PUBLIC UTILITIES COMMISSION
505 VAN NESS AVENUE
SAN FRANCISCO, CA 94102-3298

Dale Donmoyer, General Manager
Delta Energy Center
1200 Arcy Lane
Pittsburg, CA 94565
Dale.Donmoyer@calpine.com

June 13, 2018

SUBJECT: **General Order (GO) 167 Audit of Delta Energy Center**
Audit Number GO167-1026

Dear Mr. Donmoyer:

The Electric Safety and Reliability Branch (ESRB) of the California Public Utilities Commission (CPUC) has completed and enclosed the audit report for the 2018 Delta Energy Center (Delta) audit that was conducted from February 12 through 16, 2018.

On December 22, 2017, ESRB notified Delta of the audit and requested pertinent documents that included operation procedures such as lock-out tag-out, confined space entry, and emergency response procedures, as well as maintenance records. ESRB's initial data request is included in the Appendix of the Audit Report. Prior to the start of the onsite audit, ESRB reviewed the submitted documents.

During the audit, ESRB observed plant operations, inspected facility and equipment, reviewed additional data, and interviewed plant staff. After the audit, ESRB requested and reviewed more data. From these activities, ESRB evaluated whether the plant complies with GO 167 requirements and identified violations requiring corrective actions as listed in Section II of the Audit Report.

Please provide a written response within 30 days of your receipt of this letter, indicating the corrective actions and preventive measures taken and/or planned to address the violations and observations noted in the report to ensure compliance with GO 167 requirements. The response should include a Corrective Action Plan (CAP) for all findings listed in Section II with a description and completion date of each remedial action and preventive measure completed within 30 days. For any outstanding items not completed within 30 days, please provide the projected completion dates of the actions that Delta plans to finish within 90 days to achieve full compliance with GO 167. The response should also include preventive measures that Delta plans to implement in order to prevent a reoccurrence of the violations listed. If you believe the audit report contains factual or other errors, you may discuss those in your response.

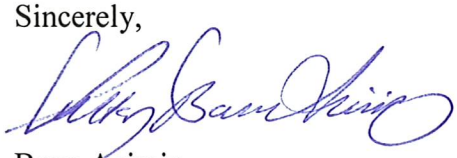
Please submit your response electronically to Chris Lee (chris.lee@cpuc.ca.gov). After ESRB reviews your response, the audit team may set up a meeting with you for further discussions.

Please note that although Delta has been given 30 days to respond, Delta has a continuing obligation to comply with all applicable requirements of General Order 167. The 30-day period does not alter this continuing duty.

If you wish to make a claim of confidentiality covering any of the information in the Audit Report, please submit a confidentiality request pursuant to Section 15.4 of General Order 167, using the heading "General Order 167 Confidentiality Claim." Please send the request to Anand Durvasula (Anand.Durvasula@cpuc.ca.gov) of our Legal Division, with a copy to Chris Lee and me.

Thank you for your courtesy and cooperation throughout the audit process. Please contact Chris Lee at (415) 703-1323 for further questions or additional information.

Sincerely,



Banu Acimis
Program and Project Supervisor
Electric Safety and Reliability Branch
Safety and Enforcement Divison

Attachment:
2018 Audit Report of Delta Energy Center

Cc:
Elizaveta Malashenko, CPUC
Lee Palmer, CPUC
Charlotte TerKeurst, CPUC
Rick Tse, CPUC
James Miller, CPUC
Lana Tran, CPUC
Andie Biggs, CPUC
Mina Botros, CPUC
Chris Lee, CPUC
Anand Durvasula, CPUC
Avis Kowalewski, Calpine

2018 Audit of *Delta Energy Center*

June 2018

STAFF REPORT

PREPARED BY: ELECTRIC SAFETY AND RELIABILITY BRANCH
SAFETY AND ENFORCEMENT DIVISION

Edmund G Brown, Jr., Governor

Table of Contents

I. Introduction....3
II. Findings Requiring Corrective Action....3
Finding 1 – Delta's safety orientation video is not up-to-date.... 3
Finding 2 – Delta fails to mark and identify its secondary and alternate assembly points.... 4
Finding 3 – The Plant's security camera does not adequately monitor the plant's perimeter.. 6
Finding 4 – Delta fails to recognize and repair equipment defects.... 6
Finding 5 – The Plant fails to maintain proper signage and labeling. 13
Finding 6 – Delta fails to improve its fire suppression system.... 17
Finding 7 – The Plant failed to follow its confined space procedures.... 18
Finding 8 – The Plant failed to retain root cause analysis reports.... 19
Finding 9 – The Plant has not kept its inspection record tags up-to-date.... 19
Finding 10 – The Plant failed to follow proper safety protocols during a lift operation.... 20
Finding 11 – The Plant failed to maintain test labels on two hot sticks. 21
Finding 12 – Delta fails to take proper action to address high pH warnings.... 23
Finding 13 – The Plant failed to keep monthly inspection records for its fire system. 24
Finding 14 – The Plant failed to document completion of overspeed tests for its steam turbine prior to 2015, and did not document the results of overspeed tests done in June 2015 and April 2017.... 25
Finding 15 – The Plant fails to run the necessary tests and to record water chemistry data appropriately.... 25
Finding 16 – The Plant must address a low reading at a cathodic protection test station. 26
Finding 17 – The Plant fails to stow ladders and other equipment appropriately. 26
Finding 18 – The Plant failed to address phosphate buildup at Unit 1's BFP.... 29
III. Observations and Recommendations....31
Observation 1 – Delta's Title IV permit has expired.... 31
Observation 2 – Oil leaks at station service transformers.... 31
Observation 3 – Confined space signs may not be visible.... 32
Observation 4 – The Plant needs to update its list of required training.... 34
Appendix – CPUC-Requested Documents....35

I. Introduction

This is the 2018 Audit Report of the Delta Energy Center ("Delta" or "the Plant") prepared by the California Public Utilities Commission's ("CPUC's" or "Commission's") Electric Safety and Reliability Branch (ESRB). ESRB audited the Plant for compliance with Commission General Order (GO) 167, which includes Operation, Maintenance, and Logbook Standards for power plants. GO 167 requires generating asset owners to operate and maintain their power plants in a safe and reliable manner. Electricity is vital to the State's economic well-being and the safety of its residents. Therefore, ESRB enforces GO 167 and conducts compliance audits to ensure electric generation safety and reliability for the State.

On December 22, 2017, ESRB notified Delta of the audit and requested pertinent documents that included operation procedures such as lock-out tag-out, confined space entry, and emergency response procedures, as well as maintenance records. ESRB's initial data request is included in the Appendix of this report. Prior to the start of the onsite audit, ESRB reviewed the submitted documents. ESRB conducted the onsite audit from February 12 through 16, 2018 during which it observed plant operations, inspected facility and equipment, reviewed additional data, and interviewed plant staff. During and after the onsite audit, ESRB requested and reviewed more data. From these activities, ESRB evaluated whether the Plant 1) complies with GO 167 requirements, and 2) could improve its programs, procedures, and policies to enhance safety and reliability.

ESRB identified 18 findings in Section II of the report, which represent potential violations of Operation and Maintenance Standards. These deficiencies can adversely affect reliable operation and present safety hazards to plant staff. ESRB also notes four observations and recommendations in Section III of the report.

II. Findings Requiring Corrective Action

Finding 1 – Delta's safety orientation video is not up-to-date, which is a violation of GO 167, Operation Standard (OS) 4 – Problem Resolution and Continuing Improvement, and OS 8 – Plant Status and Configuration.

Delta designates three assembly points (primary, secondary, and tertiary or alternate) for workers to gather in the event of an emergency evacuation, see Figure 1. However, the safety video makes no mention of the *alternate* assembly point nor its whereabouts. In the event of an emergency, contractor and visitor who are unfamiliar with the site may get disoriented easily. Orienting contractor and visitor correctly is crucial prior to starting work and setting foot onsite, and may mean the difference between life and death. Delta must update its safety video to include the location of its alternate muster point.

