. VALIDATION (STEP 3)

A. SELECTION OF A QUALIFIED AUTHORITY

PWP selected the Pasadena Police Department (PPD) as the qualified authority by contacting and screening various sections within the department to find a suitable candidate. The PPD assigned the Counter Terrorism Unit (CTU) supervisor to review and validate this Plan. The selection was based on the supervisor's expertise and knowledge of physical security and security based environmental design.

B. RESULTS OF THE QUALIFIED AUTHORITY REVIEW

PWP and PPD staff toured 11 out of 12 facilities and conducted inspections of current physical security measures and designs. The inspection included the current configuration of security cameras, fencing, ingress and egress points and overall security design.

PPD validated the Plan and provided minor recommendations to complete repairs to enhance existing fencing, add additional locking devices, perimeter lighting and cameras, and numeric keypads to access critical areas/buildings depending on the criticality of each the "Covered Distribution Facilities."

C. PWP RESPONSE TO THE QUALIFIED AUTHORITY REVIEW

PWP accepts PPD's recommendations and is currently in the process of implementing them. A list of recommended enhancements is provided in Section VI.

PWP is committed to refining, maintaining and updating this Plan -as necessary- in compliance with CPUC requirements to preserve plan integrity and purpose. This security plan shall be concurrent with and integrated into utility resiliency plans and activities.

IX. NARRATIVE DESCRIPTIONS FOR UTILITY SECURITY PLAN

The CPUC order has additional requirement that the utility mitigation plans must include: a detailed narrative explaining how the utility has:

- A. An asset management program to promote optimization and quality assurance for tracking and locating spare parts stock, ensuring availability and the rapid dispatch of available spare parts;
- B. A robust workforce training and retention program to employ a full roster of highly-qualified service technicians able to respond to make repairs in short order throughout a utility's service territory using spare parts stockpiles and inventory; and,
- C. A preventative maintenance plan for security equipment to ensure that mitigation measures are functional and performing adequately.

A. ASSET MANAGEMENT PROGRAM

Asset Management is the foundation of many risk management frameworks. PWP currently utilizes an asset management application developed by DNV-GL, a global quality assurance and risk management company, called Cascade. Cascade is a software solution for achieving asset performance management objectives. Cascade provides PWP with a focused solution for risk management, predictive maintenance and other asset management activities that maximize equipment lifetimes.

This asset management program helps PWP in tracking and locating spare parts stock, ensuring availability and the rapid dispatch of available spare parts of substation security equipment. Having an informed understanding of the performance, configuration, and capabilities of each substation (and the supported feeders of course) across the complete lifecycle of PWP assets will improve not only our operational awareness but each of the substation's security stance too. The asset management program helps PWP identify the risks earlier for better asset maintenance and replacement cycles.

PWP monitors the operational condition of its security systems and does timely repairs if a problem occurs. The security systems are upgraded as technology improves using the latest security standards based on the assessment and recommendations of security experts. A PWP information security officer administers the security systems plan that includes backups, staff training, user administration.

B. WORKFORCE TRAINING AND RETENTION PROGRAM

One key role of the City of Pasadena Human Resources Department (HR) is to help PWP find the qualified workers we need. HR offers services that may include electronic job orders and job fairs, use of private interview space, background checks and customized screening, and regular referrals of qualified candidates. City of Pasadena works mainly with Government Jobs to find

diverse candidates – such as youth, older workers, individuals with disabilities, and other untapped sources of workers.

The following paragraphs summarize Recruitment, Training and Retention Activities and Programs as conducted by the City of Pasadena.

Recruitment

The following are the most common steps taken by City of Pasadena during the hiring process of new employees. It is a step-by-step process for hiring a new employee, whereby PWP identifies its talent needs, recruits from its talent pool and eventually hires the most qualified candidates.

1. Identify the hiring need
2. Write/Update the job description
3. Advertise and Recruit the Position
4. Review Applications and Initial Screening
5. Interviews and Applicant Assessment and Selection
6. Background and Reference checks
7. Hiring Best Qualified Candidate(s)

Training, Education and Up-Skilling

Building the skills and competencies of PWP workforce is essential to ensuring the swift and effective response to make (emergency) repairs in short order throughout PWP's service area using available spare parts and inventory. PWP recognizes that training for individuals must align with the needs of its business in the electric industry. Here are several ways that PWP supports this need for training to its workforce:

- Provides access to training and education programs for all employees. The programs are available through universities, colleges and trade or technical schools; LA Trade Tech through the Apprenticeship Program is a good example.
- Offers tuition reimbursement to qualified programs and certifications (not covered in programs mentioned above in the previous point) to further their education by sharing the expenses with them.
- Provides a formally approved apprenticeship Programs in Dispatching, Electronics/communications, Electrical/Meter Test, Electrical Construction and Electrical Distribution for interested staff to become a Test Technician or Electrical Mechanic or Electrical Distribution Mechanic. The Power Plant established a new apprenticeship program that attracted hundreds of interested applicants. All apprenticeships are State certified/Union certified.
- New employees are offered shadowing and cross training with a mix of instruction and on-the-job training.
- PWP provides updated procedure manuals/desk reference materials/task manuals for key positions and ongoing training.
- PWP offers two Leadership programs thru Woodbury University and SCPPA

Retention

The success or failure of any organization is increasingly determined by its ability to keep its best people. Therefore, building the skills and competencies of PWP workforce may not enough to retain these highly skilled employees. To overcome this obstacle, PWP took tangible steps in that direction:

- Publish the existing succession plan (career plan) to provide a clear path for career development and advancement.
- Continuously adjust employee compensation to insure competitiveness with comparable positions across the electric industry. PWP also offers extra incentive (pay) for certifications (crane operators/welders) for skills that are above job duties but benefit the utility.
- Periodically recognizes outstanding employees and offer awards/certificates of appreciations
- Provide a constructive annual performance evaluation that highlights achievements and goals for individual development.
- Provides (refresher) training services to incumbent workers and developing on-the-job and workplace training
- Supporting employee retention by offering services such as mentoring programs to individuals engaged in training

C. PREVENTATIVE MAINTENANCE PLAN

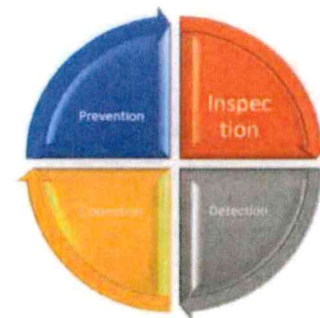
PWP defines Preventive Maintenance (PM) as a systematic approach to Power Delivery (PD) operations to predict and prevent equipment failures before they occur. To accomplish this goal, PD crew members conduct routine inspections, maintenance and repairs on assets to ensure they work as the manufacturer intended. This allows crew members to focus more on capital or time-sensitive projects and less on reactive maintenance activities.

The PM programs aims to extend the asset lifecycle, enhances efficiency and keep people and assets safe from harm. PWP benefits from the PM program in many ways but not limited to:

- Reduction of excess depreciation of equipment
- Prevention of early breakdowns of critical equipment
- Deferring Capital Investments by extending the useful life of assets

PWP Preventive Maintenance Activities

PWP has a proactive approach towards preventive maintenance and conducts the following activities: *inspection*, *detection*, *correction* and *prevention*. Here how PWP conducts each activity in its preventive maintenance program.



1. **Inspection:** Scheduling and conducting regular inspections are necessary parts of our preventive maintenance program. Inspections ensure that equipment is safe, help prevent workplace injuries and protect PWP property. Inspections ensure that equipment is functioning as the manufacturer intended.
2. **Detection:** Preventive maintenance helps PWP detect problems early, when issues are still relatively easy and inexpensive to fix. Operating on a run-to-failure approach should not be an option for PWP. This may end up costing PWP substantial capital dollars.
3. **Correction:** PWP takes a proactive approach towards equipment care and correct issues before they occur. If an issue (or potential issue) is detected, staff take steps to promptly address the problem before it worsens or shuts down operations. For example, Staff repair and replace any defective equipment parts before failure or they can adjust controls for optimal performance and/or energy efficiency.
4. **Prevention:** Facility managers can combine inspection records and maintenance notes to learn from past mistakes and correct repeated issues with equipment. Prevention of asset failure reduces stress and increases productivity for facilities teams. When equipment works as inspected, staff can focus on proactive (rather than reactive) maintenance tasks. Cleaning assets and lubricating moving parts will reduce the wear-and-tear for example.

Preventive Maintenance

PWP's time-based preventive maintenance approach involves setting up a schedule to perform regular inspections on pieces of equipment, especially those that would have a severe impact on production in the event of a breakdown. Maintenance and replacements are "condition-based" maintenance which means an asset is repaired or replaced based on the findings of the time-based inspection programs. Currently, PWP plans to utilize the existing asset management software (Cascade) to do the following:

- **Use a work order and PM scheduling module to create recurring PM tasks.**
Assign work orders to specific crew and receive automatic reminders of upcoming preventive maintenance tasks.
- **Upload asset documentation, receipts and proper O&M manuals for future reference.**
Cascade is capable to upload and store any document, including O&M manuals, warranty information, receipts and as-built for commissioning reports.

Here are a few examples to illustrate of PWP time-based preventive maintenance:

1. "Inspect Gates/Fences/perimeter lighting once a month"
2. "Inspect and lubricate surveillance cameras once a year"
3. "Inspect vegetation around substations once a year"

-END-