



November 10, 12 and 19, 2020 Fact-finding Report **Robert Budnitz, Member, and Richard McWhorter, Consultant**

- 1. Attend Outage Planning Meetings**
- 2. Attend Corrective Action Review Board Meeting**
- 3. Meet with Nuclear Regulatory Commission (NRC) Senior Resident Inspector**
- 4. Unit 2 Forced Outage**
- 5. Cybersecurity Program**
- 6. Radioactive Waste Processing Systems**
- 7. Meet with DCPD Officer**
- 8. Seismically Induced System Interactions Program**
- 9. Control Room Simulator**
- 10. Drone Sightings**
- 11. Engineering Reorganization and Excellence Plan**
- 12. Nuclear Safety Oversight Committee Exit Meeting**



Attend Outage Planning Meetings

- **Attended Via Conference Call Two of DCCP's November 10 Outage Planning Meetings During Forced Outage 2Z22 (Unit 2 Main Generator Repairs)**
- **0600 Outage Coordination Center (OCC) Brief**
 - **Reviewed the Status of Plant Work Activities and Issues Related to the Forced Outage**
- **1100 OCC Schedule Review**
 - **Reviewed Changes and Updates to the Detailed Schedule for the Forced Outage**
- **Conclusion – Meetings were Effectively Conducted with Clear Informational Exchanges Across Many Activities**



Observe Corrective Action Review Board (CARB) Meeting

- **Regular Reviews of Corrective Action Documents by Senior Plant Management**
- **Reviewed Routine Items and One Significant Item**
 - **Quality of Corrective Actions for Adverse Trend in Heat Stress Incidents Inside the Containment Building**
- **Conclusion – Meeting Met Intended Objectives**



Meet with NRC Senior Resident Inspector

- **Senior Resident's Experience Prior to His Assignment at DCP**
- **Unit 2 Forced Outage 2Z22 performance**
- **Refueling Outage 1R22 performance**



Unit 2 Forced Outage

- **October 15, 2020, Main Generator Hydrogen Usage Increasing, Unit Shutdown (Forced Outage 2Z22)**
- **Forced Outage Overlapped with Refueling Outage 1R22**
- **Investigations Found Hydrogen Leak to Stator Cooling Water System Inside Main Generator (Similar to July 2020 Leak, Forced Outage 2Y22)**
- **Also Found Multiple Smaller Weld Cracks in Non-Structural Components Inside the Generator**
- **Extensive Root Cause Evaluation (RCE) Efforts Initiated Using Four Consultants**

Continued



Unit 2 Forced Outage (Continued)

- **Frame to Floor Weight Loadings Checked and Corrected**
- **Shaker Testing Performed; Internal Generator Modifications Made to Reduce Likelihood of Failures**
- **Extensive Vibration Monitoring Instrumentation Installed; Monitoring Plan Prepared**
- **RCE Not Complete at Time of Meetings**
- **Conclusion – Forced Outage Was Properly Managed; The DCISC Should Continue to Follow Event and Review the Final RCE During a Future Fact-Finding Meeting and At the Next Public Meeting**



Cybersecurity Program

- Identifies and Implements Protection for ~4,000 Critical Digital Assets at DCPD
- Full Program Implemented in 2017
- Program Since Focused on Effective Management of Ongoing Program
- Minor Implementation Issues/Lessons Learned Processed Through Corrective Action System
- NRC Inspection Deferred from April 2020 to March 2021
- Self-Assessment Recently Completed
- Conclusion – Program Appears to be Effectively Managed; DCISC Should Review Again Following the Upcoming NRC Inspection



Radioactive Waste Systems

- **LRWS Collects Radioactive Liquid Wastes from Various Sources and Processes to Reduce Radioactivity Prior to Discharge**
- **LRWS System Generally Healthy**
- **30 mCi Discharged in 2019 (Industry Third Quartile); One Off-Normal Spill Contributed Significantly to Amount (Caustic Liquid Spilled Internally; Not Directly Released)**
- **Expect Very Low Number for 2020, Trending to < 5 mCi**
- **Solid Radioactive Wastes Continue to Be Effectively Processed and Shipped Offsite**
- **Conclusion – Liquid and Solid Radwaste Processing Systems are Effective in Minimizing Waste Volumes**



Dr. Budnitz Meeting with Site Vice President Paula Gerfen

- **Discussed Items from the Fact-Finding Meeting and Other Subjects of Interest**



Seismically Induced Systems Interaction Program

- **Ensures Safe-Shutdown and Accident-Mitigating SSCs Will Properly Function During and Following Seismic Event**
- **Focuses on Protecting Plant Equipment in Specific Locations from Unrestrained Temporary Equipment or Components**
- **Program Healthy; No Significant Issues**
- **Recently Revised to Improve Checklists for Field Activities**
- **Conclusion – Program Effective in Ensuring that Systems Important to Safety Would Not Be Impaired During a Seismic Event**



Control Room Simulator

- **Simulator Is an Accurate Copy of the Actual DCPP Unit 1 Control Room and Is Used for Training and Examinations**
- **Major Upgrades Made Two Years Ago Were Successful in Improving Model Stability, Ease of Use, and Reliability**
- **Simulator Fidelity Regularly Tested Per ANSI Standards; No Issues**
- **Conclusion – Simulator Performing Well in Supporting Operator Training and Examinations**



Drone Sightings

- **Heightened Awareness of Identifying and Tracking Drone Activity Near Nuclear Power Plants Started in 2014 with Voluntary Reporting to NRC**
- **Several Past Sightings at DCPD (Most in 2017-2018) Over Owner Controlled Area and Away From Protected Area**
- **Reviewed Available Documentation Demonstrating That Drone Intrusions Do Not Pose a Substantial Security Risk**
- **DCPD Recently Became First NPP to Obtain Permanent FAA Airspace Restriction Near Plant**
- **Conclusion – DCPD Monitors Drone Activity Near the Plant and Has Acted Appropriately When Drones Were Observed in the Past**



Engineering Reorganization and Excellence Plan

- **Starting in 2018, Engineering Reorganized to Transform System Engineering into Strategic Engineering and Move Tactical Activities to Component Engineering and 'Engineering Fix-It-Now' Team**
- **Reorganization Completed in 2020, Generally Considered Successful Via Effectiveness Reviews**
- **Current Excellence Plan Has Performance Improvement Initiatives in Six Broad Areas**
- **Areas Include Focusing on Future Transitions for Engineers and Improving Equipment Reliability**
- **Conclusion –Engineering Department Continues to Perform Effectively and Significant Organizational Changes Are Complete and Appear Successful**



Nuclear Safety Oversight Committee Exit Meeting

- **Observed November 19 NSOC Exit Meeting**
- **Committee of Six Executive-Level External Industry Peers that Reviews DCPD Performance Three Times Per Year**
- **Two NSOC Onsite Observations This Cycle; Remainder Remote**
- **Conclusions Generally Similar to DCISC and Other External Organizations**
- **Noted Two Items for DCISC Follow Up; Completed in January**
- **Conclusion – NSOC Appeared Comprehensive in Their Investigations and Candid in Their Reports**



November 10, 12 and 19, 2020 Fact-finding Report **Robert Budnitz, Member, and Richard McWhorter, Consultant**

- 1. Attend Outage Planning Meetings**
- 2. Attend Corrective Action Review Board Meeting**
- 3. Meet with Nuclear Regulatory Commission (NRC) Senior Resident Inspector**
- 4. Unit 2 Forced Outage**
- 5. Cybersecurity Program**
- 6. Radioactive Waste Processing Systems**
- 7. Meet with DCPD Officer**
- 8. Seismically Induced System Interactions Program**
- 9. Control Room Simulator**
- 10. Drone Sightings**
- 11. Engineering Reorganization and Excellence Plan**
- 12. Nuclear Safety Oversight Committee Exit Meeting**

DCPP Performance Based on NRC Performance Indicators

Russ Prentice
Director, Risk and Compliance
February 16, 2021



Together, Building
a Better California

DCPP Performance Summary

November 2020 – February 2021

- This presentation covers approximately 4 months of NRC inspections involving ~1800 hours of inspection time
- DCPP remains in the highest performance category for all NRC Performance Indicators
- There have been three findings / violations of more than minor significance since the last DCISC update

NRC Performance Indicators

Unit 1	Unit 2	
G	G	Unplanned Scrams per 7000 Critical Hrs
G	G	Unplanned Power Changes per 7000 Critical Hrs
G	G	Unplanned Scrams with Complications
G	G	Safety System Functional Failures
G	G	Mitigating Systems Performance Index, Emergency AC Power System
G	G	Mitigating Systems Performance Index, High Pressure Injection System
G	G	Mitigating Systems Performance Index, Heat Removal System
G	G	Mitigating Systems Performance Index, Residual Heat Removal System
G	G	Mitigating Systems Performance Index, Cooling Water Systems
G	G	Reactor Coolant System Activity
G	G	Reactor Coolant System Leakage
G	G	Drill/Exercise Performance
G	G	ERO Drill Participation
G	G	Alert & Notification System
G	G	Occupational Exposure Control Effectiveness
G	G	RETS/ODCM Radiological Effluent

November 2020 – February 2021

- **There have been three findings / violations of more than minor significance since the last DCISC update**
 - **Green Non-Cited Violation** associated with the documented level of detail for a scaffolding evaluation performed in support of maintenance on a diesel generator
(A Cross-cutting aspect of H.1, “Inadequate Procedure,” was assigned to this violation)
 - **Green Finding** associated with the inadequate use of industry operating experience associated with environmental corrosion of outdoor piping
(No Cross-Cutting Aspect)
 - **Green Non-Cited Violation** associated with a Containment Spray Drain Valve misposition that occurred during refueling outage 1R22
(A Cross-cutting aspect of H.12, “Avoid Complacency,” was assigned to this violation)

NRC Violations – Cross-Cutting Aspects

NRC Cross-Cutting Issue Summary [DCPP]

(Rolling 4 Quarters)

Quarter Ending: 21Q1

Prior Assessment Theme: Green				Current Assessment Theme: Green				Upcoming Assessment			
Areas	2 HU Findings							0 Problem Identification & Resolution Findings			
Traits	Leadership Safety Values & Actions	Personal Accountability	Work Processes	Continuous Learning	Effective Safety Communication	Questioning Attitude	Decision Making	PI&R	Continuous Learning		
Aspects	Resources H.1	Teamwork H.4	Work Management H.5	Training H.9	Bases for Decisions H.10	Challenge the Unknown H.11	Consistent Process H.13	Identification P.1	Operating Experience P.5		
	0 1 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0		
	1	0	0	0	0	0	0	0	0		
	Field Presence H.2	Summary of Findings **			Avoid Complacency H.12	Conservative Bias H.14	Evaluation P.2	Self Assessment P.6			
	0 0 0 0	Design Margins H.6	N,L,S			CCA	NR,SR	0 0 1 0	0 0 0 0	0 0 0 0	0 0 0 0
	0	0	21Q1 0 20Q4 1 20Q3 2 20Q2 0 Total 3	0 1 2 0 3	0 0 1 0 2	0 1 2 0 3	1	0	0	0	
	Change Management H.3	Documentation H.7	Legend				Resolution P.3				
	0 0 0 0	0 0 0 0	Aspect	HU Total	PIR Total	SCWE					
	0	0	Green 1 - 2	0 - 10	0 - 6	0					
	Procedure Adherence H.8	NRC/SR Traditional Violations				Trending P.4					
	0 0 0 0	Aspect A.N	Cross-Cutting Aspect	Green	All SL=0						
	0	n-3 n-2 n-1 n	Findings per Quarter	White	IV=1						
Traditional Violations		N		Total Findings, rolling year	Yellow	IV=2, III=1					
SL IV: 0 SL III: 0				Red	IV>2, III>1, II>0, I>0						
SL II: 0 SL I: 0											
** Based on Published NRC Inspection Reports											

** Based on Published NRC Inspection Reports



Licensee Event Reports

November 2020 – February 2020

- No Licensee Event Reports (LERs) were submitted during this time period

DCPP Performance Summary

November 2020 - February 2021

- DCPP remains in the highest performance category for all NRC Performance Indicators
- The following Inspection Reports were issued since the last DCISC meeting:
 - 3rd Quarter 2020 Integrated Inspection Report (2020-003, 10/29/2020)
 - 2020 Problem Identification and Resolution (PI&R) Inspection (2020-010, 10/30/2020)
 - 4th Quarter 2020 Integrated Inspection Report (2020-004, 01/26/2021)