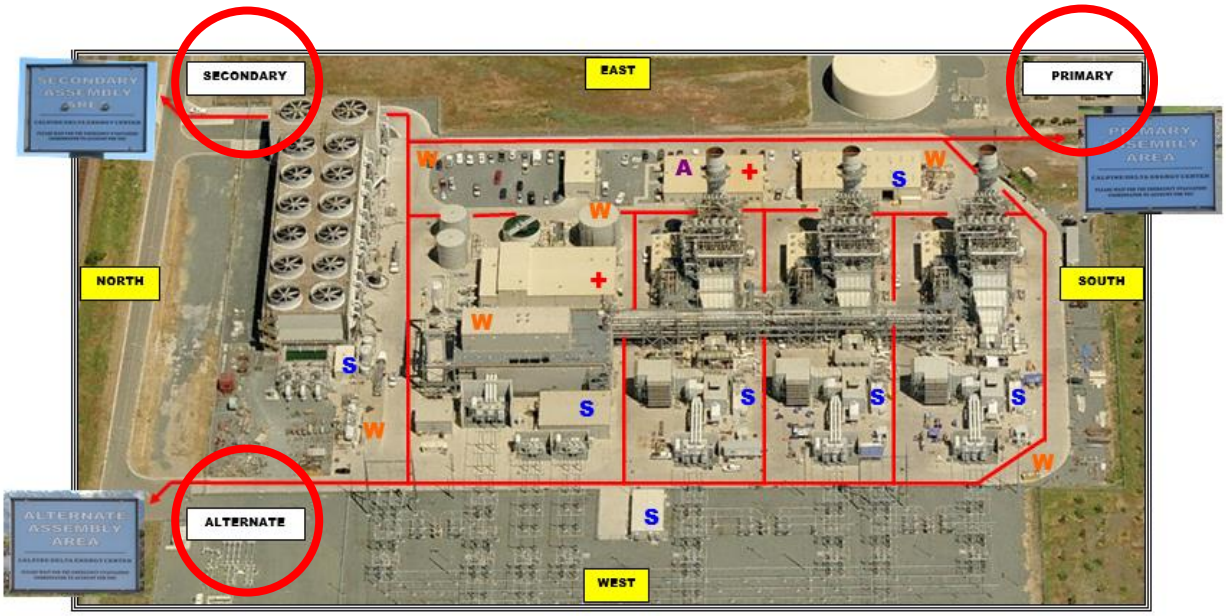


Figure 1: Delta Energy Center's Evacuation Map.

Finding 2 – Delta fails to mark and identify its secondary and alternate assembly points, which is a violation of GO 167, Maintenance Standard (MS) 1 – Safety, OS 1 – Safety, and OS 7 – Operations Procedures and Documents.

While Delta designates three assembly points (primary, secondary, and tertiary or alternate) for workers to gather in the event of an evacuation, only one of the assembly points is clearly marked and identified.

Delta fails to mark and identify both its secondary and tertiary assembly points. At the secondary muster point, the original sign has faded and is no longer readable, see Figure 2.

Figure 2: Faded sign at the secondary muster point on Arcy Lane.

In response, Delta has temporarily labeled the secondary assembly point while it awaits for a permanent sign which is in-ordered, see Figure 3. Delta has provided ESRB with a copy of the Purchase Order for the new sign. Delta must clearly identify both the secondary and the tertiary assembly points with permanent signs. Further, ESRB recommends Delta to erect a directional sign in front of the main entrance gate to direct workers to the secondary assembly point, which is further down the road on Arcy Lane. Without a directional sign, it may be ambiguous where workers should gather as the actual assembly point is at least 300 feet away from the main entrance.

Figure 3: Temporary label at the secondary assembly point on Arcy Lane.

At the tertiary muster point, Delta fails to erect a sign at all, see Figure 4.


Figure 4: Missing sign at the tertiary or alternate assembly area.

Finding 3 – The Plant's security camera does not adequately monitor the Plant's perimeter, which is a violation of GO 167, OS 21 – Plant Security.

The Plant currently has two working security cameras; one each at the front and back gate. While the front gate camera has the ability to pan left and right, the peripheral view is extremely limited. The operator can view only 30 feet to the left of the camera and slightly more to the right of the camera. The back gate camera has a 360-degree view at low resolution. With the two cameras, less than 30% of the plant can be monitored remotely in the Control Room.

Upon further review, ESRB learned that the Plant previously had a third camera on the steam turbine deck, which was destroyed during the January 2017 generator fire. Although the fire incident occurred over one year ago, the plant has not yet replaced the camera. Plant staff informed ESRB that the plant had already ordered Pelco cameras, but discarded the plan while Calpine develops a corporate-wide security upgrade following the Metcalf intrusion incident.[1] Delta stated it is reviewing its Physical Security Standard and the Metcalf intrusion investigation to incorporate best practices to further improve its security. Delta must inform ESRB of its progress on its Security Plan Upgrade as well as its anticipated schedule to replace and/or install additional cameras, particularly the one that was destroyed in the 2017's generator fire.

Finding 4 – Delta fails to recognize and repair equipment defects, which is a violation of GO 167, OS 1 - Safety.

Delta fails to recognize and repair equipment defects that may lead to operational and maintenance errors and affect plant reliability.

First, ESRB observed a faulty temperature gauge[2] on a cooling water discharge line, see Figure 5.

[1] On January 9, 2018, an intruder breached Metcalf Energy Center's security and entered the Plant with weapons. As part of its response, Calpine is reassessing security and examining the need to replace and/or upgrade security cameras across its fleets.

[2] The gauge measures the temperature of the water discharging from the hydrogen cooler. Delta uses hydrogen gas to cool the steam turbine generator coils. The hydrogen in turns circulates through a hydrogen cooler, a heat exchanger, where it dissipates heat to a steady flow of cooling water. Delta monitors the temperature of the water entering and exiting the cooler via these analog temperature gauges.

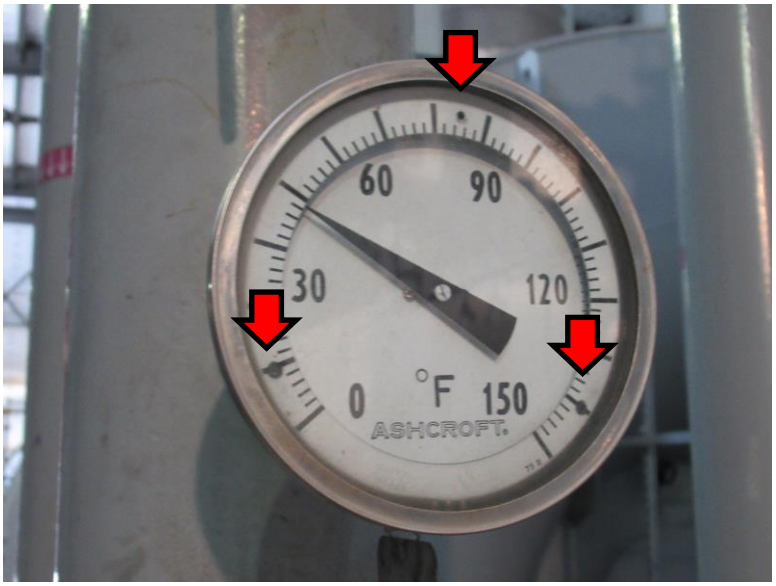


Figure 5: Faulty temperature gauge on a cooling water discharge line.

As shown in Figure 5, the marking plate has detached and is no longer secured to the gauge. Due to equipment vibration, ESRB observed the plate free-spinning inside the gauge. Therefore, the gauge does not provide an accurate reading to operators. Monitoring cooling water temperature is crucial to ensure the generator is adequately cooled and to prevent the generator coils from overheating. In response, Delta generated a Work Order (WO) to replace the defective gauge. Delta must complete the WO in a timely-manner to prevent operational errors.

Second, ESRB observed defective Eye-Hye® drum level gauges in the Control Room, see Figure 6. These gauges provide water level readings in the HRSG drums that are crucial for normal operation. Per ASME Code Section 1 (Part PG-60.1.1), "Boilers having a maximum allowable working pressure exceeding 400 psi shall have *two* gage glasses." While the plant's Digital Control System (DCS) also provides drum level readings on computer displays and digital gauges, both of these readings come from the same feed, see Figure 7. Per the Code, two independent and discrete systems (that continuously measure, transmit, and display water level) must be provided. Therefore, Delta must repair the Eye-Hye® gauges to comply with this ASME requirement.

