

An aerial photograph of the Diablo Canyon nuclear power plant. The plant's containment dome is prominent in the center-right. To the left, a large coastal reservoir is bordered by a concrete dam. The ocean is visible on the far left with waves crashing against the shore. The background features rolling green hills and a clear sky.

Diablo Canyon
Independent
Safety Committee

Public Meeting
October 9 and 10, 2024

Avila Lighthouse Suites

Diablo Canyon Power Plant: State of the Plant Update

Justin Rogers
Station Director



Station Update

2





Station Update

Plant Operation

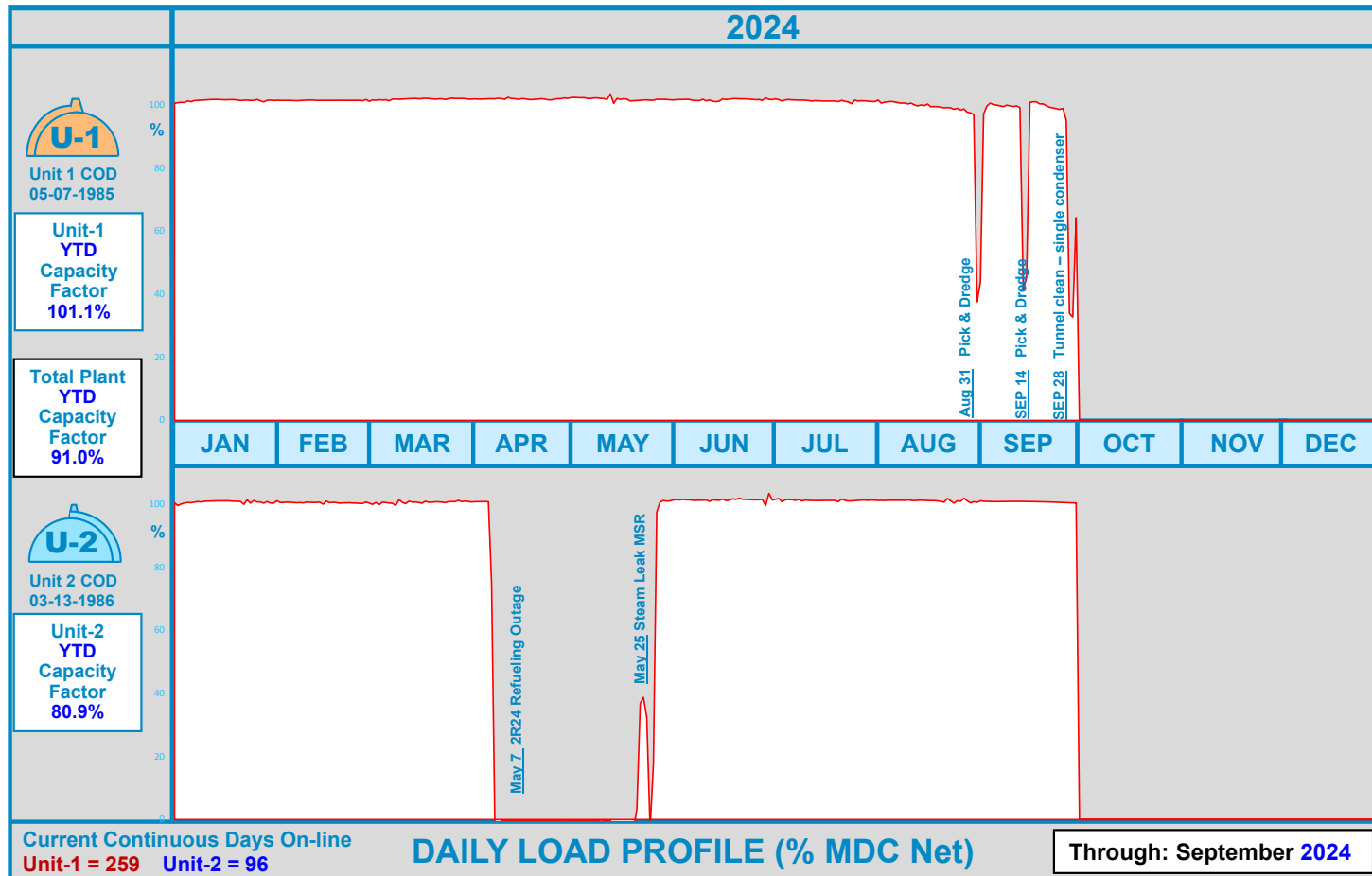
- Units 1 & 2 are safely operating at 100% power
- All NRC Performance Indicators (PIs) are Green





Daily Load Profile: Calendar Year 2024

Daily Capacity Factor Power History Curves





Station Update

Key Events

Recently Completed Activities

- ✓ June-July 2024: Intake Dredging Project
- ✓ July-Oct. 2024: Used Fuel Outage Campaign (on track to complete)
- ✓ June 10-13, 2024: NRC Age-Related Degradation Inspection
- ✓ July-August 2024: Multiple License Renewal Inspections
- ✓ June 24-27, 2024: Nuclear Safety Oversight Committee (NSOC) Onsite Observations
- ✓ July 15, 2024: NRC Operating Exam
- ✓ July 29-Aug 2, 2024: NRC Emergency Preparedness Exercise
- ✓ August 5-19, 2024: World Association of Nuclear Operators (WANO) Peer Review
- ✓ August 12-25, 2024: NRC Radiation Protection Insp
- ✓ August 24, 2024: Annual Siren Test
- ✓ September 9-13, 2024: NRC Problem Identification & Resolution Insp



Station Update

Upcoming Station Activities

Nuclear Safety Oversight Committee (NSOC)

- October 21-24, 2024

Diesel Generator 1-3 Maintenance Outage Window (MOW)

- October 13-21, 2024

Thank You

Justin Rogers
Diablo Canyon Power Plant
Station Director



Diablo Canyon Power Plant Regulatory Performance Update

Jordan Tyman
Director, Risk and Compliance





DCPP Performance Summary

July 2024 – September 2024

- DCPD continues to provide safe, clean, and reliable electricity to Californians
- Since the last update to the DCISC, the NRC oversight of DCPD included approximately ~1500 hours of inspection time
- Update on the very low safety significance violations received since the last DCISC update
- DCPD remains in the highest performance category for all NRC Performance Indicators



NRC Performance Indicators

DCPP remains in the highest performance category

- In addition to performing inspections, the NRC also evaluates every nuclear plant using performance indicators
- NRC gauges licensee performance using 16 separate indicators related to various aspects of plant operation
- DCPP remains in the highest performance category of the NRC's Reactor Oversight Process Action Matrix
 - Inspection findings very low safety significance (i.e., Green)
 - Performance indicators within the expected range (i.e., Green)



Regulatory Update

July 2024 – September 2024

NRC Violations

- All violations received since the last DCISC update were of very low safety significance (as defined by the NRC Reactor Oversight Process)
- Violation themes include:
 - Effective use of some procedures
 - Opportunity to improve configuration control



Regulatory Update

July 2024 – September 2024 Licensee Event Reports (LER)

- There were no LERs issued during the reporting period



Upcoming Inspections

Upcoming NRC Inspections

- DCPD ISFSI Security Inspection – October 2024
- Security Access Control Inspection – October 2024



Licensing Activities

License Amendments

- DCPD has submitted License Amendment Requests to support continued operations which are with NRC for review and approval (e.g., 50.69, industry improvements to Technical Specifications, etc.)



DCPP Regulatory Performance

July 2024 – September 2024

- DCPP remains in the highest NRC regulatory performance category
- All violations received since the last DCISC update were of very low safety significance
- DCPP continues to provide safe, clean, and reliable electricity to Californians

Thank You

Jordan Tyman
Diablo Canyon Power Plant
Director, Risk and Compliance



PG&E Evaluations of Technical Questions on Seismic Safety

**Provided by Dr. Peter Bird in His Letter to the DCISC Dated May
16, 2024, and His Presentation to the DCISC on June 21, 2024**

Jeff Bachhuber, Chris Madugo, Albert Kottke – PG&E Geosciences

Diablo Canyon Independent Safety Commission Public Meeting

October 9, 2024





PG&E SB-846 Seismic Assessment

- The Senate Bill (SB) updated seismic assessment found that continued research since 2015 identified minor changes in the source characterization of hazard-significant seismic sources but no significant increase in seismic risk
- The update found no new seismic information that would change the 2015 assessment conclusions that were reviewed and accepted by the Nuclear Regulatory Commission (NRC)
- The process and results were independently verified by the Participatory Peer Review Panel and a panel from UCLA Garrick Institute for the Risk Sciences
- The study confirms seismic safety of DCP



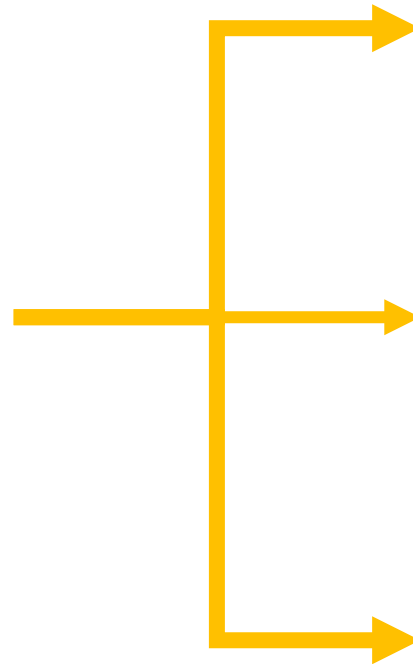
DCISC Review Process

Date	Milestone
2/23	Review initial SB-846 plan with DCISC
3/23	Review detailed SB-846 project plan with DCISC
5/23	Present detailed SB-846 project plan with IPRP
8/23	DCISC observation of Working Meeting #1
9/23	DCISC observation of Workshop #1
11/23	DCISC observation of Workshop #2
12/23	DCISC observation of Results Presentation
2/23	- PG&E submits SB-846 report to DWR - PG&E presents overview to DCISC

Date	Milestone
3/24	DCISC fact-finding meeting
5/24	Dr. Bird Letter to DCISC
6/24	DCISC Public Meeting: - Review of SB-946 report: -IPRP Presentation -Dr. Bird Presentation
8/24	DCISC fact-finding meeting
9/24	DCISC fact-finding meeting

Presentation Outline

- PG&E Model
- Contentions
- Research Program



1. Is there evidence for a previously uncharacterized thrust fault beneath DCPD?

2. Is there evidence that modeled slip rates for faults bounding the Irish Hills are higher than modeled?

3. Does the Noto earthquake indicate increased seismic hazard and risk for DCPD?

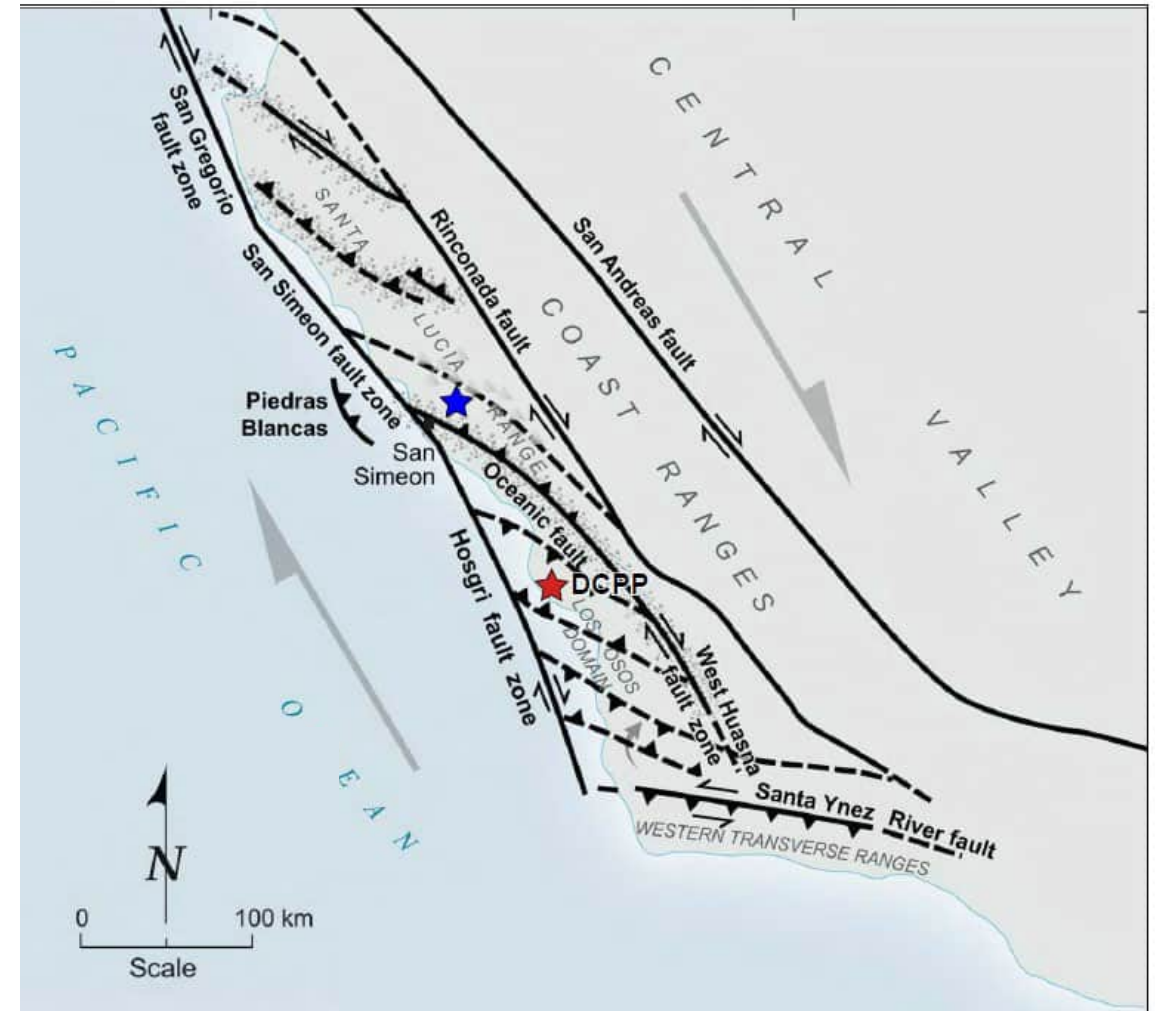


Preview of Findings

- PG&E carefully considered the technical issues raised by Professor Bird
- No evidence has been provided to support the existence of the Inferred Coastline Thrust
- Novel slip rate approaches proposed by Dr. Peter Bird are not validated, have poorly characterized uncertainties, and are not yet accepted by the seismic hazard community
- Modelled PG&E slip rates for reverse faults are consistent with rates modeled using geodetic methods including Shen & Bird (2022)
- Noto earthquake:
 - Not a direct analog for DCPD hazard assessment based on differences in geology, seismicity/activity rates, and scale
 - Not applicable to estimate a core damage frequency
- PG&E hazard model:
 - Captures center, body & range of technically defensible interpretations
 - Reviewed at multiple levels; including acceptance by the NRC

Tectonic Environment

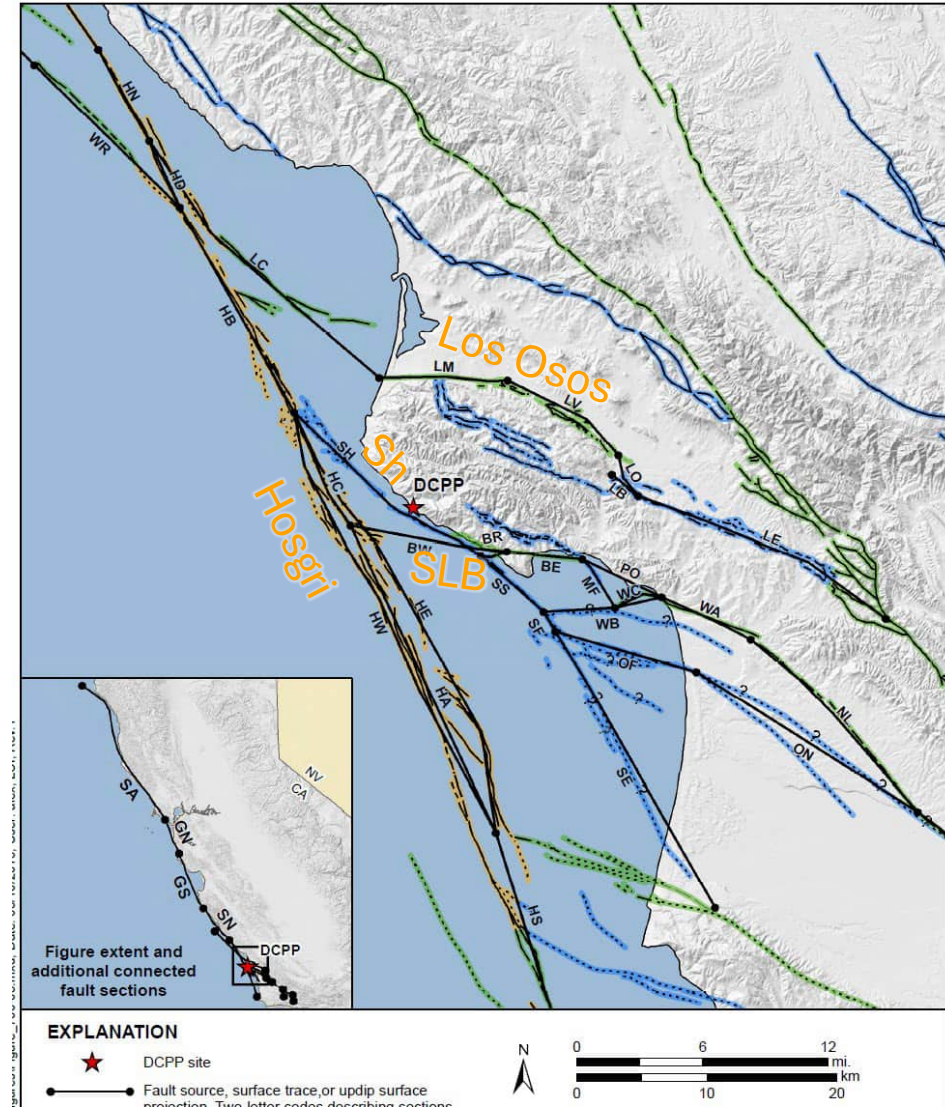
- Region characterized by transpression
- Combination of strike-slip and reverse faulting
- Source model informed by style of observed faulting, stress inversion, San Simeon earthquake



2015 Model: Fault and Fault Source Location

Primary fault sources:

- Hosgri
- Los Osos
- San Luis Bay (SLB)
- Shoreline (S)
- Other faults



DRAFT

Public

PG&E, 2015

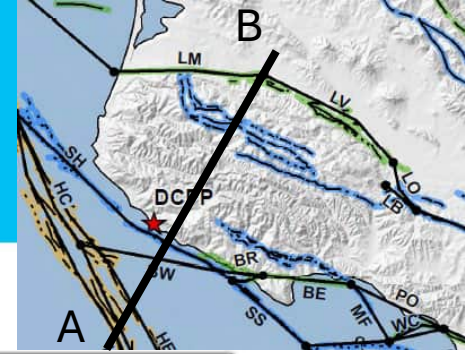


Alternative Fault Geometry Models

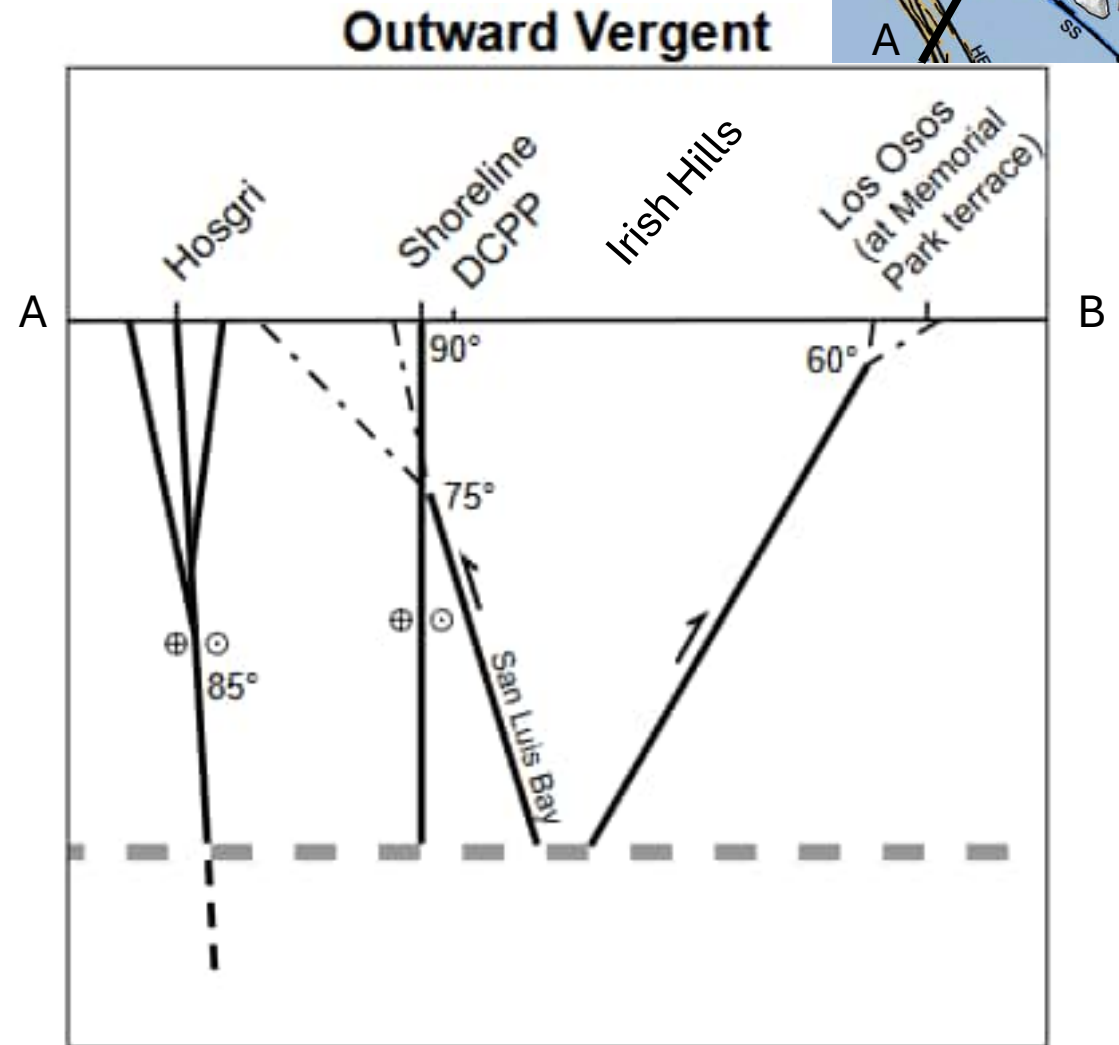
2015 Seismic Source Characterization team developed three alternative fault geometry models:

1. Outward Vergent
2. Southwest Vergent
3. Northeast Vergent

Fault Geometry – Outward Vergent



- San Luis Bay and Los Osos fault work together to uplift Irish Hills
- Consistent with geomorphology, geophysics, seismicity, stress and analog models



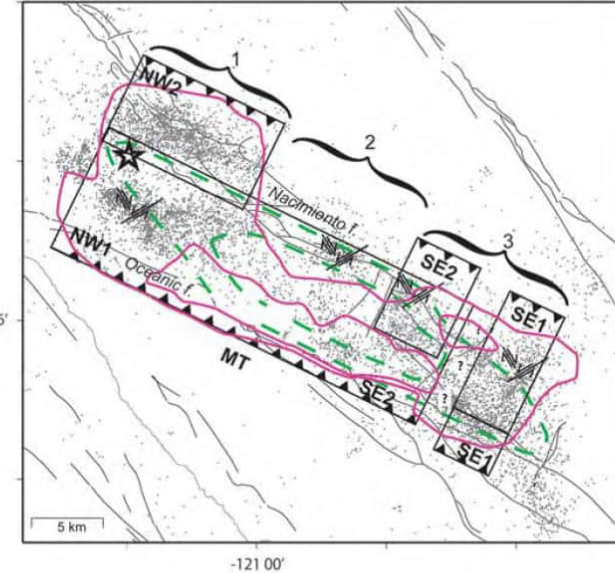
San Simeon Earthquake Analog

- M_w 6.6 earthquake within San Luis Pismo block
- Rupture dip

Data Source	Dip
Focal Mechanism	46
Moment Tensor	32, 50, 58
Seismic Model	60-35-90 45-70

- Pop-up block with dextral transpression

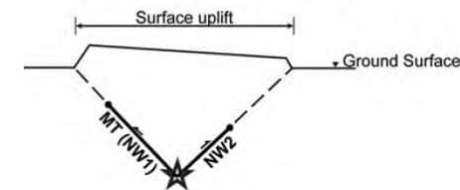
(a) Map View



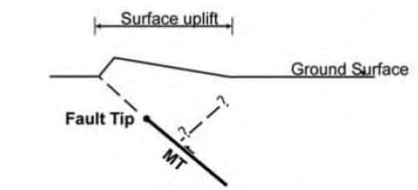
McLaren et al., 2008

Panels (b)-(d). Schematic cross section views across the three bracketed regions showing surface uplift from InSAR and fault motion at depth

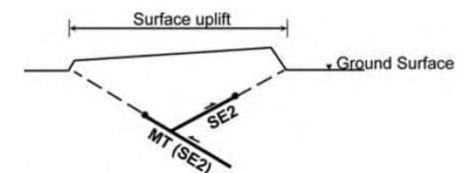
(b) Pop-up block model: Across northwest end of the aftershock zone (bracket 1)



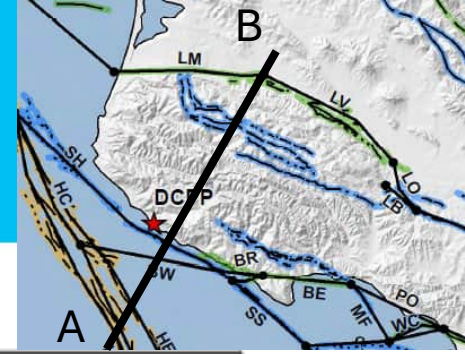
(c) Fault-propagation fold model: Across central section of the aftershock zone (bracket 2)



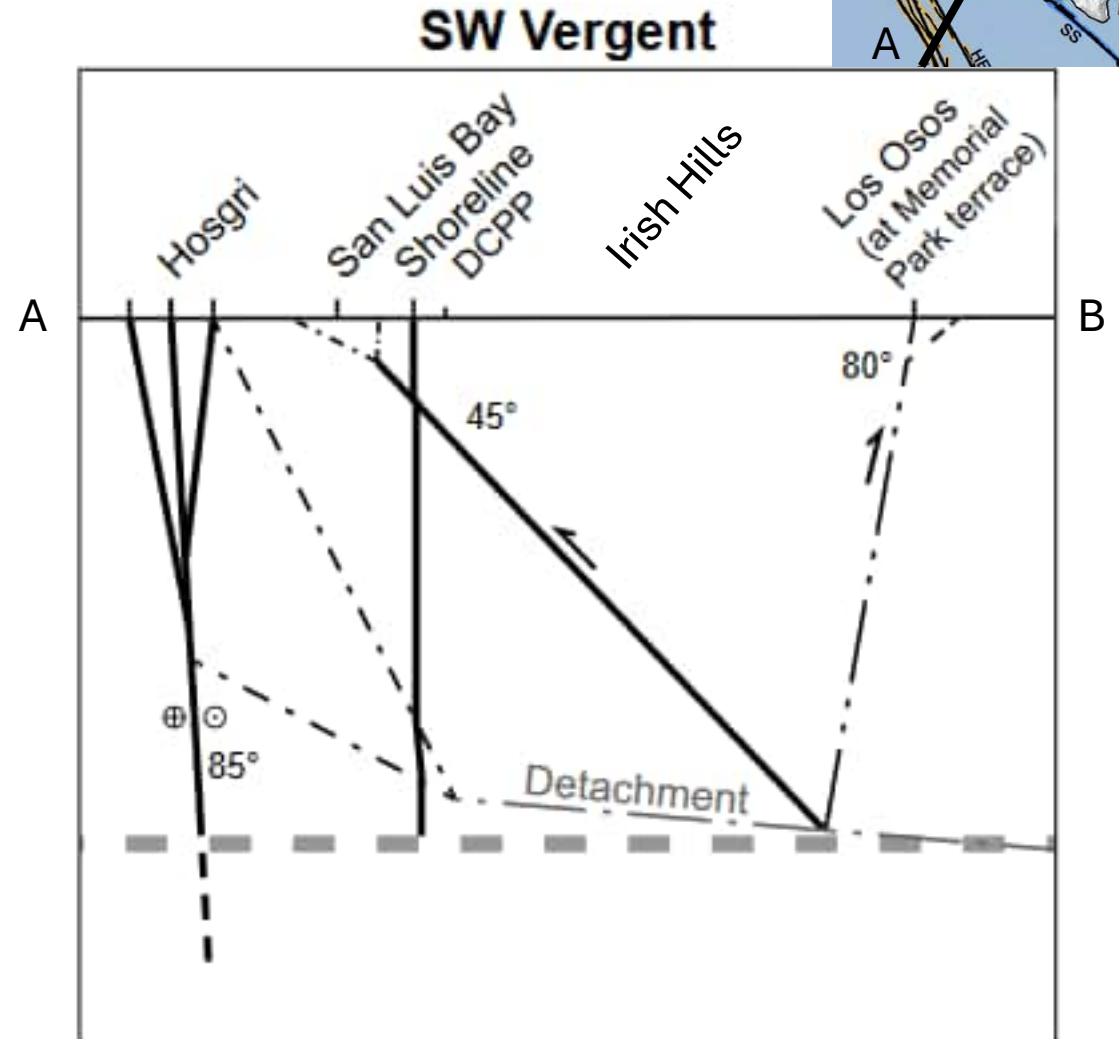
(d) Pop-up block model: Across southeast end of the aftershock zone, near the end of the main thrust (bracket 3)



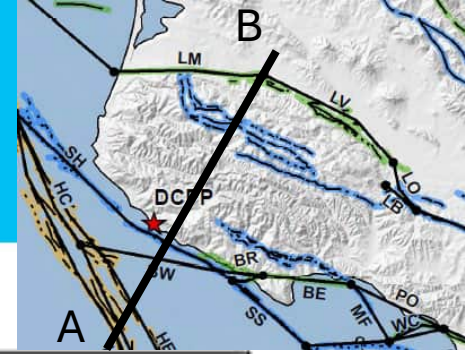
Fault Geometry – Southwest Vergent



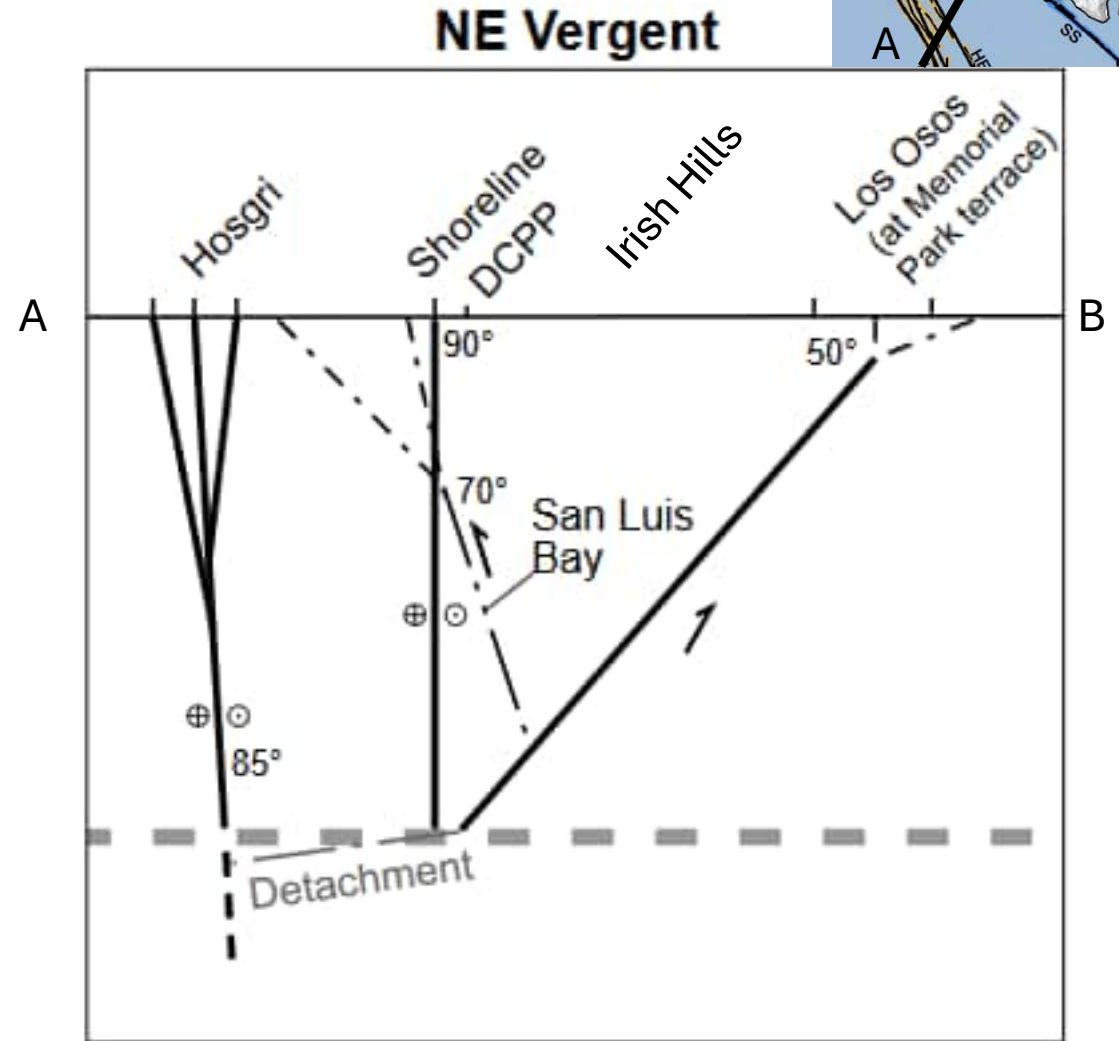
- San Luis Bay fault is the main driver for uplift
- Explores dip uncertainty in San Luis Bay fault
- Incorporates elements of past proposed thrust models



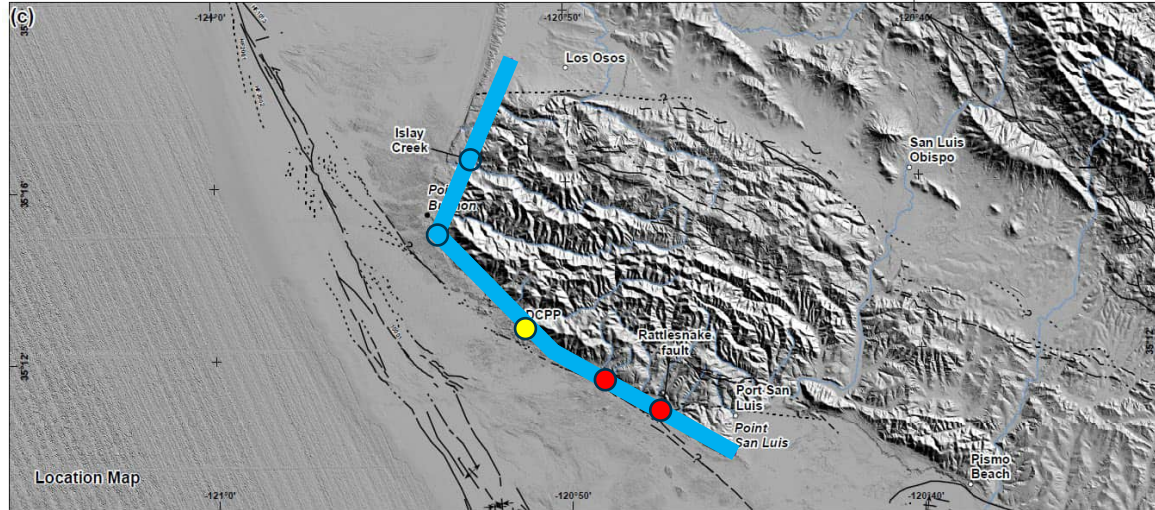
Fault Geometry – Northeast Vergent



- Los Osos fault is the main driver for uplift
- Alternative model for block uplift of the Irish Hills