Status of License Amendment Requests

License Amendment Requests approved since the last DCISC update:

- There have been no License Amendment Requests approved since the last DCISC update

Thank you

Russ Prentice

Diablo Canyon Power Plant Unit 1 22nd Refueling Outage

Matt Coward

Diablo Canyon Outage Manager

February 16th, 2021



Together, Building
a Better California

Key Activities

Performance Indicators

Results Achieved

Fuel and Steam Generator Inspection Results

Open Items

Summary

- **October 3rd – November 2nd**

Key Activities

- **Reactor Vessel Hot Leg inspection**
- **Steam Generator Eddy Current testing**
- **Reactor Coolant Pump Seal replacement**
- **Main Turbine LP “C” inspection**
- **Circulating Water Pump 1-1 motor overhaul**
- **Condensate Polisher Computer upgrade**
- **230 kV tower replacement**
- **500 kV Tower 5-1 and 5-2 vertical insulator replacement**
- **Auxiliary Transformer 1-1 high voltage bushing replacement (emergent)**

Outage Safety / Defense-in-depth

- Defense-in-depth levels were maintained to ensure key safety functions were satisfied
- High-risk and infrequently performed tests and evolutions (IPTE)
 - Initial drain to lowered reactor coolant inventory for reactor disassembly and reassembly
 - Refueling cavity drain to lowered reactor coolant inventory following core reload
 - Vital bus transfer and integrated safeguards testing
 - Initial criticality of the new reactor core
 - Performance of heavy lifts over the reactor core

Duration

- **October 3rd, 2020 at 21:00 hours to November 2nd, 2020 at 21:40**

Performance Metrics:

Performance Measure	Goal	Actual
Serious Near Hit events	0	0
Nuclear Safety Events	0	0
Site Clock resets	0	0
Outage duration (Days)	30	29.9
ALARA – As Low As Reasonably Achievable (Rem)	30.5	26.7
Power Ascension (Days)	5	4.1

Results Achieved

- **Hot leg inspection**
- **Steam Generator eddy current inspection**
- **Zero significant Human Performance Events**
- **Line ownership of ALARA continues to be a strength**
- **Best collective radiation exposure for Unit 1**
- **Addressed the Unit 2 forced outage during 1R22**

Fuel and Steam Generator Inspection Results

- No fuel defects
- Only minor non-safety significant fuel findings
- Steam Generator inspections revealed no findings

Diablo Canyon Outage Management

1R22 Outage In-Processing

Temporary Outage Workers

- DCPD brought in 743 temporary workers to assist in outage related work activities.

Follow-up Items:

- Fuel handling upender kick-off spring failure**
- Heat stress and mask usage**

(Above Items are documented in SAP to track corrective actions)

Thank you

Matthew Coward

Diablo Canyon Power Plant: State of the Plant Update

Cary Harbor
Station Director
2/16/2021



Together, Building
a Better California

Station Update

Key Upcoming Activities



Plant Operation

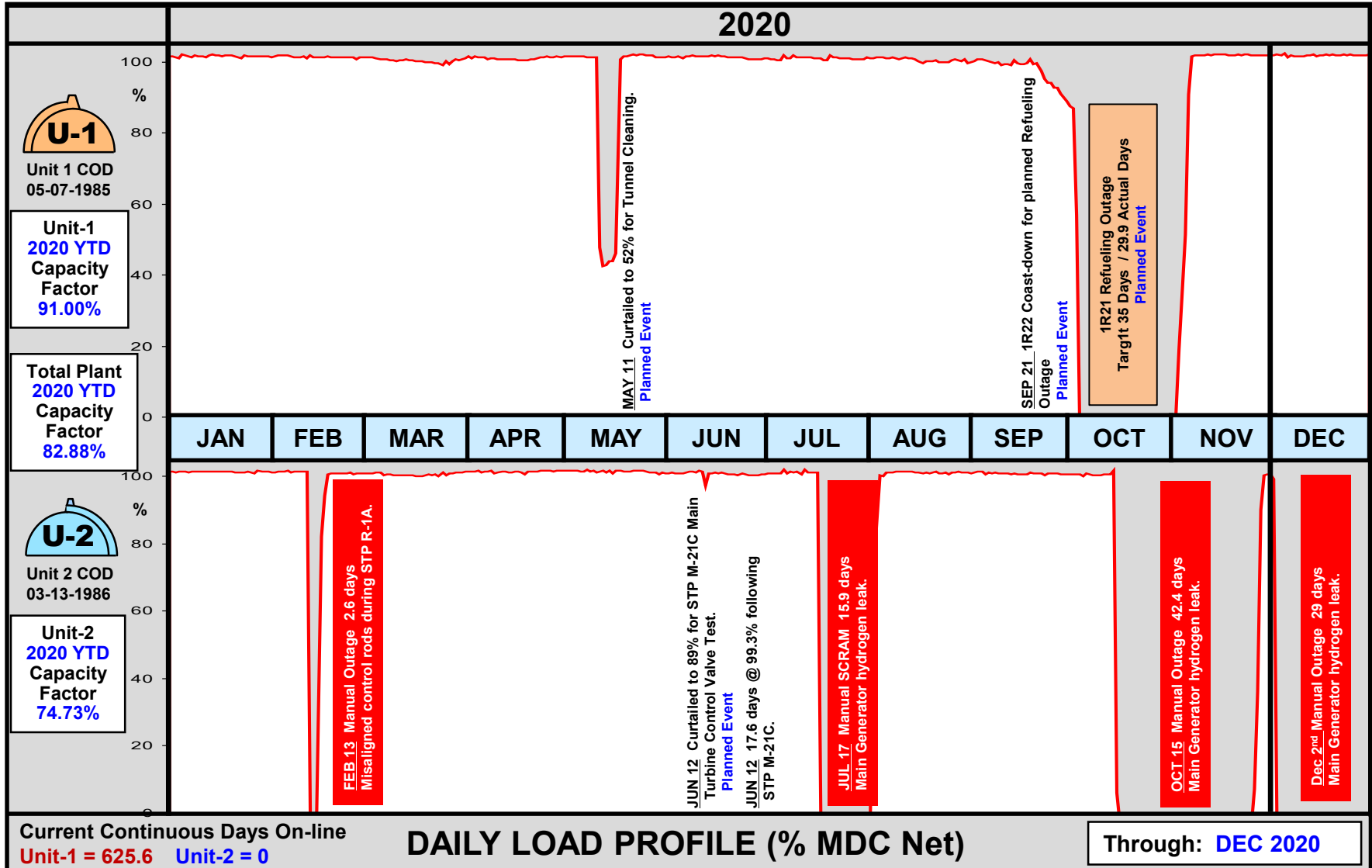
- Unit 1 is safely operating at 100% power with a Probabilistic Risk Assessment (PRA) of “Green”
- Unit 2 is safely shutdown in Mode 3 to perform maintenance of the main generator.
- All NRC Performance Indicators (PIs) are “Green”.



Diablo Canyon Power Plant

Daily Load Profile: Calendar Year 2020

Daily Capacity Factor Power History Curves



Station Update

- Commenced Tier 2 Retention Agreement

COVID-19 Update

- No impact on Diablo Canyon Power Plant safe operations
- Robust monitoring is in place



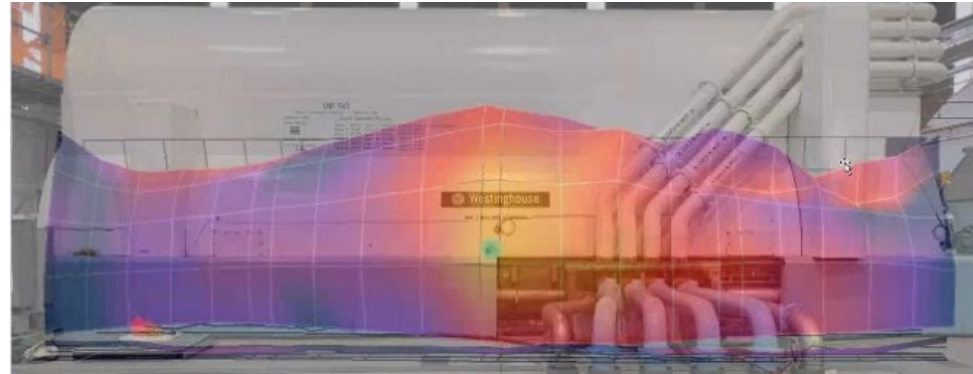


Unit 2 Main Generator

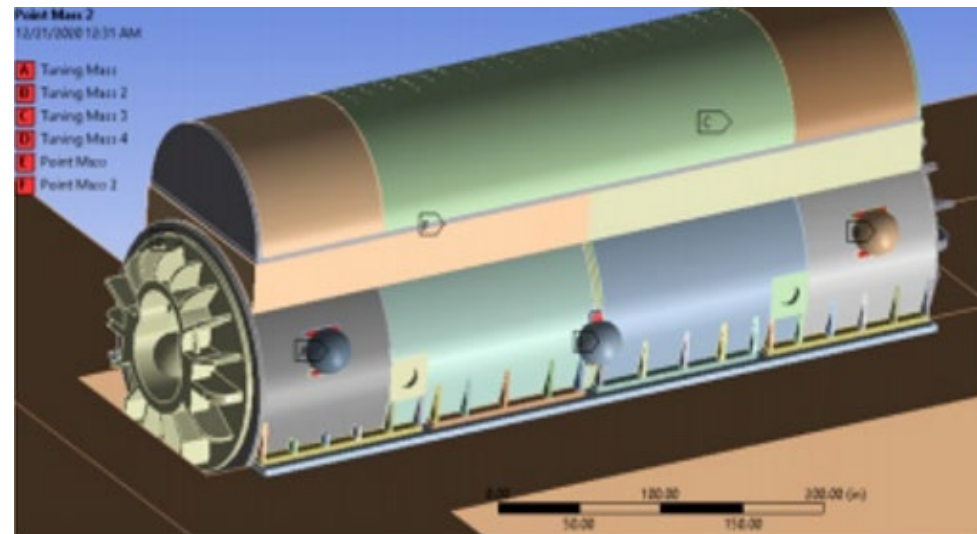
- **This is not a nuclear safety issue**
 - Work is on main electrical generator, on non-nuclear side of the plant
 - No impacts to the health and safety of our workforce or our community
- We have been working to address vibration issues on the Unit 2 Main Generator
- Extensive investigation and analysis performed by PG&E, our vendor (Siemens) and industry experts

Unit 2 Main Generator

- As part of our plan, the unit is offline again in order to perform additional inspections and adjustments based on what we have learned
- Plan to bring it back online for additional monitoring and data gathering prior to our scheduled Spring refueling outage
- During the planned Spring outage, we will make any additional refinements to address the vibration issues and replace some components
- PG&E is committed to ensuring the availability and reliability of Unit 2 well in advance of the summer months



Operational Deflection Survey overlaid on generator photo



Tuning Mass Model

Upcoming Station Activities

- Operator License Class has completed
- Unit 2 Refueling Outage Scheduled for March
- NRC Evaluated Emergency Planning Exercise & Inspection scheduled for 9/15/2021



Thank you

Cary Harbor

National Drone Guidelines at Nuclear Power Plants

Shawn P. Kirven

Director, Nuclear Security & Emergency Services

February 16, 2021



Together, Building
a Better California

Topics Covered

- NRC established reporting guidelines
- Nuclear Safety is not impacted
- Industry Engagement
- Industry Standards
- Federal Aviation Administration (FAA) Airspace Rulemaking

Reporting Guidelines

- In 2014, the Nuclear Regulatory Commission (NRC) established voluntary reporting guidelines
- Guidance included contacting;
 - FAA (Federal Aviation Administration)
 - Local Law Enforcement
 - NRC Headquarters
- Defined suspicious aircraft, to include drones
 - UAS = Unmanned Aerial Systems
 - UAV = Unmanned Aerial Vehicles
- Provided examples of exceptions

Nuclear Safety is Not Impacted

- The NRC believes there are no risk-significant vulnerabilities at nuclear power plants that could be exploited by adversarial use of currently available commercial drones
- The Nuclear Energy Institute (NEI) provides 4 reasons why US nuclear plants are safe from drones
 - Nuclear plants are among the most robust structures in America
 - Comprehensive defense strategies are thoroughly tested
 - Even against drones, nuclear plants are protected from cyberattacks
 - A unified response is already in place