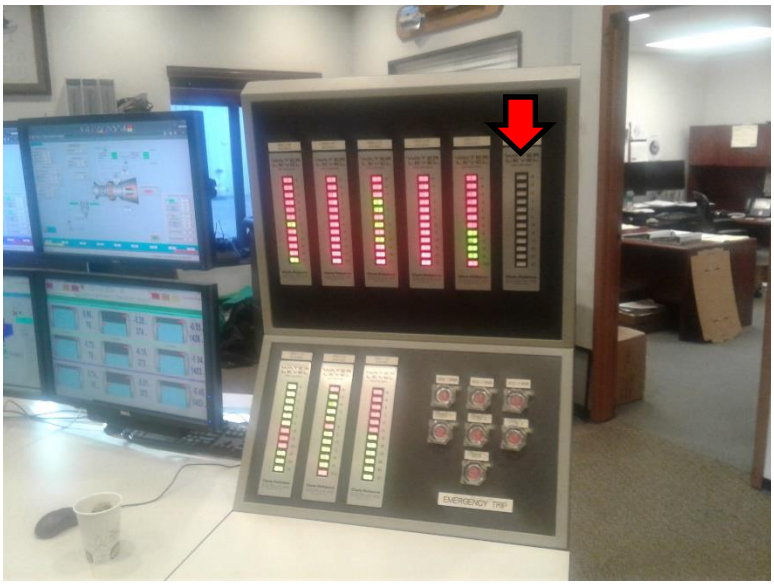


Figure 6: Defective Eye-Hye® drum level gauges in the Control Room.

Figure 7: Delta's DCS provides drum level readings in computer displays and digital gauges.

Third, ESRB observed a metal chain dangling from an overhead valve that was obstructing the walk path, see Figure 8. This is a defect and a safety hazard warranting corrective action as operators can accidentally get caught in the chain and inadvertently hurt themselves or operate the valve. In response, Delta repositioned and secured the chain away from the path, see Figure 9. Delta must inspect Unit 2's and 3's BFPs and do the same to mitigate this hazard.

Figure 8: Dangling chain obstructs walk path at Unit 1's BFP.

Figure 9: Delta repositioned and secured the chain away from walk path.

Forth, ESRB observed fallen insulation blankets on two pressure relief valves. These insulation blankets, in addition to preventing burn risk hazards, are used to minimize heat loss and enhance

thermal efficiency. In response, Delta re-installed the insulation blankets, see Figure 10. Further, ESRB observed the valve tag for 'TB2A' was detached from the valve. Valve tags help operator and maintenance personnel identify the valve and provide crucial data such as the valve's pressure setpoint. In response, Delta rehung the tags, see Figure 11; therefore, the Plant does not need to take any further corrective action.

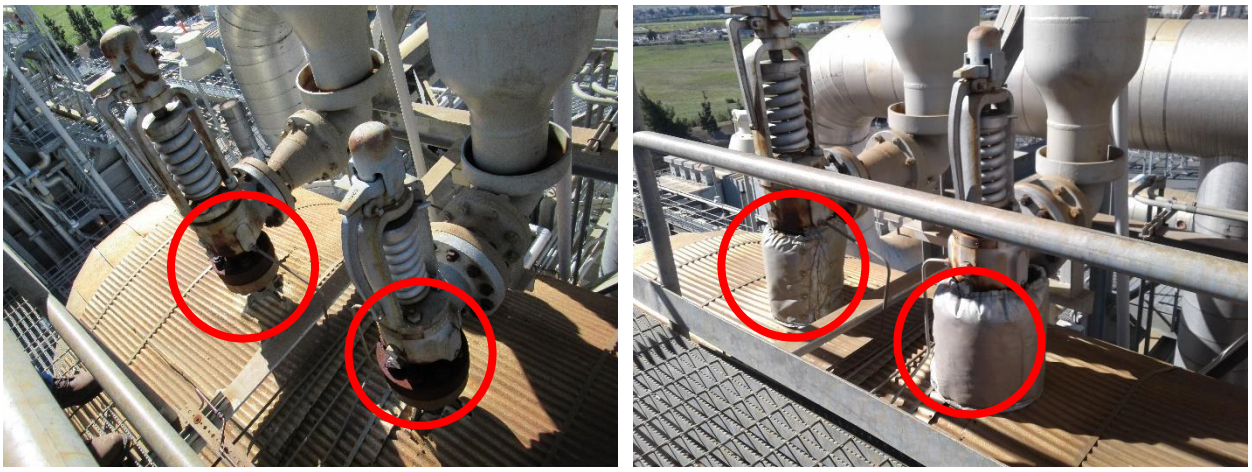


Figure 10: Fallen insulation blankets on two HP steam drum pressure relief valves.

Figure 11: Valve tag detached from PRV TB2A.

Fifth, ESRB observed depleted liquid-filled gauges at the raw water booster pumps, see Figure 12. Liquid gauges are typically filled with glycerin to help dampen vibration and prolong the gauge's life. In response, Delta refilled the gauges with liquid glycerin; therefore, the Plant does not need to take further corrective action.

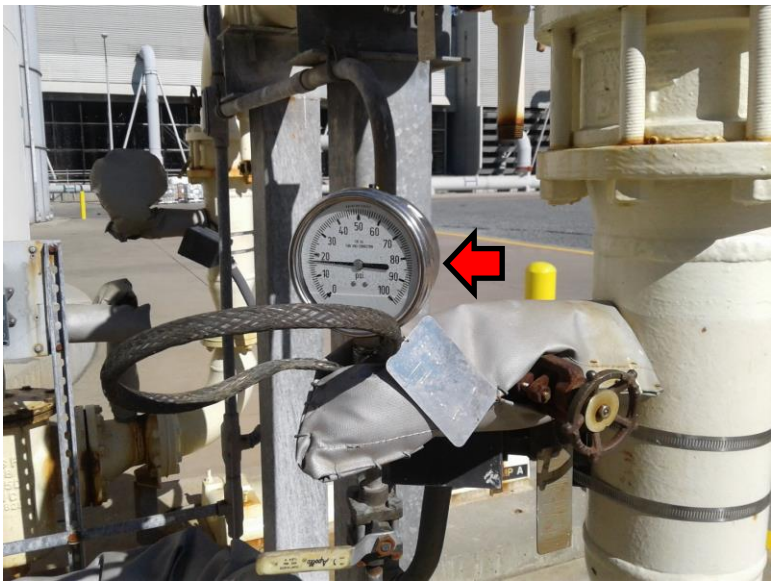


Figure 12: Depleted liquid-filled gauge at the raw water booster pumps.

Sixth, ESRB observed a defective fire extinguisher next to a stairway on the steam turbine deck. Although the extinguisher was last inspected in January 2018, it was not properly charged, see Figure 13.

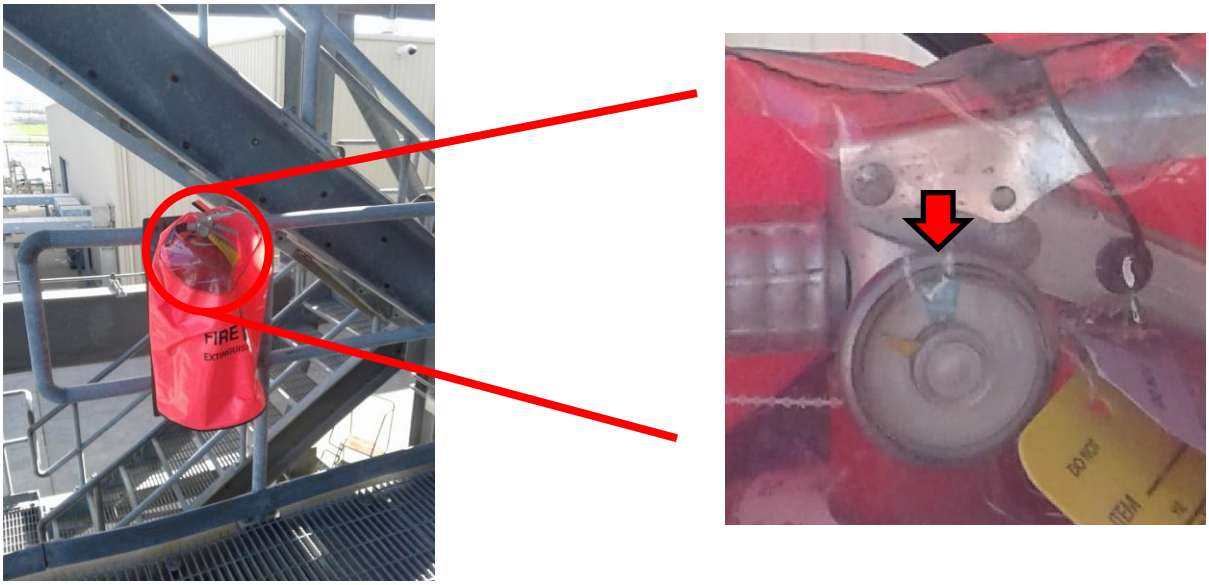


Figure 13: Defective fire extinguisher on the steam turbine deck.