Reverse Fault Slip Rates



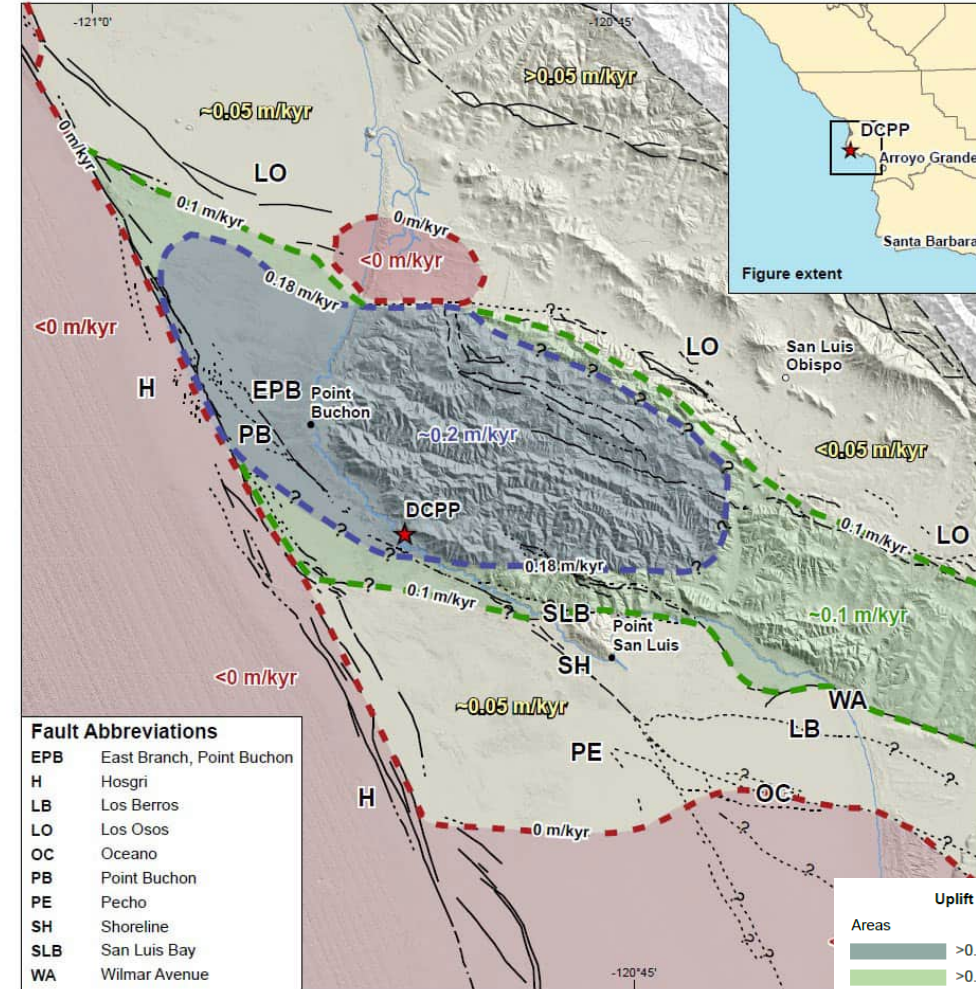
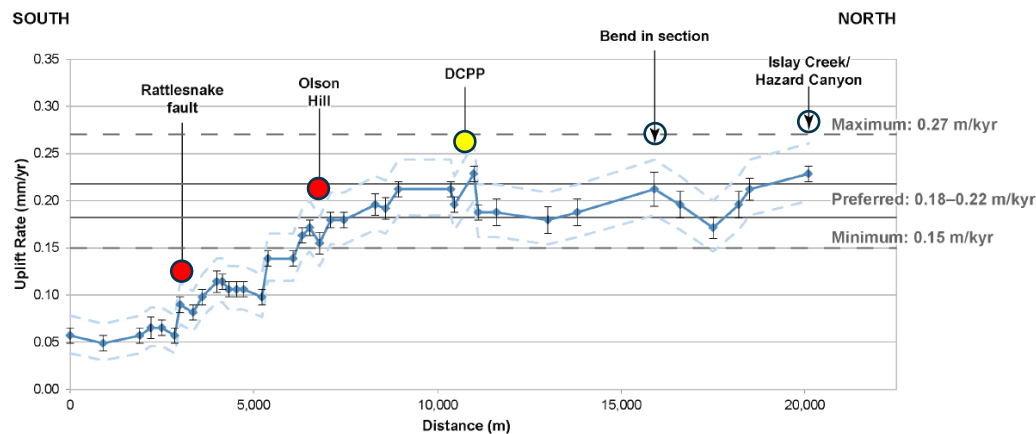
EXPLANATION

— O2 rate-Hanson et al. (1994)
age/paleosea-level model

Note: Uplift rate estimates for the Irish Hills are based on the

Map projection and scale: WGS 84 / UTM Zone 10N, 1:200,000

(a) Hanson et al. (1994) Paleosea-Level Model



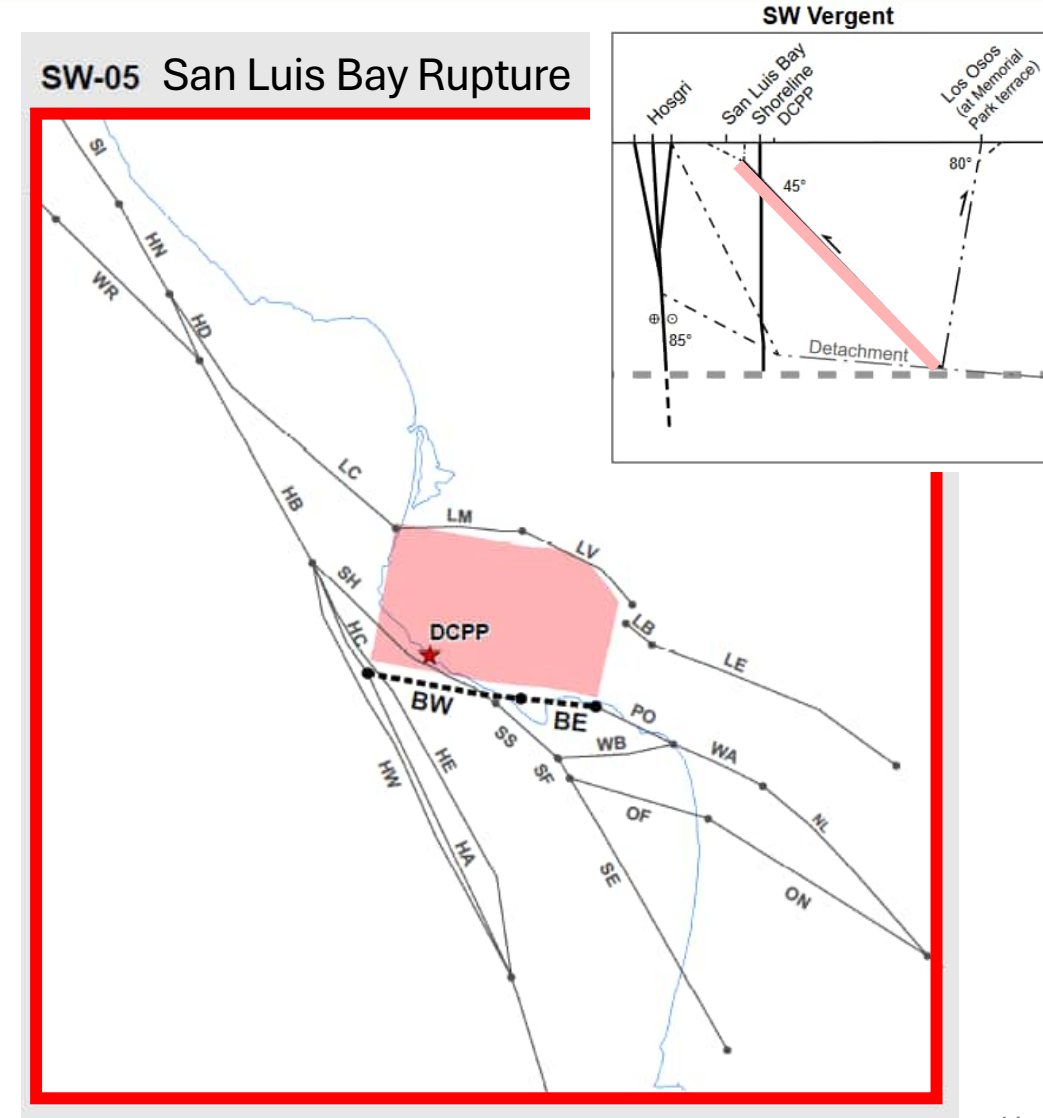
EXPLANATION

— ? — Quaternary fault trace: solid where well located, dashed where approximately located, dotted where buried by undeformed unconformity H10 or older strata, short dashed where inferred, queried where existence is uncertain

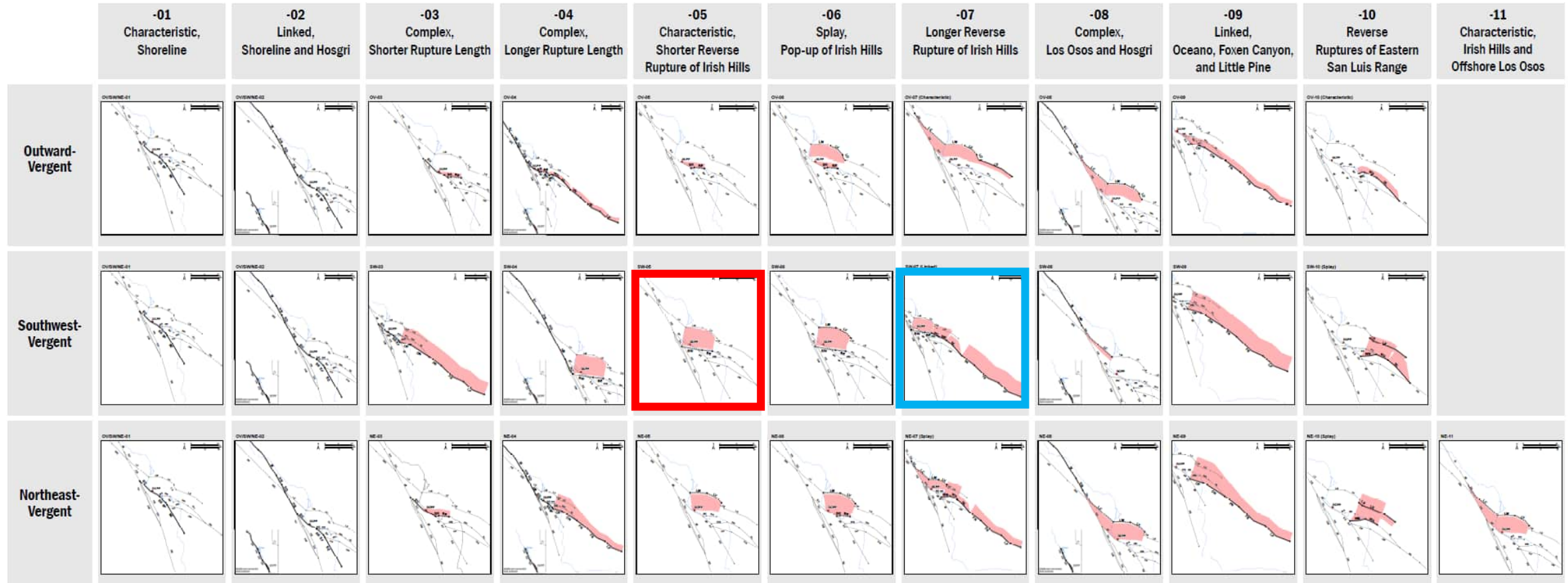
Map projection and scale: WGS 84 / UTM Zone 10N, 1:200,000

Rupture Models

- Rupture models developed to account for uncertainty in characteristic and maximum earthquakes
- Models range single fault ruptures to complex multi-fault ruptures
- Multi-fault ruptures can produce large ($>M_w 8$) earthquakes along the coastal margin

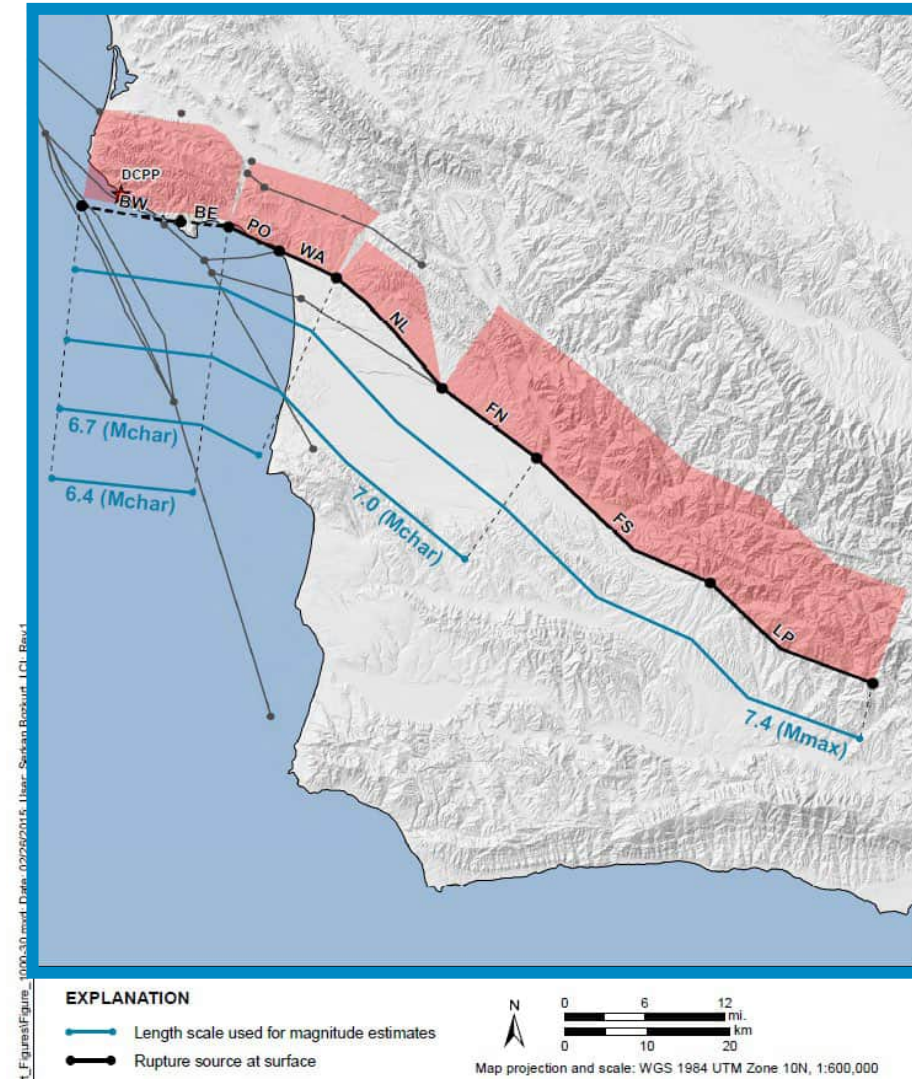
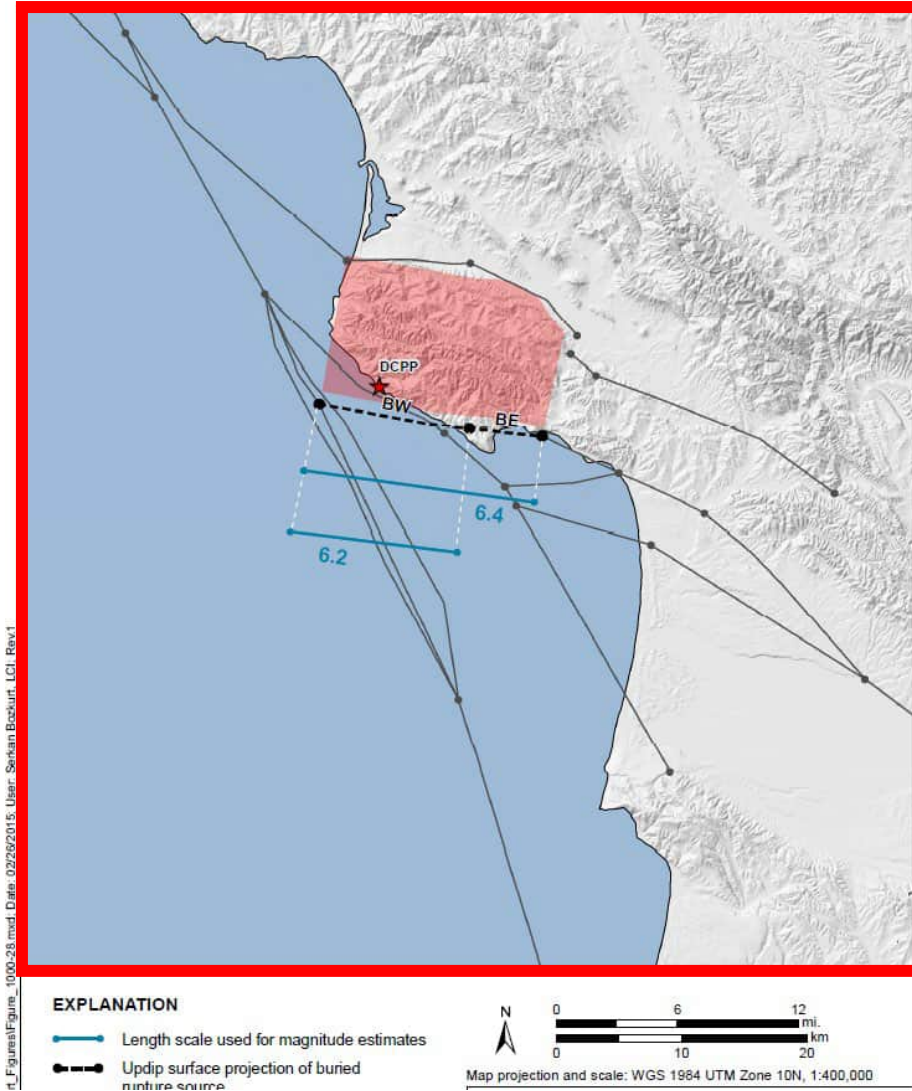


All Non-Hosgri Rupture Models



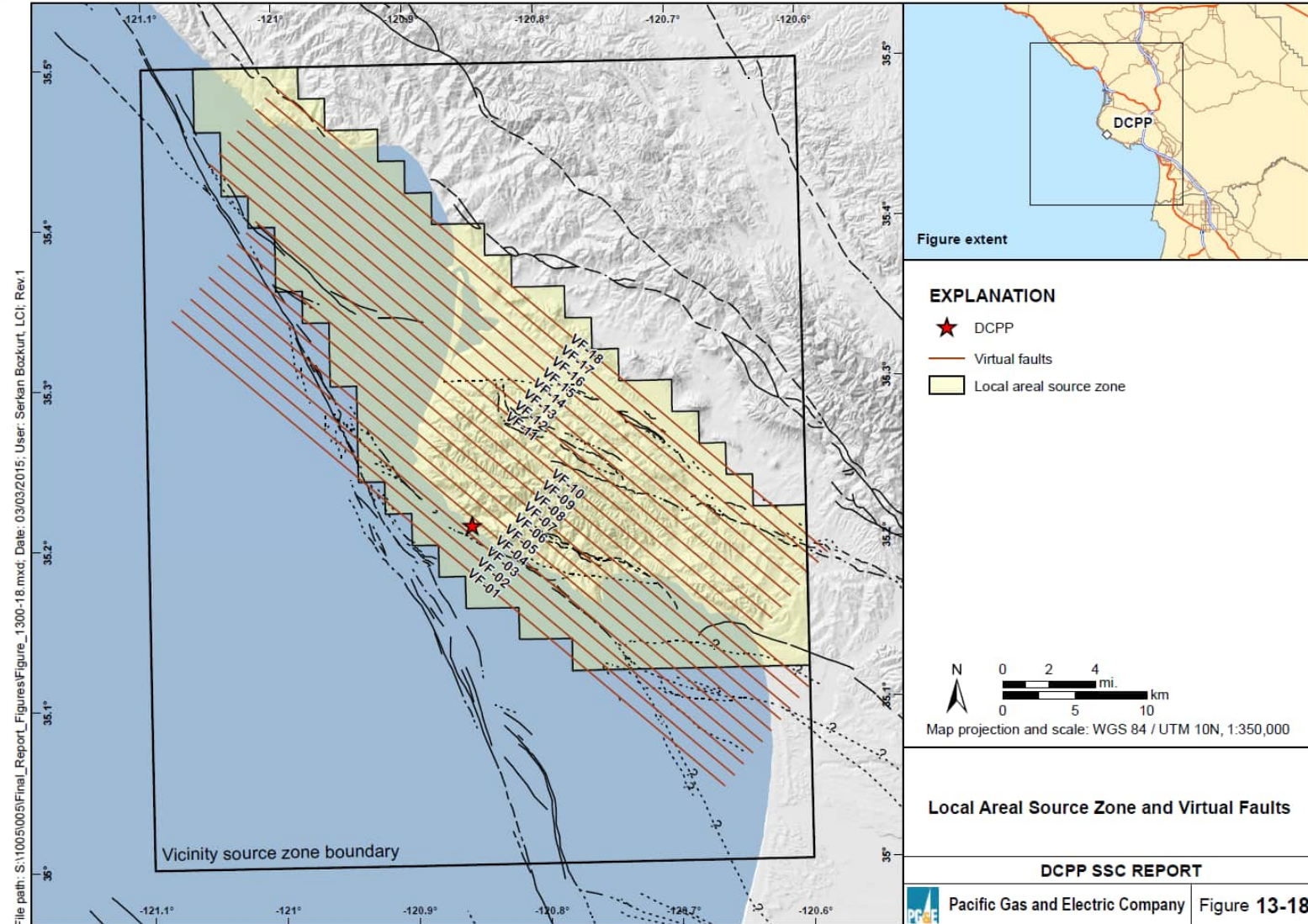
PG&E, 2015

Magnitude Frequency Distribution



Background Model

- Accounts for seismicity on unknown faults
- Virtual faults: 50 km long, 1 km spacing
- Strike slip and thrust

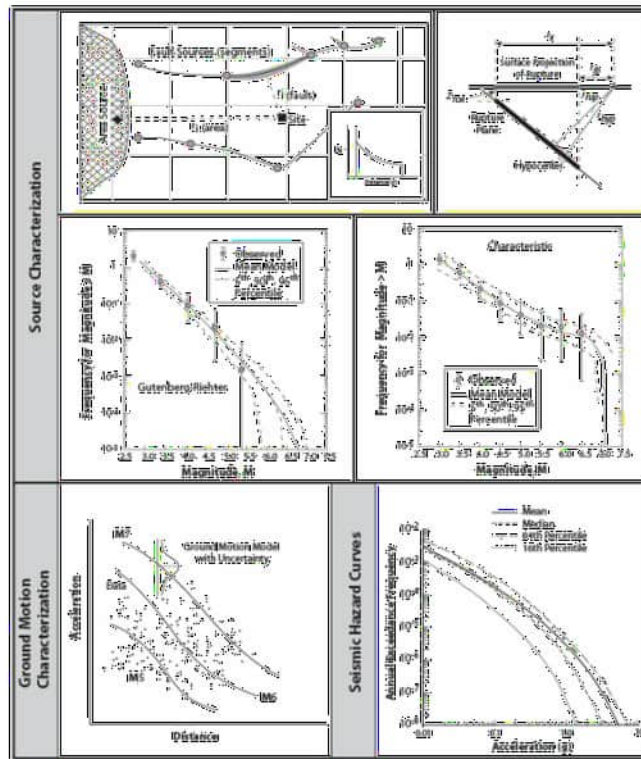


LTSP Seismic Studies, Process and Review

Reports

- 1988 LTSP Report
- 1990 LTSP Report
- 2011 Shoreline Report
- 2014 AB-1632 Report
- *2015 SSHAC Level 3 Seismic Hazard Assessment*
- 2017 SPRA
- *2024 SB-846 Seismic Assessment*

Process



Reviewers

- Nuclear Regulatory Commission (Federal)
- Independent Peer Review Panel (State)
- Diablo Canyon Independent Safety Commission (State)
- Department of Water Resources (State)
- SSHAC Participatory Peer Review Panel
- UCLA Garrick Risk Institute Review Panel
- Independent Reviewers

Contentions in Letter to DCISC and Presentation

General Contention Topics

- (1) Thrust fault at shallow depth under DCPD with slip-rate of ~ 1 mm/a
- (2) Fault slip-rates were selected subjectively and in isolation
- (2) Seismicity from unexpected, undetected, and/or subterranean ruptures
- (4) Noto earthquake analog

Contentions in Letter to DCISC and Presentation

General Contention Topics

- (1) Thrust fault at shallow depth under DCPD with slip-rate of ~ 1 mm/a
- (2) Fault slip-rates were selected subjectively and in isolation
- (2) Seismicity from unexpected, undetected, and/or subterranean ruptures
- (4) Noto earthquake analog

Considerations for Review

- Are new data, methods, models technically defensible for use in site-specific hazard assessment?
- Does the existing model capture the goal of proponent models?
- What is the standard of practice?

Contention: Inferred Coastline Thrust

SLOMFP/Bird Contend

“Despite several arguments and proposals for a thrust fault at shallow depth under DCPP with slip-rate of ~ 1 mm/a, no such seismic source was included”

Letter to DCISC, May 16, 2024

Basis for Postulated Inferred Coastline Thrust (ICT)

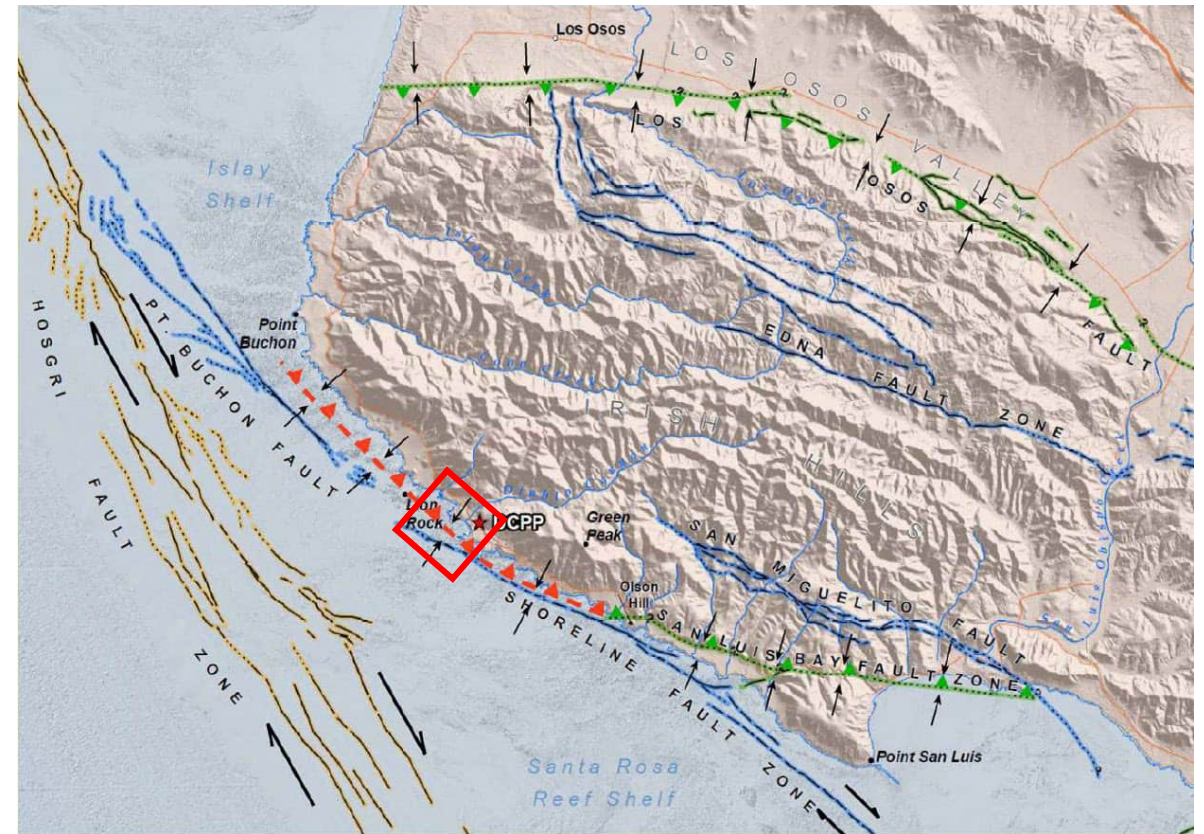
SLOMPF/Bird Contend

- The simplest structural explanation for the folding that produced the Pismo syncline in the Irish Hills is that both flanking faults (**Shoreline fault** on the SW; Los Osos fault on the NE) are active thrust faults which have relatively uplifted their respective flanks of the Irish Hills.

SLOMPF, May 2023

- The southwestern front of the Irish Hills is a **topographic scarp** with a smooth arcuate shape, mirroring the slightly-lower scarp on the northeast which has been formed by slip on the Los Osos thrust fault. This suggests that a thrust fault may also be present under the southwestern front, at or near the coastline

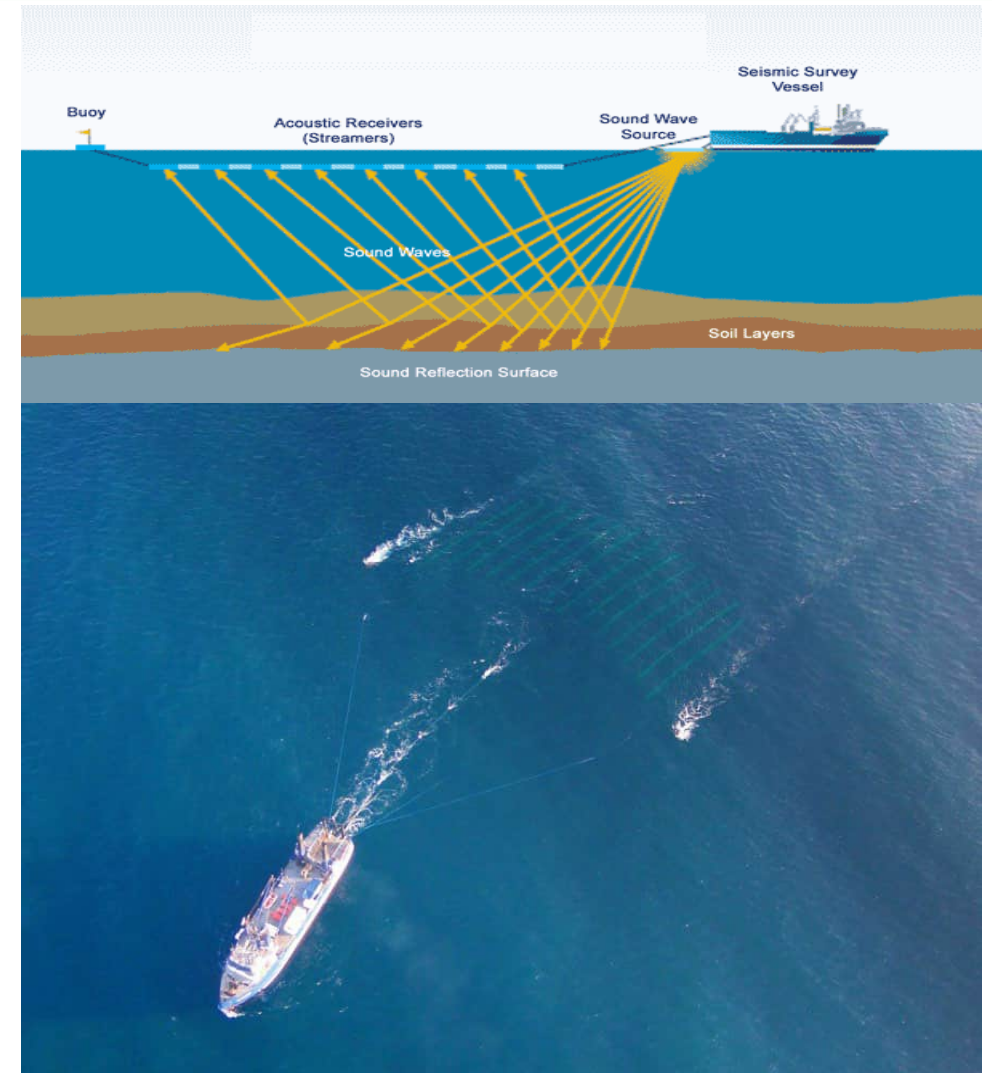
SLOMPF, June 2023



Bird, Presentation to DCISC, June 21, 2024

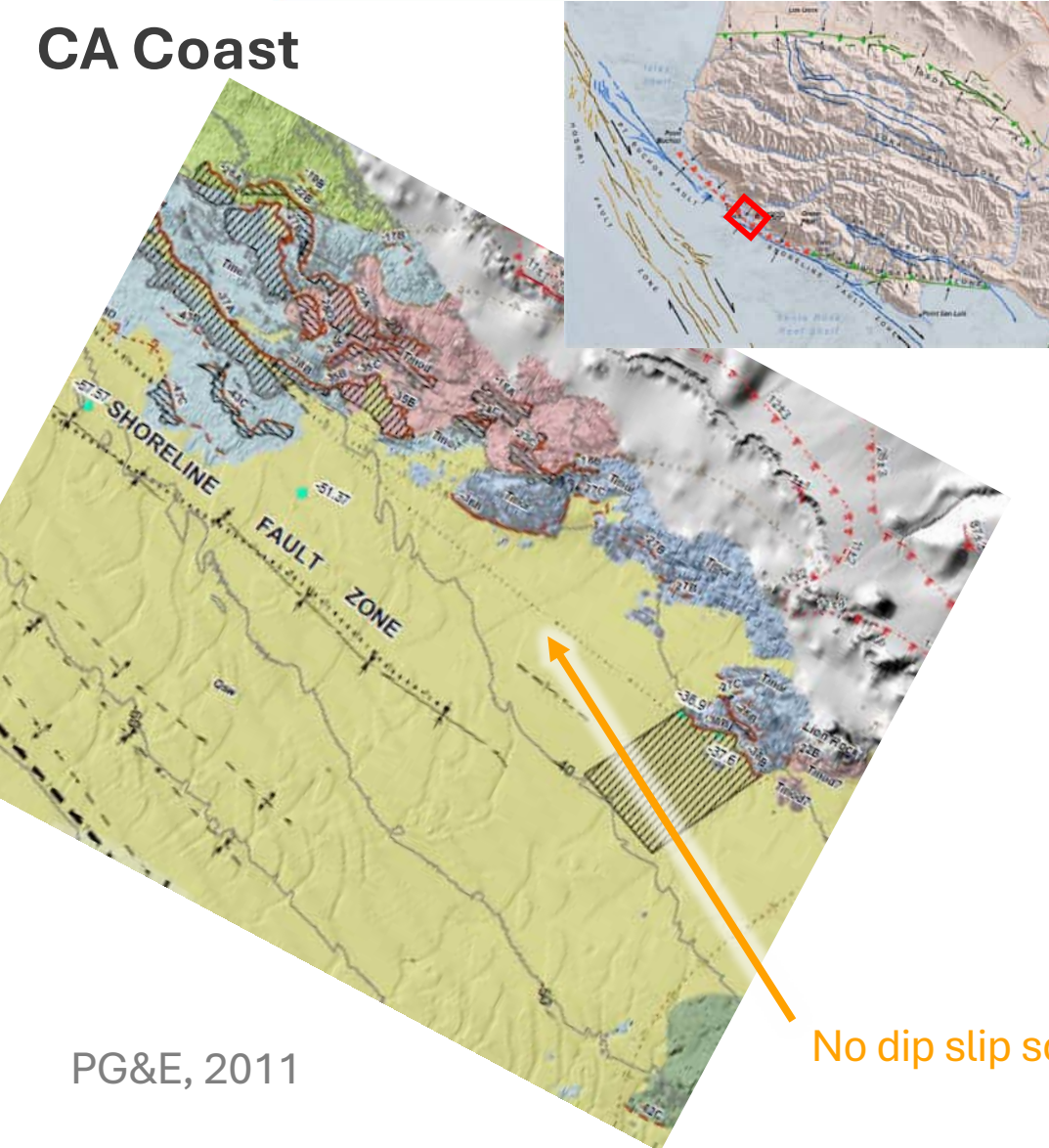
California Central Coast Seismic Imaging Project

- The extensive geophysical investigations associated with the AB-1632 program were requested by the California Energy Commission and used state-of-art 2D and 3D seismic imaging
- Dense onshore and offshore survey grids
- Extent of surveys and advanced techniques resulted in one of the most comprehensive series of data acquisition performed for a U.S. nuclear project