- NEI Task Force is a member of the DHS Critical Infrastructure Partnership Advisory Council on Unmanned Aircraft Systems (CIPAC UAS)
- DCPD is a member of the NEI UAS Task Force
- All Nuclear Power Plants have protocols in place to promptly respond to suspicious aircraft activity
 - FAA, Local Law, FBI & NRC HQS Ops Center

Industry Standards

- NEI coordinated development of industry standards that cover
 - Background
 - Offsite Notification of Unauthorized Drone Activity
 - Recommended Site Actions
 - References
 - Checklists
- Comprehensive guidance document established standard response plan throughout the industry
 - Shared with law enforcement partners

FAA Airspace Rulemaking

- FAA rulemaking allowing private industry to request airspace restrictions is several years away
- NEI coordinated with the FAA & DOE (Department of Energy) to obtain federal sponsorship for Nuclear Power Plants to request restricted airspace under “special security instructions”
- DOE approved sponsorship in September 2019

Thank You

Shawn P. Kirven



January 13, 14 and 21, 2021 Fact-finding Report Peter Lam, Member, and Richard McWhorter, Consultant

- 1. Institute of Nuclear Power Operations Corporate Evaluation**
- 2. Steam Generator Inspection Results**
- 3. Safety System Functional Failures**
- 4. Large Transformer Health**
- 5. Meet with Nuclear Regulatory Commission (NRC) Senior Resident Inspector**
- 6. Meet with DCPD Officer**
- 7. Licensed Operator Training Class Observation**
- 8. Low Temperature Overpressurization Protection System Event**
- 9. Chemical and Volume Control and Emergency Core Cooling Systems**
- 10. Control Room Ventilation Systems**
- 11. COVID-19 Pandemic Response**
- 12. Learning Services Department Update**
- 13. Unit 2 Main Generator Issues and Root Cause Evaluation Update**



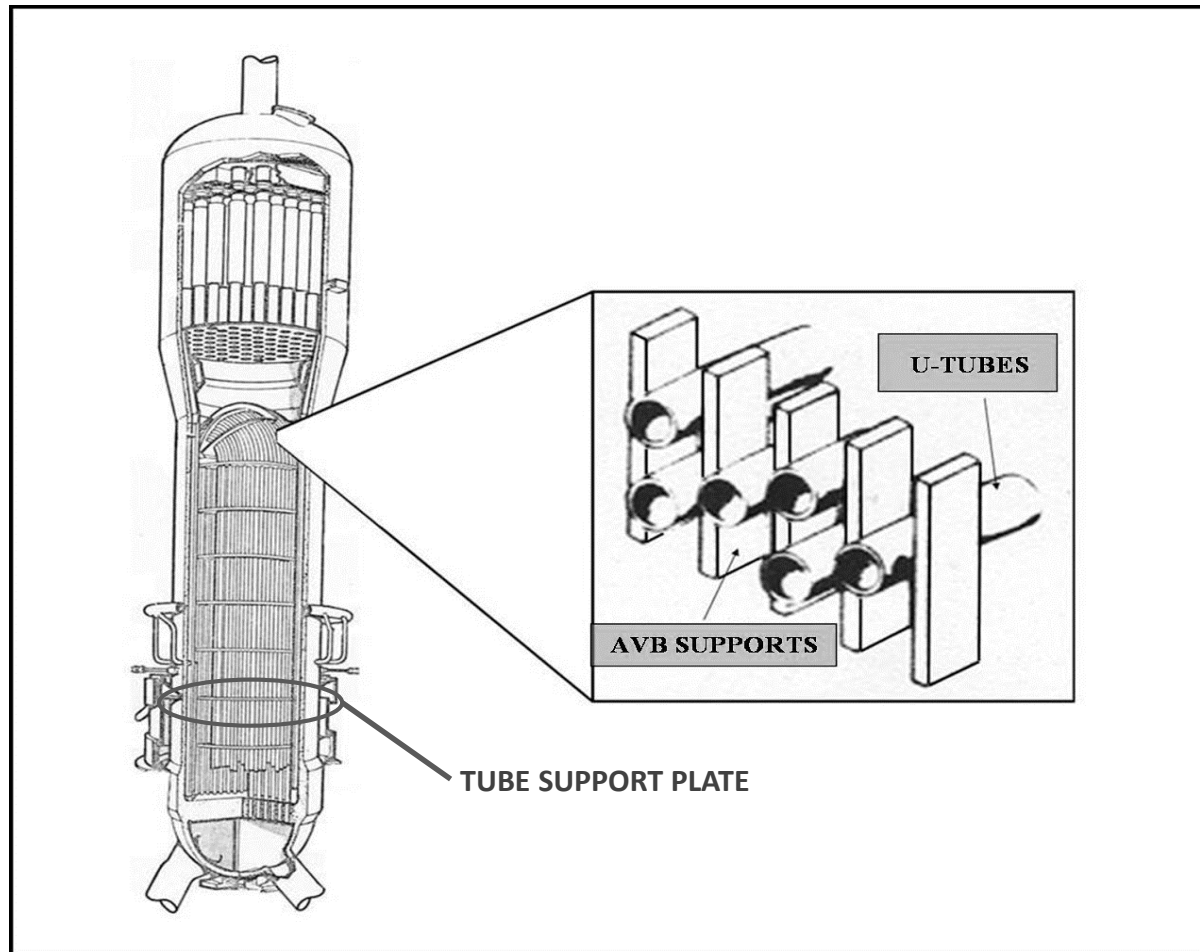
Institute of Nuclear Power Operations Corporate Evaluation

- **Follow-up Item From November 19 NSOC Exit Meeting**
- **INPO Evaluation of Executive Oversight Performed Every Six Years (Postponed by One Year)**
- **Because of Confidentiality Agreements, the DCISC Cannot Share the Details of the Evaluation**
- **Conclusion – No Significant Safety Concerns and Appropriate Corrective Actions Initiated**



Steam Generator Inspection Results

- Reviewed Results of 1R22 SG Inspection Results (SG Inspection Results for Previous Three Outages Reviewed in March 2020)
- Periodic Primary Side Inspection; Secondary Side Extended and Not Performed (DCISC Open Item Reviewed and Closed in August 2020)
- 1R22 Results:
 - Twelve New Indications of Wear at Tube Support Plates (87 Total)
 - Four New Indications of Wear at Anti-Vibration Bars (18 Total)
 - No Additional Tubes Required Plugging (8 Plugged Previously)
- Structural Evaluations Acceptable for Three Fuel Cycles
- Conclusion – SG Inspections Demonstrated Good Results



**SG Cutaway Showing Anti-Vibration
Bars and Tube Support Plates**



Safety System Functional Failures

- **SSFF Is an Event or Condition That Could Have Prevented the Fulfillment of the Safety Function of a Safety Structure or System**
- **High Numbers in Past at DCPD (2012)**
- **Recently One SSFF in 2017 and One SSFF in 2019**
- **Conclusion – Continuing Good Performance in SSFFs; DCISC Should Consider Reviewing Maintenance Rule Performance Instead in the Future**



Large Transformer Health

- **14 Total Large Transformers at DCCP; All in Good Health**
- **Most Major Projects Completed; One Remaining for Radiator Replacement on Aux Transformer 2-1 During 2R22**
- **Briefly Discussed Future Use of Electrical Distribution Systems During Decommissioning**
- **Conclusion – Large Transformers in Good Health Overall**



Meet with NRC Senior Resident Inspector

- Senior Resident's Experience Prior to His Assignment at DCPD
- Recent NRC Inspection Results and Concerns
- Forced Outage 2G22 performance

Dr. Lam Meeting with Site Vice President Paula Gerfen

- Discussed Items from the Fact-Finding Meeting and Other Subjects of Interest



Licensed Operator Training Class Observation

- **Licensed Operator Continuing Training (LOCT) Lecture Conducted Remotely for Five Operators**
- **Topic – Abnormal Operating Procedure AP-8 Series on Control Room Evacuation Procedures**
- **Instructor and Trainees in ‘Audio-Only’ Mode With PowerPoint Presentation**
- **Instructor Walked Students Through the Procedures Using Procedure Excerpts and Pictures**
- **Focus on Use of Human Performance Tools and Operator Fundamentals**
- **Conclusion – Training Was Well Prepared, Contained Appropriate Information, and Was Professionally Presented**



Low Temperature Overpressurization Protection System Event

- **LTOP Armed When Shutdown at Low Temperatures to Protect Against Vessel Brittle Fracture; Uses Reactor Coolant System Power Operated Relief Valves**
- **LTOP Unexpectedly Actuated During Solid-Water Reactor Coolant Pump Start on October 29 (Follow-up Item from November 19 NSOC Exit Meeting)**
- **No Safety Concern; Operator Responses Were Appropriate**
- **Cause Evaluation Incomplete at Time of Meeting; Likely Unexpected Heating of Water When Pump Started**
- **Conclusion – Response to LTOP Actuation Appropriate; DCISC Should Review the Cause Evaluation When Complete**



Chemical and Volume Control and Emergency Core Cooling Systems

- **CVCS Supplies Makeup/Letdown for Reactor Coolant System**
- **ECCS Includes Charging Pumps, Safety Injection Pumps and Accumulators, and Residual Heat Removal Pumps; Injects Water into Reactor During Accidents**
- **CVCS and ECCS Systems Healthy (Green) With Only Minor Issues Being Tracked for Resolution**
- **Regular Testing Completed Without Major Issues**
- **Conclusion – CVCS and ECCS Were in Good Health on Both Units**



Control Room Ventilation Systems

- **CRVS Includes Heating, Cooling, and Pressurization Systems for the Shared Main Control Room and Adjacent Areas; Also Protects Operators Against Radiation During Accident Conditions**
- **Systems Generally in Good Health with No Major Issues**
- **Continuing Efforts to Improve Ventilation Damper Performance**
- **Regular Testing Completed Without Major Issues**
- **Conclusion – CRVS in Good Health Overall; Minor Issues Were Being Addressed**



Status of Responding to the COVID-19 Pandemic

- **Self Screening, Social Distancing, Hygiene, and Remote Work Actions Continued to Appear Effective; Few Active Cases**
- **Screening Cases Slightly Increased Following Holidays**
- **Vaccination Planning in Progress**
 - **Employees Divided into Four Groups (Priorities)**
 - **Vaccinations Likely to Be Given On Site**
 - **Distribution Coordinated with SLO County**
- **Conclusion – Pandemic Response Actions Continue to be Effective; the Facility Continues to be Safely Operated and Maintained**



Learning Services Department Update

- **INPO Reaccreditation Completed for All 12 Training Programs in 2020**
- **Two Recent Initial License Training Classes Completed with 100% NRC Exam Pass Rate**
- **Final ILT Class (16 ROs and 5 SROs) Have Exam in Early 2021**
- **All Training Programs Continuing During Pandemic With Varying Combinations of Remote and Onsite Classes**
- **Working on Managing Instructor Staffing Levels and Needs for Technical Training In Light of Upcoming Cessation of Power Operations**
- **Conclusion – Performance Was Good with the Department Appropriately Focused on Future Challenges**



Unit 2 Main Generator Issues and Root Cause Evaluation Update

- **History**
 - **Fall 2019 – Unit 2 Main Generator Stator Refurbished**
 - **July 16, 2020 – Hydrogen Leak to Stator Cooling Water System Inside Main Generator, Unit Shutdown (Forced Outage 2Y22). Restarted on August 2, 2020.**
 - **October 15, 2020 – Hydrogen Usage Again Increasing, Unit Shutdown (Forced Outage 2Z22)**
 - **DCISC November Review – Additional Weld Cracking Noted on Non-Structural Elements Inside Generator, Generator Frame to Floor Weightings Corrected, Additional Vibration Instrumentation Installed, and Detailed Root Cause Evaluation Initiated**

Continued



Unit 2 Main Generator Issues and Root Cause Evaluation Update (Continued)

- **RCE Initiated in October Included Four External Parties:**
 - **Independent Cause Evaluation Technical Consultant**
 - **Structural Vibration Analysis Consultant**
 - **Individual Generator Expert Consultant**
 - **Personnel from Electric Power Research Institute**
- **Unit 2 Restarted on November 28, 2020, with RCE Still Open and Extensive Vibration Monitoring Equipment Installed for Further Investigations**
- **Vibrations Improved, But Issue Not Considered Resolved**
- **On December 2, 2020, Hydrogen Usage Again Increased and Unit Shutdown (Forced Outage 2G22)**

Continued



Unit 2 Main Generator Issues and Root Cause Evaluation Update (Continued)