Fire extinguishers are an effective mean to fight incipient fires and must be regularly inspected to ensure they're working properly. In response, Delta replaced the extinguisher with one that was fully-charged; therefore, the Plant does not need to take any further corrective action.

ESRB reviewed additional records and found evidence that the Plant regularly inspected its extinguishers. ESRB also inspected a few other extinguishers, which were fully-charged, freed from defects, and secured with safety pin and temper seal.

Seventh, ESRB observed missing anchor bolts at two locations, see Figure 14. ESRB observed missing bolts at a climb ladder on the containment wall by the cooling tower and missing bolts at a brace support. In response, Delta re-installed the anchor bolts; therefore, the Plant does not need to take further corrective action.

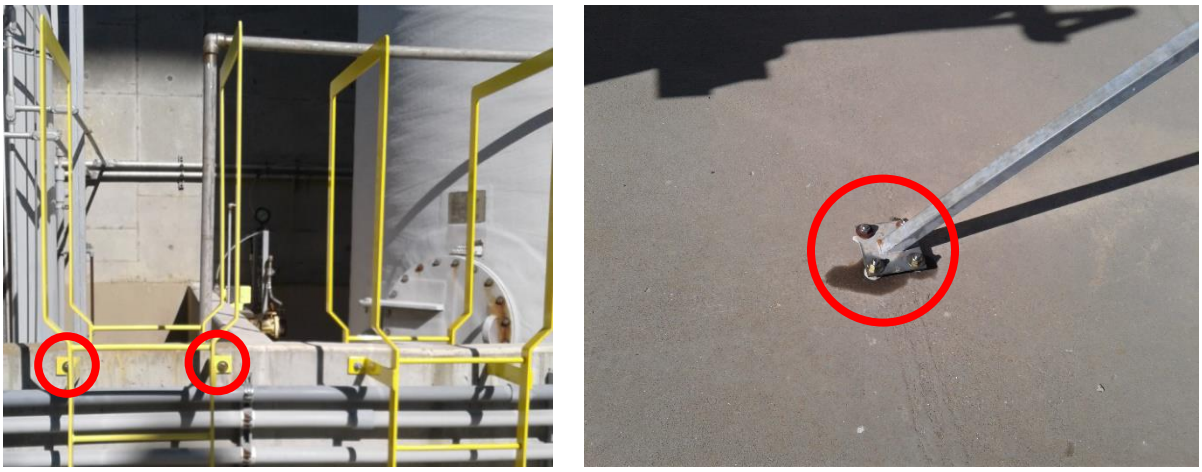


Figure 14: Delta re-installed missing anchor bolts at two locations.

And finally, ESRB observed a torn wind sock by the main entrance, see Figure 15. In response, Delta replaced the torn sock with a new one, see Figure 16; therefore, the Plant does not need to take further corrective action.

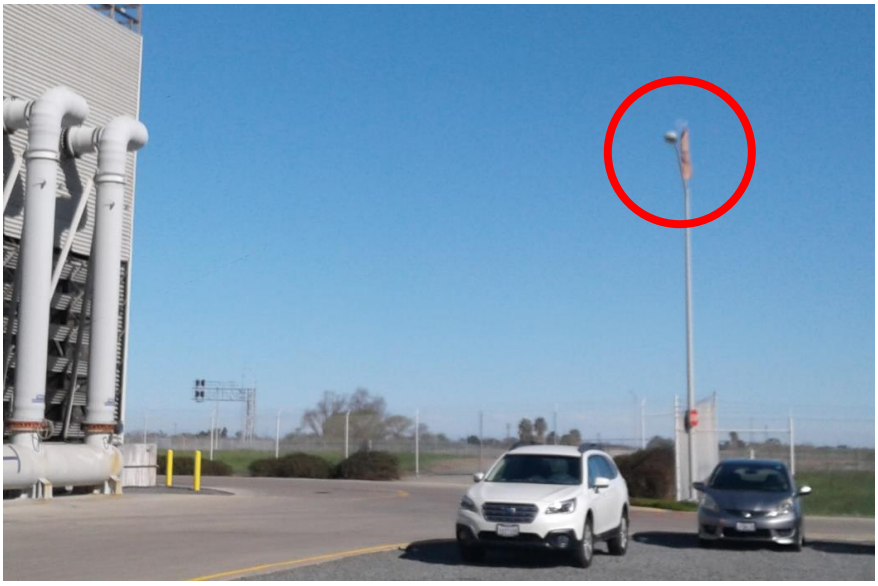


Figure 15: Torn wind sock by the main entrance.

Figure 16: Delta replaced torn wind sock with a new one.

Finding 5 – The Plant fails to maintain proper signage and labeling, which is a violation of GO 167, Section 11.4 – Preservation of Records.

Delta fails to maintain proper signage and labeling to ensure they're secured, legible, and provide adequate notification as intended. ESRB observed faded, partially-peeled, or otherwise illegible labels throughout the plant. Labels help identify equipment and chemical to prevent operational and maintenance errors. For example, ESRB observed partially-peeled labels on chemical storage tanks by the cooling tower, rendering them unreadable and ineffective, see Figure 17.

Figure 17: Partially-peeled labels on two chemical storage tanks.

ESRB also observed faded labels on a suction pipe at the raw water booster pumps, see Figure 18. The labels were intended to provide operators important data regarding the medium and the direction of its flow.

Figure 18: Faded labels on a suction pipe at the raw water booster pumps.

At the generator hydrogen storage area, ESRB observed a faded sign, see Figure 19. Hydrogen is highly flammable. Workers should exercise precautions in the area.

Figure 19: Faded warning sign at the generator hydrogen storage.

At Unit 1's Boiler Feed Pump (BFP), ESRB observed unlabeled pressure gauges, see Figure 20. These gauges provide the pump's suction and discharge pressure readings that are crucial for normal operation. While these gauges are also equipped with digital transducers that provide the same readings to the plant's DCS, outside operators often look at these gauges to reconcile and

identify disparities between the digital and analog readings. The same set of gauges were properly labeled at Unit 2's BFP, see figure 21.

Figure 20: Unlabeled pressure gauges at Unit 1's BFP.

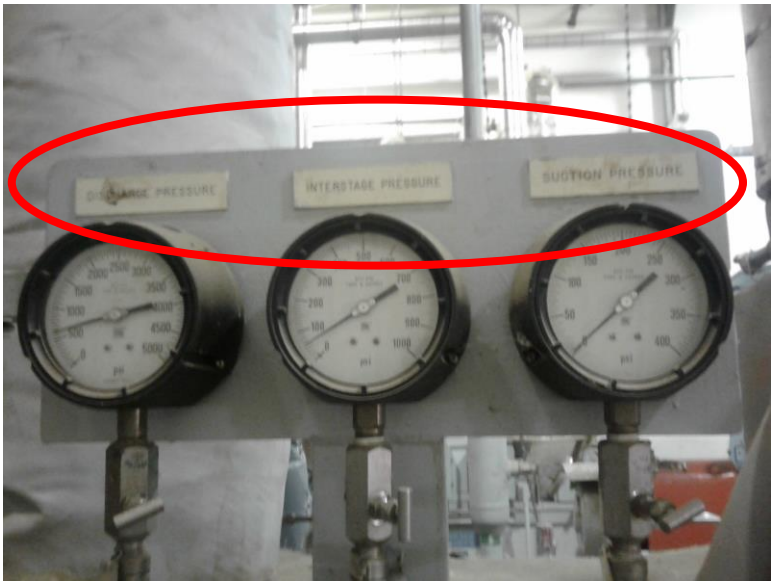


Figure 21: Labeled pressure gauges at Unit 2's BFP.