PG&E Response: No Evidence for Fault in Bathymetry

CA Coast

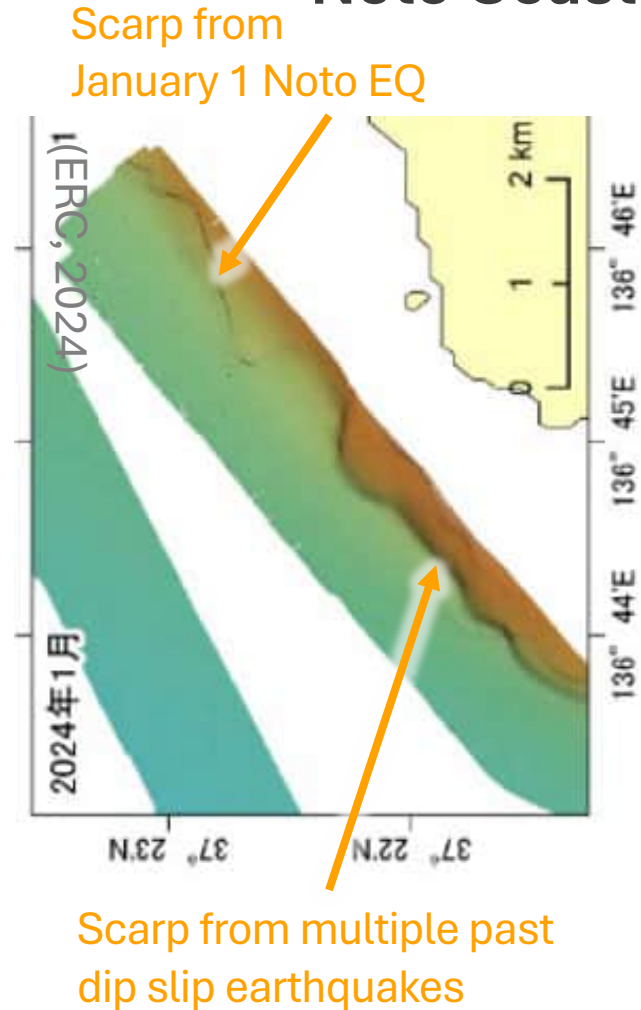


PG&E, 2011



- Onshore drilling, mapping and geophysics do not show a fault at base of hills
- Offshore bathymetry, geology and geophysics do not show deformation consistent with ICF
- No new compelling evidence presented in contentions

Noto Coast



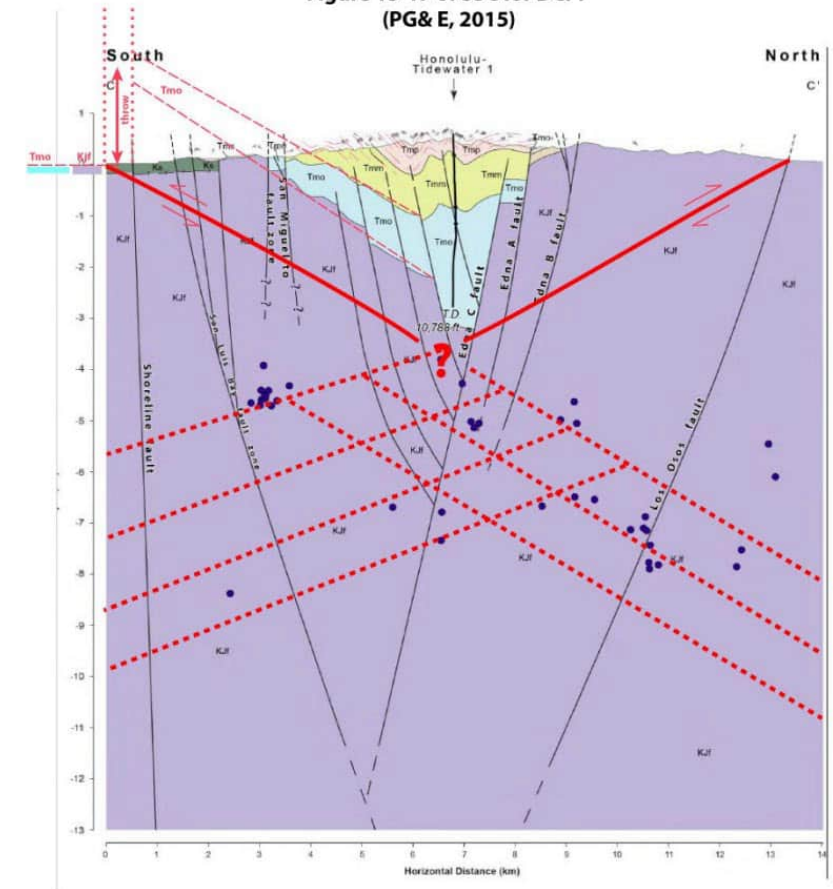
Postulated Long Term Slip Rate for ICT

SLOMPF/Bird Contend

- *Throw of Obispo Formation across Inferred Coastline Fault over last 5 Ma supports a higher slip than in the PG&E SSC.*
- *Slip rates over time scales of 3-5 Ma appropriate for hazard studies (Bird, 2007)*

FIGURE 1 OF TESTIMONY:

Mark-up (in red) by P. Bird, 2023 of
Figure 13-17 of SSC for DCPD
(PG&E, 2015)



SLOMPF, May 2, 2023

PG&E Response: Long-Term Slip Rate Not Applicable

- NRC, USGS, others assign low credibility to pre-Quaternary (>2.58 Ma) faults
- Unit correlation across inferred fault not-unique
- Marine terrace and other data yield Late Quaternary slip rates over time frame relevant to seismic hazard and risk

4. Methodology for Characterizing Seismic Sources

Table 4-1 Data Used to Assess Seismic Source Locations and Geometries and Their Relative Usefulness

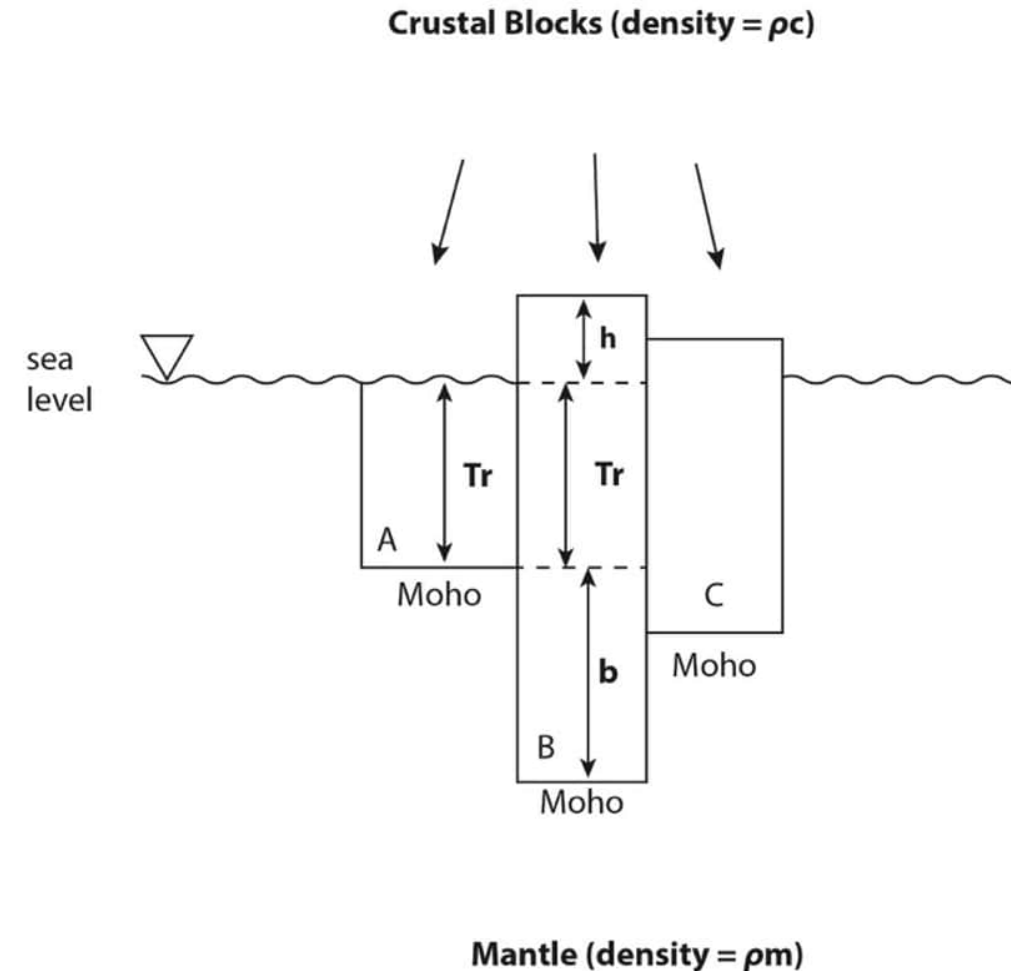
TYPE OF SOURCE	DATA/BASIS FOR SOURCE	RELATIVE USEFULNESS/ CREDIBILITY (1: high, 3: low)
Type 1: Faults	Mapped fault with historical rupture	1
	Mapped Quaternary fault at surface	1
	Mapped localized Quaternary deformation, inferred fault at depth	2
	Borehole evidence for fault, especially in young units	2
	Geophysical evidence (e.g. seismic reflection) of fault at depth	2
	Map of pre-Quaternary faults	3

(SSHAC, 1997)

Contention: Airy Isostasy Based Crustal Thickening

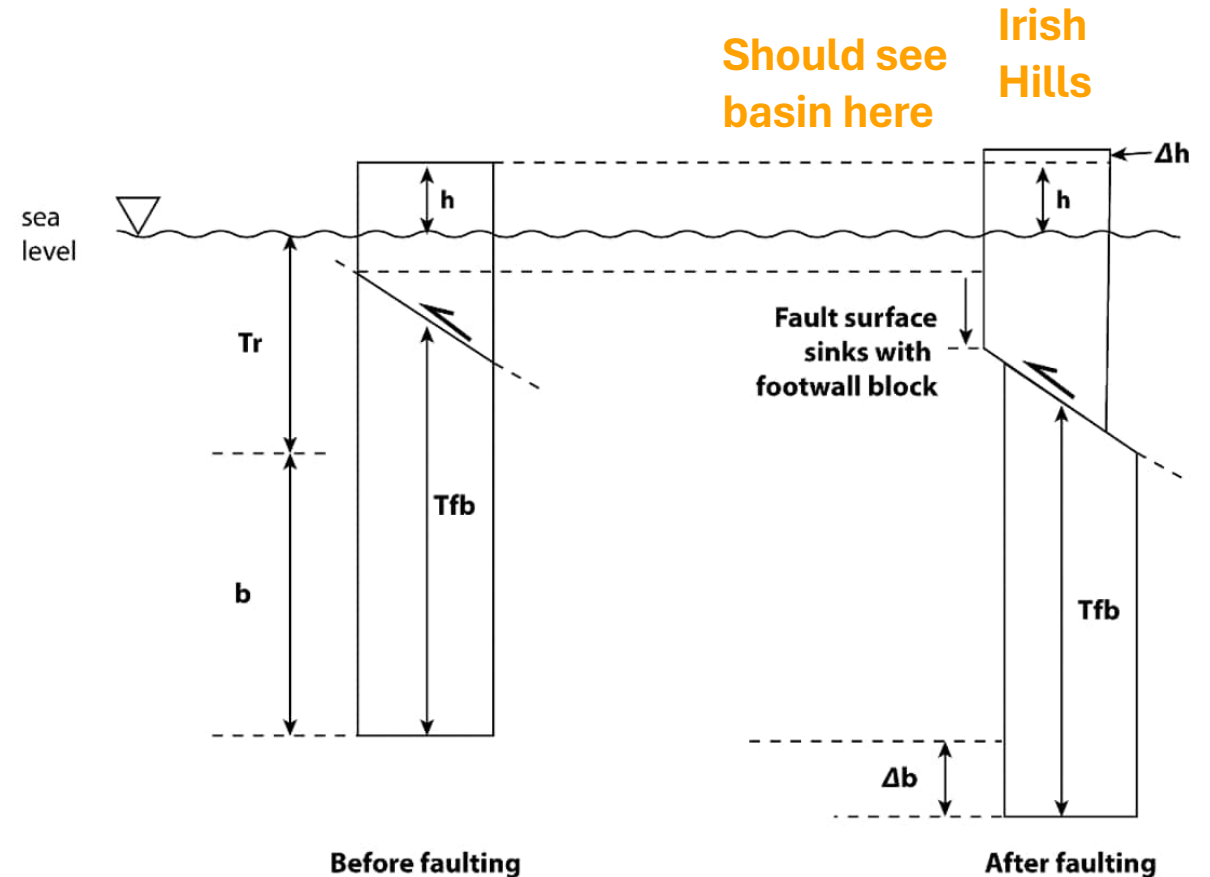
SLOMPF/Bird Contend

- *Weak crust beneath Irish Hills has little rigidity*
- *Airy isostasy a major factor*
- *Thickening rate is six times greater than uplift rate*
- *High rate of crustal thickening accommodated by Inferred Coastline Thrust or multiple faults*



PG&E Response: Not Consistent with Observations

- Model predicts lowering of fault surface
- Would produce a basin in the footwall of the fault
- No basin observed offshore Irish Hills





PG&E Response: Not Appropriate and Not Adopted

- Model not applicable at scale of Irish Hills:
“Given the noted shortcomings of local isostatic models, one must question their continued use.” (Kirby, 2019)
- Airy isostasy **not** considered for rates of faults or fault zones by:
 - USGS National Seismic Hazard Model
 - Site-specific hazard studies
 - Common slip rate databases
 - Bird, 2007 slip rate database

Contention: Deformation Modeling

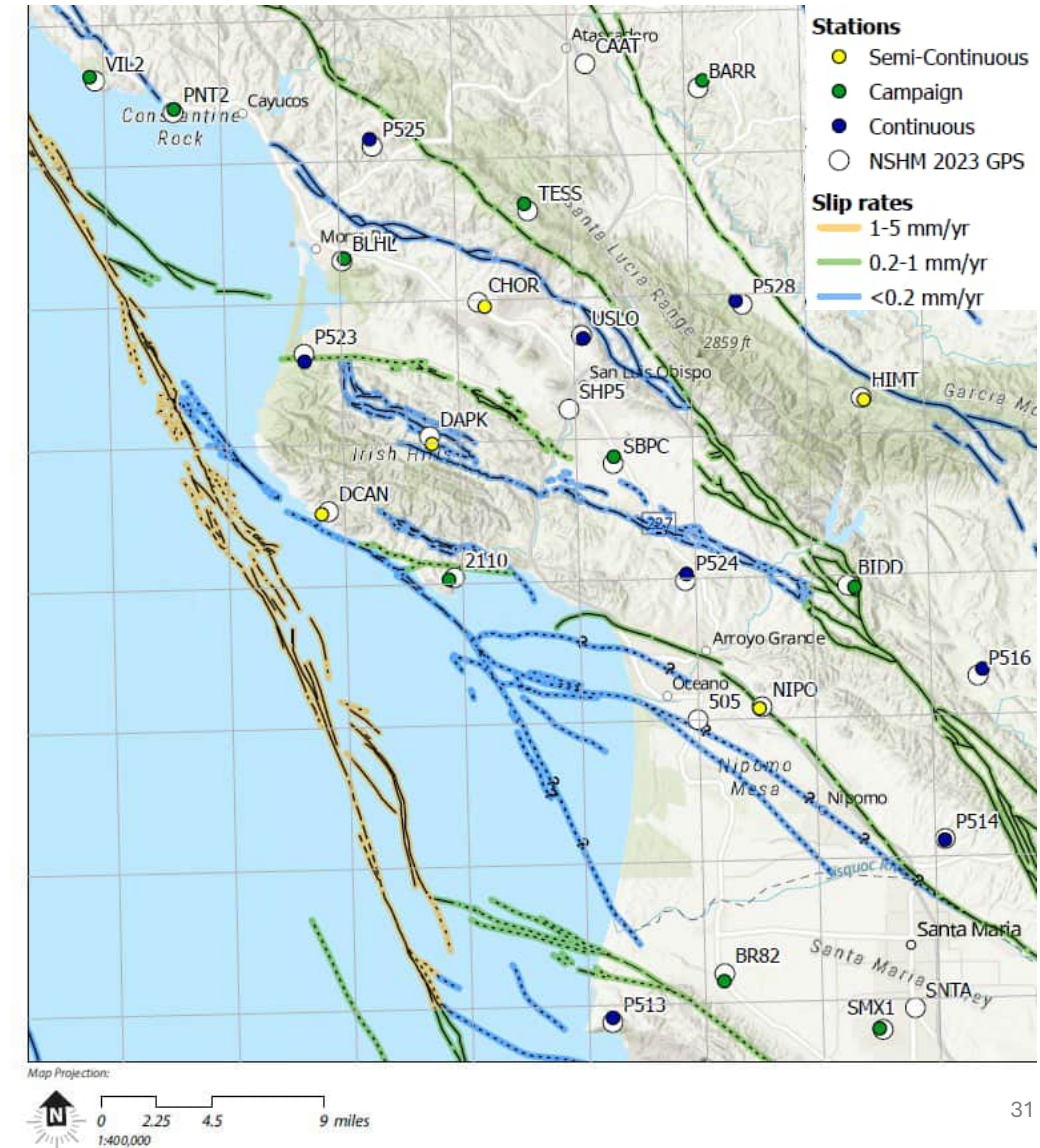
SLOMPF/Bird Contend

“Fault slip-rates were selected subjectively and in isolation, without modern deformation-modeling (as used by USGS) to guarantee that all fault slip-rates and rates of distributed permanent deformation are self-consistent, and also consistent with geodetic velocity and stress-direction data.”

Letter to DCISC, May 16, 2024

PG&E Response: Issues with Geodetic Modeling

- Given the density of fault sources near the DCCP, there is low confidence that geodetic data could resolve the rates and kinematics of individual faults
- Coastal location of the Primary fault sources presents a challenge given the absence of offshore GPS velocities
- Uncertainties within each model are poorly understood, which reduces confidence in the robustness of the mean model result





PG&E Response: Good Comparison to Geodetic Models

Table 5-11. Comparison of Fault Source Slip Rates, 2015 SSC Model and WUS ERF-2023 Deformation Models

Fault Source	2015 SSC Model Rates (mm/yr)	WUS 2023-ERF Deformation Model Slip Rates (mm/yr)			
		Geologic	Pollitz	Shen-Bird	Zeng
Hosgri (all FGMs)	1.7 (0.6-3.0)	2.5 ± 1.0	3.8 ± 1.3	1.0 ± 0.5	2.8 ± 0.7
Shoreline (all FGMs)	0.07 (0.03-0.16)	$0.1^* \pm 0.125$	0.01 ± 0.08	0.05 ± 0.10	0.11 ± 0.90
Los Osos OV	0.26 (0.17-0.39)	$0.39^* \pm 0.2$	0.25 ± 0.07	0.24 ± 0.08	0.21 ± 0.91
Los Osos SW	0.19 (0.13-0.27)				
Los Osos NE	0.42 (0.31-0.55)				
San Luis Bay OV	0.16 (0.10-0.24)	$0.2^{*\dagger} \pm 0.125$	$0.20^\dagger \pm 0.10$	$0.12^\dagger \pm 0.09$	$0.13^\dagger \pm 0.7$
San Luis Bay SW	0.22 (0.13-0.32)				
San Luis Bay NE	0.16 (0.10-0.24)				

* A category slip rate; not based on site-specific data

† Slip rate listed for the 45° San Luis Range (extended) source, which has a higher slip rate than the vertical San Luis Bay source in the ERF-2023 model.

PG&E, 2024

Los Osos
San Luis Bay



Contention: Off-Fault Deformation

SLOMPF/Bird Contend

“Seismicity from unexpected, undetected, and/or subterranean ruptures between the known faults was modeled based on projection of a few decades of microseismicity, ignoring globally-calibrated relationships between long-term tectonic strain-rate and (typically higher) long-term-mean seismicity which includes seismic crises.”

Letter to DCISC, May 16, 2024



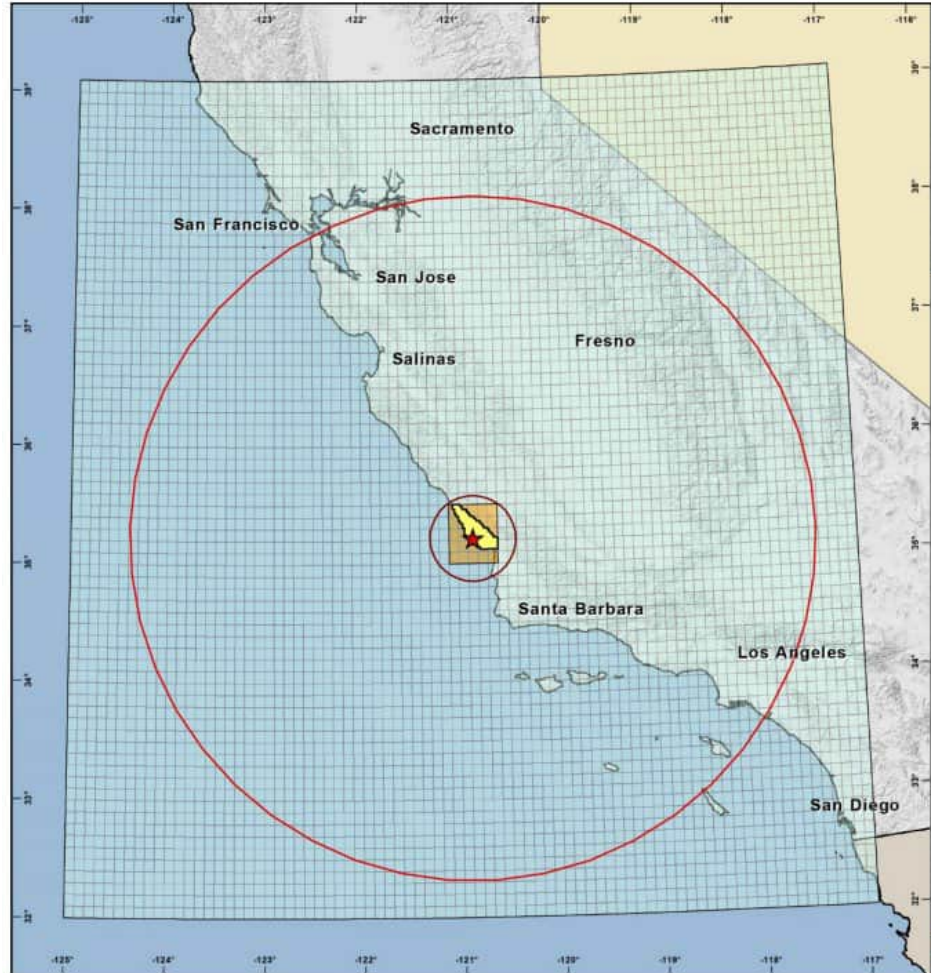
PG&E Response: Documented Issues With Modeled Off-Fault Deformation

USGS declined to adopt this method for regional model:

- *“The four geodetic deformation models also provided estimates of off-fault deformation (fig. 14 of Pollitz et al., 2022 or fig. 4 of Johnson et al., 2023). However, and as in UCERF3, **it is not clear how much of the implied features are real versus artifacts of model assumptions and approximations**, so we have once again declined use of these, at least for the ERF-CONUS2023-TI.”*
- *“**This is consistent with recommendations of the review team** (Johnson et al., 2023), which also discusses what it might take to improve such estimates.”*

Field et al., 2023

PG&E uses industry standard areal source zones



PG&E, 2015

Table 13-1. Regional and Vicinity Areal Source Zone Parameters

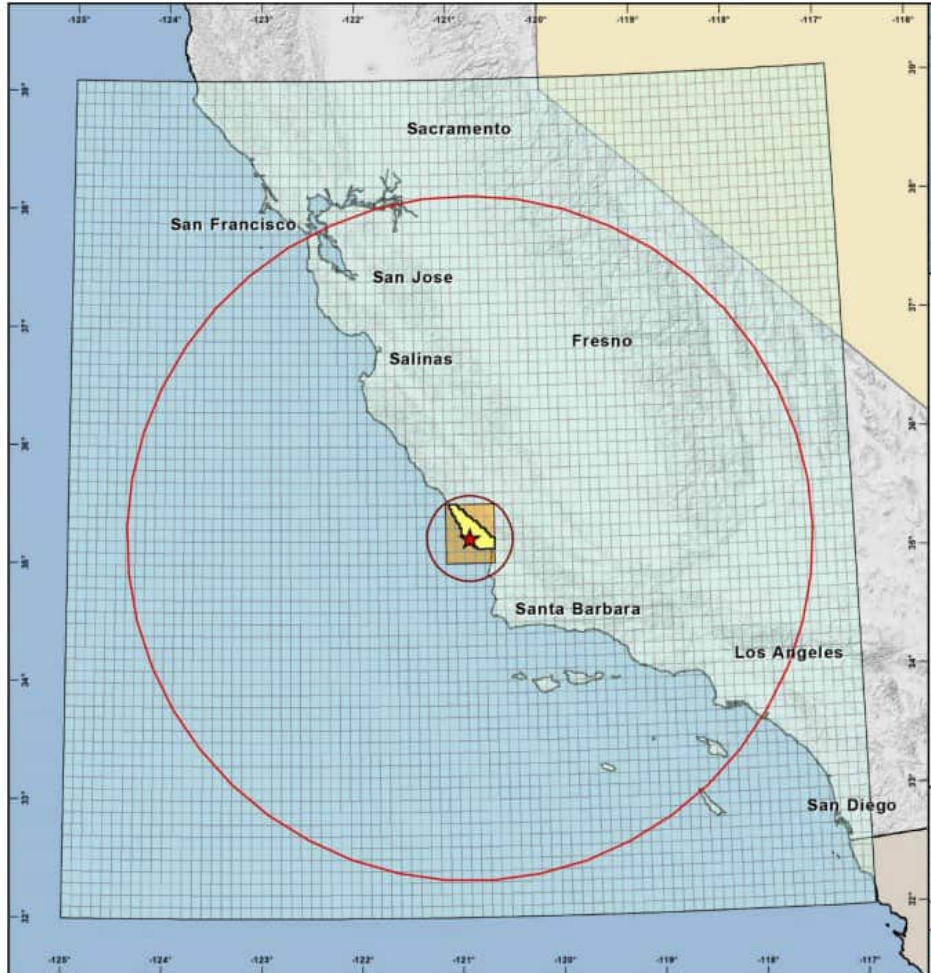
Parameter	Regional	Vicinity
Grid cell size	0.1° x 0.1°	0.1° x 0.1° and 0.02° x 0.02°
<i>b</i> -value	0.8	0.8
<i>M</i> _{max} value [weight]	7.9 [0.1] 7.6 [0.8] 7.3 [0.1]	7.5 [0.1] 7.0 [0.5] 6.5 [0.4]
Depth distribution	Uniform: 0 to 12 km	Uniform: 0 to 12 km
Style of faulting	70% Strike-slip 30% Reverse	70% Strike-slip 30% Reverse
Activity rate baseline value	2008 NSHMP model (Petersen, Frankel, et al., 2008)	2008 NSHMP model (Petersen, Frankel, et al., 2008)
Activity rate uncertainty [weight]	Only baseline value used	2x baseline value [0.2] Baseline value [0.6] 0.5x baseline value [0.2]

PG&E, 2015

Methodology Adopted by nuclear industry, NRC, U.S. Geological Survey, State of California, etc.

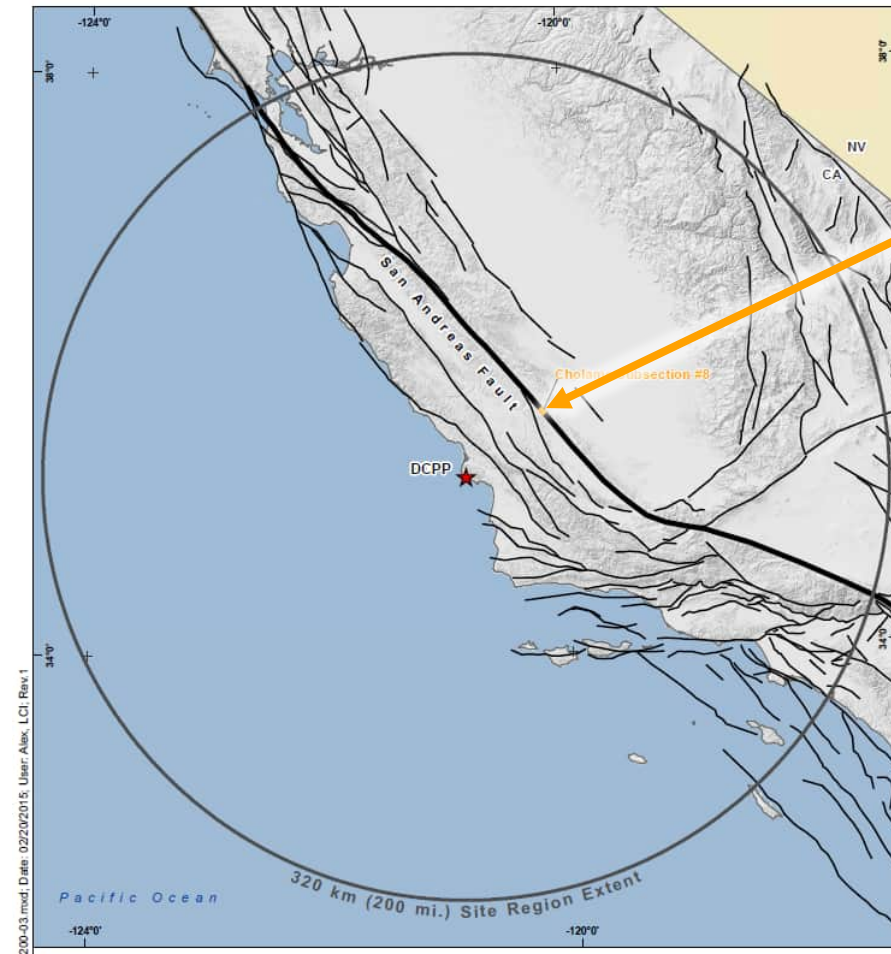
On-fault Deformation Is Captured In PG&E Fault Source Model

Background



PG&E, 2015

Fault Source



PG&E, 2015

San Andreas Fault

Contention: Postulated Noto Earthquake Analog

SLOMFP/Bird Contention Statement

After the 2024.01.01 $m7.5$ Noto Peninsula earthquake in Japan (with fault geometry comparable to the Irish Hills, and PGA of 1.0~2.3 g at 5 modern digital strong-motion seismic stations),

I found 3 simple ways to estimate total slip-rate on all gently-dipping thrust faults under the Irish Hills (~ 2.8 mm/year), and convert that to a recurrence time of ~ 715 years for Noto-type earthquakes that would cause SCD at DCPP.

This was the basis for my 4 March 2024 Declaration to NRC documenting that SCDF at DCPP is 1.4×10^{-3} /year, not 3×10^{-5} /year.

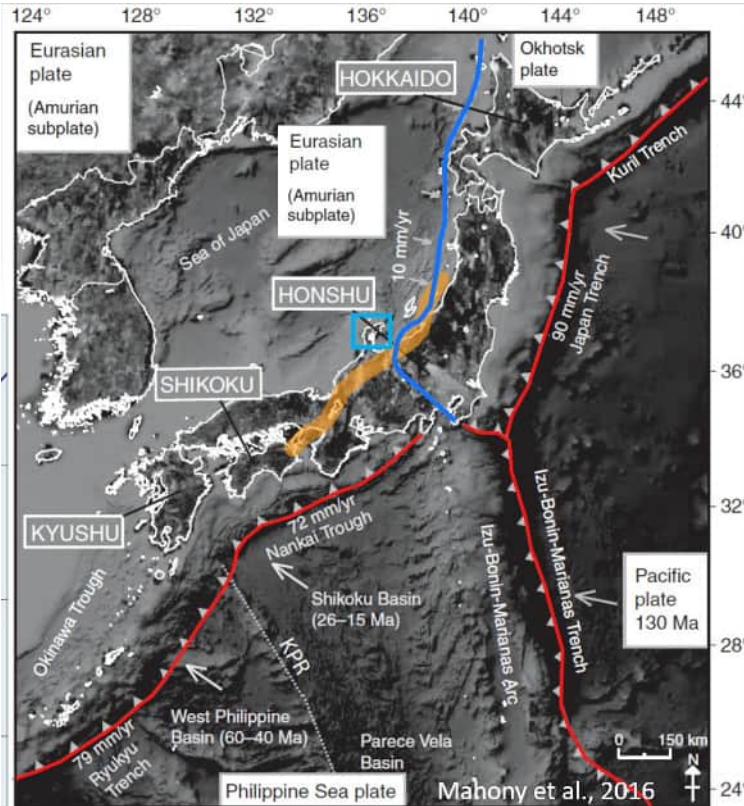
Bird, Presentation to DCISC, June 21, 2024

Evaluating Noto Eearthquake Analog to Irish Hills

Noto Earthquake to Irish Hills comparison through:

1. Tectonic setting
2. Fault characteristics
3. Seismicity
4. Deformation patterns
5. Characteristic earthquakes

Tectonic Setting Comparison

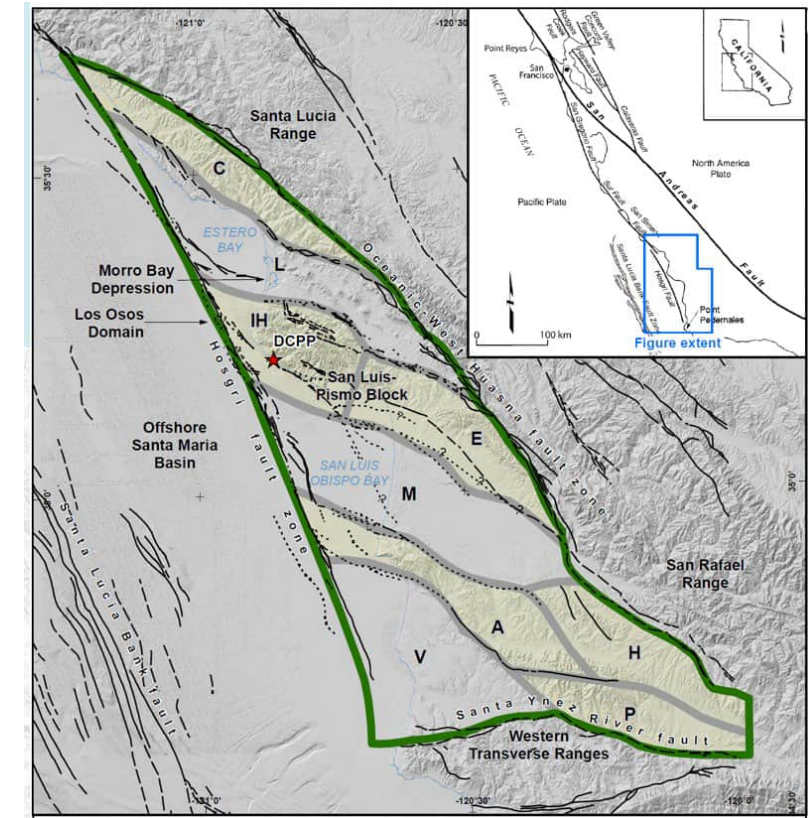


Mahony et al., 2016

What are the tectonic settings of both regions?

Nota: Plate margin shortening, incipient subduction(?)

CA Coast: Transpression along a transform plate boundary.



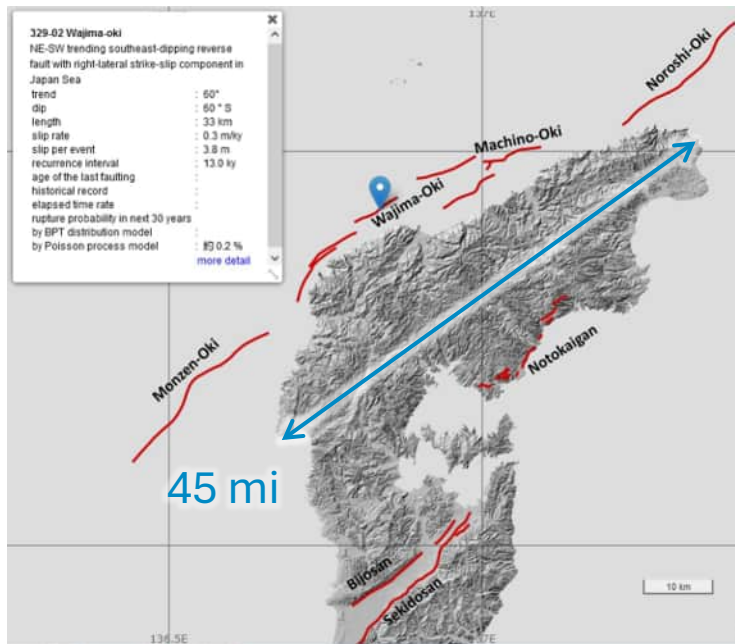
PG&E, 2015

Fault Characteristics Comparison

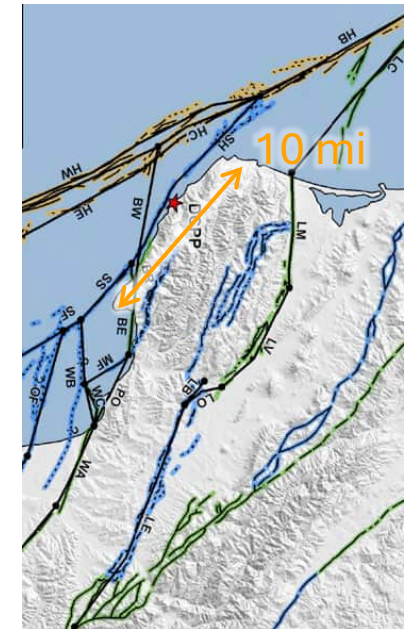
What are the characteristics of faults that bound the Noto Peninsula and Irish Hills blocks (dip, orientation, kinematics)?