- **Further RCE Analysis During Forced Outage 2G22 :**
 - **Developed Finite Element Analysis Computer Models for Generator Frame**
 - **Model Cases Run Simulating Vibrations; Identified Stator Frame Resonant Frequency at 120 Hz**
 - **Corresponds to Natural Frequency of Electrical Generation (Spinning Rotor Magnetic Influence Upon Stator Windings/Frame)**
 - **Larger Vibrations at Exciter End of Frame (Location of Leaks)**
- **Internal Welds Extensively Examined (Including Radiography) and Repaired as Needed**

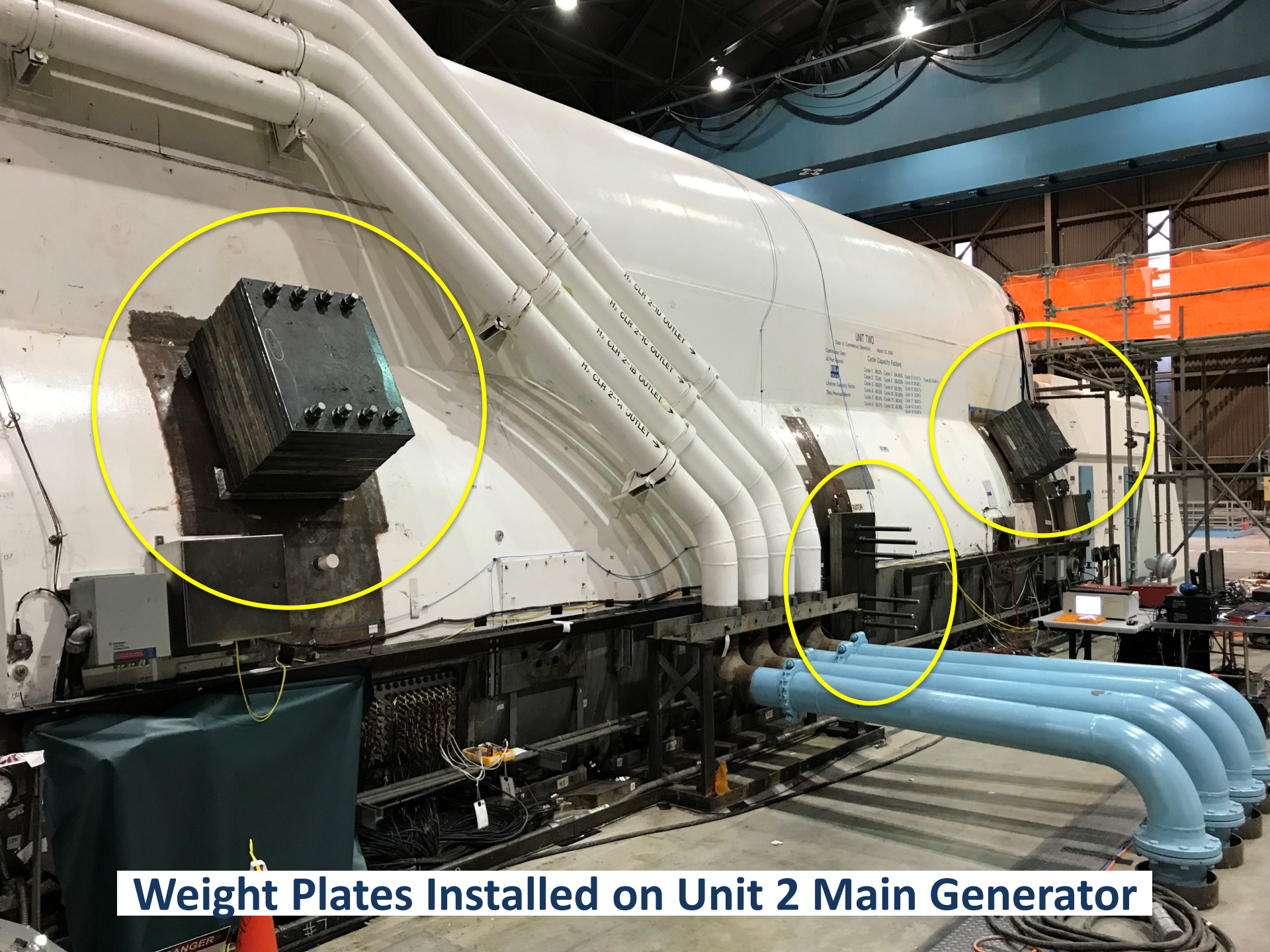
Continued



Unit 2 Main Generator Issues and Root Cause Evaluation Update (Continued)

- **Modifications Made During Forced Outage 2G22 :**
 - **Minor Modifications Made to Generator Internal Piping to Reduce Vulnerabilities to Weld Cracking**
 - **Twelve Possible Design Changes Considered to Change Generator Frame Resonate Frequency**
 - **Selected a Modification to Add the Ability to Install Various Combinations of Weight Plates External to the Generator Frame at Six Locations (Three Each Side)**
 - **Allowed for “Tuning” of Generator Frame Resonance Following Startup**

Continued



UNIT TWO
Date of Commercial Operation: March 15, 1988
Generator Data
Cycle Capacity Factors
Coke # 1: 100% Cycle # 1: 100% Cycle # 1: 100% Cycle # 1: 100%
Coke # 2: 100% Cycle # 2: 100% Cycle # 2: 100% Cycle # 2: 100%
Coke # 3: 100% Cycle # 3: 100% Cycle # 3: 100% Cycle # 3: 100%
Coke # 4: 100% Cycle # 4: 100% Cycle # 4: 100% Cycle # 4: 100%
Coke # 5: 100% Cycle # 5: 100% Cycle # 5: 100% Cycle # 5: 100%
Coke # 6: 100% Cycle # 6: 100% Cycle # 6: 100% Cycle # 6: 100%
Coke # 7: 100% Cycle # 7: 100% Cycle # 7: 100% Cycle # 7: 100%
Coke # 8: 100% Cycle # 8: 100% Cycle # 8: 100% Cycle # 8: 100%
Coke # 9: 100% Cycle # 9: 100% Cycle # 9: 100% Cycle # 9: 100%
Coke # 10: 100% Cycle # 10: 100% Cycle # 10: 100% Cycle # 10: 100%
Coke # 11: 100% Cycle # 11: 100% Cycle # 11: 100% Cycle # 11: 100%
Coke # 12: 100% Cycle # 12: 100% Cycle # 12: 100% Cycle # 12: 100%
Coke # 13: 100% Cycle # 13: 100% Cycle # 13: 100% Cycle # 13: 100%
Coke # 14: 100% Cycle # 14: 100% Cycle # 14: 100% Cycle # 14: 100%
Coke # 15: 100% Cycle # 15: 100% Cycle # 15: 100% Cycle # 15: 100%
Coke # 16: 100% Cycle # 16: 100% Cycle # 16: 100% Cycle # 16: 100%
Coke # 17: 100% Cycle # 17: 100% Cycle # 17: 100% Cycle # 17: 100%
Coke # 18: 100% Cycle # 18: 100% Cycle # 18: 100% Cycle # 18: 100%
Coke # 19: 100% Cycle # 19: 100% Cycle # 19: 100% Cycle # 19: 100%
Coke # 20: 100% Cycle # 20: 100% Cycle # 20: 100% Cycle # 20: 100%
Coke # 21: 100% Cycle # 21: 100% Cycle # 21: 100% Cycle # 21: 100%
Coke # 22: 100% Cycle # 22: 100% Cycle # 22: 100% Cycle # 22: 100%
Coke # 23: 100% Cycle # 23: 100% Cycle # 23: 100% Cycle # 23: 100%
Coke # 24: 100% Cycle # 24: 100% Cycle # 24: 100% Cycle # 24: 100%
Coke # 25: 100% Cycle # 25: 100% Cycle # 25: 100% Cycle # 25: 100%
Coke # 26: 100% Cycle # 26: 100% Cycle # 26: 100% Cycle # 26: 100%
Coke # 27: 100% Cycle # 27: 100% Cycle # 27: 100% Cycle # 27: 100%
Coke # 28: 100% Cycle # 28: 100% Cycle # 28: 100% Cycle # 28: 100%
Coke # 29: 100% Cycle # 29: 100% Cycle # 29: 100% Cycle # 29: 100%
Coke # 30: 100% Cycle # 30: 100% Cycle # 30: 100% Cycle # 30: 100%
Coke # 31: 100% Cycle # 31: 100% Cycle # 31: 100% Cycle # 31: 100%
Coke # 32: 100% Cycle # 32: 100% Cycle # 32: 100% Cycle # 32: 100%
Coke # 33: 100% Cycle # 33: 100% Cycle # 33: 100% Cycle # 33: 100%
Coke # 34: 100% Cycle # 34: 100% Cycle # 34: 100% Cycle # 34: 100%
Coke # 35: 100% Cycle # 35: 100% Cycle # 35: 100% Cycle # 35: 100%
Coke # 36: 100% Cycle # 36: 100% Cycle # 36: 100% Cycle # 36: 100%
Coke # 37: 100% Cycle # 37: 100% Cycle # 37: 100% Cycle # 37: 100%
Coke # 38: 100% Cycle # 38: 100% Cycle # 38: 100% Cycle # 38: 100%
Coke # 39: 100% Cycle # 39: 100% Cycle # 39: 100% Cycle # 39: 100%
Coke # 40: 100% Cycle # 40: 100% Cycle # 40: 100% Cycle # 40: 100%
Coke # 41: 100% Cycle # 41: 100% Cycle # 41: 100% Cycle # 41: 100%
Coke # 42: 100% Cycle # 42: 100% Cycle # 42: 100% Cycle # 42: 100%
Coke # 43: 100% Cycle # 43: 100% Cycle # 43: 100% Cycle # 43: 100%
Coke # 44: 100% Cycle # 44: 100% Cycle # 44: 100% Cycle # 44: 100%
Coke # 45: 100% Cycle # 45: 100% Cycle # 45: 100% Cycle # 45: 100%
Coke # 46: 100% Cycle # 46: 100% Cycle # 46: 100% Cycle # 46: 100%
Coke # 47: 100% Cycle # 47: 100% Cycle # 47: 100% Cycle # 47: 100%
Coke # 48: 100% Cycle # 48: 100% Cycle # 48: 100% Cycle # 48: 100%
Coke # 49: 100% Cycle # 49: 100% Cycle # 49: 100% Cycle # 49: 100%
Coke # 50: 100% Cycle # 50: 100% Cycle # 50: 100% Cycle # 50: 100%
Coke # 51: 100% Cycle # 51: 100% Cycle # 51: 100% Cycle # 51: 100%
Coke # 52: 100% Cycle # 52: 100% Cycle # 52: 100% Cycle # 52: 100%
Coke # 53: 100% Cycle # 53: 100% Cycle # 53: 100% Cycle # 53: 100%
Coke # 54: 100% Cycle # 54: 100% Cycle # 54: 100% Cycle # 54: 100%
Coke # 55: 100% Cycle # 55: 100% Cycle # 55: 100% Cycle # 55: 100%
Coke # 56: 100% Cycle # 56: 100% Cycle # 56: 100% Cycle # 56: 100%
Coke # 57: 100% Cycle # 57: 100% Cycle # 57: 100% Cycle # 57: 100%
Coke # 58: 100% Cycle # 58: 100% Cycle # 58: 100% Cycle # 58: 100%
Coke # 59: 100% Cycle # 59: 100% Cycle # 59: 100% Cycle # 59: 100%
Coke # 60: 100% Cycle # 60: 100% Cycle # 60: 100% Cycle # 60: 100%
Coke # 61: 100% Cycle # 61: 100% Cycle # 61: 100% Cycle # 61: 100%
Coke # 62: 100% Cycle # 62: 100% Cycle # 62: 100% Cycle # 62: 100%
Coke # 63: 100% Cycle # 63: 100% Cycle # 63: 100% Cycle # 63: 100%
Coke # 64: 100% Cycle # 64: 100% Cycle # 64: 100% Cycle # 64: 100%
Coke # 65: 100% Cycle # 65: 100% Cycle # 65: 100% Cycle # 65: 100%
Coke # 66: 100% Cycle # 66: 100% Cycle # 66: 100% Cycle # 66: 100%
Coke # 67: 100% Cycle # 67: 100% Cycle # 67: 100% Cycle # 67: 100%
Coke # 68: 100% Cycle # 68: 100% Cycle # 68: 100% Cycle # 68: 100%
Coke # 69: 100% Cycle # 69: 100% Cycle # 69: 100% Cycle # 69: 100%
Coke # 70: 100% Cycle # 70: 100% Cycle # 70: 100% Cycle # 70: 100%
Coke # 71: 100% Cycle # 71: 100% Cycle # 71: 100% Cycle # 71: 100%
Coke # 72: 100% Cycle # 72: 100% Cycle # 72: 100% Cycle # 72: 100%
Coke # 73: 100% Cycle # 73: 100% Cycle # 73: 100% Cycle # 73: 100%
Coke # 74: 100% Cycle # 74: 100% Cycle # 74: 100% Cycle # 74: 100%
Coke # 75: 100% Cycle # 75: 100% Cycle # 75: 100% Cycle # 75: 100%
Coke # 76: 100% Cycle # 76: 100% Cycle # 76: 100% Cycle # 76: 100%
Coke # 77: 100% Cycle # 77: 100% Cycle # 77: 100% Cycle # 77: 100%
Coke # 78: 100% Cycle # 78: 100% Cycle # 78: 100% Cycle # 78: 100%
Coke # 79: 100% Cycle # 79: 100% Cycle # 79: 100% Cycle # 79: 100%
Coke # 80: 100% Cycle # 80: 100% Cycle # 80: 100% Cycle # 80: 100%
Coke # 81: 100% Cycle # 81: 100% Cycle # 81: 100% Cycle # 81: 100%
Coke # 82: 100% Cycle # 82: 100% Cycle # 82: 100% Cycle # 82: 100%
Coke # 83: 100% Cycle # 83: 100% Cycle # 83: 100% Cycle # 83: 100%
Coke # 84: 100% Cycle # 84: 100% Cycle # 84: 100% Cycle # 84: 100%
Coke # 85: 100% Cycle # 85: 100% Cycle # 85: 100% Cycle # 85: 100%
Coke # 86: 100% Cycle # 86: 100% Cycle # 86: 100% Cycle # 86: 100%
Coke # 87: 100% Cycle # 87: 100% Cycle # 87: 100% Cycle # 87: 100%
Coke # 88: 100% Cycle # 88: 100% Cycle # 88: 100% Cycle # 88: 100%
Coke # 89: 100% Cycle # 89: 100% Cycle # 89: 100% Cycle # 89: 100%
Coke # 90: 100% Cycle # 90: 100% Cycle # 90: 100% Cycle # 90: 100%
Coke # 91: 100% Cycle # 91: 100% Cycle # 91: 100% Cycle # 91: 100%
Coke # 92: 100% Cycle # 92: 100% Cycle # 92: 100% Cycle # 92: 100%
Coke # 93: 100% Cycle # 93: 100% Cycle # 93: 100% Cycle # 93: 100%
Coke # 94: 100% Cycle # 94: 100% Cycle # 94: 100% Cycle # 94: 100%
Coke # 95: 100% Cycle # 95: 100% Cycle # 95: 100% Cycle # 95: 100%
Coke # 96: 100% Cycle # 96: 100% Cycle # 96: 100% Cycle # 96: 100%
Coke # 97: 100% Cycle # 97: 100% Cycle # 97: 100% Cycle # 97: 100%
Coke # 98: 100% Cycle # 98: 100% Cycle # 98: 100% Cycle # 98: 100%
Coke # 99: 100% Cycle # 99: 100% Cycle # 99: 100% Cycle # 99: 100%
Coke # 100: 100% Cycle # 100: 100% Cycle # 100: 100% Cycle # 100: 100%