At Unit 3's gas turbine mechanical package, ESRB observed a fallen and broken switch label, see Figure 22.

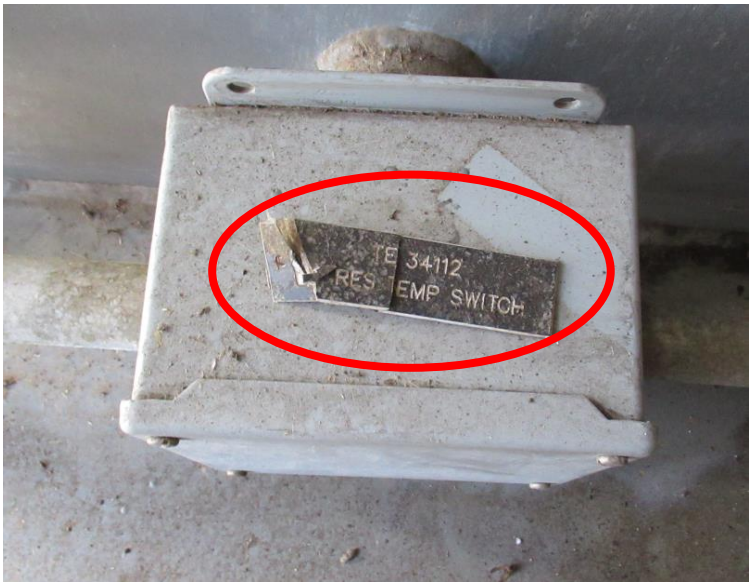


Figure 22: Fallen and broken switch label at Unit 3's turbine package.

Throughout the plant, ESRB observed tattered and faded confined space warning signs, see Figures 23 and 24. Confined space warning signs notify workers of potential hazards and inform workers to obtain proper permit prior to entry.

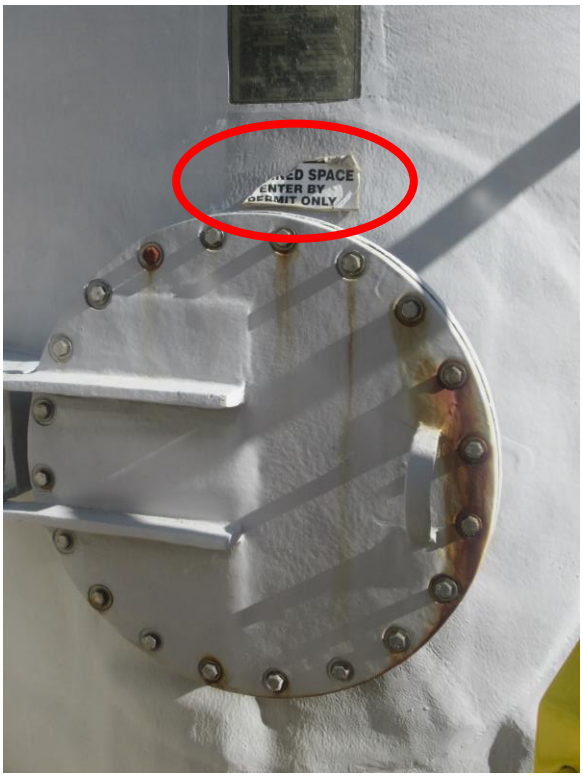


Figure 23: Tattered confined space warning sign at the Sodium Hypochlorite tank.

Figure 24: Tattered and faded confined space warning sign at Unit 1's high pressure steam drum.

In regards to illegible signage and labels, Delta must conduct a plant-wide survey to identify all faded, partially-peeled, or otherwise illegible labels on critical pieces of equipment and re-stencil or relabel them as necessary to prevent operational or maintenance errors. All labeling should withstand their usage environment. If necessary, the Plant should consider applying an over-laminate to protect the printed surface from exposure to sunlight and/or other elements or consider installing Occupational Safety and Health Administration (OSHA)-compliant signs that are more visible and resistant to wear.

Finding 6 – Delta fails to improve its fire suppression system, which is a violation of GO 167, MS 1 – Safety, OS 1 – Safety, MS 11 – Plant Status and Configuration, OS 8 – Plant Status and Configuration.

The May 2016 loss prevention report from Delta's insurer, Global Risk Consultants (GRC), identified recommendations to improve the Plant's fire suppression system. Delta fails to complete the following recommendations:

1) **11-06 Warehouse Sprinkler System.** The report noted that the warehouse's current sprinkler system does not provide detection/protection for storage above 18 feet. The report recommended the plant to lower warehouse storage to 10 feet (or 12 feet if all flammable filters are removed), or otherwise, upgrade the ceiling's sprinkler system. The Plant acknowledged the fire risk and in response lowered its warehouse storage by 3 feet to approximately 15 feet, and committed to address this risk by upgrading its warehouse's sprinkler system. Delta must mitigate this fire risk by either upgrading its sprinkler system, or implementing one of the other options from the GRC report.

2) **14-02 Photoelectric Smoke Detector.** The report recommended Delta to install photoelectric smoke detectors in the Water Treatment Building MCC-1. Delta provided

WO No. 24575386 for the project, for which it still needs to evaluate and send out to bid. Delta must install the detector as recommended to mitigate the fire risk.

3) **14-04 Fire Pump Starting Pressure.** The insurance report noted that the jockey and the electric and diesel fire pumps operate at low starting pressures, which may cause water hammer and can damage underground fire service water mains and fire protection systems. The report indicated that the Plant should make changes by May 2016. Delta provided ESRB work order status for replacing the jockey pump, which requires engineering design change and an MOC (Management of Change). Delta must take proper corrective action to address this potential risk.

4) **16-01 Natural Gas Compressor Building Heat and Gas Detection.** The report recommended heat and gas detection for the Natural Gas Compressor Building, which operates monthly for testing. Delta stated that the project was assigned to WO No. 2457536 and that the work will be contracted out upon evaluation by engineers for an MOC. The Plant must complete this recommendation to address the potential fire risk.

5) **16-02 Reorient Subfloor Smoke Detection in the Control Room.** The smoke detectors in the Control Room subfloor are currently installed facing the wrong direction, and need to be re-mounted. Delta provided WO No. 24575372 for the project, which still needs to be completed.

Delta must provide ESRB its evaluation of these projects and their anticipated completion dates.

Finding 7 – The Plant failed to follow its confined space procedures, which is a violation of GO 167, OS 1 – Safety, OS 7 – Operations Procedures and Documentation, MS 1 – Safety, and MS 8 – Maintenance Procedures and Documentation.

ESRB reviewed Delta's most recent confined space permits for adherence to the following procedures: permit-required, alternate entry, and confined space reclassifications. ESRB also reviewed Delta's quarterly confined space audits for 2017.

ESRB found two instances where the Plant did not document hourly monitoring, as required in the plant's SHS/SHP-18, Confined Space Procedure.[3] Entry Permit 17-064 was missing hourly air monitoring from 9 to11 am, while the entry and exit log showed three entrants were in the confined space during this time. Similarly, Entry Permit 17-063 was missing hourly read at 12:30 pm, while workers were in the confined space. The plant stated that while it did not document the hourly monitoring on the permit itself, it did use air monitoring equipment that monitors continuously and alerts workers when atmospheric conditions reach dangerous levels. Regardless, Delta failed to follow its own procedures to document hourly air monitoring as required.