Noto: Moderately-dipping reverse faults with an oblique component; offshore surface traces on north side of peninsula.

Irish Hills: Moderate to steep reverse faults on both sides of Irish Hills accommodating transpression. Faults on SW bound by transform faults.

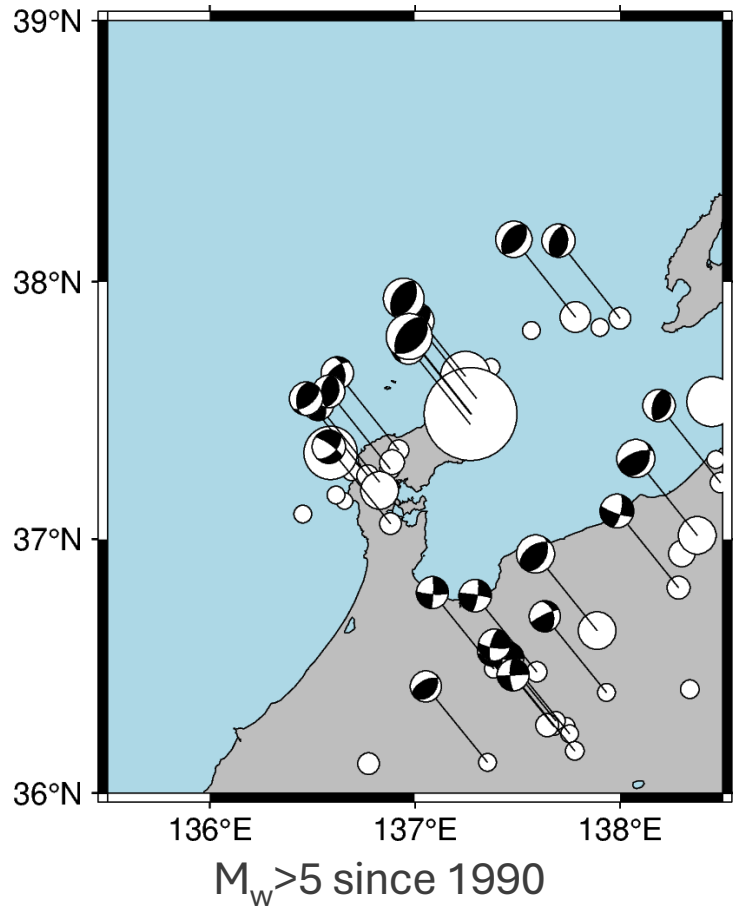


AIST, 2024



PG&E, 2015

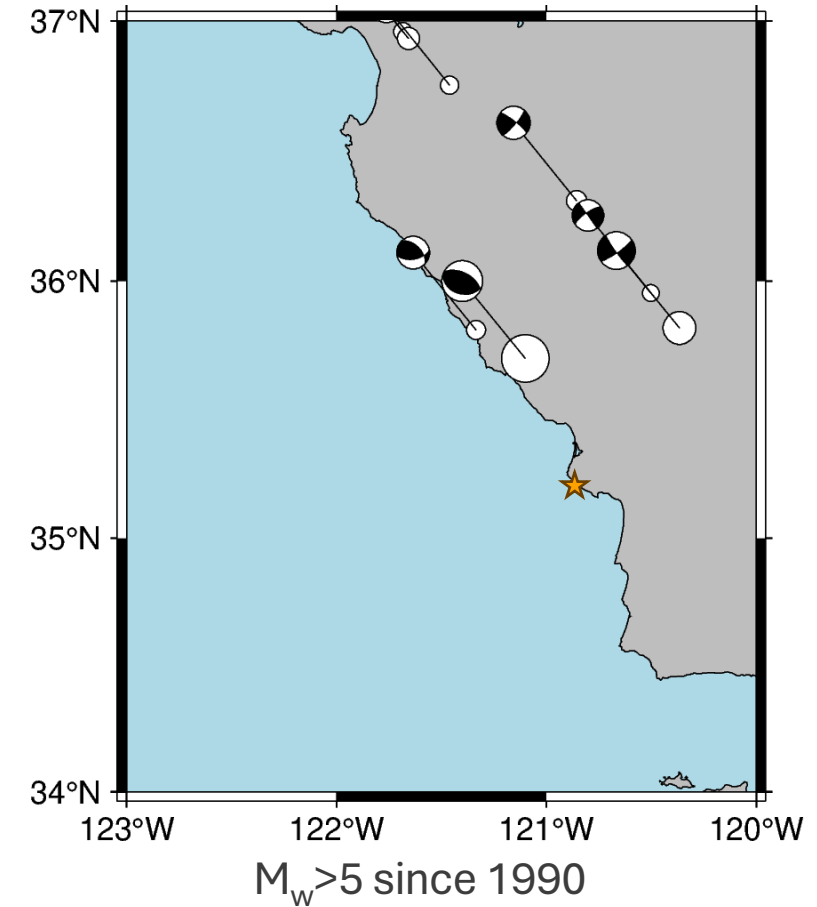
Seismicity Comparison (M>5)



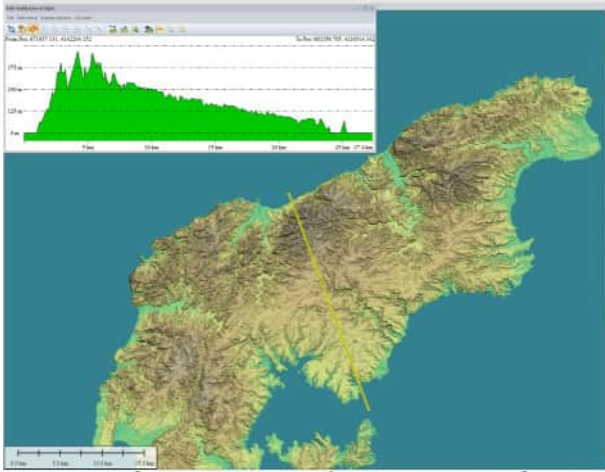
What are seismicity patterns for Noto Peninsula and Irish Hills (magnitude, frequency, style)?

Noto: Four M_w>6 and one M_w>7 earthquakes since 1990s on reverse faults along the north side of the peninsula.

Irish Hills: Closest event M_w 6.6 San Simeon; No events M_w>5 in the Irish Hills.



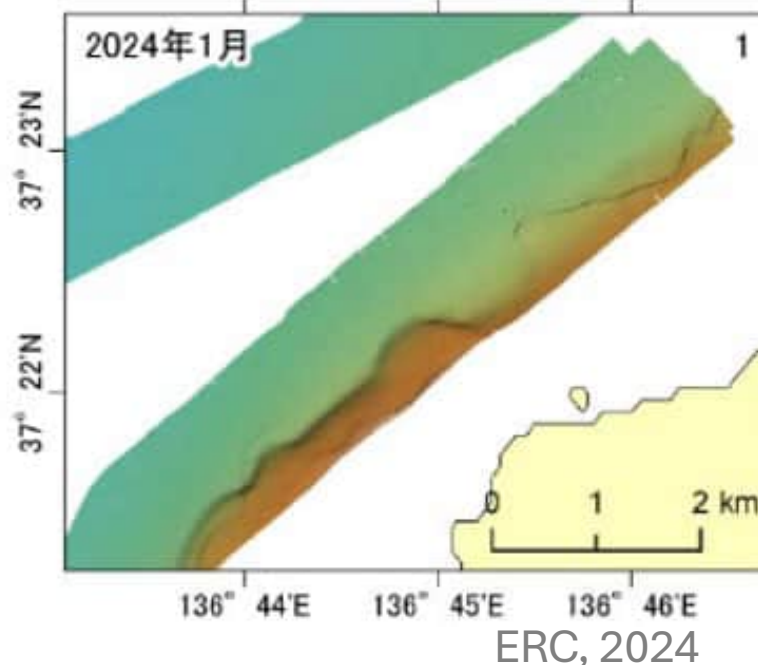
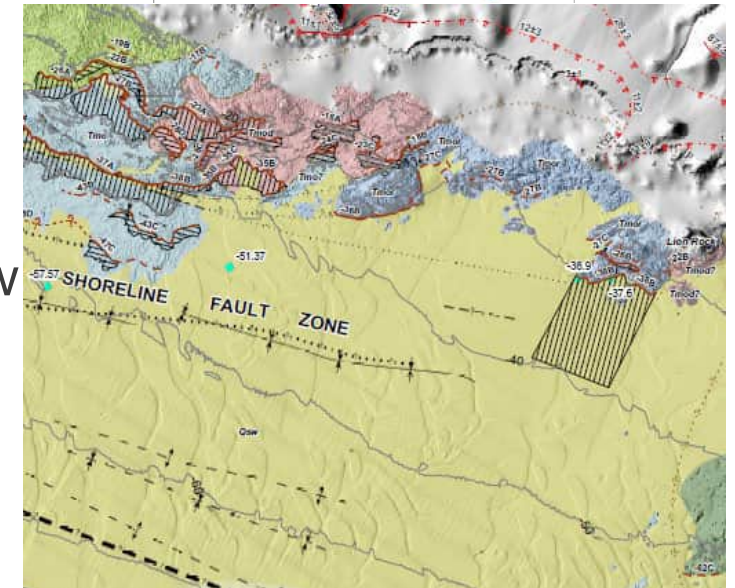
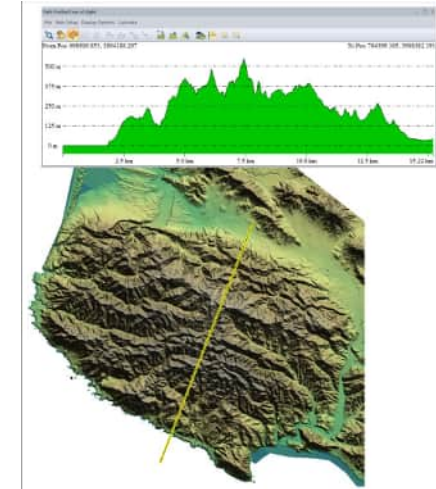
Deformation Pattern Comparison



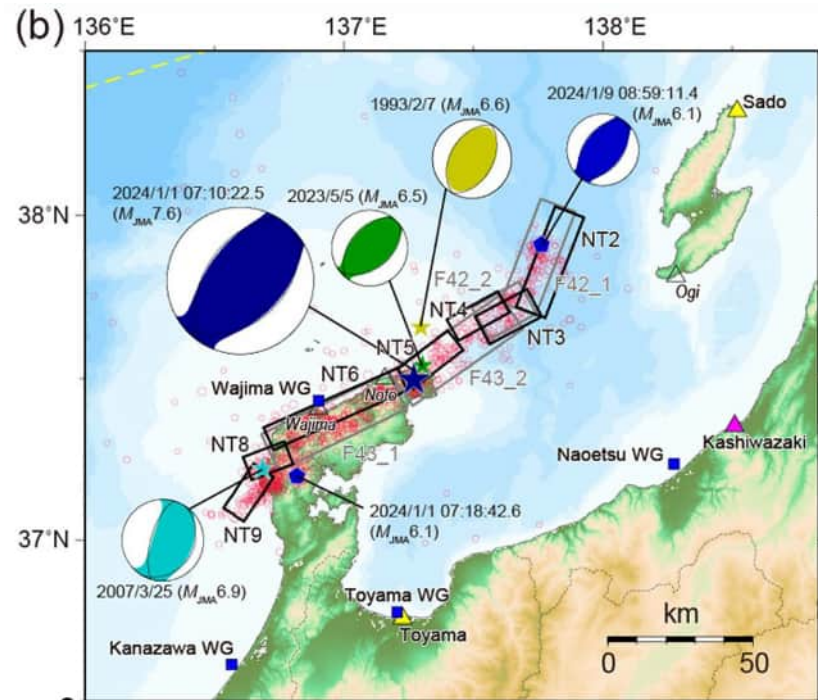
What are the uplift patterns, i.e., where is deformation concentrated and how was it expressed?

Nota: Offshore; faults generate prominent vertical scarps indicative of reverse faulting and are observable on seismic sections.

Irish Hills: Offshore faults generate low scarps in shelf strata; Onshore structures observed as discontinuous scarps along range front.



Characteristic Earthquake Comparison

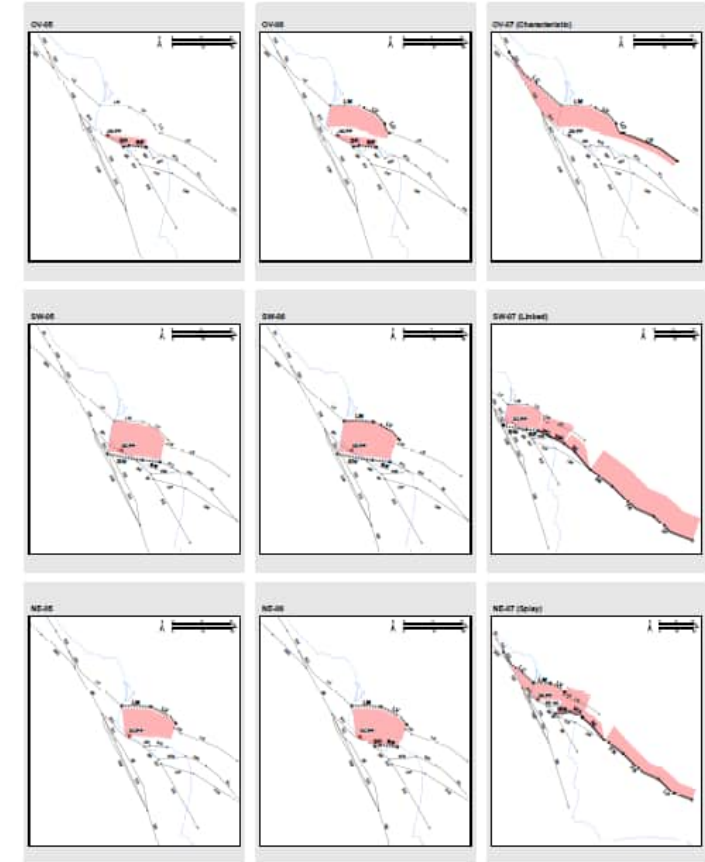


ERC, 2024

How are characteristic earthquakes defined for each region?

Noto: Range of $M_w > 6$ to $M_w > 7$ earthquakes based on seismicity and local fault parameters

Irish Hills: A range of earthquakes based on local fault parameters



PG&E, 2015

Evaluating Noto EQ Analog to Irish Hills

Noto Earthquake to Irish Hills comparison through:

1. Tectonic setting – Different mechanisms and styles
2. Fault characteristics – Different fault characteristics
3. Seismicity – Different seismic history
4. Deformation patterns – Different regional and local uplift patterns
5. Characteristic earthquakes – Range for both (not enough data to confirm single characteristic magnitude)



Contention: Return Period of Failure

SLOMFP/Bird Contend

“PG&E’s 2018 estimate and 2023 revision of the long-term rate of seismic core damage as $2\sim3\times10^{-5}$ /yr fail to take into account current information or to deploy a technically defensible seismicity model that show the seismic severe accident rate is about 47~70 times higher, or $\sim1.4\times10^{-3}$ /year.”

Letter to DCISC, March 6, 2024

Bird's Estimates of Core Damage Frequency

- Core damage frequency estimate is not based on accepted practice
- Noto earthquake is not a direct analogy for various reasons
- Direct application of ground motions hasn't been standard practice for over two decades
- Observed ground motions need to be corrected for site effects, source-to-site distance, earthquake event term, etc.
- Hazard yields larger ground motions due to probabilistic approach
- Assessment makes no consideration of structural response and fragility



Contention: PG&E Ignored Hanging-Wall Terms

SLOMFP/Bird Contend

“In addition, PG&E did not use a hanging-wall term for the modeling of potential ground motions from the Los Osos and San Luis Bay thrust faults.”

SLOMFP and others, Petition to NRC, March 4, 2024

Hanging-Wall Modeling

- Bird **inaccurately** asserts that PG&E isn't using a hanging wall model in its calculations
- 2015 GMC model developed 5 alternative hanging-wall factors
- This aspect of ground motions is important for Diablo Canyon as well as our dams
- PG&E funded :
 - Hanging-wall NGA-West2 study
 - Development and verification of numerical earthquake simulations
 - Continued work in NGA-West3

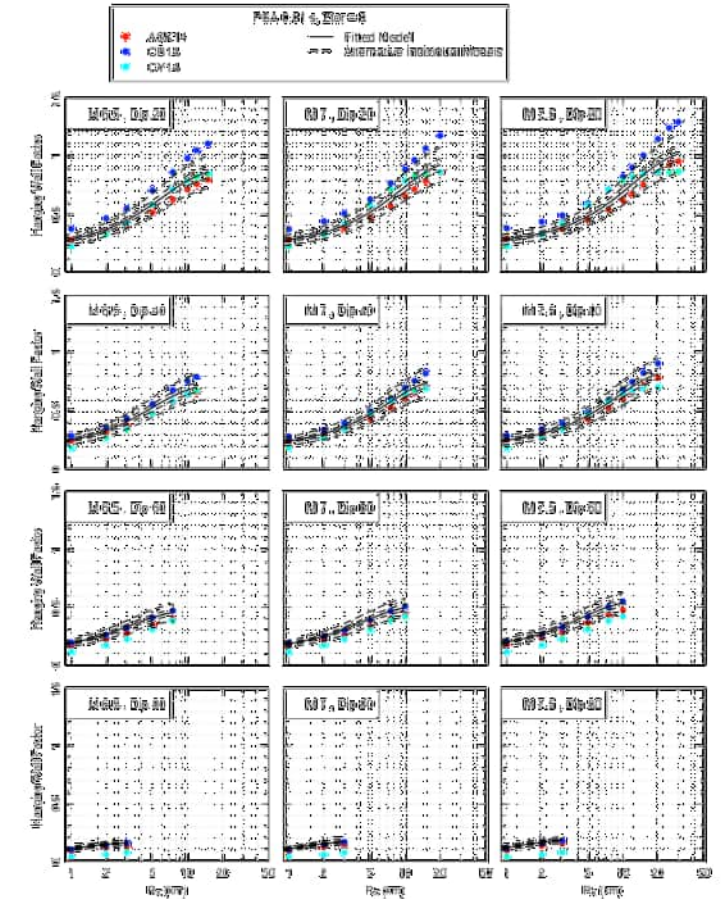


Figure 6.3.2-1: HW factors from ASK14, CB14 and CY14 for PG&E, for Z_{max} values of 0 km, for M5.5, M7.0 and M7.5, and for fault dip values of 20, 40, 60 and 80 degrees. The solid black line shows the fitted common form (in Eq. 6.3-2 (central model)), and the dashed black lines show the other four individual models used to approximate the distribution of the modeled HW factors.

Conclusions

- No evidence has been provided to support the existence of the Inferred Coastline Thrust
- Novel slip rate approaches proposed by Dr. Peter Bird are not validated, have poorly characterized uncertainties, and are not yet accepted by the seismic hazard community
- Modelled PG&E slip rates for reverse faults are consistent with rates modeled using geodetic methods including Shen & Bird (2022)
- Noto earthquake:
 - Not a direct analog for DCPD hazard assessment based on differences in geology, seismicity/activity rates, and scale
 - Not applicable to estimate a core damage frequency
- PG&E hazard model:
 - Captures center, body & range of technically defensible interpretations
 - Reviewed at multiple levels; including acceptance by the NRC



Next Steps: Relevant Ongoing and Planned LTSP Research

- Application of new geologic dating methods to assess deformation style and rates for the Irish Hills (U.S. Geological Survey)
- Vetting and publication of structural models for Irish Hills (multiple independent external teams)
- Evaluation of Casmalia Hills dating/uplift rates (e.g. work by McGregor and Onderdonk) & model relevance evaluation (SB-846 TI & PPRP)
- Further assessment of on-fault and off-fault geodetic modeling for the Irish Hills including applicability, constraints, uncertainty
- Ongoing precariously balance rock studies (Rood, Wittich, Arrowsmith)
- NGA West3 support including evaluation of new ground motion data (e.g. Noto earthquake)



Technical Reference List

- Bird, P. [2007] Uncertainties in long-term geologic offset rates of faults: General principles illustrated with data from California and other western states, *Geosphere*, 3(6), 577-595;doi:10.1130/GES00127.1, + 9 digital file appendices.
- Bird, P. [2024] Declaration of Peter Bird, Ph.D, submitted to the U.S. Nuclear Regulatory Commission in support of Request by San Luis Obispo Mothers for Peace, Friends of the Earth and Environmental Working Group for Hearing on Pacific Gas & Electric Company's License Renewal Application for the Diablo Canyon Nuclear Plant and Petition by San Luis Obispo Mothers for Peace, Friends of the Earth and Environmental Working Group for Shutdown of Diablo Canyon Nuclear Power Plant Due to Unacceptable Risk of Seismic Core Damage Accident, NRC ADAMS Accession No. ML24065A434, filed March 4, 2024.
- Earthquake Research Committee (ERC), 2024, Evaluation of the 2024 Noto Peninsula Earthquakes, University of Tokyo online report dated Feb. 9, 2024, https://www.jishin.go.jp/main/chousa/24feb_noto/index-e.htm, accessed July 17, 2024
- Field, E. H., K. R. Milner, A. E. Hatem, P. M. Powers, F. F. Pollitz, A. L. Llenos, Y. Zeng, K. M. Johnson, B. E. Shaw, D. McPhillips, et al. (2023). The USGS 2023 conterminous U.S. time-independent earthquake rupture forecast, *Bull. Seismol. Soc. Am.* doi: 10.1785/0120230120.
- Kirby, J.F., 2019, On the pitfalls of Airy isostasy and the isostatic gravity anomaly in general: *Geophysical Journal International*, v. 216, p. 103-122.
- Langenheim, V.E., Jachens, R.C., Graymer, R.W. and Wentworth, C.M., 2008, Implications for fault and basin geometry in the central California Coast Ranges from preliminary gravity and magnetic data: Proceedings of the American Geophysical Fall Meeting, San Francisco, California, USA, 15-19 December 2008; Supplement, *Eos, Transactions, American Geophysical Union* 89 (53), Abstract #GP43B-0811.
- Mahony, S. H., R. S. J. Sparks, L. M. Wallace, S. L. Engwell, E. M. Scourse, N. H. Barnard, J. Kandlbauer, and S. K. Brown (2016), Increased rates of large-magnitude explosive eruptions in Japan in the late Neogene and Quaternary, *Geochem. Geophys. Geosyst.*, 17, 2467–2479, doi:10.1002/2016GC006362
- McLaren, M.K., Hardebeck, J.L., van der Elst, N., Unruh, J.R., Bawden, G.W., and Blair, J.L., 2008. Complex faulting associated with the 22 December 2003 Mw 6.5 San Simeon, California earthquake, aftershocks and postseismic surface deformation: *Bulletin of the Seismological Society of America* 98 (4): 1659–1680.
- National Institute of Advanced Industrial Science and Technology (AIST), 2024, Active Fault Database of Japan, April 26, 2024 version. https://gbank.gsj.jp/activefault/index_e_gmap.html
- Pacific Gas and Electric Company (PG&E), 2011. Report on the Analysis of the Shoreline Fault Zone, Central Coastal California, report to the U.S. Nuclear Regulatory Commission, January; available at www.pge.com/myhome/edusafety/systemworks/dcpp/shorelinereport/.
- Pacific Gas and Electric Company (PG&E), 2014. Central Coastal California Seismic Imaging Project (CCCSIP), report to the California Public Utilities Commission; available at <http://www.pge.com/en/safety/systemworks/dcpp/seismicsafety/report.page>. Pacific Gas and Electric Company (PG&E),
- Pacific Gas and Electric Company (PG&E), 2015, Seismic Source Characterization for the Diablo Canyon Power Plant, San Luis Obispo County, California; report on the results of SSHAC level 3 study, Rev. A, March; available at <http://www.pge.com/depp-ltsp>
- Pacific Gas and Electric Company (PG&E), 2024, Diablo Canyon Updated Seismic Assessment: Response to Senate Bill 846, 1 February 2024, 392 pages.
- Shen, Z.-K., and P. Bird, 2022, NeoKinema deformation model for the 2023 update to the U.S National Seismic Hazard Model, *Seismol. Res. Lett.*, 93(6), 3037-3052 <https://doi.org/10.1785/0220220179>, 16 pages.
- Simpson, R.W., Jachens, R.C., Blakely, R.J., and Saltus, R.W., 1986. A new isostatic residual gravity map of the conterminous United States with a discussion of the significance of isostatic residual anomalies: *Journal of Geophysical Research* 91 (B5): 8348–8372.
- SSHAC [Senior Seismic Hazard Analysis Committee, R.J. Budnitz, Chairman, G. Apostolakis, D.M. Boore, L.S. Cluff, K.J. Coppersmith, C.A. Cornell, and P.A. Morris], 1997, Recommendations for 48 probabilistic seismic hazard analysis—Guidance on uncertainty and use of experts: Washington, D.C., U.S. Nuclear Regulatory Commission Report, NUREG/CR-6372

Questions?



Extra Slides

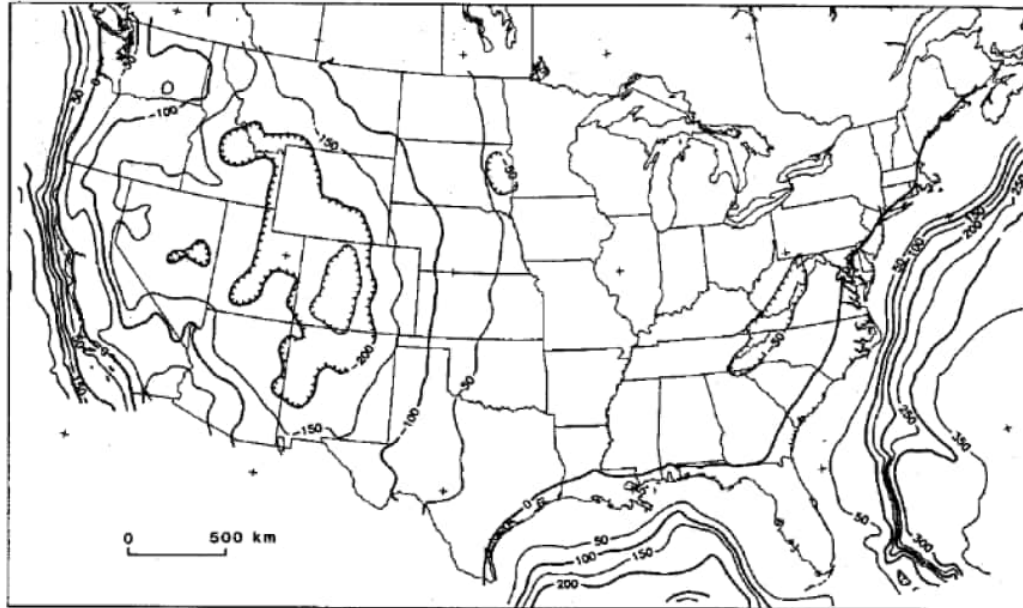


Figure 6-1. Small-Scale Map Showing General Residual Gravity Anomaly Patterns in the United States (from Simpson et al., 1986)

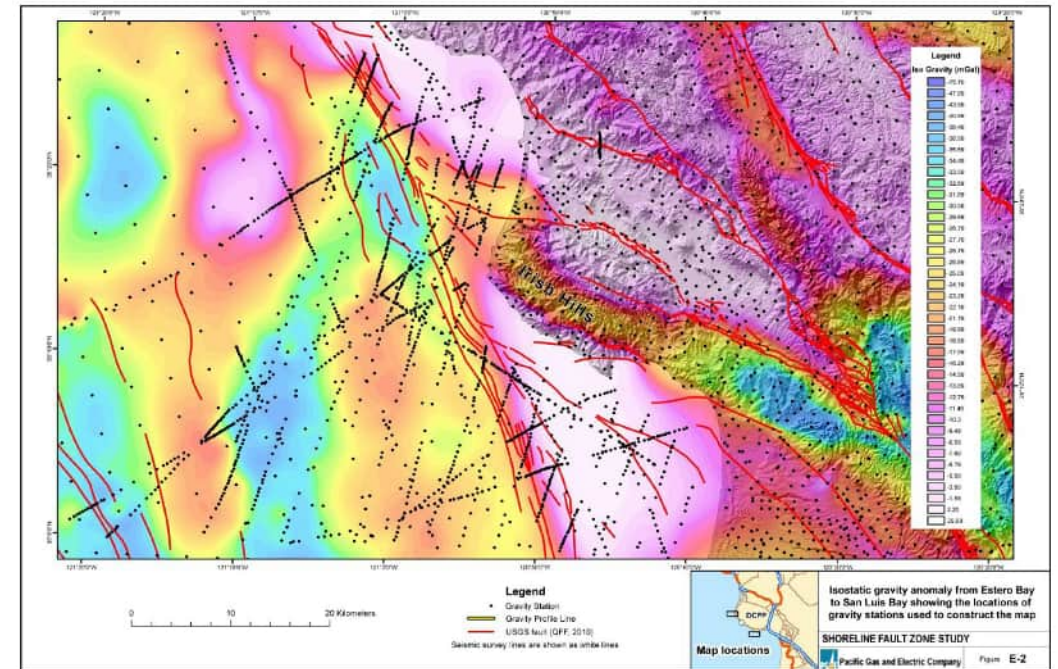
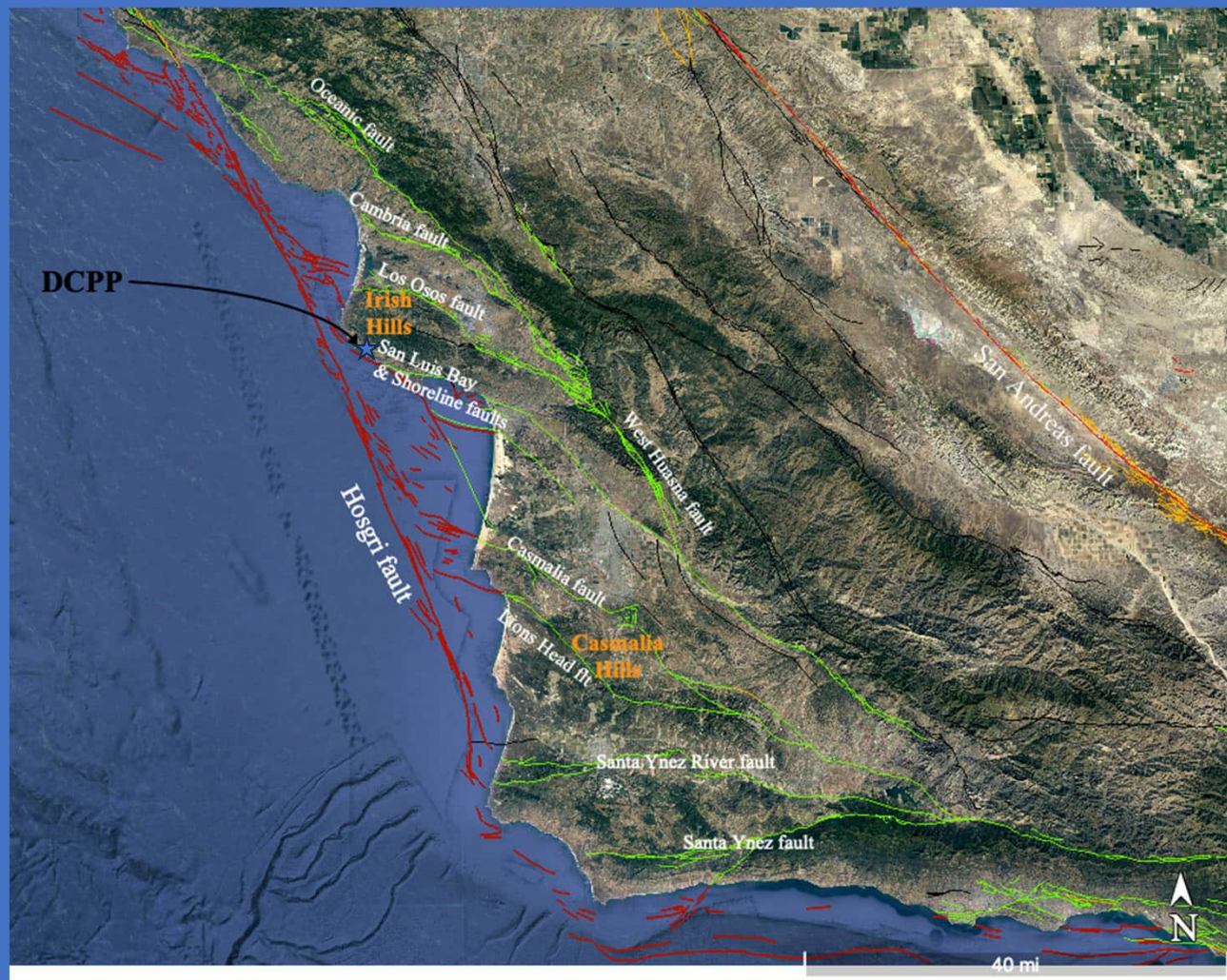
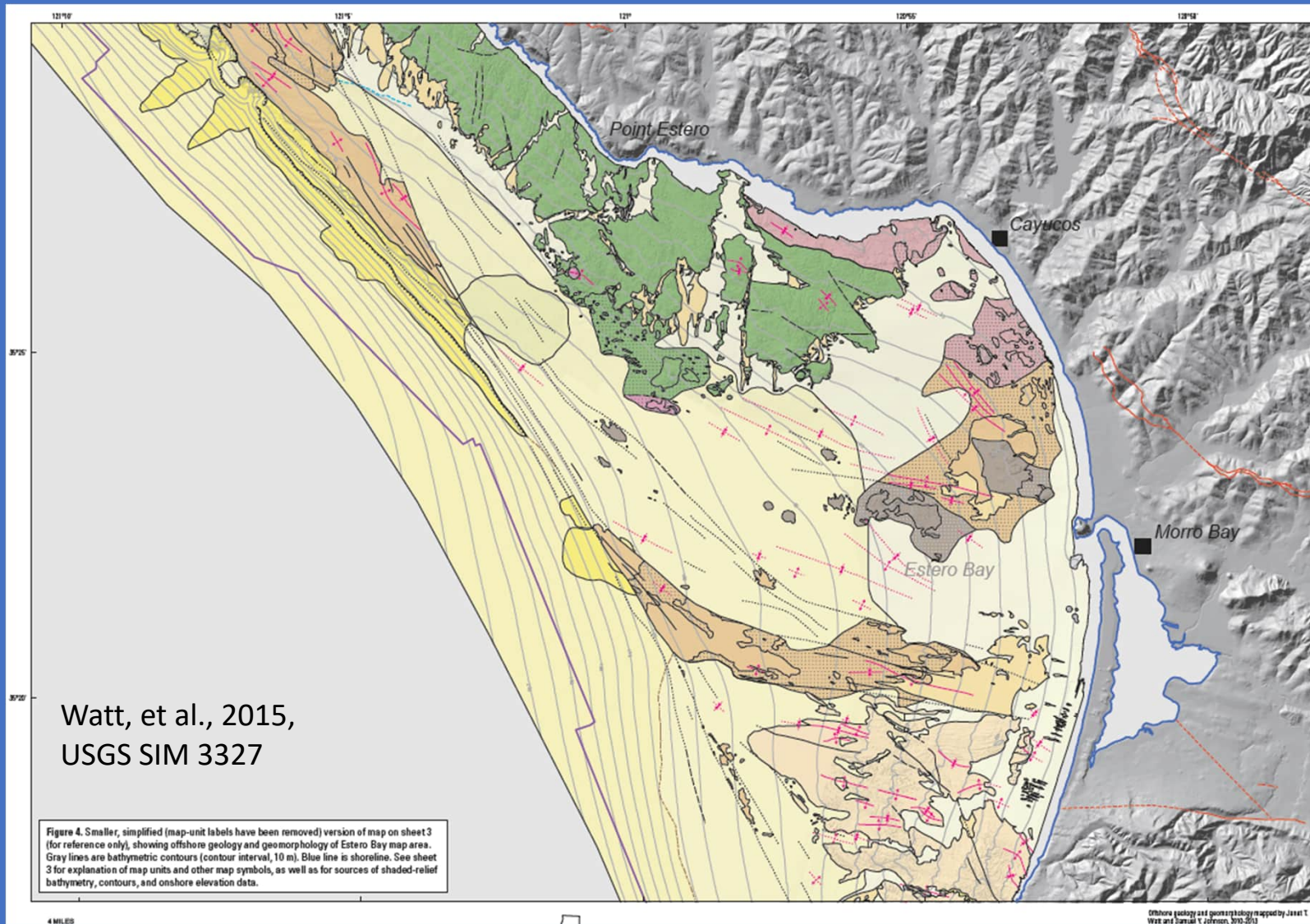


Figure 6-2. Large-Scale Residual Isostatic Gravity Anomaly Map Showing a Negative Gravity Anomaly Coincident with the Irish Hills (modified from Langenheim et al., 2008 and PG&E, 2011, Figure E-2)

Regional Tectonic Framework



- The current data set is not adequate to distinguish between competing fault geometry models for the Irish Hills and the Los Osos fault.
- Additional offshore seismic reflection data focusing in detail on the Los Osos and Casmalia faults may identify piercing features that could yield rates of lateral slip.
- Additional onshore investigation is needed to better characterize the Los Osos fault and evaluate competing geologic models.