Weight Plates Installed on Unit 2 Main Generator



Unit 2 Main Generator Issues and Root Cause Evaluation Update (Continued)

- **Initial Combination of Weight Plates Installed and Unit Restarted on January 12, 2021**
- **Vibrations Measured at Various Loads and Number and Location of Weight Plates Adjusted**
- **Significant Reduction in Generator Frame Vibrations**
- **Unit 2 Frame Significantly Differs from Unit 1**
- **Conclusion:**
 - **Forced Outage Was Properly Managed and the Ongoing Response Was Appropriate**
 - **The DCISC Should Continue to Follow the Issue and Review the Final RCE During a Future Fact-Finding Meeting and a Future Public Meeting**



January 13, 14 and 21, 2021 Fact-finding Report Peter Lam, Member, and Richard McWhorter, Consultant

- 1. Institute of Nuclear Power Operations Corporate Evaluation**
- 2. Steam Generator Inspection Results**
- 3. Safety System Functional Failures**
- 4. Large Transformer Health**
- 5. Meet with Nuclear Regulatory Commission (NRC) Senior Resident Inspector**
- 6. Meet with DCPD Officer**
- 7. Licensed Operator Training Class Observation**
- 8. Low Temperature Overpressurization Protection System Event**
- 9. Chemical and Volume Control and Emergency Core Cooling Systems**
- 10. Control Room Ventilation Systems**
- 11. COVID-19 Pandemic Response**
- 12. Learning Services Department Update**
- 13. Unit 2 Main Generator Issues and Root Cause Evaluation Update**

National Drone Guidelines at Nuclear Power Plants

Shawn P. Kirven

Director, Nuclear Security & Emergency Services

February 16, 2021



Together, Building
a Better California

Topics Covered

- NRC established reporting guidelines
- Nuclear Safety is not impacted
- Industry Engagement
- Industry Standards
- Federal Aviation Administration (FAA) Airspace Rulemaking

Reporting Guidelines

- In 2014, the Nuclear Regulatory Commission (NRC) established voluntary reporting guidelines
- Guidance included contacting;
 - FAA (Federal Aviation Administration)
 - Local Law Enforcement
 - NRC Headquarters
- Defined suspicious aircraft, to include drones
 - UAS = Unmanned Aerial Systems
 - UAV = Unmanned Aerial Vehicles
- Provided examples of exceptions

Nuclear Safety is Not Impacted

- The NRC believes there are no risk-significant vulnerabilities at nuclear power plants that could be exploited by adversarial use of currently available commercial drones
- The Nuclear Energy Institute (NEI) provides 4 reasons why US nuclear plants are safe from drones
 - Nuclear plants are among the most robust structures in America
 - Comprehensive defense strategies are thoroughly tested
 - Even against drones, nuclear plants are protected from cyberattacks
 - A unified response is already in place

- NEI Task Force is a member of the DHS Critical Infrastructure Partnership Advisory Council on Unmanned Aircraft Systems (CIPAC UAS)
- DCPD is a member of the NEI UAS Task Force
- All Nuclear Power Plants have protocols in place to promptly respond to suspicious aircraft activity
 - FAA, Local Law, FBI & NRC HQS Ops Center

Industry Standards

- NEI coordinated development of industry standards that cover
 - Background
 - Offsite Notification of Unauthorized Drone Activity
 - Recommended Site Actions
 - References
 - Checklists
- Comprehensive guidance document established standard response plan throughout the industry
 - Shared with law enforcement partners

FAA Airspace Rulemaking

- FAA rulemaking allowing private industry to request airspace restrictions is several years away
- NEI coordinated with the FAA & DOE (Department of Energy) to obtain federal sponsorship for Nuclear Power Plants to request restricted airspace under “special security instructions”
- DOE approved sponsorship in September 2019

Thank You

Shawn P. Kirven

Diablo Canyon

Monitoring and Reporting of Radiological Effluent and Radiological Environmental Impacts

David Cortina

Manager, Chemistry and Environmental Ops

February 2021



Together, Building
a Better California



Our Commitment

PG&E is absolutely committed to the health and welfare of our workforce and our community.

Reflecting our focus on safety, we are in full compliance with industry guidance and all regulatory standards regarding radiological and nuclear safety.

Radiological Monitoring and Controls Program

Diablo Canyon maintains the Radiological Monitoring and Controls Program (RMCP) in conformance with applicable Federal regulations and ALARA (As Low As Reasonably Achievable).

RMCP is comprised of:

- Radioactive Effluent Control Program (RECP)
- Radiological Environmental Monitoring Programs (REMP)
- Satisfies Technical Specifications requirements

Radiological Effluent Control Program

RECP consists of:

- Monitoring requirements for potential release paths
- Periodic sampling of systems with the potential of becoming radioactively contaminated
- Procedures to control potential liquid and gaseous radioactive discharges
- Onsite meteorological program for the performance of dose assessments
- Radioactive liquid and gaseous monitoring instrumentation
- Liquid and Gaseous Effluents Limits per 10 CFR Part 20, Appendix B
- Annual and quarterly doses or dose commitment limits from Effluents released per 10 CFR Part 50, Appendix I



REMP provides for:

- Monitoring the radiation and radionuclides in the environs of the plant by
 - Thermoluminescent Dosimeters (TLDs)
 - Air Samples
 - Environment Samples
- Addressing a Land Census to identify changes in use of areas at and beyond the site boundary
- Complying with the plant federal Technical Specifications

Annual Reports

- DCPD submitted the 2019 Annual Radioactive Effluent Release Report (ARERR) and the 2019 Annual Radiological Environmental Operating Report (AREOR) to the Nuclear Regulatory Commission (NRC) in April 2020
- **In all cases the impact of operations are well below federal approved limits for the year**

Radiation Sources

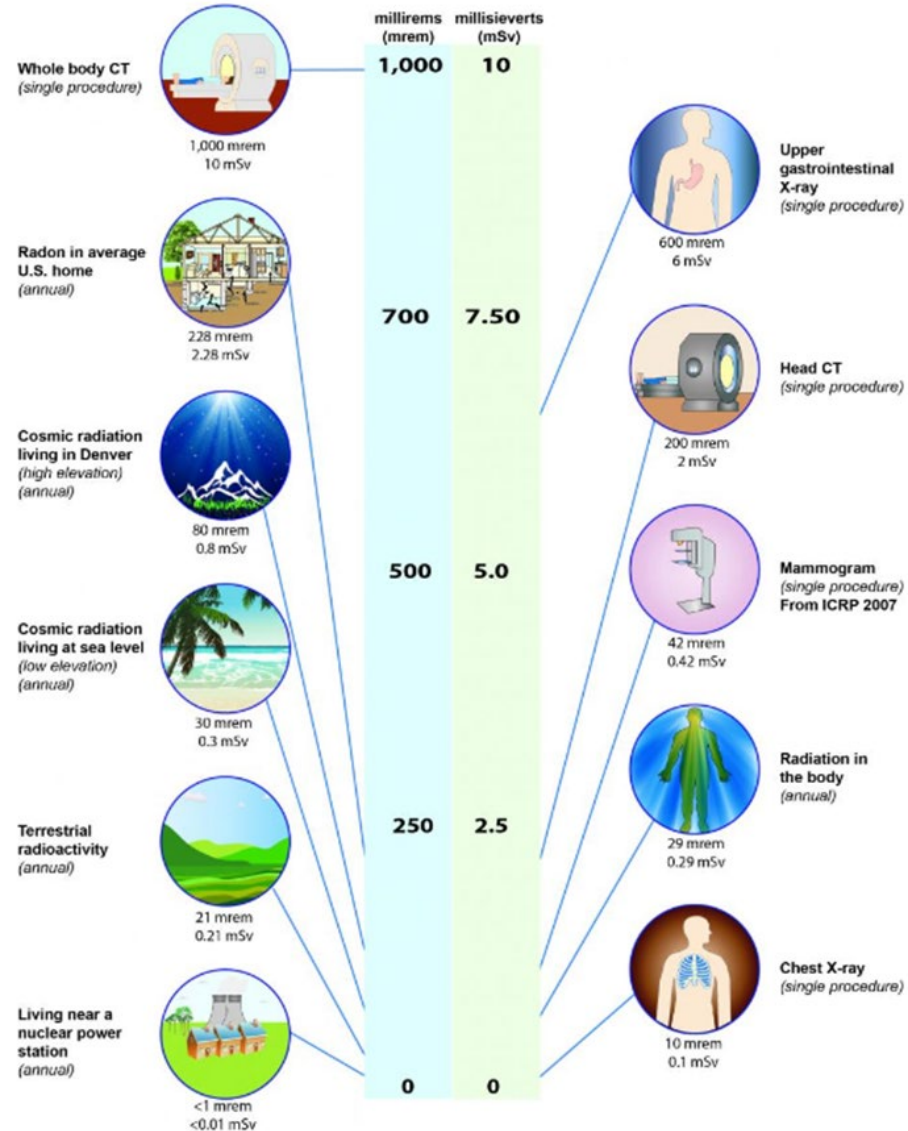
Reflecting our focus on safety, we are in full compliance with industry guidance and all regulatory standards regarding radiological and nuclear safety.