[3] Delta's SHS/SHP-18 Confined Space Entry Standard at Page 24, effective 1/1/2018

Further, ESRB found several mistakes in the Plant's record-keeping. Entry Permit 17-063 lacked an end-time for the attendant after 2:55 pm. Also, the entry and exit log showed just four entries by two people, when in fact 18 entrants were authorized by the permit. The Plant explained that a third-party contractor served as the attendant on the "hole watch" and recorded the entries and exits in a different space on the form, resulting in over-lapping entries and exits for the same two people. ESRB proposed, and the Plant agreed, to re-train its workers and contractors on its Confined Space Procedures and ensure the correct use of appropriate forms.

Finding 8 – The Plant failed to retain root cause analysis reports, which is a violation of GO 167, Section 11.4 – Preservation of Records.

The Plant preforms Root Cause Analysis (RCA) per Calpine Corporation's Incident Investigation and Prevention Program. Based on information provided, Delta performed multiple RCAs in 2016 and 2017. Other than the RCA report for the January 2017 steam turbine generator fire event, the Plant failed to provide copies of RCAs performed in 2016 and 2017. Delta explained that several reports conducted in 2016 and 2017 were stored on a laptop belonging to an employee who was terminated. As a result, the Plant was unable to retrieve the reports. Delta must retain records concerning its operation and maintenance, including RCAs, for at least five years.

Finding 9 – The Plant has not kept its inspection record tags up-to-date, which is a violation of GO 167, Section 15.6 – Compliance with Other Laws, OS 17 – Records of Operation.

The Plant uses tags to record inspection dates for its STG (Steam Turbine Generator) fire system. ESRB inspected control valves inside a fire system cabinet and found most inspection tags out-of-date, see Figures 25 and 26. For example, the STG fire system cabinet had inspection tags dating back to May 5, 2016. Delta explained that it regularly inspects its fire protection system, but its contractor has not kept its inspection tags up-to-date. Inspection tags provide crucial data for operator and maintenance workers at the equipment's physical location. Delta must keep its inspection tags up-to-date.

Figure 25: STG bearing fires system cabinet.

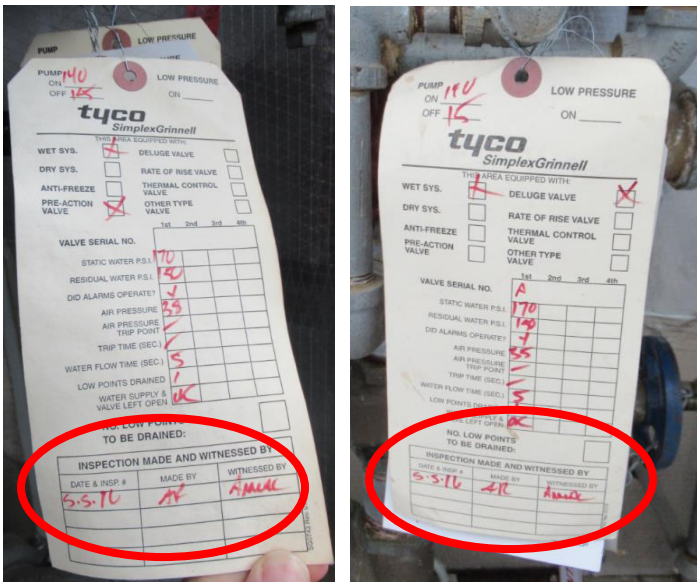


Figure 26: Outdated inspection tags inside the STG fire system cabinet.

Finding 10 – The Plant failed to follow proper safety protocols during a lift operation, which is a violation of GO 167, Section 15.6 – Compliance with Other Laws, OS 15 – Communications and Work Order Meetings.

ESRB observed Delta performed a lift operation without the use of cones or barrier tapes to restrict the lift area, see Figure 27. Such a protocol is crucial in preventing worker's injuries from falling objects. Delta must retrain its workers on its safety procedures and proper lift operations.

Figure 27: Delta performed lift operation without restricting access to the lift area.

Finding 11 – The Plant failed to maintain test labels on two hot sticks, which is a violation of GO 167, MS 1 – Safety, OS 1 – Safety, and OS 7 – Operations Procedures and Documents.

Delta performs functionality test on its equipment, such as hot stick, on a regular basis. Hot sticks are insulated poles (usually made of fiberglass) that workers use when conducting live work on energized conductors (operating switches, tightening nuts and bolts, etc.). As such, hot sticks need to be regularly tested for integrity and dielectric strength to ensure they protect the workers who use them. After testing, a label is affixed on the stick indicating when it was last tested and when it needs to be retested again. ESRB found two hot sticks with wrong test labels.

One label showed an overdue test date, see Figure 28. And another is missing the test date and report number altogether, see Figure 29. Delta explained that the overdue test date was the vendor's recommended test date. The Plant, however, tests the sticks every three years per NFPA 70E. Regardless, wrong and/or missing information on the label can confuse and mislead workers. Workers who use the sticks may not be aware of the 70E requirement and may rely strictly on the test labels. To avoid confusion, Delta must maintain test labels to ensure they are accurate.

Figure 28: Test label showing an overdue test date.

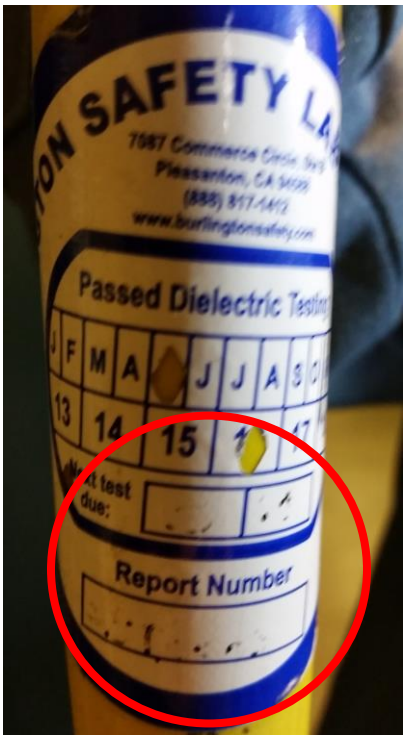


Figure 29: Test label missing test date and report number.

Finding 12 – Delta fails to take proper action to address high pH warnings, which is a violation of GO 167, OS 28 – Equipment and Systems, OS 5 – Operations Personnel Knowledge, and MS 15 – Chemistry Control.

ESRB found evidence of high pH in the boiler feedwater (pH measures acidity or alkalinity of the water). For instance, from January 2 to 7, 2017, the daily log shows a pH that ranged from 11 to 12.1, see Figure 30. The normal range for pH is 9.4 to 9.8. For each excursion, a warning was registered on the log. Yet, ESRB found no evidence that the Plant responded to the warning and the pH continued to be high.

The Plant explained that its protocol for high pH is to decrease the phosphate feed rate, check and/or increase blow down, and to test the water for high silica. However, ESRB did not find evidence that the Plant took any of such actions. An operator explained that the pH is kept higher than normal to prevent corrosion in the pipes.

pH is a critical water chemistry parameter that must be closely monitored. Running at a pH that constantly registers warnings is a bad practice that would only serve to confuse operators. And the lack of response breeds complacency. Delta must evaluate to determine whether it needs to lower its pH or adjust its range accordingly.

Figure 30: Daily round sheet showing high pH in the feedwater beyond its normal range.

Finding 13 – The Plant failed to keep monthly inspection records for its fire system, which is a violation of GO 167, OS 13 – Routine Inspections, OS 16 - Participation by Operations Personnel in Work Orders, and MS 8 – Maintenance Procedures and Documentation.

Delta failed to keep records of its monthly fire system inspections, making it unclear whether it has actually inspected the system. Delta conducts monthly inspections in which it checks pressure at different points in the system. The Plant keeps records of the pressure readings on an inspection form, see Figure 31. While the Plant's Maximo shows these monthly checks were completed and closed out in the last five years, the Plant could not provide inspection forms for the following months:

1) April, August 2013
2) October, December 2014
3) March, September 2015
4) May 2016
5) May, June 2017

Further, the form does not provide acceptable ranges for the pressures being recorded. In order to ensure its fire system is properly inspected, the Plant must document all inspections and include acceptable ranges on its inspection form.