- Results of a preliminary investigation by the U.S. Geological Survey indicate that the offshore Los Osos fault is a broad zone characterized by vertical strike slip faults.
- Detailed offshore seismic reflection data could better characterize this fault zone and potentially quantify rates of lateral slip.
- **The Irish Hills uplift rate is approximately 0.1 to 0.2 mm/yr, indicating low vertical slip rates on the bounding faults. However, if detailed offshore investigation shows that the Los Osos fault has a higher lateral slip rate, the overall slip rate on this fault could be higher. Conversely, if the lateral slip rate is low, then the overall slip rate for the Los Osos fault could be relatively low.**

Data Not Included in the PG&E 2024 Report:

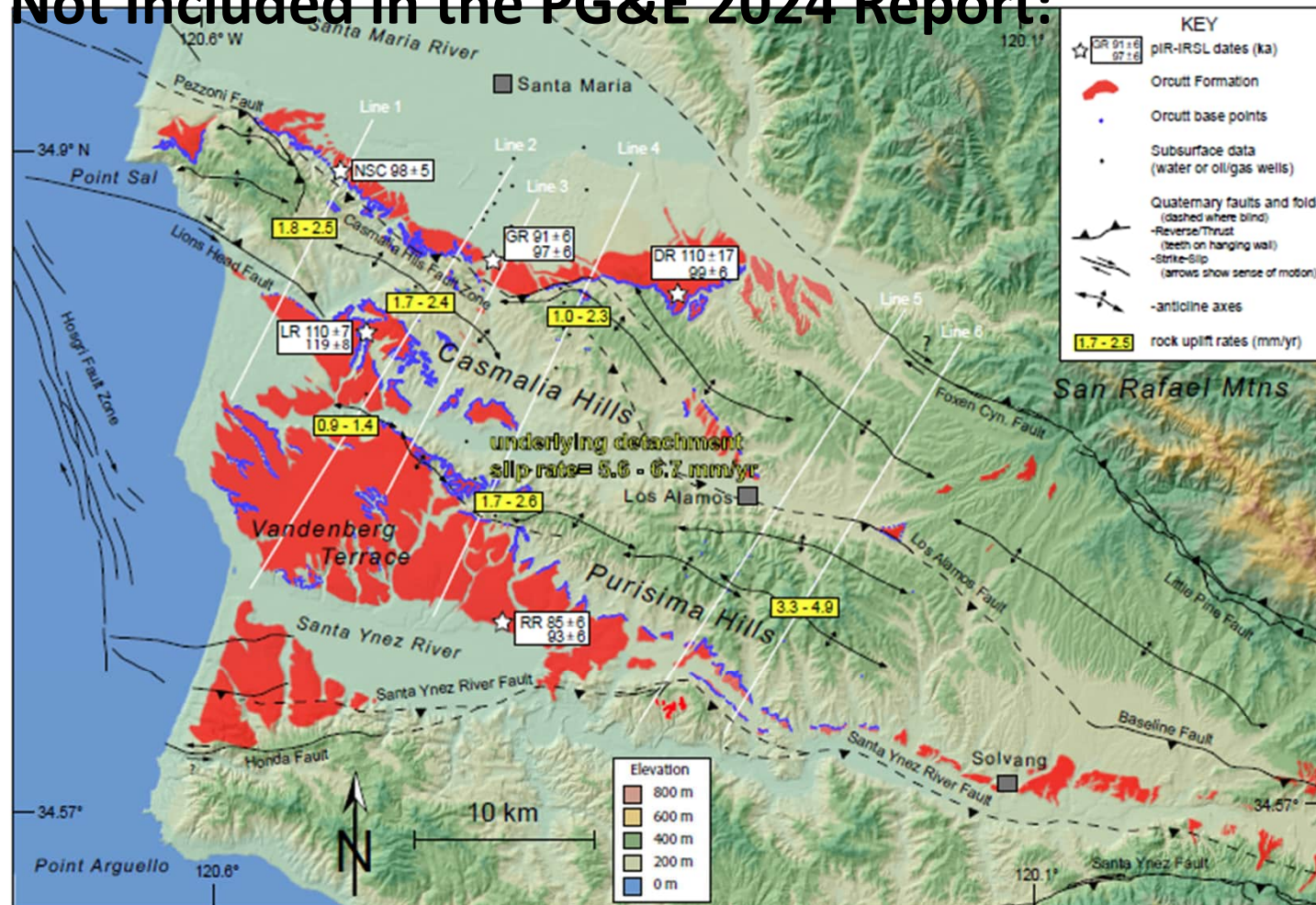


Figure 2. Map of the Santa Maria Basin showing faults, anticline axes, the extent of the mapped Orcutt Formation at the surface, the Orcutt basal surface control points, cross sections, post-infrared-infrared-stimulated luminescence (pIR-IRSL) sample sites, and rock uplift rates mapped on a 5-m-resolution digital elevation model.

McGregor and Onderdonk, 2021, Geosphere

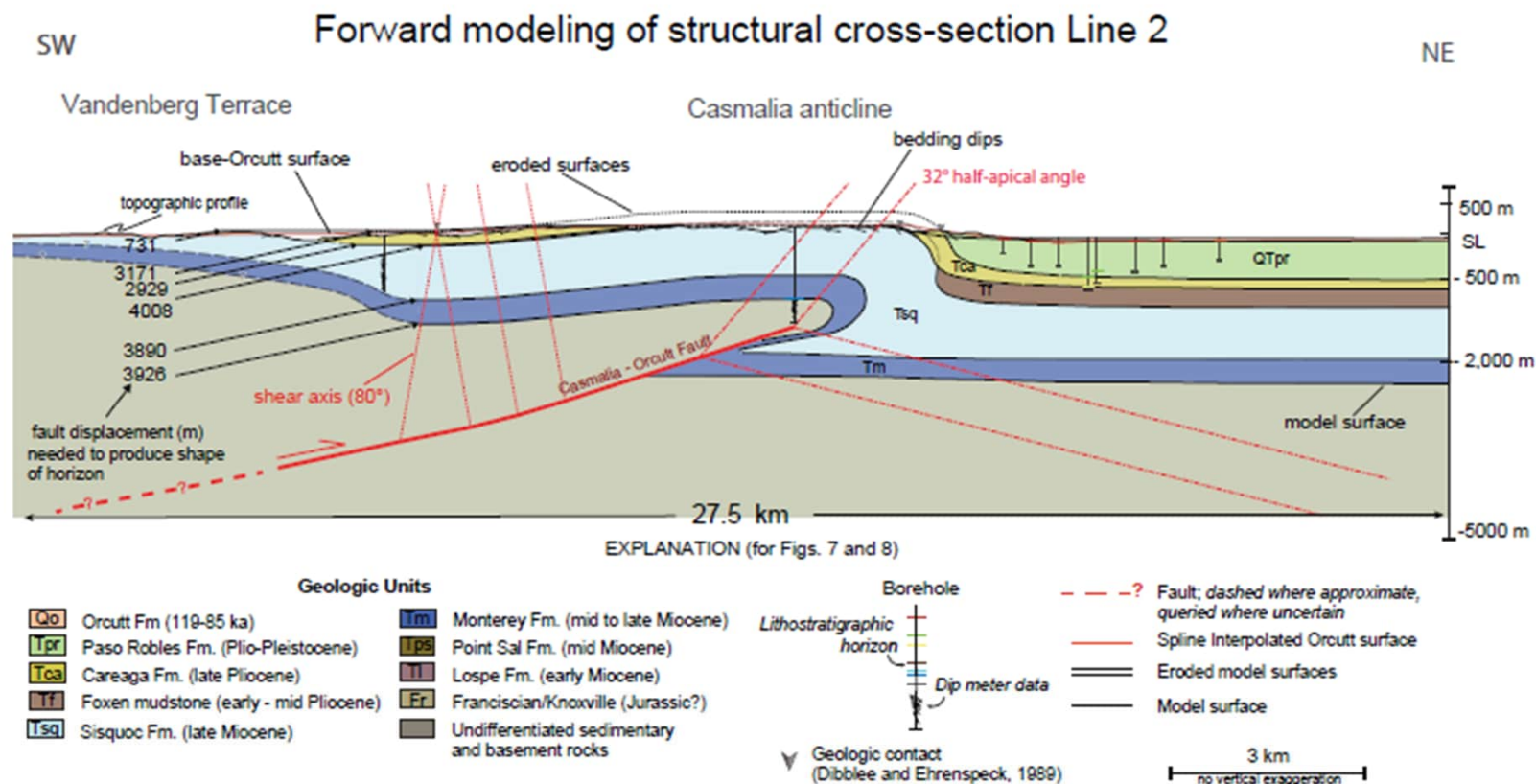
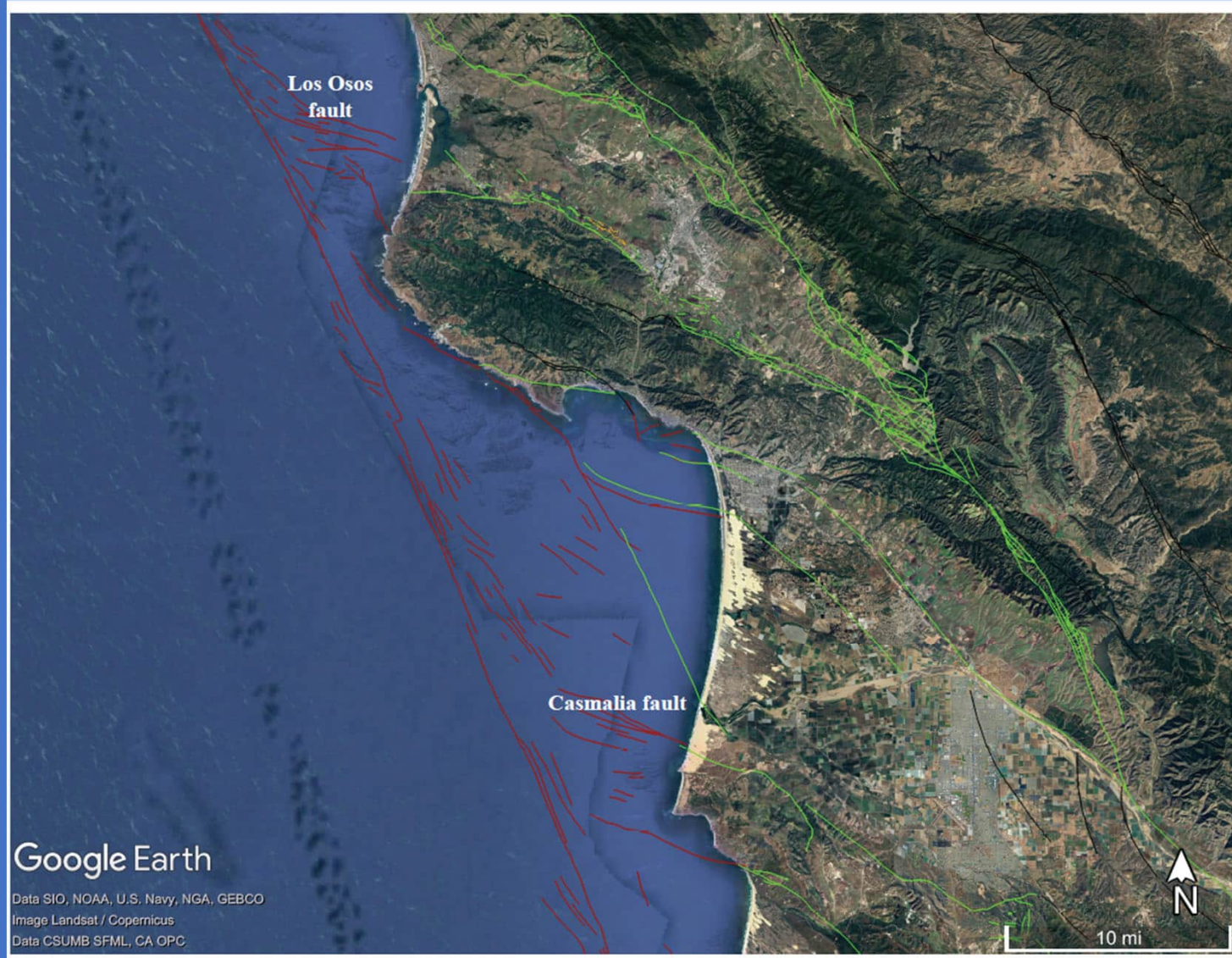


Figure 7. Area-balanced, fault-related fold model solution for the western Casmalia Hills. Shear axes, trishear parameters, and horizons depths were adjusted to fit the shown geometric constraints and produce fault displacements. The fault displacement arrows show the direction (fault parallel) and magnitude (m) of displacement along the fault that produces the above fold shape of a particular horizon in our preferred geometric models. For some horizons, there is a greater amount of displacement in younger units relative to older units beneath, which is the result of an earlier episode of normal slip along the fault. Note that geologic and subsurface data indicate very steep, and in some places overturned, bedding dips on the north side of the Casmalia Hills anticline, showing that a significant amount of folding occurred prior to planation and deposition of the Orcutt Formation. SL—sea level.

McGregor and Onderdonk, 2021, Geosphere

- Recent work by McGregor and Onderdonk (2021) indicates a slip rate of 5.6 to 6.7 mm/yr for the Casmalia fault. This is more than 10 times the slip rate used for this fault in the PG&E (2015) seismic hazard assessment.
- We recommend that PG&E conduct a comprehensive review of all fault studies in the region surrounding the DCPD within the past 10 years, reference those studies, and evaluate the impacts to the DCPD seismic hazard assessment.

- On September 25, 2024, three members of the IPRP (Dawson, Johnson, and Seitz) met on Teams with personnel from PG&E geosciences group.
- The meeting with PG&E was productive, and it allowed for clarification of the major points of our report.
- We believe that continued discussions with the PG&E geosciences group would be worthwhile.
- PG&E may need more time to prepare their response.





California
**Department of
Conservation**
California Geological Survey

THE INDEPENDENT PEER REVIEW PANEL FOR SEISMIC HAZARD STUDIES AT DIABLO CANYON:

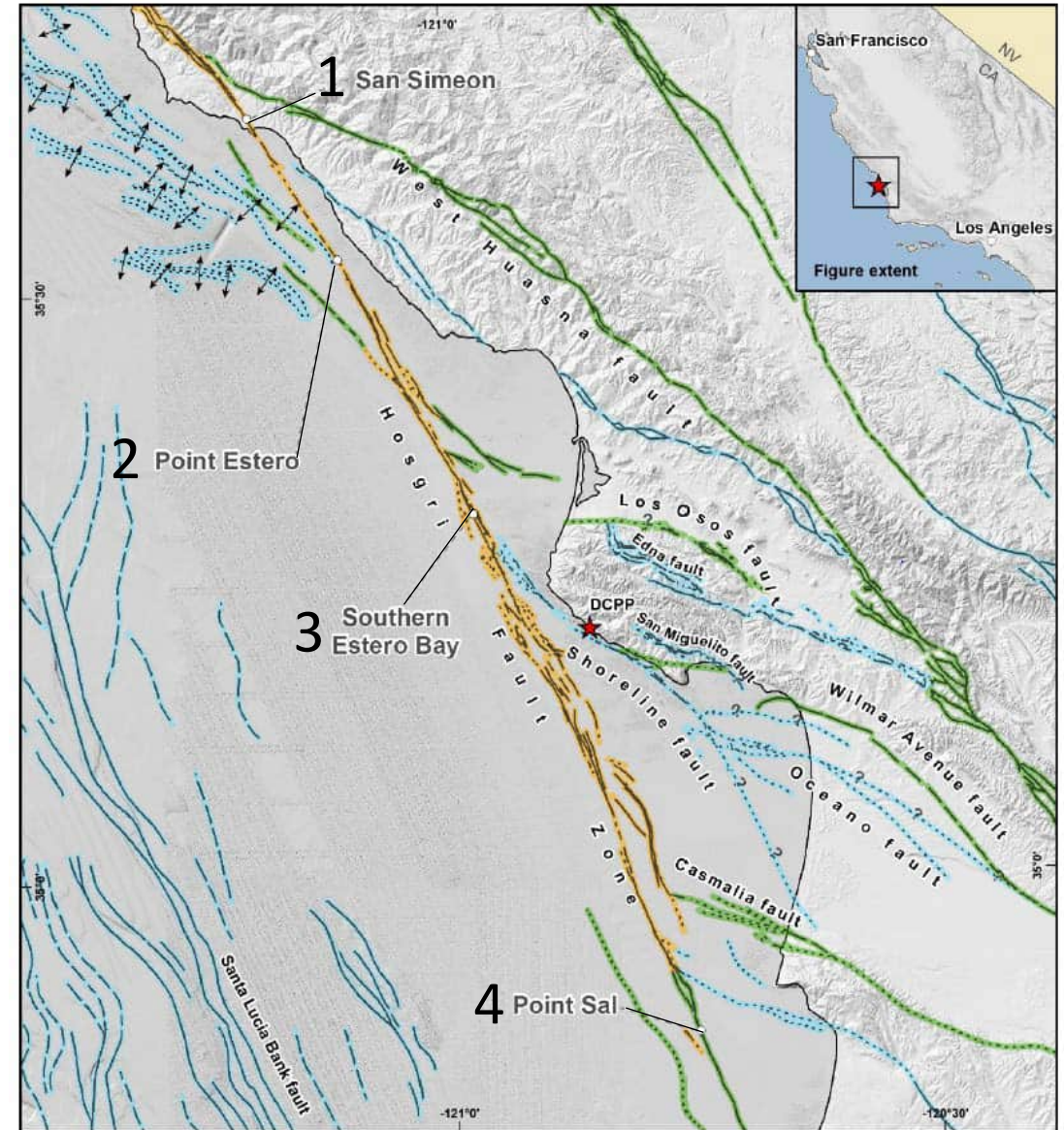
**REVIEW OF PG&E'S DIABLO CANYON UPDATED SEISMIC ASSESSMENT,
DCISC MEETING AVILA BEACH, OCTOBER 9, 2024**

Gordon Seitz, PhD
PG 5514, CEG 1718
California Geological Survey

Hosgri Fault Seismic Source



- The Hosgri fault is the primary seismic source for DCPD
 - Slip rate has been increased based on several peer-reviewed studies
 - High degree of confidence in a 2.6 mm/yr rate
 - Slip rate was calculated using 4 sites, 1-4.
 - However, we question PG&E using a lower slip rate in their hazard model based on weighting of each site.
- New data that was not addressed in the PG&E Update:
 - Hosgri fault slip rate study based on offshore seismic data reports slip rates have increased in the past million years, suggesting that rates older than Holocene may not be representative of the current seismic hazard.



High-resolution geophysical and geochronological analysis of a relict shoreface deposit offshore central California: Implications for slip rate along the Hosgri fault

Jared W. Kluesner¹, Samuel Y. Johnson¹, Stuart P. Nishenko^{2,†}, Elisa Medri³, Alexander R. Simms³, H. Gary Greene⁴, Harrison J. Gray⁵, Shannon A. Mahan⁵, Jason S. Padgett¹, Emma T. Krolczyk⁵, Daniel S. Brothers¹, and James E. Conrad¹

¹Pacific Coastal and Marine Science Center, U.S. Geological Survey, Santa Cruz, California 95060, USA

²Pacific Gas and Electric, 300 Lakeside Drive, Oakland, California 94612, USA

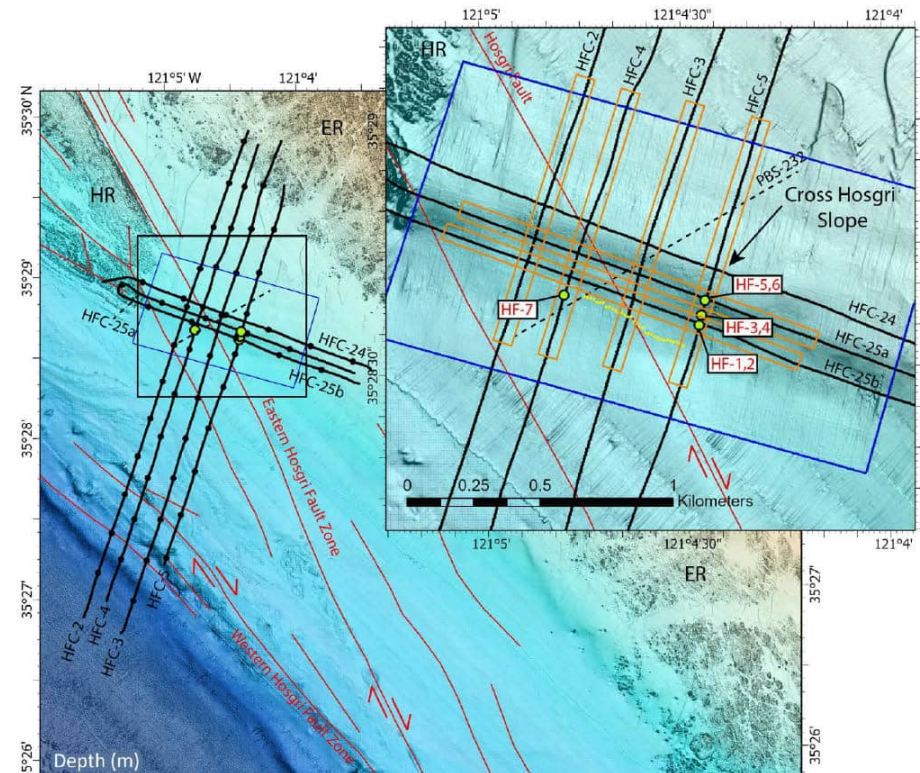
³Department of Earth Science, University of California Santa Barbara, Santa Barbara, California 93106, USA

⁴Moss Landing Marine Laboratories, Moss Landing, California 95039, USA

⁵Geosciences and Environmental Change Science Center, U.S. Geological Survey, Denver, Colorado 80225, USA

Slip rate determination improved from 2015

- Additional seismic profiles
- Sediment cores
- Chronology C-14 and OSL
- 2.6 ± 0.8 mm/yr



Research Paper

GEOSPHERE

GEOSPHERE, v. 19, no. 6

<https://doi.org/10.1130/GES02657.1>

12 figures; 6 tables; 1 set of supplemental files

CORRESPONDENCE: jkluesner@usgs.gov

CITATION: Kluesner, J.W., Johnson, S.Y., Nishenko, S.P., Medri, E., Simms, A.R., Greene, H.G., Gray, H.J., Mahan, S.A., Padgett, J.S., Krolczyk, E.T., Brothers, D.S., and Conrad, J.E., 2023, High-resolution geophysical and geochronological analysis of a relict shoreface deposit offshore central California: Implications for slip rate along the Hosgri fault: Geosphere, v. 19, no. 6, p. 1788–1811, <https://doi.org/10.1130/GES02657.1>.

Science Editor: David E. Fastovsky
Associate Editor: Craig H. Jones

Received 23 February 2023
Revision received 4 August 2023
Accepted 22 September 2023

Published online 3 November 2023

Cross-Hosgri Slope: Chirp profile and Sediment Cores

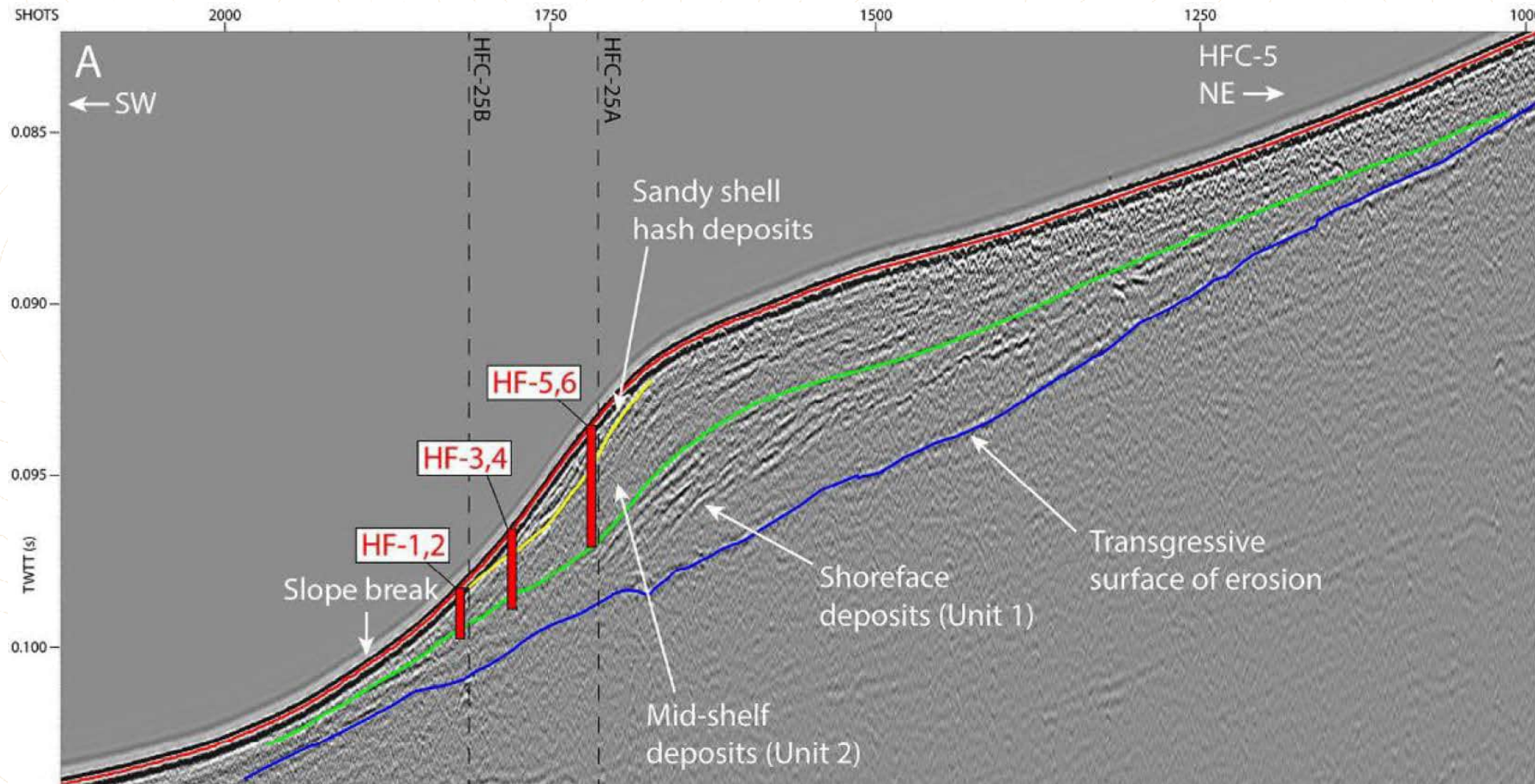


Figure 5-33. Stratigraphic Interpretation of New Chirp and Sediment Core Data Across the Cross-Hosgri Slope (from Kluesner et al., 2023, Figure 6)

Weighting of Slip Rate Sites



From PG&E (2024):

5.3.1.2. Weighting of the Four Slip Rate Sites

Due to the more thorough documentation of the CHS age and stratigraphy (Kluesner et al., 2023; Medri et al., 2023), there is greater confidence now than in 2015 that the geological interpretation of the site is correct and that the slip rate estimated from the site is a reliable estimate of the slip rate for the Hosgri fault source near the DCPD. The weighting of the four Hosgri fault slip rate sites in the 2015 SSC model (Table 5-12), therefore, needs to be revisited.

Our basis for reweighting the four slip rates sites is qualitative and considers three main criteria, as follows:

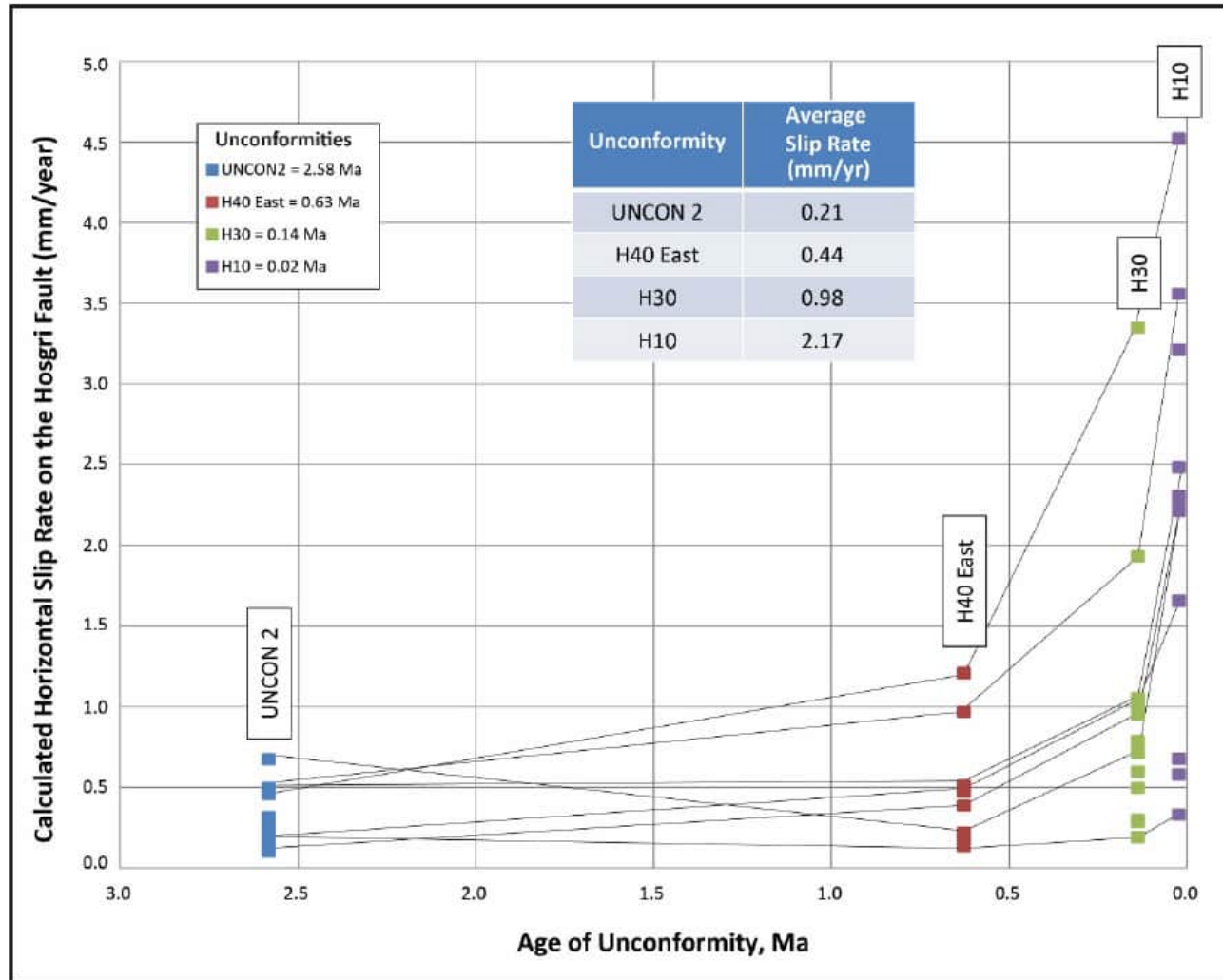
- The age of the offset feature
- The location of the slip rate site along the Hosgri fault and its proximity to the DCPD
- The confidence that the interpretation of the site provides a reliable result

Slip Rate Sites Weighting



Study Site	Applicability of Offset Feature Age	Applicability of Slip Rate Site Location	Confidence in Site Location	PG&E 2015 Weight	PG&E 2024 Weight	Slip Rate mm/yr.
1. San Simeon	High (200 ka)	Moderate	Moderate	0.3	0.25	1.8
2. Point Estero – Cross-Hosgri Slope	High (12 ka)	Moderate	High	0.2	0.5	2.6
3. Southern Estero Bay	Low (700 ka)	High	Low	0.3	0.2	1.7
4. Point Sal	Low (700 ka)	Low	Moderate	0.2	0.05	0.8

Slip Rate Sites Weighting



Slip Rate Increase in the Past 500 ka

From: Independent Evaluation of the Hosgri Fault Slip Rate Based on a Structural Analysis of the Pull-Apart Basin Linking the Hosgri and San Simeon Fault Systems, 2016, Center for Nuclear Waste Regulatory Analyses, San Antonio, Texas, NRC Contract No. NRC-HQ-50-14-E-0001

Slip Rate Increase in the Past 500 ka

Sequence Stratigraphic Models

The slip rates of the Hosgri and Shoreline faults in the 2015 SSC model relied to some degree on a sequence stratigraphic model of the continental shelf developed based on analysis of seismic reflection data (PG&E, 2014a, 2015a). Unconformity-bound sequences mapped in the shallow subsurface of the shelf were interpreted to be associated with major sea-level fluctuations associated with Quaternary glacial and interglacial periods.