Amounts of Radiation from Common Sources	Millirems
Average annual radiation exposure from all sources	624
Natural background radiation	311
Medical procedures	300
Consumer products (air travel, smoking, building materials, etc.)	13
Remainder (including living near a nuclear power station)	Less than 1

Radiation Sources

RELATIVE DOSES FROM RADIATION SOURCES

All doses from the National Council on Radiation Protection & Measurements, Report No. 160 (unless otherwise denoted)



Dose from Liquid Effluents

- 2019 dose to total body of hypothetical person at site boundary from all liquid effluents
- The corresponding percent of Technical Specifications limits were reported in the ARERR.

0.000031 millirem per year

0.0001 % of Tech Spec Limit

- The site boundary is approximately 800 yards from the plant

Annual Radioactive Effluent Release Report

3 yr Summary of Liquid Releases

Liquid Waste	2019	2018	2017
Total Activity Excluding Tritium (Ci)	3.27E-02	1.99E-02	2.37E-02
Tritium Activity (Ci)	2214	2111	1909
Total Body Dose (mRem)	3.10E-5	1.46E-05	1.50E-05
Total Volume of Primary Liquid Waste Released (liters)	7.19E+06	6.06E+06	5.54E+06

Annual Radioactive Effluent Release Report

Dose from Gaseous Effluents

- 2019 dose to hypothetical person at site boundary (800 yards from plant) from noble gas

Unit 1	Unit 2	Total
0.00049 millirad / yr	0.0011 millirad / yr	0.0016 millirad / yr
0.0049 % of T.S. Limit	0.011 % of T.S. Limit	0.016 % of T.S. Limit

- 2019 dose to nearest actual resident located NW sector at 3.6 miles from iodine, particulate, and tritium

Unit 1	Unit 2	Total
0.00019 millirem / yr	0.00015 millirem / yr	0.00034 millirem / yr
0.0013 % of T.S. Limit	0.001% of T.S. Limit	0.0023% of T.S. Limit

Annual Radioactive Effluent Release Report

3 yr Summary of Gaseous Releases

Gaseous Waste	2019	2018	2017
Tritium (Ci)	73.2	79.6	79.0
C-14 (Ci)	19.5	22.4	21.6
Fission and Activation Gases (Ci)	1.09	1.11	0.70
Total Particulates with half-lives >8 days (Ci)	6.75E-05	1.95E-05	2.69E-05
Gross Alpha (Ci)	4.99E-07	5.41E-07	2.94E-06
Iodine (Ci)	0	0	0
Calculated Gamma Air Dose (mRad)	1.56E-03	2.11E-03	1.41E-03
Calculated Beta Air Dose (mRad)	6.52E-04	7.63E-04	5.00E-04
Total Body Dose (mRem)	2.08E-03	2.34E-03	2.27E-03
Number of Refueling Outages	2	1	1
Unit 1 Capacity Factor	90.18%	99.03%	83.34%
Unit 2 Capacity Factor	74.81%	87.30%	99.71%

Direct Radiation

- 2019 dose to personnel of onsite makeup water facility from direct radiation

4.5 millirem per year

**18 % of 40 CFR Part 190 Limit
(40 CFR Part 190 is not applicable to personnel within the plant restricted area. This calculation was performed to demonstrate the upper limit for any member of the public)**

Sources of Direct Radiation	2019	2018	2017
Warehouse A, ISFSI, Onsite Storage Casks, Old Steam Generator Storage Facility	4.5 mrem	4.7 mrem	4.7 mrem

Thermoluminescent Dosimeters (TLDs)

- Direct ambient radiation was continuously measured at 32 locations surrounding DCPD using TLDs
- These 32 locations are made up of 29 indicator stations and 3 control stations
- Three TLD badges are placed at each location, and each badge has three detectors to provide an average dose at each location collected and read every calendar quarter
- The results are trended and compared with preoperational and historical operating values to look for adverse trends
- **No adverse trends were noted for 2019**

Air samples

- 6 Indicator stations and 1 Control station
- Sampled weekly



DCPP air sampling station equipment

Environmental samples

- Samples included surface water, drinking water, marine samples, vegetation, food crops, milk, and meat



No DCCP related radionuclides were detected in:

- Drinking water samples
- Ocean surface water samples
- Marine Biological samples
- Marine Aquatic Vegetation
- Recreational Beach Sampling
- Vegetation (Food Crops)
- Milk
- Meat Products

Independent Spent Fuel Storage Installation (ISFSI)

- At the end of 2019, a total of 58 casks stored within ISFSI
- Eight TLD locations surrounding the ISFSI
 - In addition to the 32 TLDs discussed earlier
- ISFSI located within the site boundary
- ISFSI loading has not affected the TLD trending results with respect to the 32 locations surrounding DCP
- An evaluation of direct radiation measurements and member-of-public occupancy times surrounding the ISFSI has indicated that all federal criteria for member-of-public dose limits are being conservatively met

Radiological Effluent Control Program

Qualification

Personnel involved in direct implementation of chemistry/radiochemistry, operations, or radiation protection activities in support of the Radiological Monitoring and Controls Program are qualified in accordance with the requirements of TQ1, Personnel Training and Qualification

Quality Assurance

- Instrument performance used for analytical processes are controlled under CAP Q-1, Chemistry Lab Quality Control Program
- Analytical confidence
 - Radioactive Effluent replicate, split and spike Program
 - REMP split samples sent California Department of Public Health - Radiologic Health Branch.
 - Offsite labs are audited
 - Participation in an Interlaboratory Comparison Program

Conclusion

- Impact of operations are well below federal approved limits
- This has been confirmed by environmental sampling around the plant indicating no unusual environmental isotopic findings from DCPD site operations
- Results were compared to preoperational data and showed no unusual trends

Thank you

David Cortina

Generation Operating Plan Update

Diablo Canyon Power Plant

Shane Guess, Generation Business Planning

February 17, 2021



Together, Building
a Better California

2020 Operating Plan Results

Nuclear Generation: Looking Back at 2020

- Completed the 1R22 refueling outage safely, on schedule, and within budget
- NRC performance results in Diablo Canyon in the highest performance category: Column 1, Licensee Response
- Establishment of robust safety standards at DCPD for COVID-19 prevention, including remote work where possible
- DCPD maintained a skilled, proficient workforce during the Tier 1 retention period

2020 Operating Plan Results

Measurable Results

Metric	Goal	Actual
DCPP Reliability & Safety Indicator	95.0	92.5
1R22 Outage Radiation Exposure	<30.5 REM	26.7 REM
Preventable Motor Vehicle Incidents	1 st quartile	1 st quartile
Days Away, Restricted, or Transferred Cases	1 st quartile	1 st quartile
Lost Work Day Cases	1 st quartile	1 st quartile
Regulatory Findings	No significant	No significant
NRC Reactor Oversight Process	Column 1 and no cross-cutting issues	Column 1 and no cross-cutting issues

Generation Operating Plan Update

Our Operating Plan reflects Generation's commitment to the PG&E Mission and Vision of delivering safe, reliable and affordable energy to our communities and supporting the state's goals for a clean energy future

2021-2025 GENERATION OPERATING PLAN

Our line-of-sight roadmap to providing **SAFE, RELIABLE + AFFORDABLE** energy to our customers.

Our Mission

Generation provides safe, reliable, and affordable energy to California's customers.

We serve our customers in Northern and Central California across 172 MW of conventional hydro, 1,700 MW of pumped storage, and 1,700 MW of solar.

Conventional Hydro is across Northern and Central California to 172 MW.

Hells Pumped Storage (in the form of water) up to 1,700 MW.

Diablo Canyon's two units in 1984 and 1985, producing 1,700 MW.

Colusa and Gateway plants, producing 557 MW respectively.

Humboldt Bay General Station in Northern California with 1,700 MW of natural gas.

Photovoltaic Solar projects across 13 sites.

Serving our Customers

The Electric Generation

Californians have choices on how they generate electricity from a generator or other sources.

On behalf of our customers, PG&E:

- Maintain **safety** as our top priority.
- **Relentlessly execute** and deliver on our promises to our customers.
- Invest in our **people** and equipment.
- Meet and exceed our customers' expectations.
- Keep our **commitments** – relationships, focusing on safety.
- Drive **financial stability** through cost-effective operations and long-term cost profile.

Generation serves our customers with a focus on safety, reliability, and affordability.

Generating Excellence

Focusing on Safe, Reliable, and Affordable Operations

At PG&E safety is our over-riding responsibility. We must always ensure our actions protect the health and safety of our employees, contractors, the public, and the communities we serve. At the same time, we must continue to look for innovative ways to reduce business risks and ensure we meet our commitments.

Generation supports this by focusing on the safe, reliable, and affordable operation of our facilities, and engaging and tapping the power of participation of our entire team. Our continued success greatly depends upon each employee's alignment with PG&E's Mission, Vision, and Culture, and actions taken by the five Generation Governance Committees in this Operating Plan.

As we prepare for the future decommissioning of Diablo Canyon and divestiture of some of our hydroelectric facilities, our plans will be in full compliance with all laws and regulations. We will continue to work with federal and state agencies, public officials, local leaders, tribal entities, and our neighbors to determine the most appropriate future uses of Generation lands and facilities.

Our Line-of-Sight to Generating Excellence

Our Mission

To safely and reliably deliver affordable and clean energy to our customers and communities every single day, while building the energy network of tomorrow.

Our Vision

With a sustainable energy future as our North Star, we will meet the challenge of climate change while providing affordable energy for all customers.

Our Focus	Safety	People	Customer	Risk-Informed Work & Resource Plan	Commitments	Relentless Execution	Willing Mitigation	Financial Stability
Our Culture	We put safety first.	We value diversity and inclusion. We speak up, listen up, and follow up.	We are here to serve our customers.	We are accountable. We act with integrity, transparency, and humility.	We are accountable. We act with integrity, transparency, and humility.	We succeed through collaboration and partnership. We are one team.	We put safety first.	We embrace change, innovation, and continuous improvement.
My Action	Am I following all standards?	Am I holding myself and others accountable?	Am I operationally focused?	Do I understand the risk associated with my work?	Am I meeting our regulations, commitments and fostering trust?	Am I operationally focused?	Am I following all standards?	Is there a better way?

2021 Looking Forward

Our Line-of-Sight to Generating Excellence

Our Mission

To safely and reliably deliver affordable and clean energy to our customers and communities every single day, while building the energy network of tomorrow.

Our Vision

With a sustainable energy future as our North Star, we will meet the challenge of climate change while providing affordable energy for all customers.

Our Focus	Safety	People	Customer	Risk-Informed Work & Resource Plan	Commitments	Relentless Execution	Wildfire Mitigation	Financial Stability
Our Culture	We put safety first.	We value diversity and inclusion. We speak up, listen up, and follow up.	We are here to serve our customers.	We are accountable. We act with integrity, transparency, and humility.	We are accountable. We act with integrity, transparency, and humility.	We succeed through collaboration and partnership. We are one team.	We put safety first.	We embrace change, innovation, and continuous improvement.
My Action	Am I following all standards?	Am I holding myself and others accountable?	Am I operationally focused?	Do I understand the risk associated with my work?	Am I meeting our regulations, commitments and fostering trust?	Am I operationally focused?	Am I following all standards?	Is there a better way?

2021 Generation Operating Plan Key Elements



Generation Operating Plan Update

Key Focus Areas in the Generation Operating Plan

Safety



People



Customer



Relentless
Execution



Wildfire
Mitigation



Risk-Informed
Work &
Resource Plan



Commitments



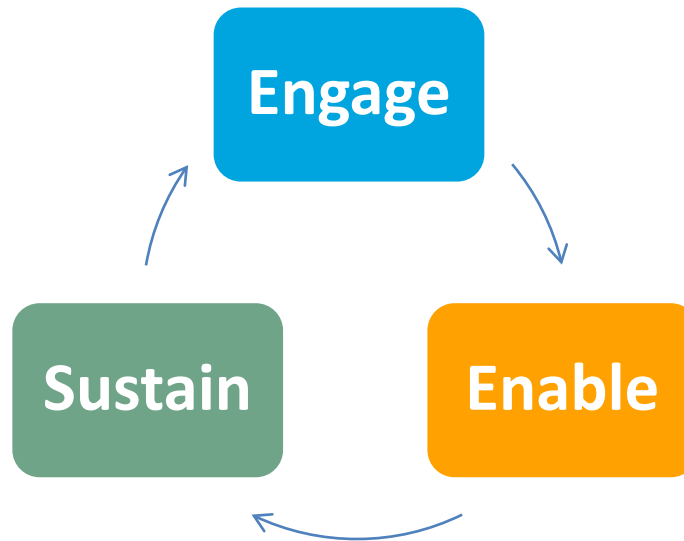
Financial
Stability



2021 Generation Operating Plan

Focusing on Safe, Reliable, and Affordable Operation through 2025

Nuclear Generation's primary focus continues to be on the safe and reliable operation of Diablo Canyon through engaging and tapping the power of participation of our entire team.