DELTA ENERGY CENTER
Monthly Fire Protection System Inspection

INSPECTED BY: [redacted] DATE: 7/31/2017

	PF-03 - Warehouse	PF-04a - Control Room	PF-04b - Admin Bldg	PF-05a - STG x-FMR	PF-05b - SST1 x-FMR	PF-05c - SST2 x-FMR	PF-05d - U1 CTG x-FMR	PF-05e - U2 CTG x-FMR	PF-05f - U3 CTG x-FMR	PF-06 - SWGR Bldg	PF-07 - Ammonia Tank	PF-08a - U1 BFP Bldg	PF-08b - U2 BFP Bldg	PF-08c - U3 BFP Bldg	PF-09 - SWYD Bldg	PF-10a - Clg Twr	PF-10b - Clg Twr	PF-10c - Clg Twr	PF-10b CT MCC	PF-10c - WT Bldg	PF-11 - STG Lube Oil	PF-12 - STG Bearings
Type	wet pipe	pre-act	wet pipe	del	del	del	del	del	del	pre-act	spray	pre-act	pre-act	pre-act	pre-act	dry pipe	dry pipe	dry pipe	wet pipe	wet pipe	del	pre-act
Air Psi	[redacted]	35	[redacted]	41.5	36	40	33	33	29	40	[redacted]	41	49	47.5	46	62	60	62	[redacted]	[redacted]	Ø	Ø
Above Seat Psi	175	Failed gauge	186	158	180	165	157	171	165	210	152	155	190	160	154				180	220	Ø	Ø
Below Seat Psi	154	186	186	160	164	180	175	166	165	160	153	166	158	160	190	160	155	Ø	160	180	Ø	Ø
OS&Y Valve Status	open	open	open	open	open	open	open	open	open	open	open	open	open	open	open	open	open	closed	open	open	closed	closed
Locked ?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y
W.O. No.																						

Comments: PF-07 - Ammonia Deluge leaking from packing.
PF-04A - Above seat gauge has failed

NOTE 1: Any abnormal condition must include a generated work order for tracking purposes.

Figure 31: Delta's monthly fire system inspection form.

Finding 14 – The Plant failed to document completion of overspeed tests for its steam turbine prior to 2015, and did not document the results of overspeed tests done in June 2015 and April 2017, which is a violation of GO 167, MS 13 – Equipment Performance and Material Condition and MS 8 – Maintenance Procedures and Documentation.

Delta performs overspeed trip test on its steam turbine annually and provided records of those tests. At the end of 2017, Delta also conducted an in-depth overspeed trip test before releasing the steam turbine for service after it had suffered damage from a generator fire early in the year. The Plant, however, failed to provide results of overspeed tests conducted in June 2015 and April 2017. And prior to 2015, Delta failed to document overspeed tests at all, making it unclear whether the Plant has conducted tests prior to 2015.

Delta must improve its recordkeeping practices and maintain electronic copies of all overspeed trip tests done on the steam turbine. This will allow easy-access to historical test results in order to evaluate and ensure that the turbine operates as it should. It will also confirm that the tests are done correctly, as Maximo WO only has limited details about the tests. Additionally, in the event of staff changes, new staff can access past reports to better understand this protection scheme.

Finding 15 – The Plant fails to run the necessary tests and to record water chemistry data appropriately, which is a violation of GO 167, OS 17 – Records of Operation and OS 5 – Operations Personnel Knowledge.

Delta performs daily water chemistry tests. When conducting the test, worker usually records parameters (pH, conductivity, total dissolved solids, etc.) first on paper then transfers the data onto an electronic database, see Figure 32. ESRB found that those tests were often either 1) done at the wrong interval, which vary from every four to 24 hours depending on the parameter being measured, or 2) not done at all because the Plant was offline and the tests were not required. Chemistry tests are integral to maintaining proper water chemistry to prevent corrosion and scaling in the boiler. Delta must run all necessary tests at required interval and record chemistry data correctly.

Differential Phosphate ←0.5→←2→			
	1.2	ppm	Jan 01, 2017 10:32 AM
	1.8	ppm	Jan 02, 2017 4:32 PM
	2	ppm	Jan 03, 2017 4:53 PM
	1.1	ppm	Jan 04, 2017 5:07 PM
	1.9	ppm	Jan 06, 2017 2:09 PM
	0.9	ppm	Jan 07, 2017 9:52 AM
	1.3	ppm	Jan 08, 2017 7:13 AM
	1.2	ppm	Jan 09, 2017 12:11 PM
	1.5	ppm	Jan 10, 2017 8:28 AM
	2.08	ppm	Jan 11, 2017 8:56 AM
	WARNING: 2.08, NORMAL (0.5:2)		
	0.1	ppm	Jan 12, 2017 11:58 AM
	WARNING: 0.1, NORMAL (0.5:2)		
	0.5	ppm	Jan 13, 2017 4:54 PM
	0.6	ppm	Jan 14, 2017 4:45 PM
	0.6	ppm	Jan 16, 2017 3:33 PM
	1.3	ppm	Jan 17, 2017 2:40 PM
	1	ppm	Jan 18, 2017 10:50 AM

Figure 32: Daily log showing the differential phosphate levels in the cooling water. Parameter is to be measured daily. However, data is missing for January 5 and 15, with no indication the Plant was offline at the time.

Finding 16 – The Plant must address a low reading at a cathodic protection test station, which is a violation of GO 167, MS 9 – Conduct of Maintenance.

During the field inspection, while taking random sample testing, Delta detected an inadequate pipe-to-soil potential reading at Test Station 9 (Circuit 5A). The station registered -584 millivolts (mV), that was less negative than the minimum required voltage of -850 mV. Delta must investigate the cause of the low potential and take corrective action to ensure that the underground pipe has sufficient current to achieve successful cathodic protection against external corrosion.

Finding 17 – The Plant fails to stow ladders and other equipment appropriately, which is a violation of GO 167, OS 12 – Conduct of Operation.

Throughout the plant, ESRB observed ladders not being properly stowed away, see Figures 33 to 37. This presents a trip and fall hazard to workers and is not indicative of good housekeeping. Delta must retrain workers and emphasize the need to properly stow tools and equipment away when work is completed.

Figure 33: A ladder lying next to a cooling tower stack.

Figure 34: A portable platform obstructing a stack's entrance.

Figure 35: Ladder in the walkway near Unit 1's HP drum.

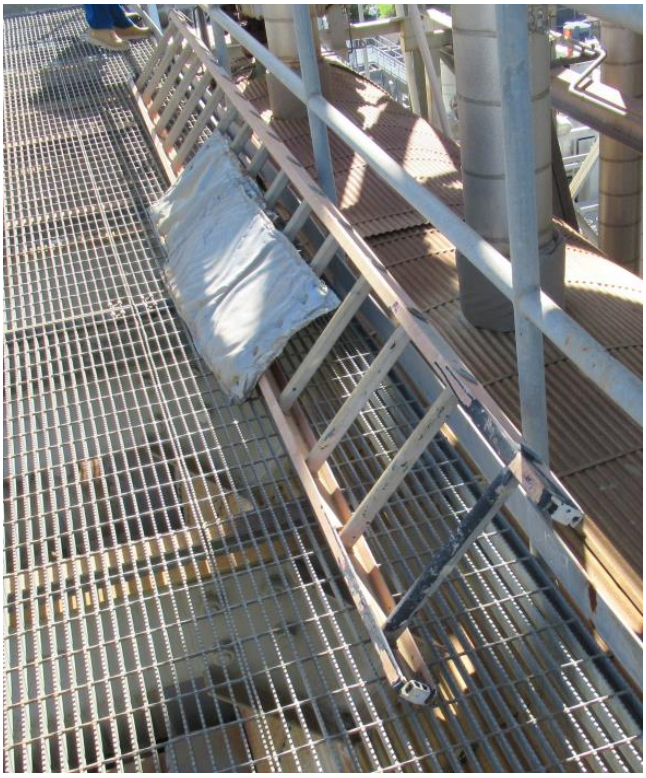


Figure 36: Ladder leaning again railing near Unit 3's HP drum.

Figure 37: Ladder leaning against a wall near a transformer.

Finding 18 – The Plant failed to address phosphate buildup at Unit 1's BFP, which is a violation of GO 167, OS 11 – Operations Facilities, Tool and Equipment.