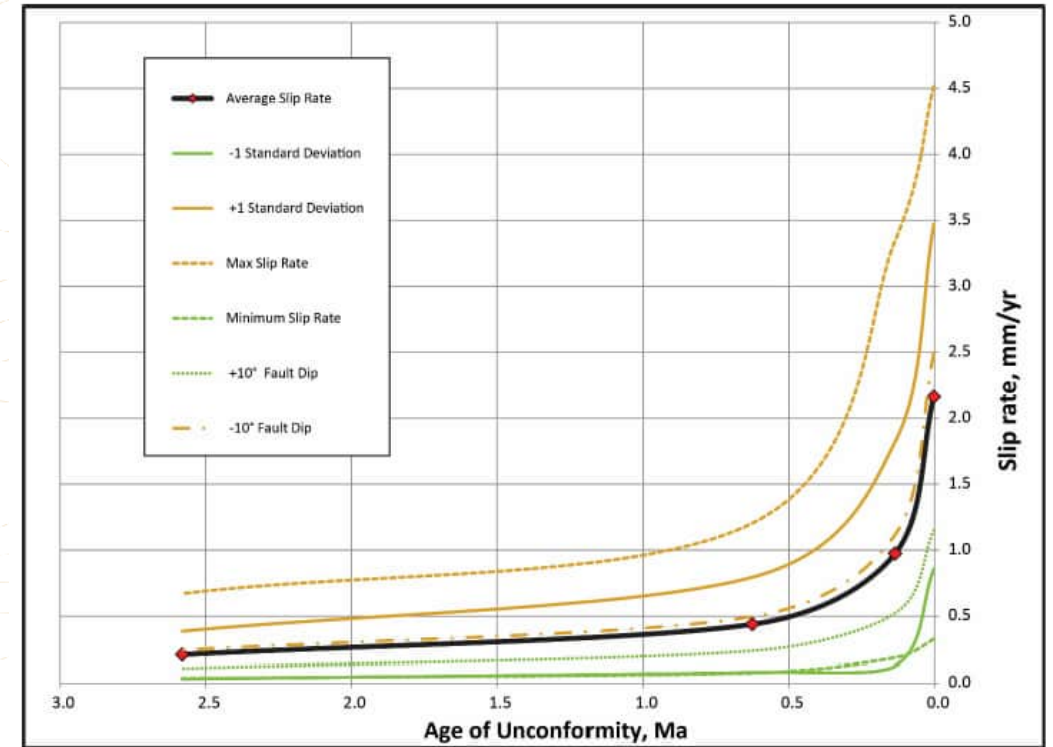
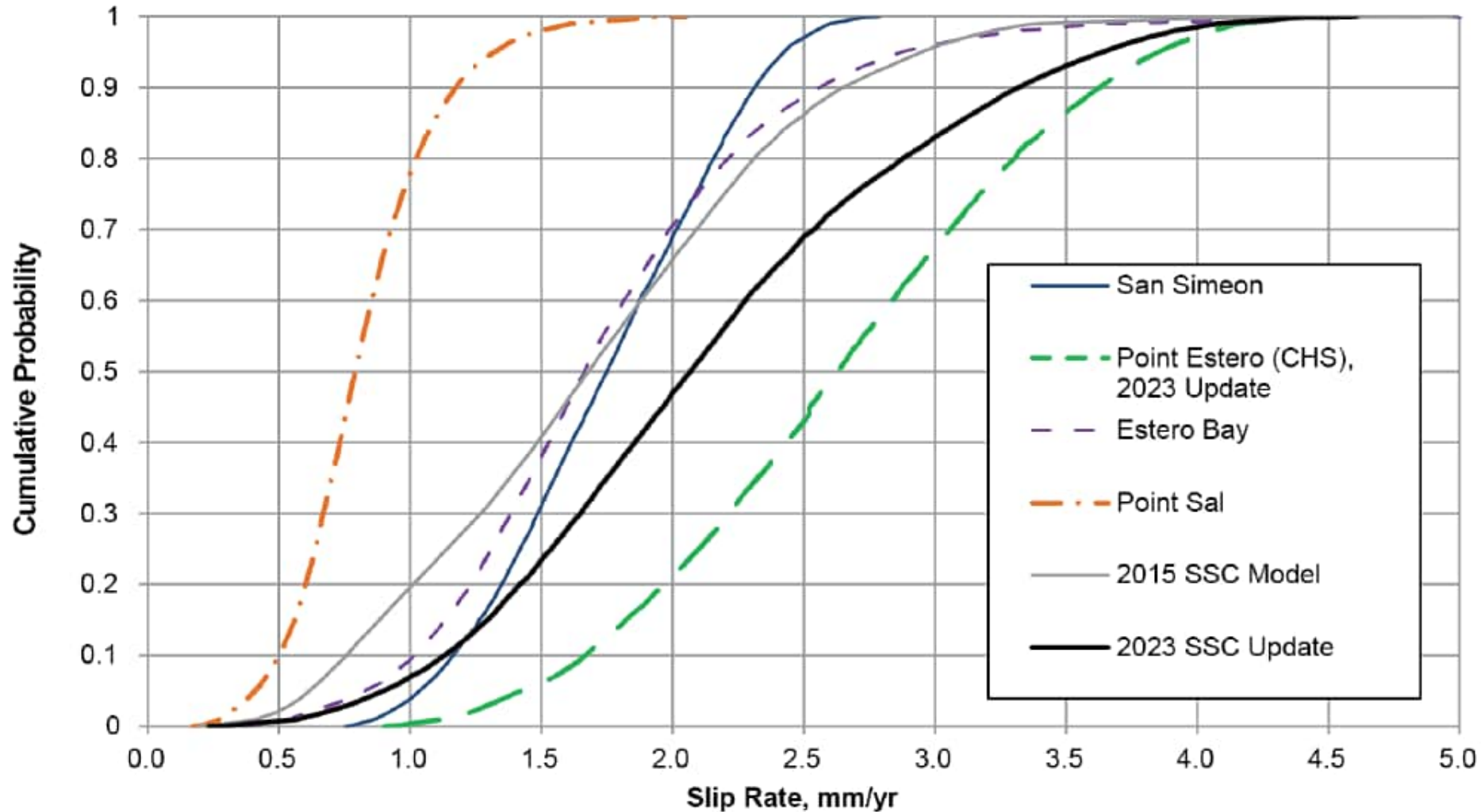


Figure 3-4. Plot of Slip Rates Versus Age. Ages are Those of the Four Unconformities Used in the Analysis. The Average Values are Averages of the Slip Estimates From All of the Cross Sections Analyzed for a Given Unconformity. The +/- 1 Standard Deviation Bounds, and the Maximum and Minimum Bounds are Based on Variations in Slip Rate Estimates From Cross Section to Cross Section. The +10 Degree and -10 Degree Bounds are the Upper and Lower Bounds of the Ranges Derived From Using the "Best Fit" Fault Dip Values Compared With Slip Estimates Derived Using A +/- 10 Degrees of Fault Dip Range. Note That the Range of Slip Rate Estimates That Results From Varying the Fault Dip Lies Well Within the Variation Bounds of the "Raw" Measurements.

From: Independent Evaluation of the Hosgri Fault Slip Rate Based on a Structural Analysis of the Pull-Apart Basin Linking the Hosgri and San Simeon Fault Systems, 2016, Center for Nuclear Waste Regulatory Analyses, San Antonio, Texas, NRC Contract No. NRC-HQ-50-14-E-0001

Hosgri Fault Source Slip Rate CDFs



From PG&E (2024) Update Fig. 5-41

Evaluation Of Models And Methods



From PG&E (2024):

3.3 EVALUATION OF MODELS AND METHODS

In similar fashion to the SSHAC process, for this project it was essential to review the center, body, and range (CBR) of the technically defensible interpretations (TDI) of both new and previously available data, models, and methods.

“The imperative to capture the full range of the integrated distribution should not lead the experts doing the model-building to include alternatives in their models only as a means to convey the impression of broad capture of epistemic uncertainty. The integration process need not be inclusive of all available interpretations and those interpretations deemed not credible by the TI Team must be culled from analysis.”

Conclusions



- We agree with PG&E that the Cross-Hosgri Slope slip rate best represents the hazard of the Hosgri fault.
- However, other slip rate sites used appear unrepresentative of current rates of tectonic deformation, and a bias towards the legacy 2015 model appears to be part of the reason.
- The Cross-Hosgri Slope slip rate should receive full weight in seismic hazard models.



THANK YOU

Gordon Seitz, California Geological Survey



Bob Budnitz, Member, and R. Ferman Wardell, Consultant

1. Meet with PG&E Geosciences Group in Oakland on August 27, 2024
2. Meet with DCCP Officer Maureen Zawalick
3. License Renewal Update
4. Unit 1 Capsule B Withdrawal
5. On-Line Maintenance
6. Observe Licensed Operator Training: Reactor Physics
7. Pressurizer Safety Valve Root Cause Evaluation
8. Current Campaign Moving Spent Fuel from Spent Fuel Pool to ISFSI
9. Results of July 31, 2024 Evaluated Emergency Preparedness Exercise
10. Meet with NRC Senior Resident Inspector and New Resident Inspector
11. Fire Protection Update
12. Recent Report By IPRP and Its Implications for Site Seismic Hazard
13. Observe Work in Progress: Calibration of Nuclear Instrumentation



Meeting with PG&E Geosciences Group in Oakland on August 27, 2024

Two Items Discussed:

1. Seismic Information Received from Dr. Peter Bird
2. Response to Latest IPRP Report



Review of Seismic Hazard Information Received from Dr. Peter Bird

Seven topics, chosen by the DCISC, were the main subject of discussions and PG&E explanations during this FF meeting:

1. The phenomena associated with the Noto Peninsula earthquake in Japan, January 2024
2. Geodetic-velocity modeling and stress-direction modeling, applicability of regional or larger-scale data
3. Seismicity from unexpected or undetected ruptures between known faults
4. A thrust fault under the DCPD plant site with slip rate about 1 mm/year
5. Microseismicity under the Irish Hills
6. Applicability of information going back a few million years
7. Airy isostasy model for the Irish Hills

Continued ³



Review of Seismic Hazard Information Presented by Dr. Peter Bird

- HISTORY --- DCISC Conclusions in May 2023
 - The 2015 PSHA (Probabilistic Seismic Hazard Analysis) and the 2018 SPRA (Seismic Probabilistic Risk Assessment) were previously reviewed by the DCISC, which concluded that the seismic safety achieved by DCPP was acceptable.
 - After reviewing the new and updated information, **the DCISC concludes that the seismic safety of the DCPP reactors is fully adequate now, and requires no additional upgrades or other changes to bring it up-to-date or to improve it.**
 - **The DCISC concludes that no upgrades or improvements to seismic safety would be necessary to assure adequate safety for extended operations beyond 2025.**

Continued 4



Review of Seismic Hazard Information Presented by Dr. Peter Bird

- Phenomena associated with the Noto earthquake in Japan, January 2024
 - PG&E experts presented several reasons why treating information from the Noto Peninsula earthquake as directly applicable is inappropriate.
 - These include the width of the Irish Hills, and the issue of dip ranges and how they constrain the possibility of reverse or thrust faults in compressional environments.
 - There is ongoing active investigation of the Noto earthquake by experts elsewhere, including some recent important journal articles. As these studies emerge and are reviewed in the community, new insights may emerge.



Review of Seismic Hazard Information Presented by Dr. Peter Bird

- Geodetic-velocity modeling and stress-direction modeling, applicability of regional or larger-scale data
 - PG&E experts presented and explained their position that although geodetic-based deformation models are useful, they should not replace geological slip-rate models.

Continued



Review of Seismic Hazard Information Presented by Dr. Peter Bird

- Seismicity from unexpected or undetected ruptures between known faults
 - PG&E experts explained their position that they do not believe that wide-area or global models are very applicable for site-specific analysis in coastal California.
 - Using nearby microseismicity rates and other site-specific data was the SSHAC 2015 approach and remains the appropriate approach.
- A thrust fault under the DCPD plant site with slip rate about 1mm/year
 - PG&E experts explained that this issue was addressed in the 2011 Shoreline Fault report. Using offshore data, no evidence was found of significant thrust or reverse faulting in the wavecut platform where Dr. Bird infers a fault exists between the Shoreline fault and the marine terraces.

Continued 7



Review of Seismic Hazard Information Presented by Dr. Peter Bird

- Microseismicity under the Irish Hills
 - PG&E experts said that microseismicity under the Irish Hills is not considered a reliable way to define fault planes, citing earlier work by J. Hardebeck. They noted their belief that using the local background source approach remains the best approach.
- Applicability of information going back a few million years
 - PG&E experts note that much research supports the conclusion that there has been extensive evolution and changes in the local tectonic environment over the past several million years.
 - This implies to PG&E that information from those early (pre-Quaternary or early Quaternary) times is of low applicability.

Continued



Review of Seismic Hazard Information Presented by Dr. Peter Bird

- Airy isostasy model for the Irish Hills
 - PG&E experts said that the Airy isostasy model for Irish Hills uplift is not consistent with broadly accepted understanding of the origin and development over the eons of the Irish Hills.
 - In particular, PG&E stated that using Airy isostasy principles to calculate fault slip rates is not credible. They note that the slip-rate calculation is based on relative movement of the hanging wall and footwall blocks across the fault, and that there is no other “isostatic” process to invoke.

Continued



Review of Seismic Hazard Information Presented by Dr. Peter Bird

- Broad DCISC conclusion

The DCISC has not yet found any reason to question the adequacy of seismic safety at DCPD. That is, so far **nothing in any of the new information changes the broader understandings** of previous seismic studies or provides any new safety insights.

- Recommendations for Future Action by the DCISC:

- The DCISC should continue to review any new seismic-related information that could be forthcoming concerning Dr. Bird's evaluations.
- This includes information from the NRC, the IPRP, PG&E, and any other applicable sources of information or any other evaluations.



Review of Seismic Hazard Information Presented by Dr. Peter Bird

Committee discussion and public comment



Robert Budnitz, Member, with Ferman Wardell, Consultant

Part Two

Review of the Recent Report by the IPRP (Independent
Peer Review Panel for Seismic Hazard Studies)

Continued



Review of the Recent Report by the IPRP

- The IPRP issued their most recent Report #16 on August 26, “Initial Review of the PG&E February 2024 ‘Updated Seismic Assessment’ ”
 - Some important sections of the IPRP report recommend more technical investigations in the future (data gathering, data analysis, evaluations, etc.). For those, the DCISC concurs.
 - Three topics chosen by the DCISC were the main subject of discussions and PG&E explanations during this FF meeting:
 - IPRP recommendations concerning the Hosgri Fault slip rate
 - IPRP comments concerning the uplift for the Irish Hills
 - IPRP comments on using the Casmalia Hills area to the south as an analog or as possibly being directly connected to the Hosgri system



Review of the Recent Report by the IPRP

IPRP recommendations concerning the Hosgri Fault slip rate

- The IPRP proposes giving 100% weight to one of the four data sets used by PG&E to understand the Hosgri Fault slip rate.
- PG&E does not agree with assigning 100% weight to the single model.
- The DCISC observes that whatever the slip rate is (among the options), the understanding of overall seismic safety of the plant is not affected, because the plant's seismic safety is adequate with significant margin using any one of the models (or any mix of them.)



Review of the Recent Report by the IPRP

IPRP comments concerning the uplift for the Irish Hills

- The IPRP report claims significant uncertainty concerning which is the best model.
- The PG&E experts explained their understanding of the sources of this uncertainty.
- The DCISC agrees that only further research and analysis will ultimately reduce these uncertainties.
- The implications for overall seismic safety at DCPD are not crucial, because the plant's seismic safety is adequate with significant margin even accounting for these uncertainties.

Continued



Review of the Recent Report by the IPRP

IPRP comments on using information from the Casmalia Hills area

- The IPRP noted that this area south of the DCPD site could be a useful analog to the Irish Hills, and also could have a linkage to the Hosgri Fault system.
- The PG&E experts noted that this is an area of active research and investigation.
- They believe that the understanding is still too premature to provide useful enough information to support a modified Irish Hills model.
- The DCISC believes that today this is a reasonable position.



Review of the Recent Report by the IPRP

Committee discussion and public comment



Meet with DCPD Officer Maureen Zawalick

- Fact-finding Meeting Agenda
- Other Items of Mutual Interest
- Conclusion: These Meetings Are Beneficial for Both Parties



License Renewal Update

The DCCP LRA consisted of the following:

- Chapter 1, Administrative Information
 - Chapter 2, Scoping and Screening Methodology (transition to NFPA 805 and Alternate Source Term)
 - Chapter 3, Aging Management Review Results
 - Chapter 4, Time-Limited Aging Analyses Updates to address the NSSS Structural and Licensing Review project.
 - Appendix A, Final Safety Analysis Report Supplement Updated to incorporate latest NRC guidance for level of detail
 - Appendix B, Aging Management Programs
 1. New Aboveground Metallic Tanks AMP
 2. Buried and Underground Piping and Tanks
 3. New Periodic Inspections for Selective Leaching AMP
- (Continued)



License Renewal Update, cont'd

The following is a history of the DCPD License Renewal process:

- Application for License Renewal (LR) submitted to the Nuclear Regulatory Commission (NRC) on November 7, 2023
- NRC determined the LR application sufficient for review on Dec 19, 2023
- NRC held oral arguments on contentions admissibility in Bethesda MD headquarters on May 22, 2024
- The U.S. Nuclear Regulatory Commission's (NRC's) federal licensing action is subject to permitting and review by State and Federal agencies
- PG&E remains in communication with involved agency staff and is working through the regulatory permitting processes and consultation



Unit 1 Capsule B Withdrawal

- DCPD has made several unsuccessful attempts to remove Capsule B
- DCPD is doing the following to assure successful removal of Capsule B in Outage 1R25 in spring 2025:
 - Removing of the core barrel for better access
 - Re-sizing of the removal tool for proper fit
 - Having a contingency plan to cut the capsule out, if necessary
- DCPD believes these measures will likely result in successful removal of Capsule B.
- The DCISC FFT agrees



Online Maintenance

1. Corrective Maintenance activities are initiated through the reporting of equipment deficiencies into the Corrective Action System as Notifications
2. Reviewed for Significance Every Shift by Shift Supervisor
3. Classified and Prioritized by Daily Review Team
4. Urgent Work is Assigned to FIN (Fix It Now)
5. Remaining Work Entered into 12-Week Rolling Matrix
6. Risk Is Determined (Trip, Personnel Safety, etc.) By Integrated Risk Review Team (Also Have the Phoenix Risk Model)
7. Online Work is Scheduled

Conclusion: Online Maintenance Has Appropriate Procedural Controls to Accomplish Work and Manage Risk



Observe Licensed Operator Continuing Training

- Classroom Lecture Format: Reactor Physics
- Approach to Criticality ($1/N$ Plotting)
- Instructor Was Qualified
- Students Were Attentive, Inquisitive
- Materials Were Appropriate
- Environment Was Conducive to Learning



Pressurizer Safety Valve Root Cause Evaluation

- Pressurizer Safety Valve Leakby Upon Startup from Outage 1R24
- Corrective Action (Depressurization to Reseat) Not Effective
- initiated Outage to Replace Valve
- Replacement Leaked Upon Restart
- Depressurized to Reseat: Successful
- Root Cause Team Formed
- Root Cause Evaluation is Confidential Per CPUC
- Confidential: Limited to Factual Information
- Root Cause: Seismic Support Interference with Valve
- Corrective Action: Modify Support – Successful
- Monitoring for Effectiveness



Spent Fuel Transfer Campaign No. 8

- Previous Campaign #7 Was 2019
- To Date: 1856 Assemblies in 58 Casks
- Current Campaign: June 22, 2024 to October 18, 2024
- Current Campaign: 6 Casks Per Unit = 192 Assemblies Per Unit
- Improvements:
 - More Robust Procedures
 - Experienced Personnel
 - Improved Training
 - Readiness Reviews
 - Challenge Boards
- Campaign has gone smoothly with no problems



ISFSI License Renewal Status

- License Renewal Application Submitted to NRC September 8, 2022
- Single Contention Dismissed
- DCCP Has Responded to Two Sets of Requests for Information
- DCCP Expects the NRC Technical Review Completion November 2024
- DCCP Plans Additional Campaigns About Every Three Years
- Holtec Storage System to Be Used for Current and Next



Results of the July 31, 2024 NRC-Evaluated Emergency Exercise

PG&E Concluded: *PG&E Emergency Response Organization (ERO) personnel adequately demonstrated reasonable assurance to protect the health and safety of plant employees and the public.*

This was based on the following satisfactory performance:

- 60 of 60 overall objectives met
- 163 of 164 facility objectives met
- 707 of 724 demonstration criteria met

DCISC Concluded: *The July 31, 2024 DCPN NRC-Evaluated Emergency Exercise appeared well designed and implemented.*



Meet with NRC Senior Resident Inspector

- Discussed Fact-finding Agenda Items
- Recent and Near-Term NRC Inspection Activities
- Conclusion: DCISC FFT Meetings with DCCP Officers Mutually Beneficial



Fire Protection Update

Scope:

- Programmatic Elements Focused on Prevention
- Fire Protection Systems
- Features for Detection, Suppression, and Separation of Nuclear Safety Related Structures, Systems and Components
- Program Health: Green

<u>Cornerstone</u>	<u>Weight(%)</u>	<u>Health Color</u>
Personnel	20	Green
Infrastructure	20	Green
Implementation	30	Green
Equipment Perf.	30	Yellow*

Continued₂₉



Fire Protection Update

Equipment Performance Yellow Due To:

- 120 maintenance fire protection work orders > 120 days old
- Three impairments >180 days old
- Incipient Fire Detection System reliability not meeting targets

Target Resolution to Achieve Green: February 2025

Conclusion: DCPD Fire Protection Satisfactory and Improving



Observe Power Block Work in Progress

- Observe Maintenance Calibration of Nuclear Instrumentation in Control Room
- Three Instrumentation and Controls Technicians with Tool Cart Behind the Control Panels
- Work Being Performed Properly with
 - Correct Procedure (using circle and slash for placekeeping)
 - Three-Way Communication
 - Phonetic Alphabet
 - Independent Verification
 - Proper Personal Protective Equipment



Bob Budnitz, Member, and R. Ferman Wardell, Consultant

1. Meet with PG&E Geosciences Group in Oakland on August 27, 2024
2. Meet with DCCP Officer Maureen Zawalick
3. License Renewal Update
4. Unit 1 Capsule B Withdrawal
5. On-Line Maintenance
6. Observe Licensed Operator Training: Reactor Physics
7. Pressurizer Safety Valve Root Cause Evaluation
8. Current Campaign Moving Spent Fuel from Spent Fuel Pool to ISFSI
9. Results of July 31, 2024 Evaluated Emergency Preparedness Exercise
10. Meet with NRC Senior Resident Inspector and New Resident Inspector
11. Fire Protection Update
12. Recent Report By IPRP and Its Implications for Site Seismic Hazard
13. Observe Work in Progress: Calibration of Nuclear Instrumentation



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

1. Observation of the July 31, 2024 NRC-Evaluated Emergency Exercise
2. DCCP Stranded Plant Procedure and FLEX
3. Annual Radiological Reports
4. Operational Experience Program Update
5. Workplace Seismic Safety
6. Nuclear Liability Insurance
7. Meet with DCCP Officer
8. Meet with NRC Senior Resident Inspector
9. Spent Fuel Movement to ISFSI



Observation of the July 31, 2024 NRC-Evaluated Emergency Exercise

- Scenario:
 - Both Units at 100% Power
 - Unit 1 Trips on Loss of 12kV Bus
 - Small Break Loss Of Coolant Accident on Unit 2
 - Emergency Response Organization Activates
 - County, etc. Activates
 - Containment Penetration Failure
 - Radiation Release to Environment
 - Protective Action Recommendations to County
 - Joint Information Center Holds News Conferences
 - Exercise Terminated

(Continued)



Observation of the July 31, 2024 NRC-Evaluated Emergency Exercise

- DCISC Fact-finding Team Observation Locations:
 - Simulator (Simulated Control Room)
 - Emergency Operations Facility
 - Joint Information Center

(Continued)



Results of the July 31, 2024 NRC-Evaluated Emergency Exercise

PG&E Concluded: *"PG&E Emergency Response Organization (ERO) personnel adequately demonstrated reasonable assurance to protect the health and safety of plant employees and the public."*

This was based on the following satisfactory performance:

- 60 of 60 overall objectives met
- 163 of 164 facility objectives met
- 707 of 724 demonstration criteria met

DCISC Concluded: *The July 31, 2024 DCPN NRC-Evaluated Emergency Exercise appeared well designed and implemented.*



DCPP Stranded Plant Procedure and FLEX

- Stranded plant means loss of all viable points to/from DCPP (i.e., roads blocked)
- DCISC Recommended Including FLEX Equipment in Stranded Plant Procedure
- DCPP Changed Procedure to Include FLEX Equipment
- Procedure Change Was Satisfactory to DCISC



2023 Annual Radioactive Effluent Release Report

Two Reports Submitted to NRC:

1. Annual Radioactive Effluent Release Report
2. Annual Radiological Environmental Monitoring Program Report

(Continued)



2023 Annual Radioactive Effluent Release Report

- Liquid Releases: 0.000285 millirem 0.0095% of Permitted
- Gaseous Releases: 0.000549 millirem 0.000366% of Permitted
- Solid Waste: Volume-reduced and shipped to licensed facility
- Direct Radiation: Background level at site boundary

(Continued)



2023 Annual Radiological Environmental Monitoring Program Report

- 275 solid and liquid samples collected and analyzed
- 884 air samples
- 1440 Thermo-Luminescent Dosimeters
- 1800 radionuclide analyses performed

Typical Samples Analyzed

Meat	Surface Water
Milk	Aquatic Vegetation
Vegetation	Fish
Drinking Water	Mussels
Groundwater	Ocean Sediment
Monitor Well	

(Continued)



2023 Annual Radiological Environmental Monitoring Program Results

- No unusual environmental isotopic findings from DCPD operations
- No unusual trends compared to pre-operational data
- No detectable offsite radiological impact



Operating Experience Program Update

Inputs:

1. Institute of Nuclear Power Operations (INPO)
2. Others: NRC, Vendors, Peers, etc.

DCPP Has Structured Process for Determining Applicability

1. Inputs to OE Coordinator
2. OE Database
3. Subject Matter Experts
4. Corrective Action Program Tracking

(Continued)



Operating Experience Program Update

- 2024 through September 5:
 - 224 reports received
 - 144 determined applicable to DCPD
 - Five resulted in additional action:
 1. Procedure change to provide guidance on instrument input connections
 2. Review SSC's related to water intrusion for rescoping into the Maintenance Rule Monitoring Program for Civil SSC's.
 3. Review structural gaps and the potential for Tritium leaks.
 4. 3d Printed Tungsten Shielding Dose Reduction Initiative
 5. Manual Reactor Scram Due to Lowering Reactor Water Level - OE reviewed with OPS Daily Planning as a reminder of what can happen

(Continued)



Workplace Seismic Safety

- DCPD Standard for Bracing Office Furniture follows the Corporate Standard
- DCISC FFTs Review/Inspect for Adherence to the Standard
- DCPD Usually in Compliance; however . . .
- . . . a new piece of furniture in the Conference Room was not secured.
- The Maintenance Director Initiated a CAP Notification
- DCISC has a concern about DCPD not consistently following their standard



Nuclear Liability Insurance

- Federal Price-Anderson Act: \$10 billion to provide prompt and orderly compensation to damaged members of the public no matter the fault
- Power reactor licensees are required to have an additional \$300 million and contribute up to \$98.5 million to a secondary pool
- DCPD has two additional sources:
 - Nuclear Electric Insurance Limited: \$1.5 billion
 - American Nuclear Insurers: \$1.25 billion
- Conclusion: DCPD is appropriately maintaining its insurance



Meet with DCPD Officer

- Meeting with Adam Peck, Site Vice-President
- Discussed Fact-finding Agenda Items and Other Items of Mutual Interest



Meet with NRC Senior Resident Inspector

- Discussed Fact-finding Agenda Items
- Recent and Near-Term NRC Inspection Activities
- Conclusion: DCISC Meetings with NRC Resident Inspectors Mutually Beneficial



Spent Fuel Transfer Campaign No. 8

- Previous Campaign #7 Was 2019
- To Date: 1856 Assemblies in 58 Casks
- Current Campaign: June 22, 2024 to October 18, 2024
- Current Campaign: 6 Casks Per Unit = 192 Assemblies Per Unit
- Improvements:
 - More Robust Procedures
 - Experienced Personnel
 - Improved Training
 - Readiness Reviews
 - Challenge Boards
- Campaign has gone smoothly with no problems



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

1. Observation of the July 31, 2024 NRC-Evaluated Emergency Exercise
2. DCPD Stranded Plant Procedure and FLEX
3. Annual Radiological Reports
4. Operational Experience Program Update
5. Workplace Seismic Safety
6. Nuclear Liability Insurance
7. Meet with DCPD Officer
8. Meet with NRC Senior Resident Inspector
9. Spent Fuel Movement to ISFSI



Najmedin Meshkati, Member, with Richard McWhorter, Consultant

- 1. Plant Design and Major System Functions**
- 2. Site Area Tour**
- 3. Probabilistic Risk Assessment Program**
- 4. Station Organization and Major Programs**
- 5. Meet with NRC Senior Resident Inspector**
- 6. Corrective Action Program and Human Performance**
- 7. Lunch with Senior Leadership Team**
- 8. License Renewal Application**
- 9. Plant Tour**



Plant Design and Major System Functions

- Overview of DCPD Design and Functions of Major Systems:
 - Reactor Plant
 - Engineered Safety Features
 - Secondary Plant
 - Electrical Distribution and Auxiliary Systems
- Conclusion: DCPD provided a briefing on the design and functions of major systems at the station as an orientation to new DCISC Member, Dr. Meshkati.



Site Area Tour

- **Toured Site Areas Outside of the Protected Area:**
 - Intake Cove
 - Fire Department and FLEX Storage Area
 - Independent Spent Fuel Storage Installation
 - Switchyards
 - Control Room Simulator
- **Conclusion:** The DCISC Fact-Finding Team toured various DCPD areas outside of the Protected Area and found that all observed equipment areas were in good condition.



**Fact-Finding Team
At Intake Cove**



Probabilistic Risk Assessment (PRA) Program

- History of the PRA Program at DCPD
- Current PRA Program Activities
- Risk-Informed Program Changes Being Implemented Through License Amendment Requests
- Effects of License Extension on the PRA Group
- Conclusion: DCPD's Probabilistic Risk Assessment (PRA) Program was emphasizing the development of various PRA applications to support extended plant operations, and the program continued to provide excellent support for enhancing the safety of plant operations.



Station Organization and Major Programs

- **Discussed Station Organization and Staffing:**
 - **Organization and Leadership Team**
 - **Currently 1287 Station Employees**
 - **Corporate Organization and Governance**
 - **Authorities for Making Decisions Related to Plant Operations**
- **Impacts of Past Major PG&E Safety Events and Bankruptcies on Nuclear Safety Culture at DCPD**
- **Organization of the Board's Safety and Nuclear Oversight (SNO) Committee and Relationship to the Station**



Station Organization and Major Programs (continued)

- **Conclusion:** DCPD provided a briefing on the organization and functions of DCPD's major departments and programs. PG&E personnel satisfactorily answered several questions regarding station safety culture including the relationship between station safety culture and the larger PG&E corporate culture. The DCISC should follow up on several additional questions related to corporate governance, the Board's Safety and Nuclear Oversight Committee, and lessons learned from past major corporate safety events.



Meet with NRC Senior Resident Inspector

- **Items Discussed Included:**
 - **Recent NRC Inspection Activities and Non-Cited Violations**
 - **Human Performance and Nuclear Safety Culture at DCP**
 - **Scheduling an NRC Presentation for the DCISC October Public Meeting**
- **Conclusion: DCISC's meetings with the NRC continue to be beneficial.**



Corrective Action Program (CAP) and Human Performance

- CAP Process for Originating and Reviewing Deficiency Reports (Notifications):
 - Operability Determinations
 - Review Teams
 - Work Scheduling Process
- Human Performance Tools Used at DCPD
- Human Performance Event Response and Use of the Human Factors Analysis and Classification System (HFACS) at DCPD (one follow-up item identified)
- Conclusion: DCPD's Corrective Action Program was performing well in that issues at the station were being effectively identified, evaluated, and tracked for resolution. DCPD's Human Performance Programs effectively incorporated human error prevention and analysis tools.



License Renewal Application (LRA)

- History of LRA Submittals
- Design and Implementation of Aging Management Plans
- NRC Inspection Results
- Status of Reactor Pressure Vessel Embrittlement Analyses Including Two Specific Questions Related To:
 - Assumptions Regarding Uncertainties
 - Reactor Vessel Performance Monitoring
- Conclusion: DCCP's License Renewal Application continued to be processed by the NRC. Aging management inspections completed to date have not discovered any significant issues, and NRC reviews of the aging management inspections have not identified any problems.



Plant Tour

- **Toured Site Areas Inside of the Protected Area, Including the Radiologically Controlled Area:**
 - **Turbine Building (All Levels)**
 - **Control Room**
 - **Spent Fuel Pools and Cask Handling Area**
 - **Auxiliary Building**
 - **High Voltage Transformers**
- **Conclusion: The DCISC Fact-Finding Team toured various DCPD areas inside the Protected Area and found that all observed equipment was in good condition.**



Fact-Finding Team On Turbine Deck



Najmedin Meshkati, Member, with Richard McWhorter, Consultant

- 1. Plant Design and Major System Functions**
- 2. Site Area Tour**
- 3. Probabilistic Risk Assessment Program**
- 4. Station Organization and Major Programs**
- 5. Meet with NRC Senior Resident Inspector**
- 6. Corrective Action Program and Human Performance**
- 7. Lunch with Senior Leadership Team**
- 8. License Renewal Application**
- 9. Plant Tour**



Report on Evaluations of Public Input on Embrittlement Studies

Drs. Mark Kirk & Andrew Kadak

Outline

1. Background and initial public concerns

1. Chronology
2. Part 1 & 2 reports
3. Conclusions of Part 2 report concerning Diablo Canyon Unit 1

2. Additional public comments expressed after the February 2024 public meeting & evaluations of these comments

3. Additional technical evaluations

1. Capsule B
2. Upper Shelf Energy
3. Assessment of impact of SECY-22-0019 on Diablo Canyon Unit 1

4. Conclusions proposed for the 35th DCISC Annual Report & request for DCISC approval

BACKGROUND & INITIAL PUBLIC CONCERNS

- 1.Chronology
- 2.Part 1 & 2 Kirk reports
- 3.Conclusions of Part 2 report concerning Diablo Canyon Unit 1

Chronology (1 of 3)

- **2009**: At the request of the Energy Commission, DCISC reviewed status of reactor pressure vessel integrity for 20-year license extension.
- **February 28, 2011**: DCISC evaluated Pressurized Thermal Shock (PTS) and Seismic Effects.
 - Concludes that, subject to new information, both units could safely operate for 20 additional years in terms of PTS concerns.

Chronology (2 of 3)

- **2023**: Public Meetings (February, June, September): public concerns about Unit 1 embrittlement status
 - Mr. Severance
 - San Luis Obispo Mothers for Peace (Dr. Digby Macdonald)
- **October 2023**: Embrittlement expert hired to address concerns
- **January 31, 2024**: DCISC issued two reports by Dr. Kirk addressing public concerns
- **February 21, 2024**: Presentation to DCISC and the public

An Evaluation of the Status of Diablo Canyon Unit 1 With Respect to Reactor Pressure Vessel Condition Monitoring and Prediction

Letter Transmitting Two Reports by Dr. Mark Kirk to the DCISC. (PDF)

Report Part 1: "Addressing Public Concerns." (PDF)

Report Part 2: "Evaluation of Diablo Canyon Unit 1 Embrittlement." (PDF)

Errata to Part 2 (PDF)

Errata #2 to Part 2 (PDF)

Presentation Slides - Evaluation of Status of U-1 pressure vessel (PDF)

Dr. Kirk's Replies to Comments Made by Mr. Bruce Severance on April 15, 2024 (PDF)

Replies to Dr Macdonald's Responses to Questions on his Evaluation of Dr Kirk's Reports (PDF)

Replies to Mr Severance's Comments of July 18 2024 (PDF)

<https://www.dcisc.org/>

Chronology (3 of 3)

- **February 29, 2024:** DCISC requests additional comments
 - by March 15, 2024
 - Later extended to April 15, 2024
- **Mr. Severance replies and response**
 - April 15, 2024: Mr. Severance replies
 - May 28, 2024: DCISC posts Dr. Kirk's response to Mr. Severance
 - June 10, 2024: Mr. Severance responds to Dr. Kirk's comments
 - July 18, 2024: Mr. Severance provides additional comments
 - August 6, 2024: DCISC response to Mr. Severance
- **Dr. Macdonald (SLOMFP) replies and response**
 - April 30 & May 6th, 2024: Ms. Curran requests extensions
 - June 14, 2024: Received Dr. Macdonald's comments
 - June 28, 2024: Submitted Questions to Dr. Macdonald on his comments
 - July 19, 2024: Received Dr. Macdonald's answers to DCISC questions
 - August 6, 2024: DCISC response to Dr. Macdonald

An Evaluation of the Status of Diablo Canyon Unit 1 With Respect to Reactor Pressure Vessel Condition Monitoring and Prediction

Letter Transmitting Two Reports by Dr. Mark Kirk to the DCISC. (PDF)

Report Part 1: "Addressing Public Concerns." (PDF)

Report Part 2: "Evaluation of Diablo Canyon Unit 1 Embrittlement." (PDF)

Errata to Part 2 (PDF)

Errata #2 to Part 2 (PDF)

Presentation Slides - Evaluation of Status of U-1 pressure vessel (PDF)

Dr. Kirk's Replies to Comments Made by Mr. Bruce Severance on April 15, 2024 (PDF)

Replies to Dr Macdonald's Responses to Questions on his Evaluation of Dr Kirk's Reports (PDF)

Replies to Mr Severance's Comments of July 18 2024 (PDF)

<https://www.dcisc.org/>

Conclusions on Unit 1 Embrittlement

- **PG&E's current reactor vessel integrity calculations confirmed and validated**
 - Unit 1 meets the NRC requirements for reactor vessel integrity through 60 years of service
 - Credibility of data was correctly assessed
 - Sister plant data was correctly used
 - Deferrals of Capsule B testing were appropriate
 - Vessel inspection schedule is appropriate

Conclusions

on Unit 1 Embrittlement (cont.)

- **Capsule B is scheduled for withdrawal during the 2025 refueling outage**
 - Removal is needed by 2028 to be consistent with NRC guidance
 - When new data are obtained it may change the outcome of current RPV integrity assessments
- **Supplemental analyses performed using more data & modern analysis techniques**
 - Very unlikely to exceed PTS screening criteria before 60 years
 - For Upper Shelf Energy (USE)
 - USE may fall below NRC screening criteria by 2029 or 2030
 - A more accurate analysis following NRC guidance is highly likely to show that acceptable margins will remain after 2029

Additional public comments expressed after the February 2024 public meeting & evaluations of these comments. Comments made by:

Mr. Bruce Severance

Dr. Digby Macdonald

Additional Comments from Mr. Severance & Responses

Comments (April 15)	Response (May 28)
Were NRC procedures used correctly: • NRC Credibility Assessments • Use of sister plant data • Limited data Why have embrittlement forecasts changed over time?	Questions reflect a misunderstanding of NRC procedures. Additional explanations provided. Embrittlement forecasts change as new information (data) becomes available
Deferrals of removal of Capsule B and its impact. Claims that the NRC had required a 4th capsule for the 40-year license term	Review of NRC requirements and DC-1 license confirm DC-1 is licensed to ASTM E185-70 and is therefore a 3-capsule plant for the first 40 years. The NRC document from 2006 (ML061660220) does not amend the Diablo Canyon's 40-year license to make a 4th capsule mandatory.
Kirk Report shows Upper Shelf Energy may reach screening limit by 2029/2030	This statement about the supplemental USE analysis is correct, but the analysis is not required by the NRC. Diablo Canyon meets all NRC license requirements. Equivalent margins analysis has shown acceptable results for all other plants

Impact of May 28, 2024 Responses on Conclusions

- **None of the concerns change the conclusions of either report**
 - Embrittlement predictions comply with NRC regulations
 - PTS screening criteria will not be exceeded for 60 years of operation
 - USE meets NRC regulatory requirements for 60 years.
 - Capsule B testing is not required for the first 40 years of operation but will be required by 2028 for extended operation.