2021 Generation Operating Plan

2021 Key Work Projects and Initiatives

- Maintain 1st quartile safety performance
- Execution of one refueling outage (2R22)
- Planning and preparation for two refueling outages in 2022
- 1st year of Tier 2 retention period for DCCP employees
- Pathways Program, Phase 2 (“Building Your Pathway”)
- Nuclear Regulatory Commission Evaluated Emergency Planning Exercise
- Last initial operator license class

2021 Generation Operating Plan



Safety

- Continuing to promote a culture of “Speak-Up, Listen-Up, and Follow-Up” to ensure an emotionally safe environment



People

- Continuing to foster safety culture through an engaged and involved workforce

2021 Generation Operating Plan



Customer

- Focusing on proper planning, preparation, and execution to improve reliability



Relentless Execution

- Leveraging our safety culture, leadership and mature processes to ensure we are the utility our customers expect us to be

2021 Generation Operating Plan



Wildfire Mitigation

- Resolving issues in a timely manner to maintain safe, event-free operations and continue to improve behaviors to standards



Risk-Informed Work & Resource Plan

- Implementing principles for excellence in Integrated Risk Management by continuing to leverage quantitative risk evaluation methodologies for risk-informed decision making

2021 Generation Operating Plan



Commitments

- Documenting areas for improvement and actions to improve in the Corrective Action Program (CAP)



Financial Stability

- Complete program and business unit workplan and commitments within budget

Thank you

Shane Guess

Generation Business Planning

Diablo Canyon Power Plant

U2 AFW Piping Leak Root Cause Evaluation

Russ Prentice
Director, Risk and Compliance
&
Root Cause Sponsor
Diablo Canyon Independent Safety Committee



Together, Building
a Better California

Problem Statement

Object:

- Unit 2 Auxiliary Feed Water (AFW) system piping on the elbow downstream of Steam Generator (SG) 2-2 AFW Control Valve

Defect:

- An approximate 1/16-inch diameter hole in the piping resulted in a calculated 3.9 gpm leak

Consequence:

- Two trains of AFW were declared inoperable on July 24, 2020, per Technical Specification, which required a mode transition to Mode 4. Unit 2 was in Mode 3 at the time of the event

Problem Statement

A Root Cause Evaluation was conducted to address this problem.

Root Cause Evaluation: *A formal investigation that uses industry-accepted analysis methods to determine the root cause(s) of a problem.*

Event Summary – What Happened

- On July 23, 2020, during shiftly operator rounds at 1100, the Unit 2 Turbine Watch noticed water coming down from the U2 AFW pipe rack (leaking out from under the insulation covering the pipe elbow just downstream of the SG 2-2 AFW Control Valve)
- Maintenance removed the insulation and a 1/16-inch diameter hole was revealed
- At the time of discovery, Unit 2 was shutdown in Mode 3
- AFW was in service feeding the steam generators with 10 percent steam dumps as the heat sink method
- The location and magnitude of the leak required declaring two trains of AFW Inoperable per the plant Technical Specification

Event Summary – Observed Leak



AFW Pinhole Leak (Isolated)



Immediate Mitigating Actions

- Station personnel weld repaired the pinhole leak
- The AFW system piping was walked down to confirm no other active leakage was present
- Engineering performed ultrasonic testing on piping to determine wall thinning on AFW system piping
 - Result of walkdown:
 - Several areas of AFW piping showed wall thinning below acceptable ASME minimum wall-thickness. These affected areas were weld repaired in addition to the weld repair performed on the leak

Causes

Direct Cause

Damaged insulation on cold AFW piping allowed moisture and contaminants to penetrate the aluminum jacket and become absorbed by the calcium interior.

These conditions led to a process called Corrosion Under Insulation (CUI) which caused an accelerated localized external corrosion.

Root Cause

Industry learning from external operating experience regarding the concept of corrosion under insulation (CUI) and the vulnerabilities it introduces to cold insulated piping was not appropriately utilized nor incorporated into the Engineering Walkdown and Inspection Processes.

Corrective Actions to Prevent Recurrence (CAPRs)

CAPRs 1-4:

Permanently remove insulation from all indoor and outdoor U1/U2 AFW discharge piping that is not required for equipment performance and recoat piping. Restore or replace any affected AFW piping that does not meet the minimum ASME code for wall thickness.

CAPR5 (Complete):

Revise "Operating Experience Program" procedure to add a step in the "Evaluation Guidelines".

CAPR6 (Complete):

Revise "System Engineering Program" procedure to add additional information regarding cold piping that can be vulnerable to Corrosion Under Insulation (CUI).

CAPR7 (Complete):

Revise "Containment Pipeway Structure Aging Management Program" procedure to add additional information on piping vulnerable to CUI.

CA1 (Complete):

Revise “Design Change Development” procedure to include consideration of Corrosion Under Insulation (CUI) as a potential failure mode in the “Material Compatibility” portion.

CA2:

Conduct training that addresses the topic of "the effects of CUI, associated vulnerabilities, and symptoms/conditions that lead to CUI" for engineering personnel.

CAs 3-4 (Complete):

Apply accountability to the evaluator and screener responsible for the technically inaccurate Operating Experience (OE) evaluations.

EOC CAs 1-6:

During the next U1 and U2 refueling outages, remove a sample of insulation and inspect for leakage or piping damage on the following systems: Steam Generator blowdown lines, Feedwater Regulating Valve bypass piping, Main Feedwater drain piping.

EOCa CA1:

Perform an inspection of the U1/U2 systems vulnerable to CUI to identify and resolve observed insulation and corrosion damage. Affected systems to be inspected:

- Main Feedwater (MFW)
- Main Steam
- Turbine Driven AFW Steam Supply
- HVAC (Control Room, Aux Building, Containment)
- Component Cooling Water (CCW)

EOCa CA2:

Revise "Plant Material Condition and Housekeeping" procedure to provide guidance for identification of insulation damage or degradation for submittal into the corrective action program.

Thank you

Russ Prentice
Director, Risk and Compliance
& Root Cause Sponsor

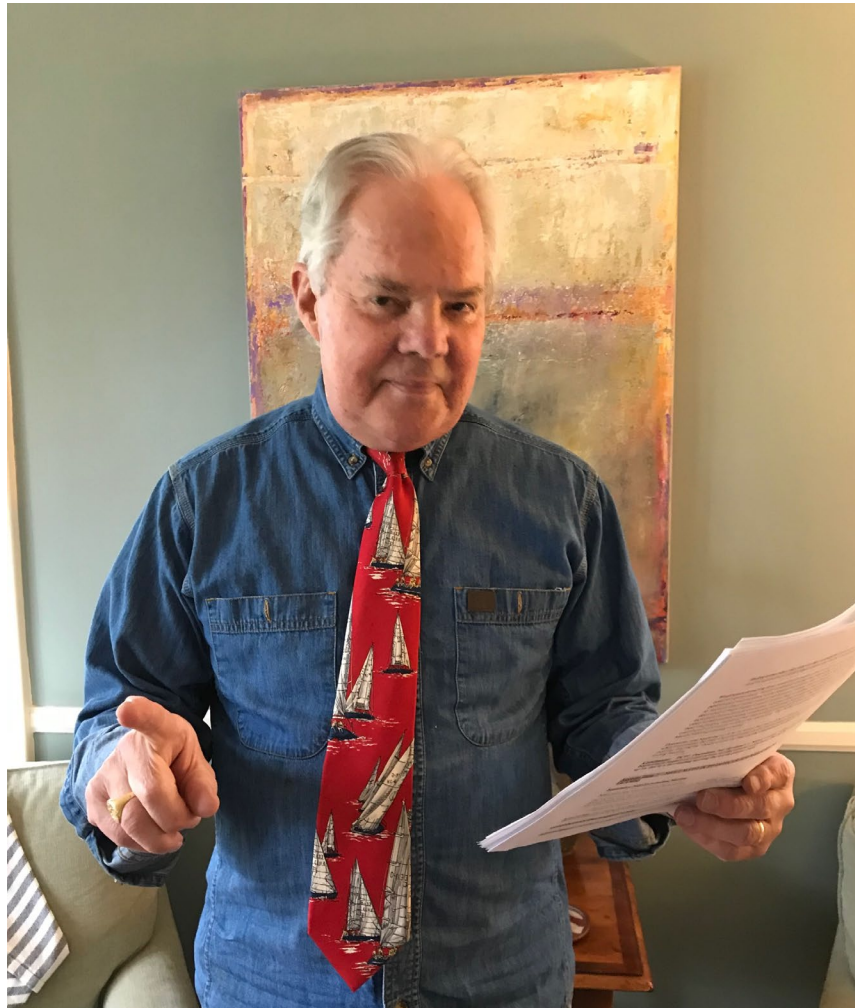


December 14-15, 2020 Fact-finding Report

Per F. Peterson, Member, and R. Ferman Wardell, Consultant



Apologies for No Tie – the Tie I Would Have Worn





December 14-15, 2020 Fact-finding Report

Per F. Peterson, Member, and R. Ferman Wardell, Consultant

1. RFO 1R22 Foreign Material Exclusion and COVID Experience
2. Motor- and Air-Operated Valve Testing Programs
3. Electronic Work Packages
4. Meeting with NRC Senior Resident Inspector
5. Workplace Seismic Safety: Control Room Procedure Cart
6. Operations Equipment Status Control Issue Update
7. Meeting with Jim Welsch, DCPD Chief Nuclear Officer
8. Safety-Security Interface and Intake Structure Devitalization
9. Turbine-Generator Health
10. Meeting with Maureen Zawalick, VP, Generation, Business & Technical Services



RFO 1R22 Foreign Material Exclusion and COVID Experience

- **RFO 1R22 October 4 – November 11, 2020**
 - **COVID: Good outage performance**
 - COVID Prevention Program
 - COVID Outage Response Coordinator
 - DCPD personnel: no new cases
 - 800 contractor personnel: Two initial, one during outage
 - **FME: Good outage performance**
 - Excluding foreign objects from entering open components
 - No Level 1 or 2 FME violations (most significant)
 - Nine Level 3 or lower FME violations



Motor- and Air-Operated Valve Testing Programs

- Periodic stroke testing of valves to assure operability
- 1900 AOVs and MOVs tested by Maintenance during outages
- Valve Categories 1, 2, 3, and 4
- Tested by automated test machine
- Outage 1R22: 44 AOVs and 23 MOVs tested successfully
- Both AOV and MOV Valve Programs were Green (Healthy)



Electronic Work Packages

- All work is performed in accordance with Work Packages
- Drawings, equipment manuals, procedures, etc.
- Industry moving from paper to electronic work packages
- DCPD at 2% EWP's with goal of 50% by end of 2020
- DCPD EWP's used for simple work: painting, insulation, scaffolding, testing, etc.
- DCPD is proceeding slowly due to the significance of this change and due to the closeness of the plant shutdown in 2025



Electronic Work Package Tablet





Typical EWP Screen

64174607-0010 SAP Operation Detail, Instructions1 of 7

OPERATION

SAP Operation Detail, Instructions

RMS

CURRENT
Updated: 04/09/2019

DATA SHEETS

Configuration Documentation sheet

RMS

CURRENT
Updated: 04/09/2019

Job Hazard Analysis

Updated: 04/09/2019

U-1

Order: 64174607

Operation #: 0010

User Status: 80

Order/Wrk: DP80

CRDM MG Set 1-2: Lube Motor/Gen Bearings

CRDM MG Set 1-2: Lube Motor/Gen Bearings

CLOS Wrk Cntr: MED-MTRM SFM Pre-Aprvl?