At Unit 1's BFP, ESRB observed phosphate powder scattered over the floor, see Figure 38. The Plant injects phosphate in the feedwater to control boiler water pH. The phosphate appeared to have precipitated from a sampling tube at the chemical skid. To contain the chemical, the Plant had placed a bucket underneath to collect fallen buildup. ESRB brought this to Delta's attention. In response, the Plant cleaned up the area and removed the bucket, see Figure 39. However, asides that the Plant failed to exercise precautions to warn workers of the splattered chemical, the Plant also failed to investigate and repair the source of the leak. Instead, it resorted to using a bucket to collect and contain the chemical as normal practice.

Per its Material Safety and Data Sheet (MSDS), sodium phosphate irritates the eye and skin, and may be harmful if swallowed or inhaled. To ensure worker's safety, the Plant must identify and repair the source of the leak. Further, Delta must inspect and repair similar defect at Unit 2's and 3's BFP chemical skid.

Figure 38: Delta used a bucket to collect fallen phosphate buildup at a chemical skid.

Figure 39: The Plant cleaned up the area and removed the bucket after ESRB notified the Plant.

III. Observations and Recommendations

Observation 1 – Delta's Title IV permit has expired.[4]

Delta's last Title IV Acid Rain Permit was effective from July 12, 2011 through July 11, 2016. On January 8, 2016, Delta submitted a revised Title V Permit and a Title IV Permit renewal application, which was due by January 11, 2016. Under 40 CFR 72.30, the permit application to reapply must be submitted 6 months before the expiration of the existing permit to "ensure that the term of the existing permit will not expire before the effective date of the permit for which the application is submitted." Since Delta submitted its renewal application before the due date, even though the last permit has expired, per 40 CFR 70.7, Delta is still allowed to operate without a permit in effect from the date the application is deemed complete to when the final permit is issued. Since the Bay Area Air Quality Management District (BAAQMD) did not determine that the application was incomplete within 60 days of receipt, the application was deemed complete.

Although Delta is shielded from needing a permit, ESRB recommends the Plant to contact BAAQMD in order to ensure that their renewal application is still being processed or has been approved and/or to resolve any potential outstanding issues.

Observation 2 – Oil leaks at station service transformers.

During a walkdown, ESRB observed minor oil leaks at station service transformers, see Figures 40 and 41. The leaks, though very minor, were clearly visible due to oil stains on the tanks. ESRB recommends that the Plant investigate and monitor the leaks and take proper corrective action when appropriate.

[4] GO 167 OS 10 - Environmental Regulatory Requirements

Figure 40: Oil leak at Station Service Transformer 1.

Figure 41: Oil leak at Station Service Transformer 2.

Observation 3 – Confined space signs may not be visible.

ESRB found an unsecured confined space sign near a manhole that appeared to have detached from its lid. The sign was not securely fastened and could easily be removed or discarded.

Confined space warning signs notify workers of potential hazards and inform workers to obtain proper permit prior to entry. In response, Delta reinstalled and securely fastened the sign near the manhole, see Figure 42.

Figure 42: Delta re-secured the confined space warning sign next to the manhole.

However, throughout the plant, ESRB observed many confined space signs attached on manhole covers, see Figure 43. While the signs were appropriate, ESRB recommends that Delta installs signs near the space in addition to the one on the cover. This will ensure proper identification of the space even while the cover is removed, which may obstruct the sign from proper view.

Figure 43: Confined space sign on manhole covers at the circulating water pump bay.

Observation 4 – The Plant needs to update its list of required training.[5]

On the required training list provided to ESRB, training on "Recycled Water" is listed as required biannually, even though it is no longer required. ESRB learned that the Plant did not give the training in the past three years since it was no longer necessary, as briefing new staff includes how to properly interact with the recycled water being used at the plant. To avoid confusion in the future and reflect accurate information, the Plant should update its list of required training.

[5] GO 167 OS 6 - Training Support

Appendix – CPUC-Requested Documents

Category	Ref #	Topics
Safety	1	Orientation Program for Visitors and Contractors**
	2	Evacuation Procedure
	3	Evacuation Map and Plant Layout
	4	Evacuation Drill Report & Critique (last 3 years)
	5	Hazmat Handling Procedure
	6	MSDS for All Hazardous Chemicals
	7	Injury & Illness Prevention Plan (IIPP) (last 3 years)
	8	OSHA Form 300 (Injury Log) in last 4 years
	9	OSHA Form 301 (Incident Report) in last 4 years
	10	List of all CPUC Reportable Incidents (last 5 years)
	11	Root Cause Analysis of all Reportable Incidents (if any)
	12	Fire Sprinklers Test Report (last 3 years)
	13	Insurance Report / Loss Prevention / Risk Survey (last 3 years)
	14	Lockout / Tagout Procedure (last 3 revisions, if applicable)
	15	Arc Flash Analysis
	16	Confined Space Entry Procedure
	17	Plant Physical Security and Cyber Security Procedures and Records
	18	Fire Protection System Inspection Record
Training	19	Safety Training Records*
	20	Skill-related Training Records*
	21	Certifications for Welders, Forklift & Crane Operators*
	22	Hazmat Training and Record*
Contractor	23	Latest list of Qualified Contractors*
	24	Contractor Selection / Qualification Procedure
	25	Contractor Certification Records
	26	Contractor Monitoring Program
Regulatory	27	Daily CEMS Calibration Records
	28	Air Permit
	29	Water Permit
	30	Spill Prevention Control Plan (SPCC)
	31	CalARP Risk Management Plan (RMP)
O&M	32	Daily Round Sheets / Checklists
	33	Feedwater Grab-sample Test Records
	34	Water Chemistry Manual

	35	Logbook**
	36	List of Open/Backlogged Work Orders*
	37	List of Closed/Retired Work Orders (last 4 quarters)*
	38	Work Order Management Procedure (last 3 revisions, if applicable)
	39	Computerized Maintenance Management System (Demonstration Onsite)**
	40	All Root Cause Analyses (if any)
Gas Turbine	41	Borescope Inspection Reports (last 2 years)
	42	Maintenance & Inspection Procedures (or Related Documents) (last 3 revisions, if applicable)
	43	Intercooler Inspection Reports
	44	Combustors Inspection (CI) Reports
	45	Hot Gas Path (HGI) Inspection Reports
	46	Bearing Lube Oil Analysis Reports
	47	DC Lube Oil Pump Test Records
Main Plant Compressor(s)	48	Inspection Procedures and Records
Document	49	P&IDs*
	50	Vendor Manuals*
Spare Parts	51	Spare Parts Inventory List
	52	Shelf-life Assessment Report
Management	53	Employee Performance Review Procedures and Verifications
	54	Organizational Chart
Boiler	55	Tube Analysis Report
	56	Chemical Clean Report
	57	Safety Valve Test Records
	58	Hot Spots / IR Inspection Reports
	59	Structural Integrity Assessment
HEP	60	FAC Inspection Procedure & Measurements
	61	Pipe Hangers / Support Calibration Records
Steam Turbine	62	NDE Reports
	63	Overspeed Trip Test Records
	64	Bearing Lube Oil Analysis Reports
	65	DC Lube Oil Pump Test Records
	66	Emergency Stop Valve Test Records on Main Steam Line
	67	Borescope Inspection Records
	68	Most recent Class A (Major) STG inspection report
	69	STG Inspection reports from May 2011 and March 2013
Generator	70	Bearing Lube Oil Analysis
	71	Maintenance & Inspection Procedures (or related

		documents)
	72	Polarization Test Records
Transformer	73	Hot Spots / IR Inspection Reports
	74	Oil Analysis Reports
Cathodic Protection	75	Procedures and Inspection Records
Cooling Water System	76	Cooling Fans & Motors Inspection Records
	77	Cooling Tower Structural Integrity Assessment
	78	Circulating Water Pumps Maintenance Records
Instrumentation	79	Instrument Calibration Procedures and Records
Test Equipment	80	Calibration Procedures and Records
Emission Control Equipment (SCR, Ammonia, NOx, CO)	81	Maintenance & Inspection Procedures and Records
Internal Audit	82	Internal Audit Procedures and all Records