Additional Comments from Mr. Severance & Responses

Comments (June 10 & July 18)	Response (August 6)
Were NRC procedures used correctly: • NRC Credibility Assessments • Use of sister plant data • Limited data Why have embrittlement forecasts changed over time?	Yes, NRC procedures were used correctly. Additional explanations were provided. Embrittlement forecasts change as new information (data) becomes available
Deferrals of removal of Capsule B and its impact. Claims that the NRC had required a 4th capsule for the 40-year license term	Review of NRC requirements and DC-1 license confirm DC-1 is licensed to ASTM E185-70 and is therefore a 3-capsule plant for the first 40 years. The NRC document from 2006 (ML061660220) does not amend the Diablo Canyon's 40-year license to make a 4th capsule mandatory.
Kirk Report shows Upper Shelf Energy may reach screening limit by 2029/2030	This statement about the supplemental USE analysis is correct, but the analysis is not required by the NRC. Diablo Canyon meets all NRC license requirements. Equivalent margins analysis has shown acceptable results for all other plants

Mr. Severance Additional Comments on Consultant's Comments

- **Comments (July 10 & 18)**

- Challenges NRC process of reviewing embrittlement
- Relies on Dr. Macdonald's input which the committee has just received
- Challenges use of sister plant information
- Challenges Kirk's embrittlement assessment since it is not NRC approved (in License Amendment application)
- Challenges Kirk's claim that Unit 1 is a 3-capsule plant

- **Reply (August 6)**

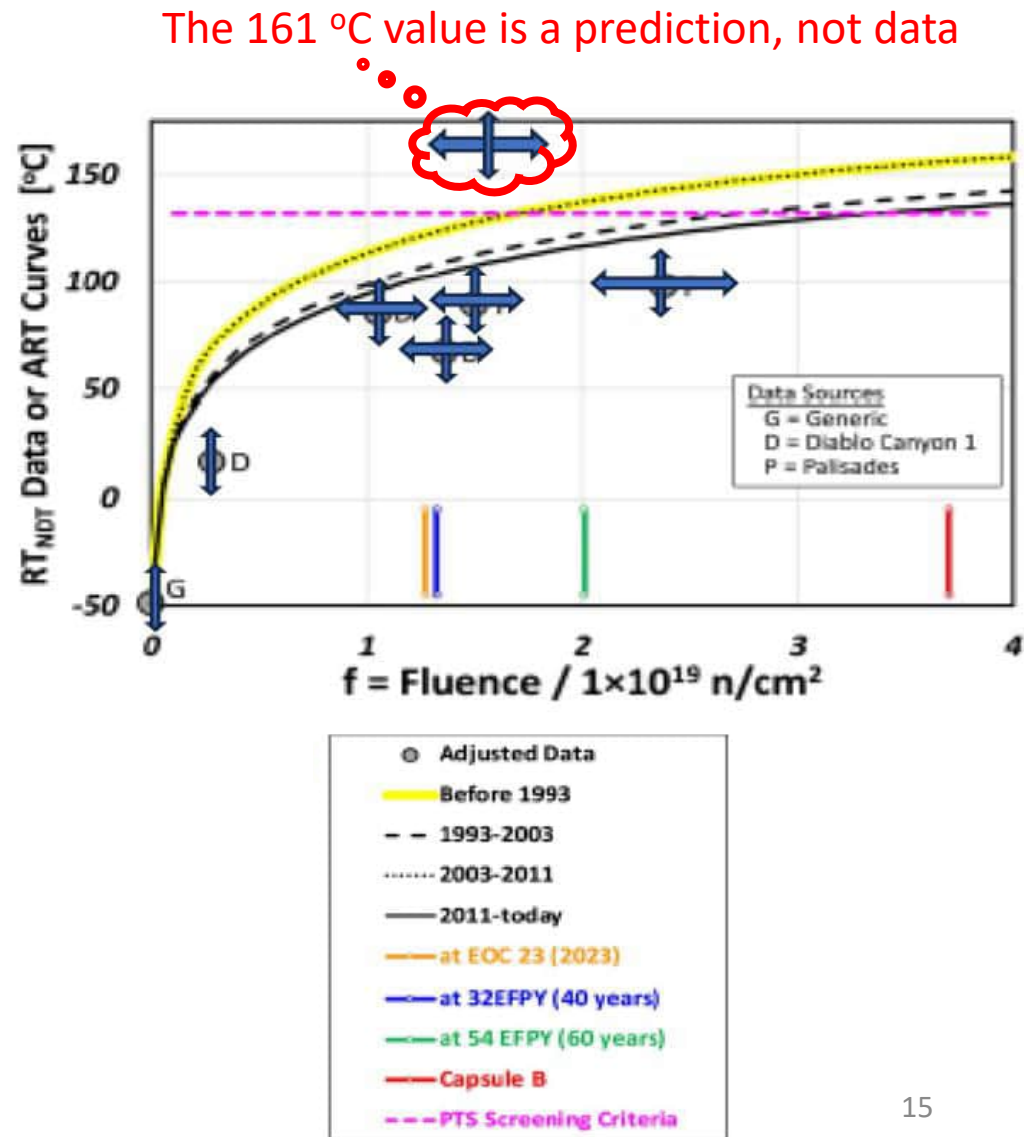
- These comments are addressed by previous communications. They do not change the conclusions found in the Parts 1 and 2 Reports
- Using the latest information (2011), Unit 1 meets NRC embrittlement requirements for 60 years of operation.
- Challenges to NRC review processes on embrittlement, including uses of sister plant data, should be addressed to the NRC

Dr. Macdonald's Presentation to DCISC on June 20, 2024, Subsequent Clarifications, & Replies

Macdonald Presentation	Reply
Unit 1 is dangerously embrittled and should be shut down	Unit 1 embrittlement meets NRC screening criteria through 60 years of operation
- Unit 1 has unjustified reliance on integrated surveillance data - Claims Kirk analysis is not credible when both Diablo Canyon & Palisades data are used	- Unit 1 does not use an integrated surveillance program - Unit 1 uses data from similar materials in other plants (Palisades) as required by NRC - Palisades & Diablo Canyon data follow consistent embrittlement trends
Proposes his own “extent of embrittlement” (EoE) approach instead of NRC process	- EoE has not been published or peer reviewed - If used, EoE approach is less conservative than NRC approach for Unit 1
Provided forecast of RT_{NDT} with increasing fluence that included one datum not used by Kirk or PG&E. Use of this datum reduces the period of PTS acceptability.	<i>See next slide</i>

Dr. Macdonald's ART vs. Fluence Graph

- Dr. Macdonald added an additional value at ART = 161 °C
 - Not used by Kirk or PG&E
 - On this basis he expressed concerns about Unit 1 embrittlement
- NRC reported the ART = 161 °C value in the 1980s (ML102310298)
 - It is a predicted value
 - **It is not surveillance data**
 - It should therefore not be included as part of surveillance data analysis for Unit 1

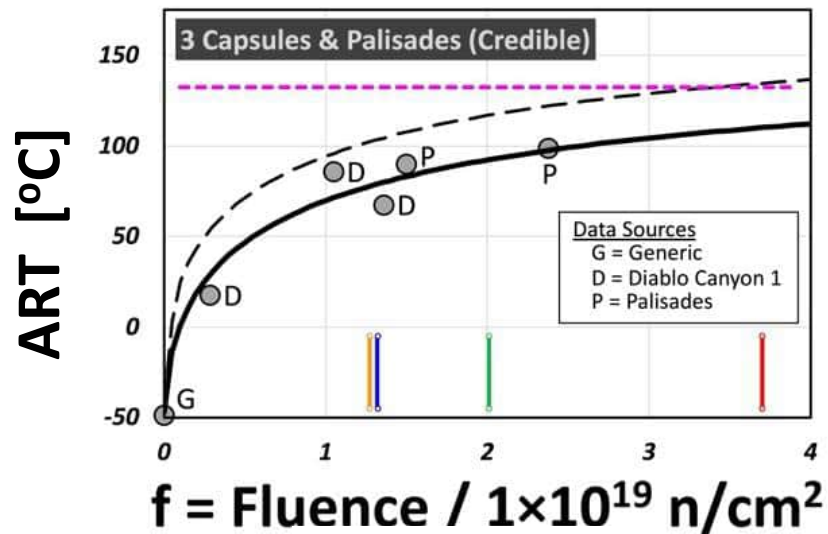


Dr. Macdonald's Presentation to DCISC on June 20, 2024, Subsequent Clarifications, & Replies

Macdonald Presentation	Reply
• Unit 1 has no reliable reference temperature data since 2003 • Unit 1 needs more testing of capsules • NRC surveillance requirements make Diablo Canyon a 5-capsule plant	• Data from 2003 represents 40-years for the RPV due to capsule lead factor • Consideration of Palisades data in 2011 provides information out to 60-years for the RPV • Number of capsules tested is appropriate • Per NRC requirements, Unit 1 is a 3-capsule plant <i>See next slide</i>

Concerns About Additional Testing

Mr. Severance and Dr. Macdonald suggest that additional testing is urgently needed



- Additional testing on an urgent basis is not needed for the following reasons
 - Since 2011 data has been available for the Unit 1 limiting material to a fluence higher than the RPV after 60 years of operation
 - Data are well predicted by existing embrittlement models
 - Data show no evidence of unexpected behavior that would warrant added attention
 - Additional data from Capsule B, which will be tested in 2025 and reported in 2027, will provide data to a fluence higher than the RPV will see after 80 years of operation



Dr. Macdonald's Presentation to DCISC on June 20, 2024, Subsequent Clarifications, & Replies

Macdonald Presentation	Reply
Unit 1 has performed no UT testing since 2005	• UT interval extension was approved by NRC • There is no service evidence of flaw growth in pressurized water reactor RPVs during service
Hydrogen induced cracking may affect Unit 1	• No evidence of HIC in any US or other PWR reactor weld • Primary circuit chemistry is controlled to inhibit hydrogen induced cracking
Suggests that Soviet reactor steels provide useful information relative to Unit 1	• Soviet steels are not comparable to reactor steels use in the USA • The ex-Soviet data cited provides no useful information

ADDITIONAL TECHNICAL EVALUATIONS

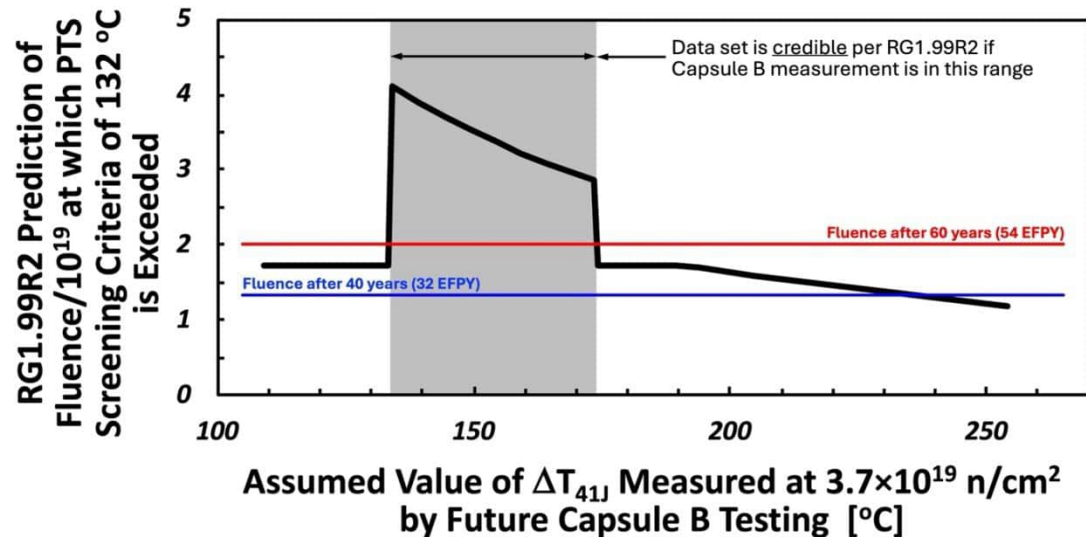
- 1. Potential impact of Capsule B results**
- 2. Revaluation of Upper Shelf Energy**
- 3. Assessment of impact of SECY-22-0019 on Diablo Canyon Unit 1**

Capsule B Analysis

- **Goal:** Evaluate potential effect of future Capsule B data on PTS acceptability

- **Result**

- Unit 1 is acceptable to far beyond 60-years if new data, including data from Capsule B, is credible (ΔT_{41J} between 134-173 °C)
- If data is not credible
 - Unit 1 is acceptable until ≈ 50 years
 - After this additional justifications are needed (e.g., alternate PTS rule)

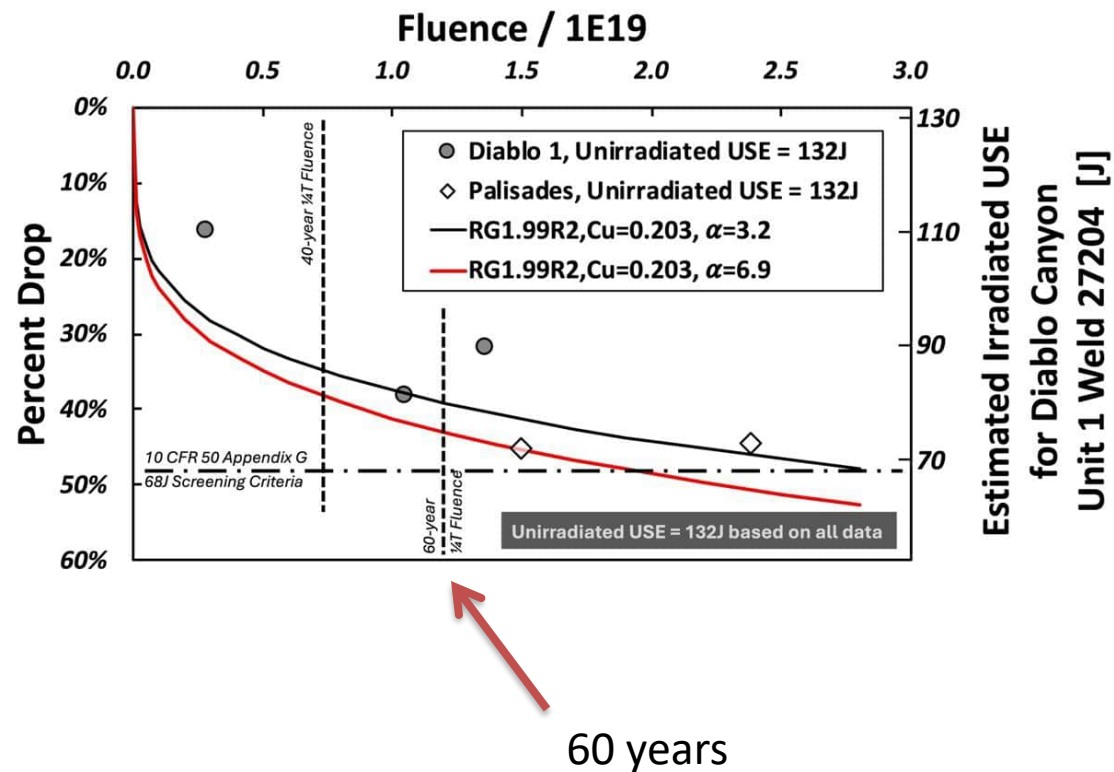


Supplemental USE Analysis

- **Goal:** Further evaluate Part 2 report finding that USE may fall below NRC 68J screening criteria by 2029 or 2030

- **Result**

- Unirradiated data from a single source was treated as two separate sources in the Part 2 report
- Unirradiated tests occurred at different temperatures
- This produced an inappropriate estimate of USE drop
- Re-analysis treating all USE data as being from a single source shows USE acceptability to far beyond 60-years of operation



Questions about Adequacy of NRC Embrittlement Predictions and Performance Monitoring

- In 2022 the NRC reviewed the accuracy of RG. 1.99 embrittlement prediction model and monitoring needs for long term operation.
 - Technical Basis:
<https://www.nrc.gov/docs/ML2131/ML21314A228.pdf>.
 - Rulemaking request:
<https://www.nrc.gov/docs/ML2131/ML21314A194.html>
- The staff submitted a rulemaking plan to the commission to address their concerns
- The Commission has not yet voted on this request
- The following slides assess the impact of the NRC's concerns on Diablo Canyon Unit 1


POLICY ISSUE
(Notation Vote)

"OFFICIAL USE ONLY"
SENSITIVE INTERNAL INFORMATION
LIMITED TO THE NRC UNLESS THE
COMMISSION DETERMINES OTHERWISE

March 8, 2022 SECY-22-0019

FOR: The Commissioners

FROM: Daniel H. Dorman
Executive Director for Operations

SUBJECT: RULEMAKING PLAN FOR THE REVISION OF EMBRITTLEMENT AND SURVEILLANCE REQUIREMENTS FOR HIGH-FLUENCE NUCLEAR POWER PLANTS IN LONG-TERM OPERATION

PURPOSE:

To request Commission approval to conduct rulemaking to amend the reactor pressure vessel (RPV) embrittlement and surveillance requirements in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 50, "Domestic Licensing of Production and Utilization Facilities," for high-fluence plants in long-term operation.

SUMMARY:

This paper provides the U.S. Nuclear Regulatory Commission (NRC) staff's request to initiate a rulemaking to revise the RPV embrittlement and surveillance requirements in 10 CFR Part 50. The rulemaking would revise Appendix H, "Reactor Vessel Material Surveillance Program Requirements," to 10 CFR Part 50 to include additional surveillance testing requirements for long-term operation and a revised fluence function fit (either a new embrittlement trend curve (ETC) or an update to existing trend curves) in the applicable regulations and implementing

Enclosure transmitted herewith contains Official Use Only - Sensitive Internal Information. When separated from Enclosure, this transmittal document is decontrolled.

CONTACTS: Stewart Schneider, NMSS/REFS
301-415-4123

David L. Rudland, NRR/DNRL
301-415-1896

"OFFICIAL USE ONLY"
SENSITIVE INTERNAL INFORMATION
LIMITED TO THE NRC UNLESS THE
COMMISSION DETERMINES OTHERWISE

Specifically

“Although the probability of RPV rupture from Reference 17 remains generically low, the impact of the embrittlement uncertainty on adequate safety margins and combined with insufficient performance monitoring, impact the staff’s confidence in the RPV integrity and challenge their finding of reasonable assurance of safety in long-term operation. To restore confidence in long-term RPV integrity, regulation and guidance changes are necessary to implement use of an accurate ETC and ensure continued performance monitoring through surveillance capsule testing.”

Statement from

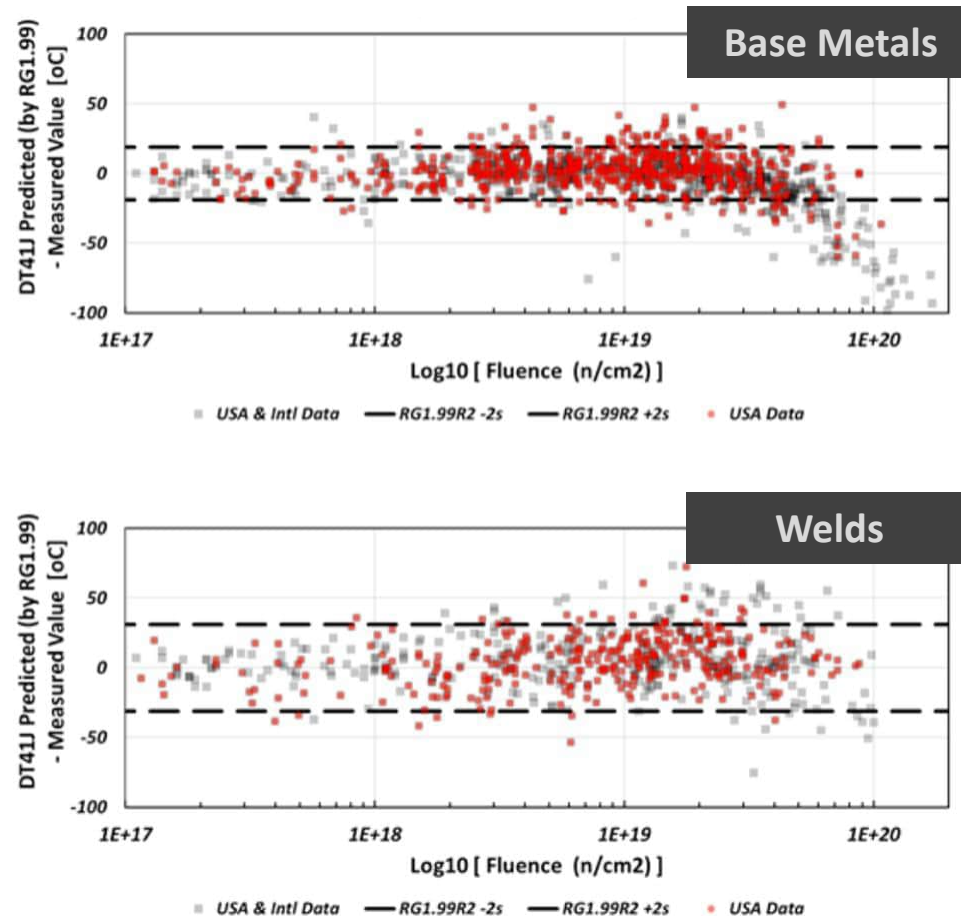
<https://www.nrc.gov/docs/ML2131/ML21314A228.pdf>

Staff Concerns Underlying SECY-22-0019

- NRC has two concerns
 - Non-conservative predictions made by the embrittlement trend curve in Reg Guide 1.99 Revision 2 for long term operation
 - Performance Monitoring - Continued deferrals of capsule withdrawals leading to insufficient information to support structural integrity and licensing decisions.
- The following slides examine these concerns as they pertain to Diablo Canyon Unit 1

Non-Conservatism of Reg Guide 1.99 Predictions

- NRC shows RG1.99 model will become non-conservative at fluences above $\approx 3\text{-}6 \times 10^{19} \text{ n/cm}^2$
- After 60 years Diablo Canyon Unit 1 will reach $2 \times 10^{19} \text{ n/cm}^2$

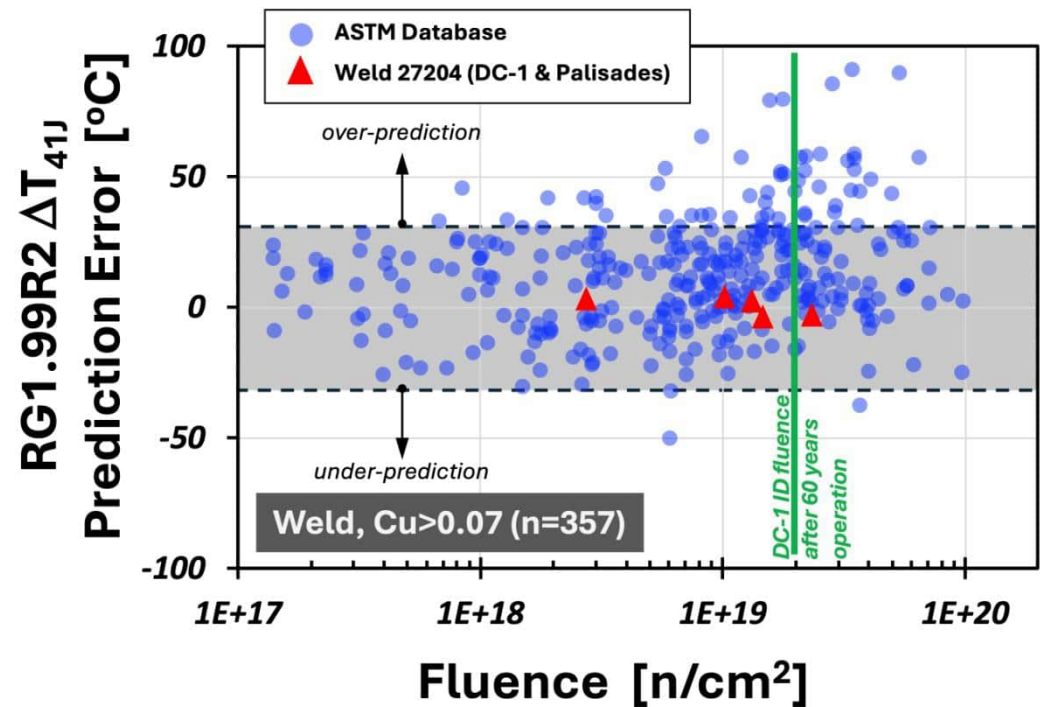


Graph from

<https://www.nrc.gov/docs/ML1920/ML19203A089.pdf>.

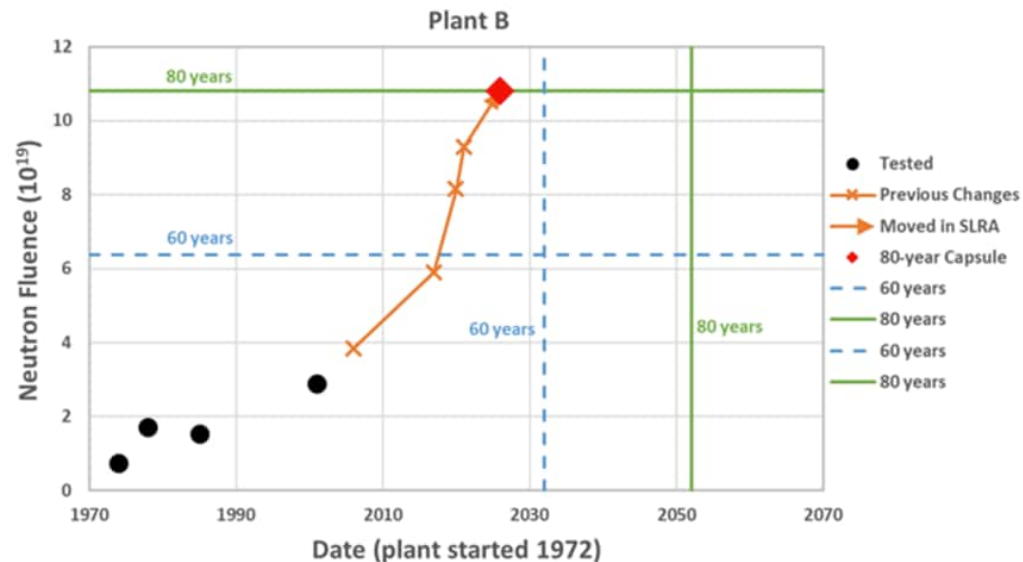
Non-Conservatism of Reg Guide 1.99 Predictions

- Diablo Canyon Unit 1 data are well predicted by the RG 1.99 model
- While NRC may need to improve their model's accuracy for long term operation, **this concern is not pertinent to Diablo Canyon Unit 1**



Adequacy of Performance Monitoring

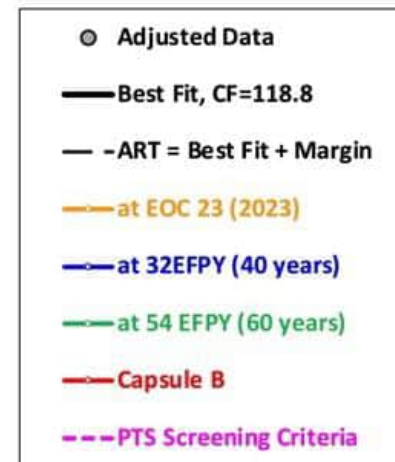
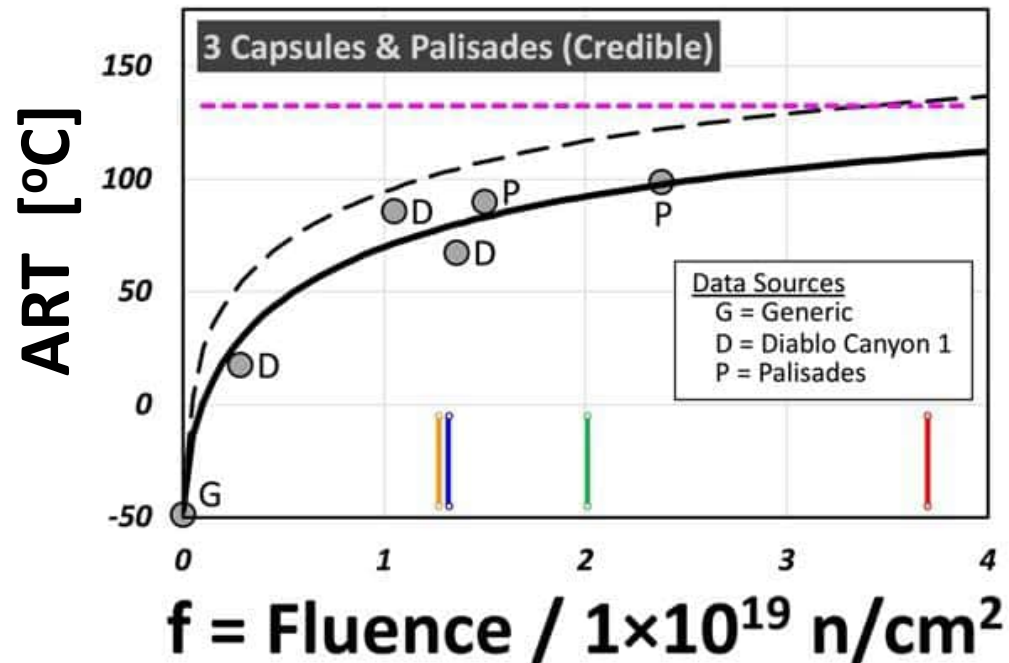
- NRC requirements for surveillance currently permit repeated deferrals of capsule withdrawals for plants seeking license renewal in order to obtain data for the subsequent license renewal period (up to 80 years)
- For some plants, this will allow operation after the RPV fluence exceeds that of available surveillance data
- NRC is concerned about such deferrals



- Graph is from <https://www.nrc.gov/docs/ML2131/ML21314A228.pdf>
- Plant is un-named in the NRC document
- **Plant is not Diablo Canyon Unit 1**

Adequacy of Performance Monitoring

- Since 2011 data has been available for the Unit 1 limiting material to a fluence higher than the RPV after 60 years of operation
- Data from Capsule B will extend this to above 80 years of operation
- While NRC may need to further enhance their requirements, **this concern is not pertinent to Diablo Canyon Unit 1**



CONCLUSIONS PROPOSED FOR THE 35TH DCISC ANNUAL REPORT & REQUEST FOR DCISC APPROVAL

Conclusions (From Final Report Section 4.26.4)

1. **Compliance of a plant with NRC screening criteria assures the safety of vessel operation because the criteria take into consideration the frequency of challenge events (rare for PTS, planned for normal operations), the stresses produced by these events and the NRC's acceptance guidelines for core damage frequency and large early release frequency as expressed in Regulatory Guide 1.174.**

Both PG&E and we have demonstrated the DCPD Unit 1 reactor vessel to be compliant with these limits, and therefore safe to operate. Specifically:

- a. **As detailed in the License Renewal Application to the NRC [DCL-23-038], the DCPD Unit 1 reactor vessel embrittlement is acceptable not just for 40 years but for 60 years. (Currently under NRC review)**
- b. **As detailed in the {Kirk Report #2}, we have concluded that the DCPD Unit 1 reactor vessel is acceptable not just for 40 years but for 60 years.**

The Unit 1 RPV complies with NRC's embrittlement screening criteria through 60 years of operation

Conclusions (From Final Report Section 4.26.4)

2. Even though the removal and testing of Capsule B from Unit 1 is required and appropriate, all currently available information suggests the acceptability of Unit 1 to 60 years and beyond. Assessment of acceptability should be re-visited once data from Capsule B becomes available.
 3. A sensitivity study of the possible outcomes of the testing of Capsule B shows that if the data is “credible,” the unit can safely operate up to 100 years from an embrittlement perspective. Should the data not be credible, after 50 years additional analysis is required to justify operation.
 4. In no cases would results from Capsule B testing change the conclusion that Unit 1 is safe to operate during the 5-year extension mandated by SB-846; instead, the primary role of Capsule B data would be to inform any potential future decision to further extend the operating life of Unit 1.
 5. Upon researching the basis of the USE finding in the supplemental analysis of Part 2 of the Kirk report, it was found that Diablo Canyon Unit 1 will not fall below the NRC’s USE screening criteria until well beyond 60 years of operation.
 6. We conclude that Diablo Canyon Unit 1’s Reactor Vessel is safe to operate from an embrittlement perspective for the next 20 years.
- Adequate data is available now to forecast Unit 1 embrittlement without extrapolation
 - Data from Capsule B will provide additional information when available. Possible outcomes:
 - Credible data: Unit 1 good until past 80 years
 - Not credible data: Unit 1 needs additional analysis to justify further operation by 50 years
 - Past supplemental USE analysis revised, shows acceptability beyond 60 years
- Overall**
Unit 1 safe to operate for next 20 years

Questions



The NRC and Diablo Canyon

Nuclear Regulatory Commission Presentation
to the Diablo Canyon Independent
Safety Committee

Mahdi Hayes

Senior Resident Inspector,
Diablo Canyon Power Plant
October 10, 2024

Agenda



Overview of the NRC

Overview of the resident inspector program

Overview of the regulatory process

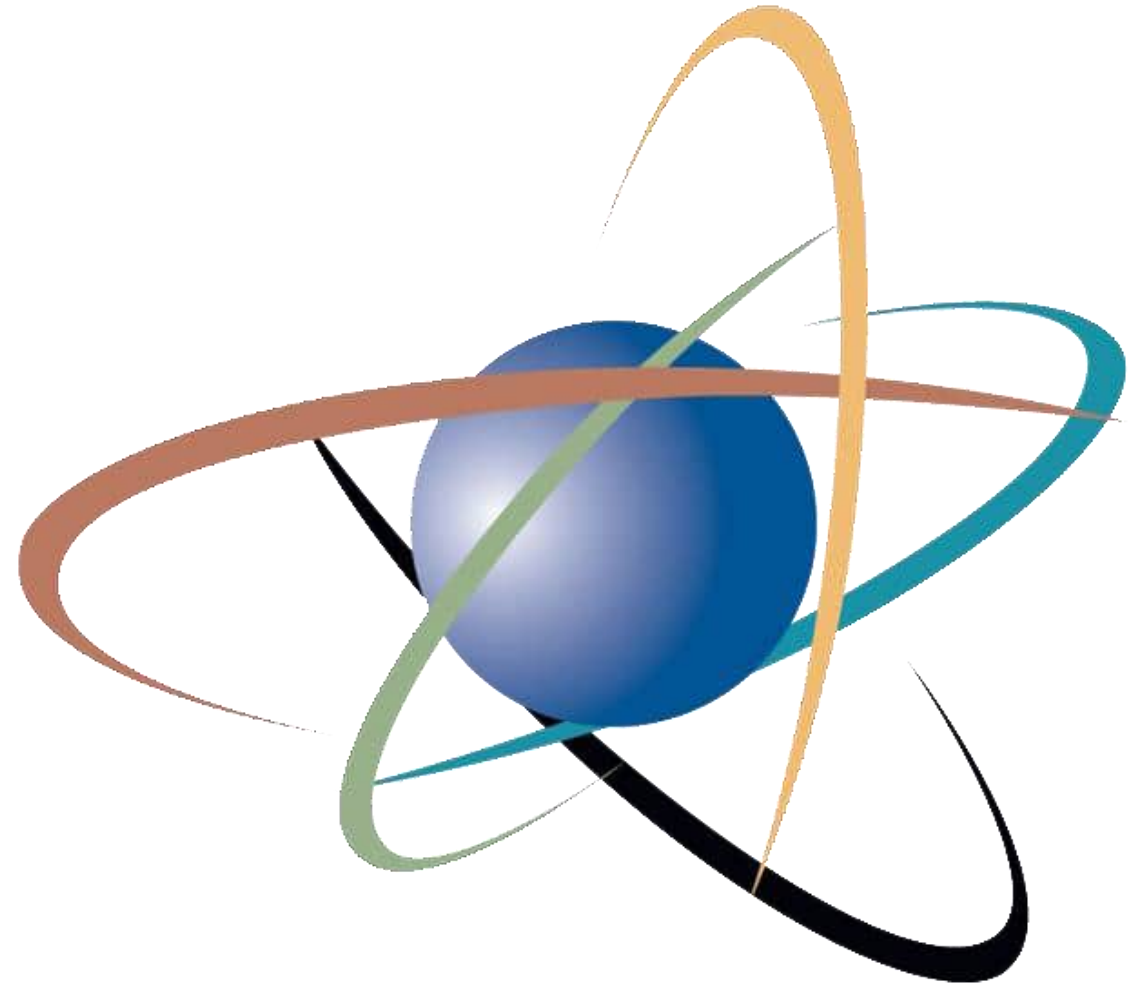
Comments and questions



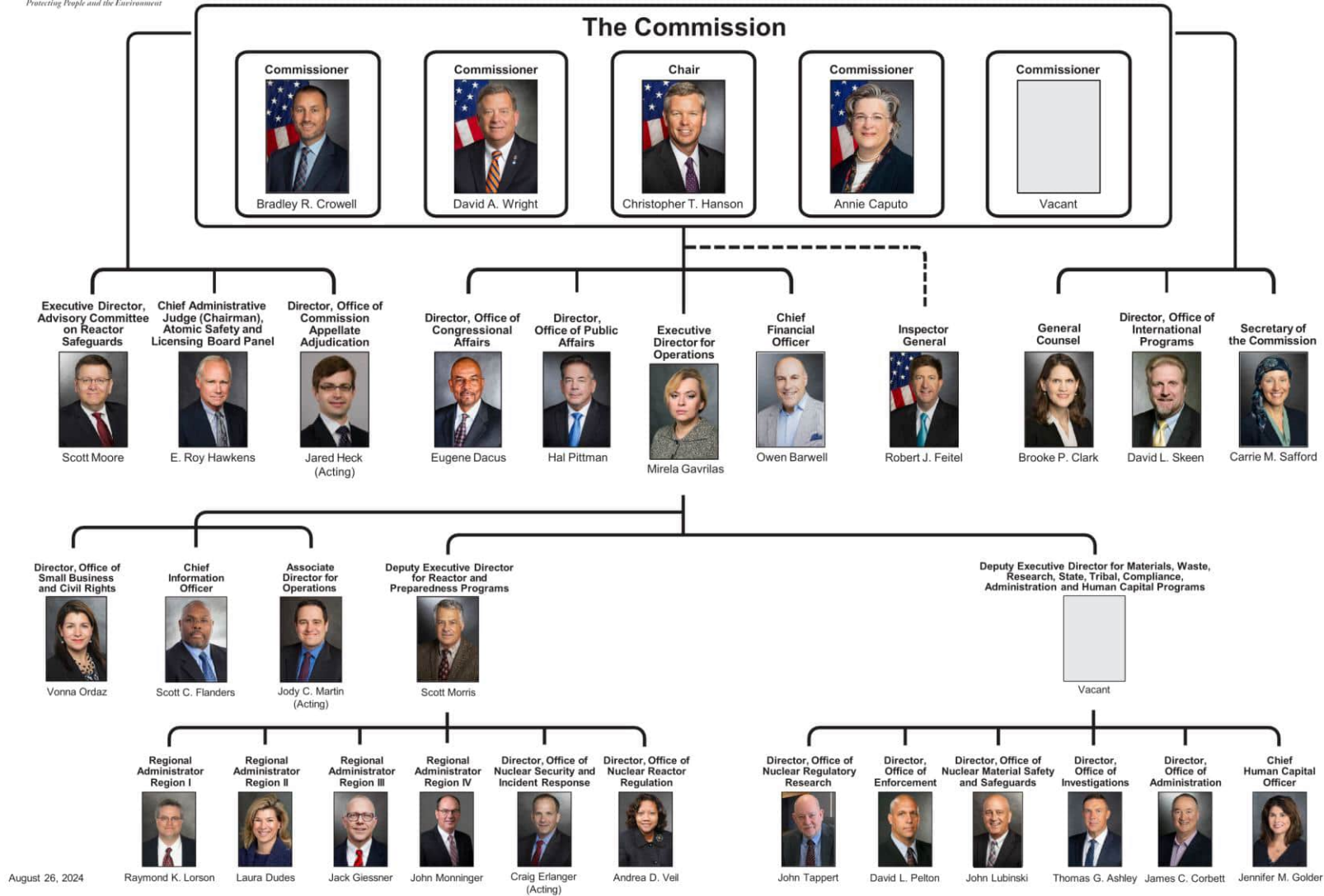
Overview of the NRC

NRC Mission

The NRC licenses and regulates the Nation's civilian use of radioactive materials to provide reasonable assurance of adequate protection of public health and safety and to promote the common defense and security and to protect the environment.