RPM P3e SID: DALY NO

OPERATION FLOC (PRIMARY)

Funct Loc: DC-1-41-E-GN-CRDM2

CONTROL ROD DRIVE MOTOR GEN 1-2

Rad Map Info: 0162.00 Q 9

Unit/Area/Elev: 1 H 115

QA CL: B Des CL: II EQ: N CL IE: N Inst CL: ISI CL:

FLEX: ERC: 2A PME: N B.5.b: CDA: NIS PRA Sig:

MAINTENANCE QUALITY CLASS AND GENERAL INFORMATION

Maint CL: B Section XI? N EQ Maint?: N Seismic Maint?: N Planner: MFC4

Clearance #

RWP#: Estimated Dose

SCHEDULE INFORMATION

TLS: NONE Control Rm Impact: NON System Breach: N Clearance: A

Action Tracking: REQUESTED

RIO Ranking Nbr:

Back

View

Actions

+

-

+

CMPLT RMKS



Meeting with NRC Senior Resident Inspector

- **Meet with SRI or RI each fact-finding meeting**
 - **Outage 1R22**
 - **Unit 2 forced outages**
 - **NRC access to DCPD data, information**
 - **DCPD safety culture as end of generation nears**
 - **Workplace seismic safety**
 - **Meetings with NRC resident inspectors are beneficial**



Workplace Seismic Safety: Control Room Procedure Cart

- Employee safety/effectiveness during and following seismic event
- Control Room procedure cart stability during earthquake
- DCPD analysis performed in 2010
- Cart will move some but not damage important equipment or personnel
- Paper procedures will remain in cart



Operations Equipment Status Control Issue Update

- Operations Procedure “Plant Status Control” – proper equipment configuration
- Challenges/problems identified in 2019
- Issue escalated in late 2019: led to Yellow Operations performance
- Operations developed “Plant Status Control Action Plan”
- Issue subject to several DCISC fact-finding and public meeting discussions
- Action Plan complete and effectiveness review positive
- Performance currently satisfactory
- Close DCISC Open Item



Meeting with Jim Welsch, DCPD Chief Nuclear Officer

- Meetings with DCPD Officers & Directors each fact-finding mtg
- Discussed fact-finding items and other areas of interest
- Meetings with DCPD Officers & Directors Are Beneficial



Safety-Security Interface and Intake Structure Devitalization

Safety-Security Interface

- Effects of security changes on nuclear safety & vice-versa
- Standard DCPD review item for plant & procedure changes
- DCISC reviews regularly
- DCPD program effective -- no issues

Intake Structure Devitalization

- Intake structure houses safety related Auxiliary Salt Water Pumps and originally a vital security area
- Analysis showed alternatives to ASW pumps available
- Intake structure reclassified non-vital area
- Analysis and reclassification satisfactory



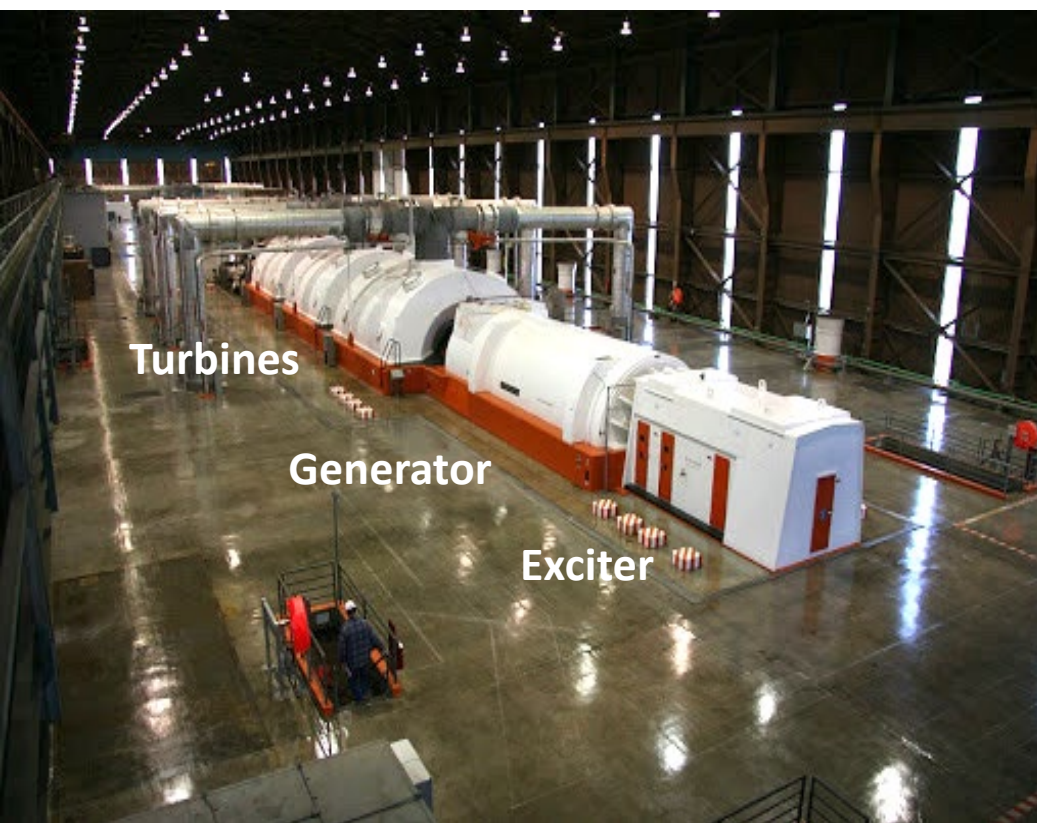
Turbine-Generator (T-G) Health

- T-G converts thermal energy to mechanical energy and to electrical energy, or
- Nuclear heat to steam to rotation to electricity
- Turbine is Siemens-Westinghouse HP turbine connected on same shaft to 3 Alstom LP turbines
- 3411 MW thermal and 1118 & 1138 MW electric @ 1800rpm
- T-G health:
 - Unit 1 Turbine: Green
 - Unit 1 Generator: Green
 - Unit 2 Turbine: Green
 - Unit 2 Generator: Red (hydrogen leak)

Cont'd,



Turbine-Generator (T-G) Health, Cont'd





Meeting with Maureen Zawalick, VP, Generation, Business & Technical Services

- **Generation Asset Strategy**
- **Geosciences**
- **Regulatory and Risk Management**
- **Strategic Initiatives**
- **Business Planning**
- **Nuclear Fuel**
- **Risk and Compliance**
- **Nuclear Decommissioning**
- **Generation Performance Improvement and Corrective Action Programs**
- **Business and Technical Services**



December 14-15, 2020 Fact-finding Report

Per F. Peterson, Member, and R. Ferman Wardell, Consultant

1. RFO 1R22 Foreign Material Exclusion and COVID Experience
2. Motor- and Air-Operated Valve Testing Programs
3. Electronic Work Packages
4. Meeting with NRC Senior Resident Inspector
5. Workplace Seismic Safety: Control Room Procedure Cart
6. Operations Equipment Status Control Issue Update
7. Meeting with Jim Welsch, DCPD Chief Nuclear Officer
8. Safety-Security Interface and Intake Structure Devitalization
9. Turbine-Generator Health
10. Meeting with Maureen Zawalick, VP, Generation, Business & Technical Services

Diablo Canyon Power Plant

Engineering Organizational Changes and Excellence Plan

Pat Nugent, Director of Engineering Services

Diablo Canyon Independent Safety Committee

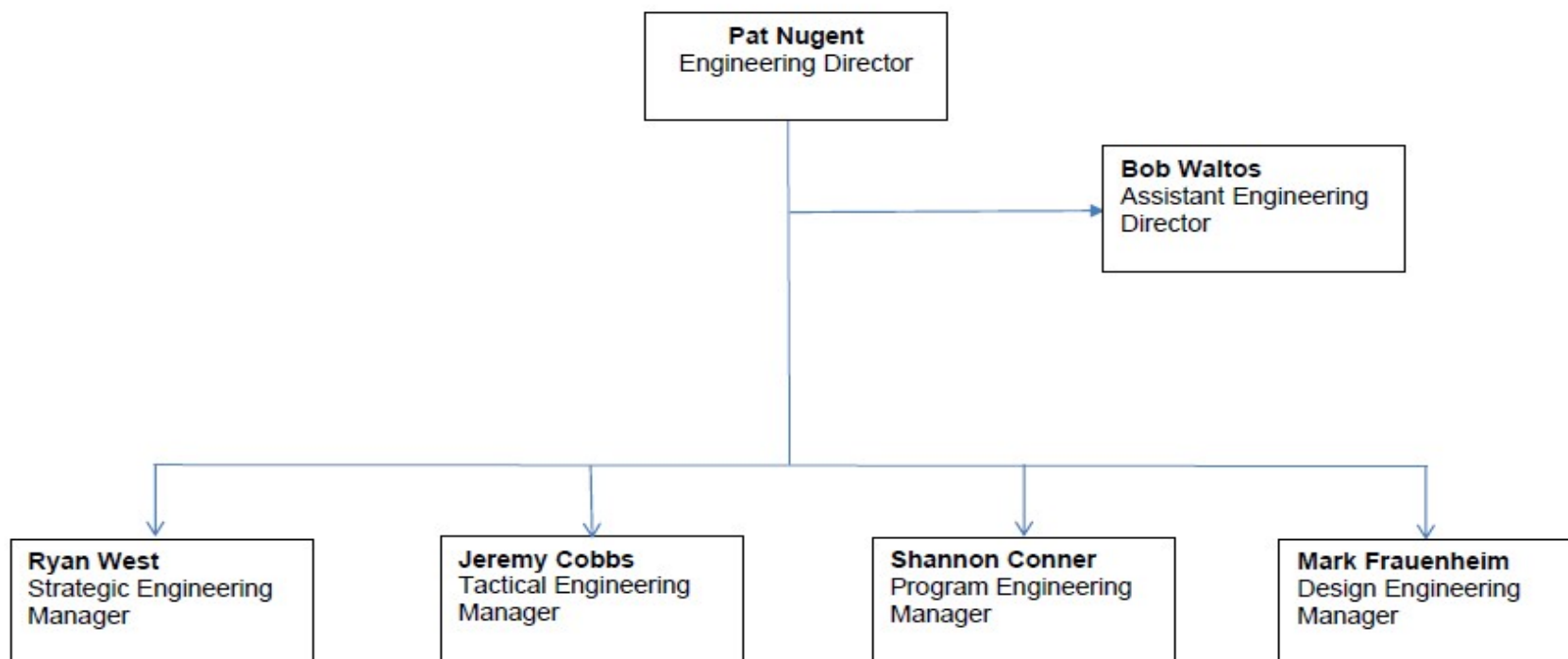
February 17, 2021



Together, Building
a Better California

2021 Engineering Organization

2021 Engineering Services



2021 Engineering Organization

- Engineering Department re-organized in August 2020
 - Engineering re-organized to:
 - Maintain proficiency with decreasing staff size
 - Increase cross-training between engineers
 - Better serve needs of internal customers
 - Changes based on industry guidance and recommendations
 - Engineering Fix-it-Now (EFIN) team expanded to provide additional resources and more rapid response to equipment challenges
 - All component experts grouped together in Tactical Engineering to allow for support of EFIN and rapid response to plant challenges

2021 Engineering Organization

- System engineers grouped together in Strategic Engineering to allow focus on system monitoring and planning for maintaining reliable equipment
- Design Engineering and Project Management combined in anticipation of fewer major projects
- Major engineering programs moved into Program Engineering to allow for continued focus through the end of plant life

2020 Excellence Plan Highlights

- Personnel Safety
 - Eliminated safety vulnerabilities with personnel working remotely
 - Routine reinforcement of safety and human performance tools to staff
- People
 - Successfully implemented engineering reorganization while working remotely
 - Successfully implemented knowledge transfer plans in advance of retirements and departures
 - Established grass roots committee to identify ways to help staff prepare for end of life of plant

2020 Excellence Plan Highlights

- Reliability
 - Unit 1 performance at top of industry
 - Unit 2 performance driven by challenges with main generator
 - Continued strong technical conscience of Engineering staff
- Affordability
 - Identified opportunities to reduce Unit 1 refueling outage work without affecting safety or reliability

2021 Excellence Plan Highlights

- Personnel Safety
 - Monitor health and well-being of staff as we move into second year of working remotely
- People
 - Implement grass roots committee ideas to strengthen PG&E knowledge of DCPD personnel

2021 Excellence Plan Highlights

- Reliability
 - Maintain Unit 1 performance at top of industry
 - Resolve Unit 2 main generator challenges to assure both units operate during summer months when power needed most by customers
 - Maintain strong technical conscience of Engineering staff
- Affordability
 - Identify process improvements to reduce time required for refueling outage equipment testing

Thank you

Pat Nugent, Director of Engineering Services