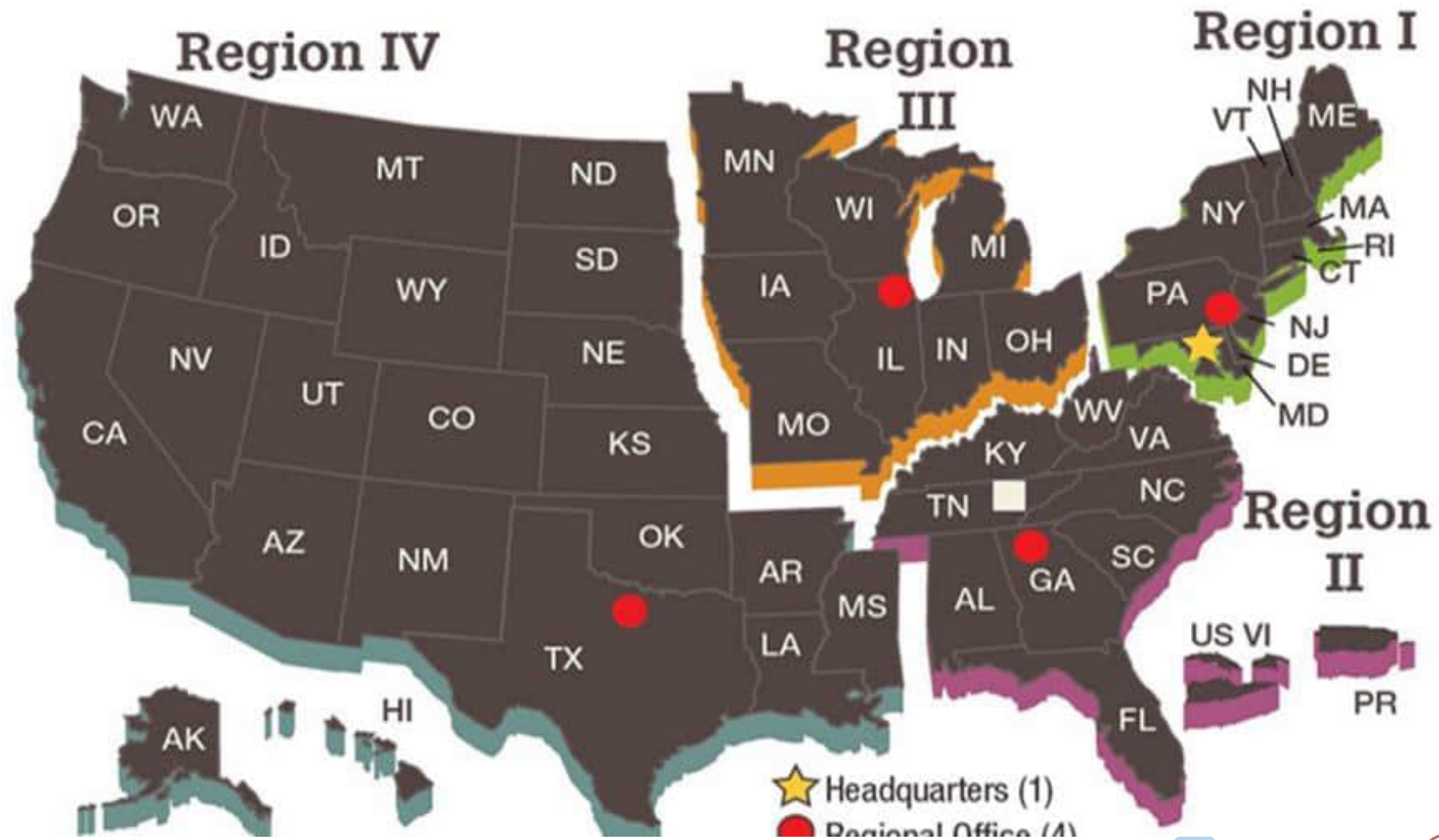


U.S. Nuclear Regulatory Commission



August 26, 2024

NRC Regions





Overview of the resident inspector program

Diablo Canyon Resident Inspectors

- Mahdi Hayes, Senior Resident Inspector
- Eli Garcia, Resident Inspector

Diablo Canyon Senior Resident Inspector

Mahdi Hayes

- B.S. Texas A&M University
- Resident Inspector at Columbia Generating Station
- Operating License Examiner in Region 4

Diablo Canyon Resident Inspector

Eli Garcia

- B.S. Texas A&M University
- Reactor Engineer in Region 1
- Resident Inspector at Salem Nuclear Generating Station

Role of the Resident Inspectors

Regulation verification

- Conduct in-depth baseline inspections

Communication

- We are the “eyes and ears” of the NRC
- Provide operational awareness and detailed facility knowledge
- Emergency response – 1st NRC responders - prompt and independent information and assessment

Inspection Activities

- A “baseline” inspection program is performed at each site
- Cross-section of licensee’s activities
- Additional inspections may be performed
 - Greater than Green issues
 - Response to operational events
 - Substantive adverse trends

2023 Annual Assessment

- PG&E operated the plant safely and in a manner that preserved the public health and safety and protected the environment
- Licensee Response Column
 - Green Performance Indicators
 - Green Performance Deficiencies
 - 9 Green Non-Cited Violations; 1 Green Finding
- Baseline inspections in 2024

Diablo Canyon Power Plant Inspection Activities

NRC completed ~1,500 hours of “direct” inspection
(~7200 hours total)

- Resident inspection “baseline” inspection
- Regional team inspections
 - Emergency preparedness inspection
 - Inservice inspection
 - Radiation safety inspections
 - Security inspections
 - Commercial grade dedication
 - Licensed operator requalification inspection
 - License renewal

Three commissioner visits during 2023

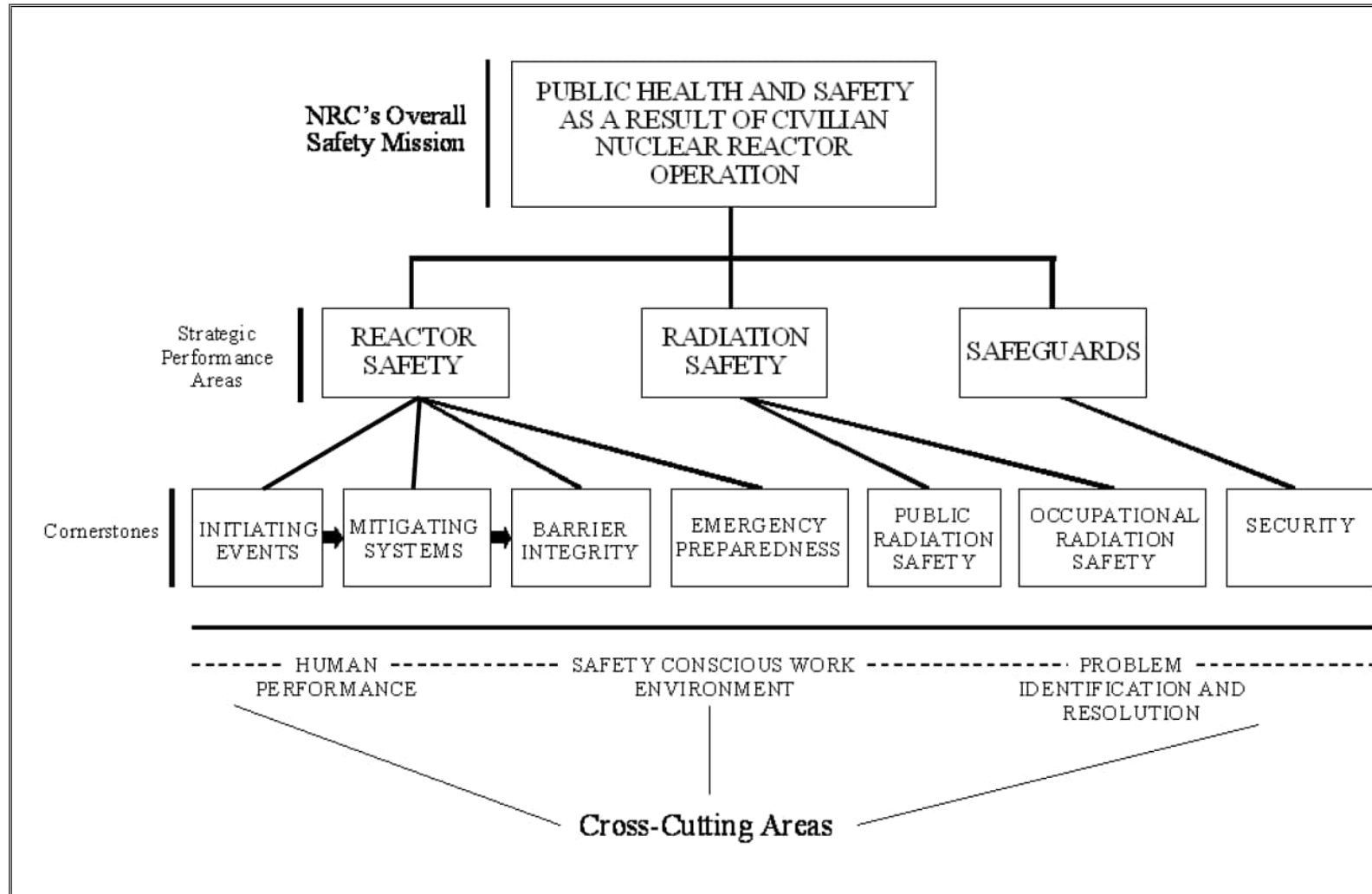
Inspection Reports

- Inspection reports are publicly available
- Inspection findings are evaluated for safety, regulatory, and risk significance, as well as enforcement
- Findings and performance indicators are used for the agency's periodic performance assessments



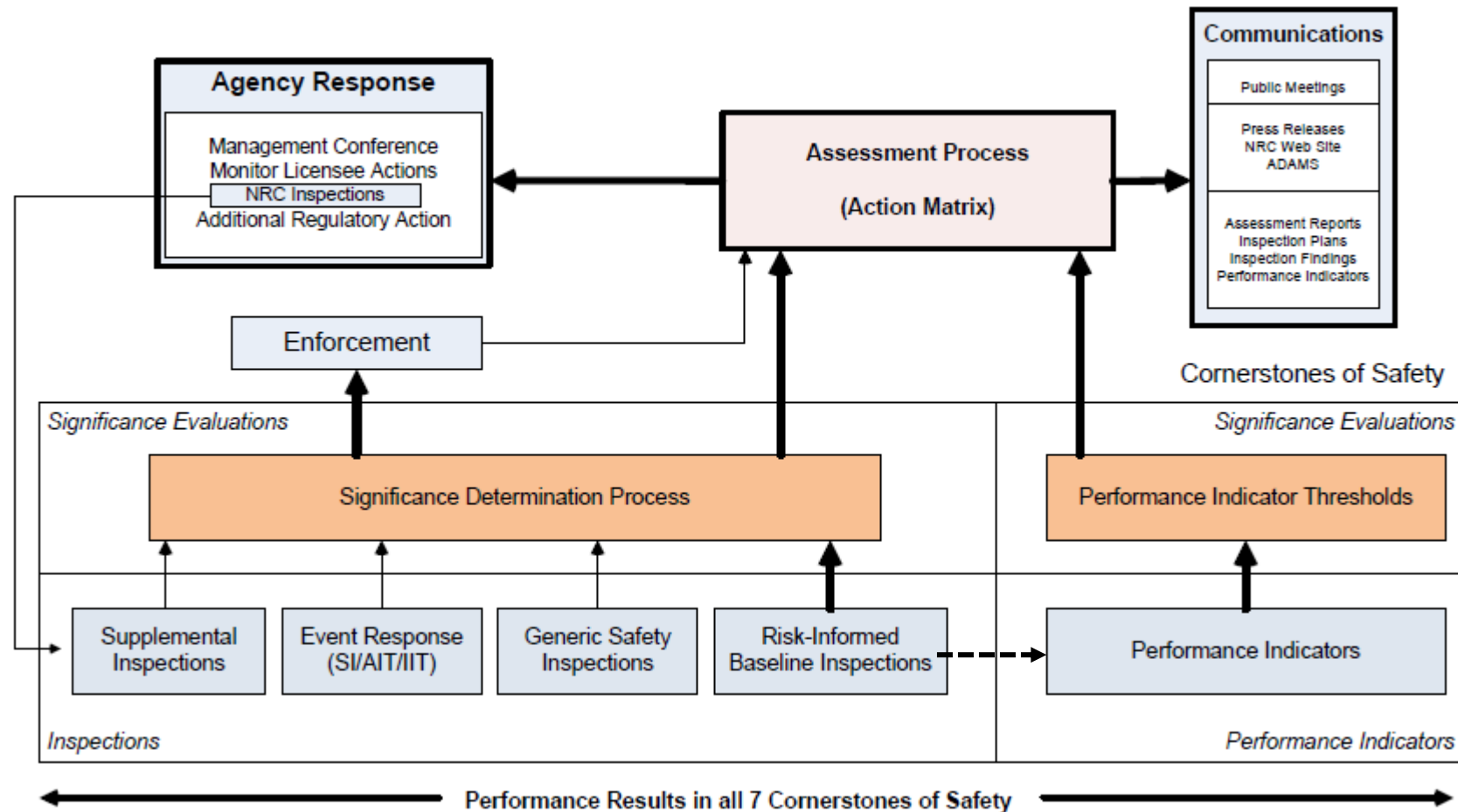
Overview of the regulatory process

How We Regulate: Regulatory Framework



How We Regulate: Reactor Oversight Process

REACTOR OVERSIGHT PROCESS



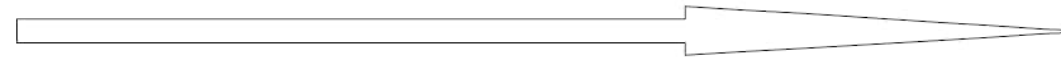
How We Regulate:



Action Matrix Concept

Licensee Response	Regulatory Response	Degraded Cornerstone	Multiple/Rep. Degraded Cornerstone	Unacceptable Performance
-------------------	---------------------	----------------------	------------------------------------	--------------------------

Column 1 Column 2 Column 3 Column 4 Column 5

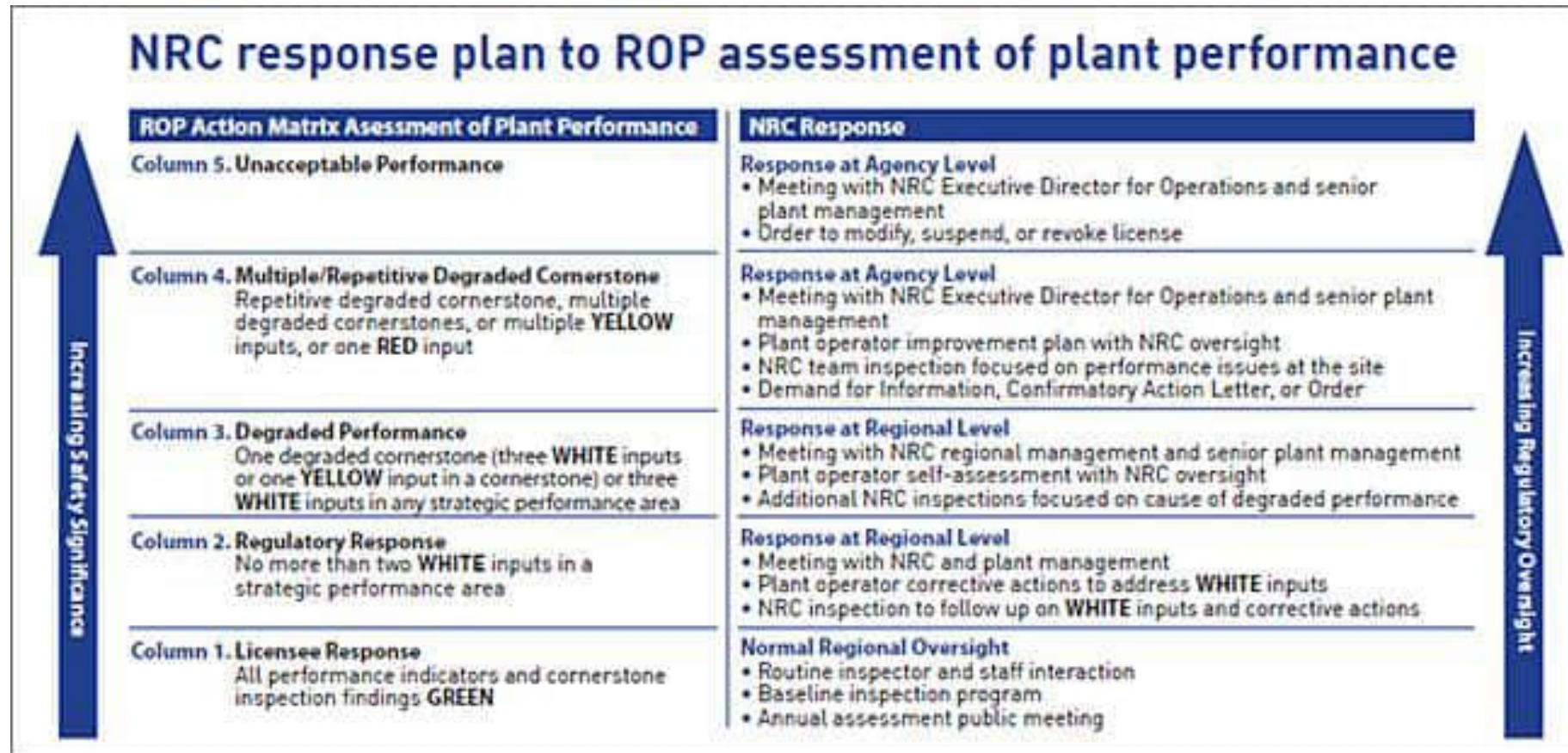


- Increasing safety significance
- Increasing NRC inspection efforts
- Increasing NRC/facility management involvement
- Increasing regulatory actions

How We Regulate: Significance “Colors” in the SDP

- **GREEN (Licensee Response Band)**
 - Cornerstone objectives fully met. Nominal risk with nominal deviation from expected performance.
- **WHITE (Increased Regulatory Response Band)**
 - Cornerstone objectives met with minimal reduction in safety margin. Changes in performance consistent with $\Delta\text{CDF} < 10^{-5}$ ($\Delta\text{LERF} < 10^{-6}$).
- **YELLOW (Required Regulatory Response Band)**
 - Cornerstone objectives met with significant reduction in safety margin. Changes in performance consistent with $\Delta\text{CDF} < 10^{-4}$ ($\Delta\text{LERF} < 10^{-5}$).
- **RED (Extensive Regulatory Response Band)**
 - Performance within the cornerstone represents an unacceptable loss of safety margin. Changes in performance consistent with $\Delta\text{CDF} > 10^{-4}$ ($\Delta\text{LERF} > 10^{-5}$). Sufficient safety margin still exists to prevent undue risk to public health and safety.

How We Regulate: Action Matrix



Publicly Available Information

The NRC places a high priority on keeping the public and stakeholders informed of its activities.

- At **www.nrc.gov**, you can:
 - Find site specific oversight information
 - Public meeting dates and transcripts;
 - Read NRC testimony, speeches, press releases, and policy decisions; and
 - Access the agency's Electronic Reading Room to find NRC publications and documents.

Contacting the NRC

Report an emergency

- (301) 816-5100 (collect calls accepted)

Report a safety concern

- (800) 695-7403
- Allegation@nrc.gov

General information or questions

- www.nrc.gov
- Select “What We Do” for Public Affairs

Questions?



Quality Verification's Perspective on Plant Performance

Chris Newport
Acting Director, Quality Verification
October 10, 2024





Quality Verification

Responsibilities include:

- Audits
- Assessments
- Independent in-plant inspections
- Plant Quality Control (QC) Inspections
- Vendor/Supplier Audits and Material Receipt Inspections

Note: as required by federal regulation, the QV department acts as an independent group within DCP.



Performance Summary

- DCPD continues to exhibit traits reflecting a strong Nuclear Safety Culture. Recent comprehensive WANO/INPO assessment as well as Nuclear Safety Oversight Committee (NSOC) confirms.
- DCPD continues to effectively implement the Quality Assurance Program consistent with regulatory requirements and commitments to the Nuclear Regulatory Commission (NRC)
- Quality Verification has two primary responsibilities – ensuring identification of gaps to compliance as well as closing gaps to excellence
- The station is focused on proficiency after having hiring a significant number of new employees over the last 1-2 years as well as succession and diversity in experience



Performance Summary

Operations

- Operations is focusing on plant status control and station equipment alignment

Maintenance

- Maintenance Services is focusing on effectiveness and efficacy of corrective actions in response to lower-level performance challenges

Emergency Planning

- Emergency Planning is focusing on drill & exercise performance and successful and efficient implementation of the Emergency Response Organization (ERO) staffing plan

Projects

- The Projects department is focusing on ensuring DCPD processes are effectively integrated across the entire organization



Performance Summary

Engineering

- Engineering Services is focused on enhancing plant equipment reliability, particularly secondary-side equipment, to ensure sustained excellence in plant operation

Work Management/Outage Management

- The station is focused on the support of outage management milestones as we transition from two larger scope outages necessary for continued operations to traditional scope outages

Operational Focus

- The station is focused on new coworkers, proficiency, and maintaining excellence in site performance



Summary

- Overall plant performance remains strong and is on a stable trajectory. QV and the site are focused on sustaining excellence.
- The QV organization will continue to assess and challenge the station's performance independently and report out to individual departments, the CNO, the Nuclear Safety Oversight Committee, and the DCISC
- DCPD continues on its path to providing a safe, reliable, and cost-effective energy option to the State of California.

Thank You

Chris Newport
Diablo Canyon Power Plant
Acting Director, Quality Verification



DCISC – Update on Spent Fuel Management

Al Bates, Director, Nuclear Fuel and Decommissioning

Update on Movement of Used Fuel from Wet to Dry Storage



Diablo Canyon Power Plant

Generating Excellence

October 10, 2024

2024 Used Fuel Offload Campaign

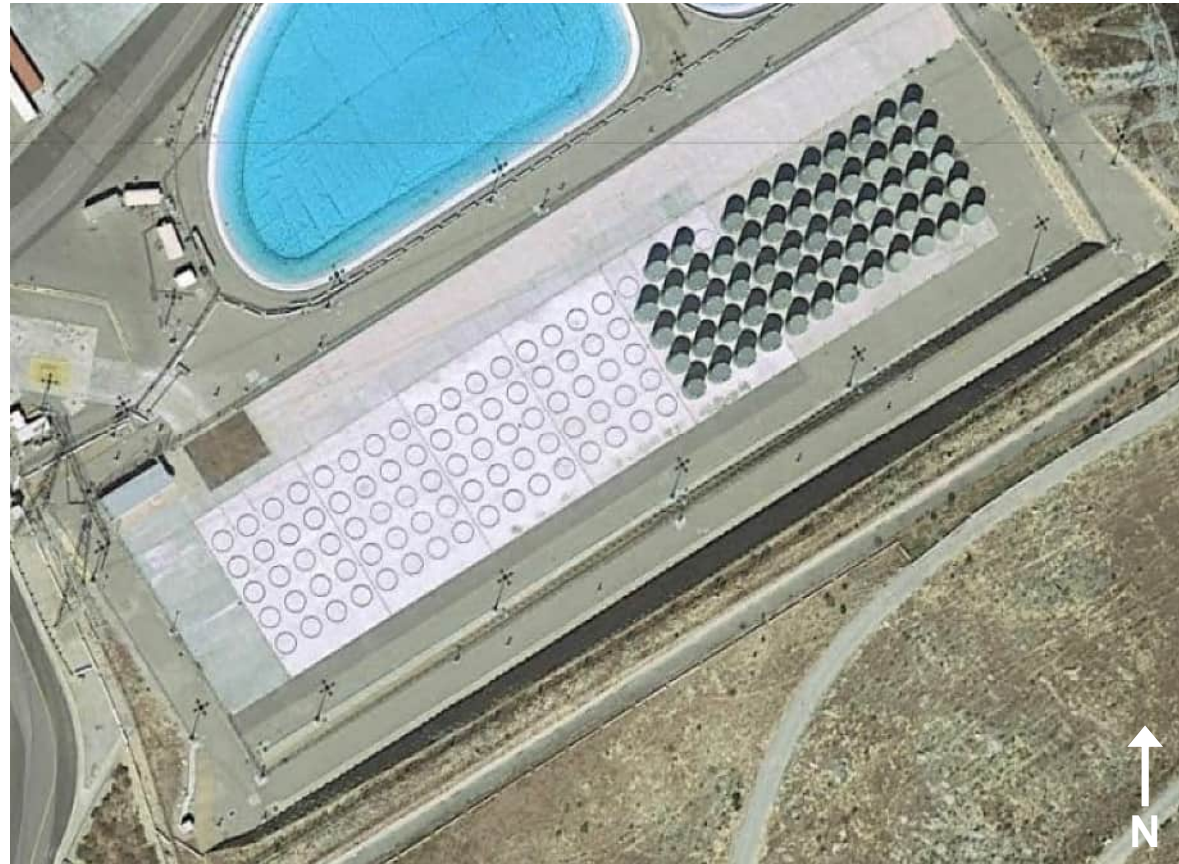




Overview of DC ISFSI

Independent Spent Fuel Storage Installation

- Sized to store all fuel through the end of the DCPD current operating licenses (2024/2025) with an additional 20 years' worth of continued operation storage available in the spent fuel pools.
- DCPD has safely completed seven loading campaigns since 2009, we are currently in Campaign #8 which moves 12 Multi-Purpose Canisters (MPCs) containing 32 fuel assemblies each.



Public



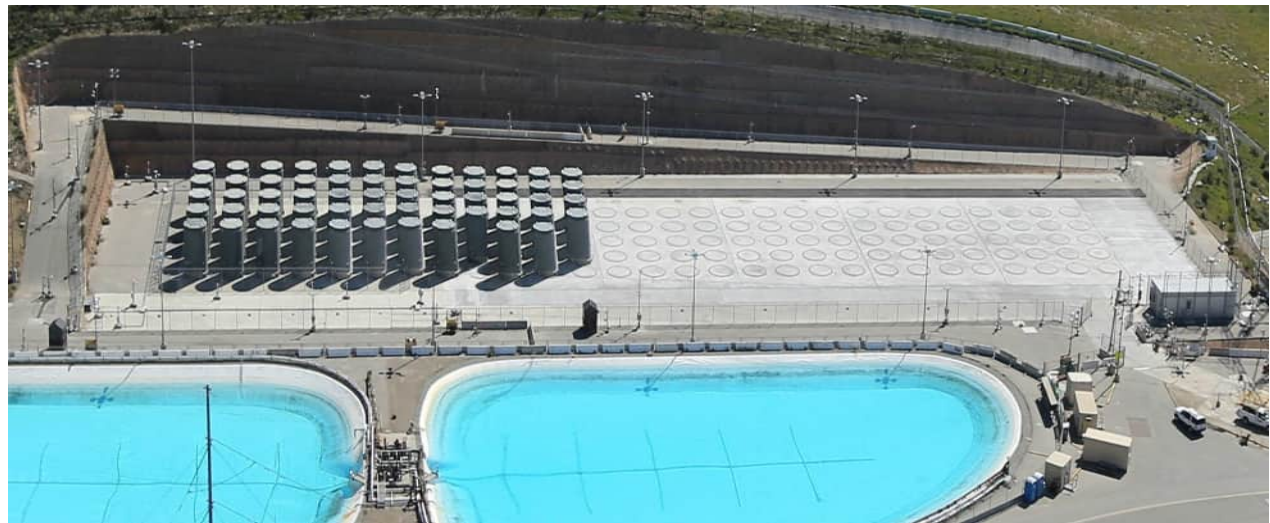
2024 Fuel Offload Campaign

Scope

- Transfer 192 spent fuel assemblies from each spent fuel pool to dry storage.
- 12 Canisters, 1 per week (6 days), from July 22 to October 18 (1 rest week off over Labor day)

Safe and Successful Execution

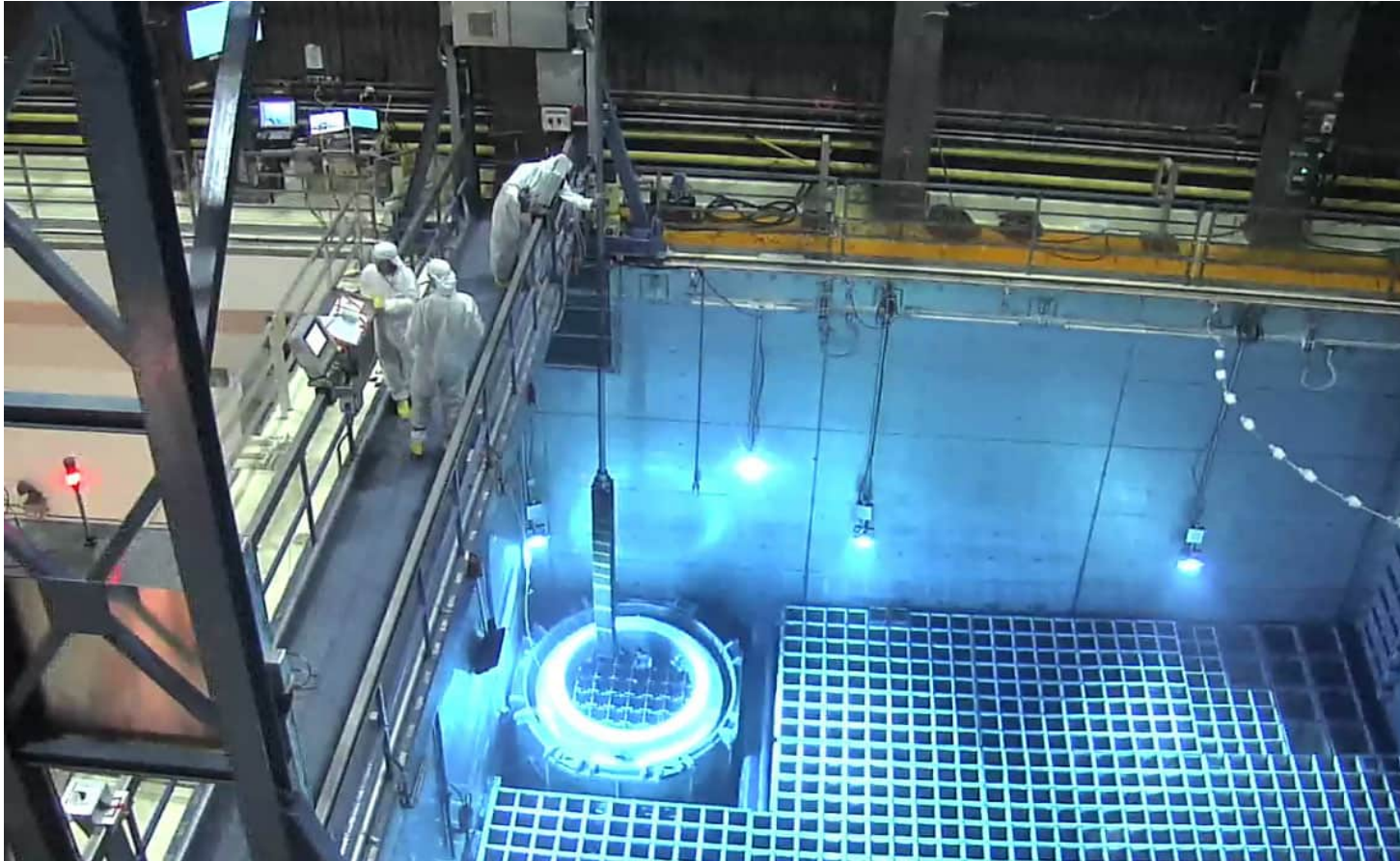
- Robust procedures govern all work activities
- PG&E management oversight of all work activities
- Contract partners (Holtec and Bragg) provide experienced crew members
- Pre-Campaign Training and Dry Runs
- External SME readiness reviews
- DCPD readiness challenge boards
- ALARA reviews





Overview of Loading Campaign

Loading Fuel from the Spent Fuel Pool into the Holtec Multi-Purpose Container

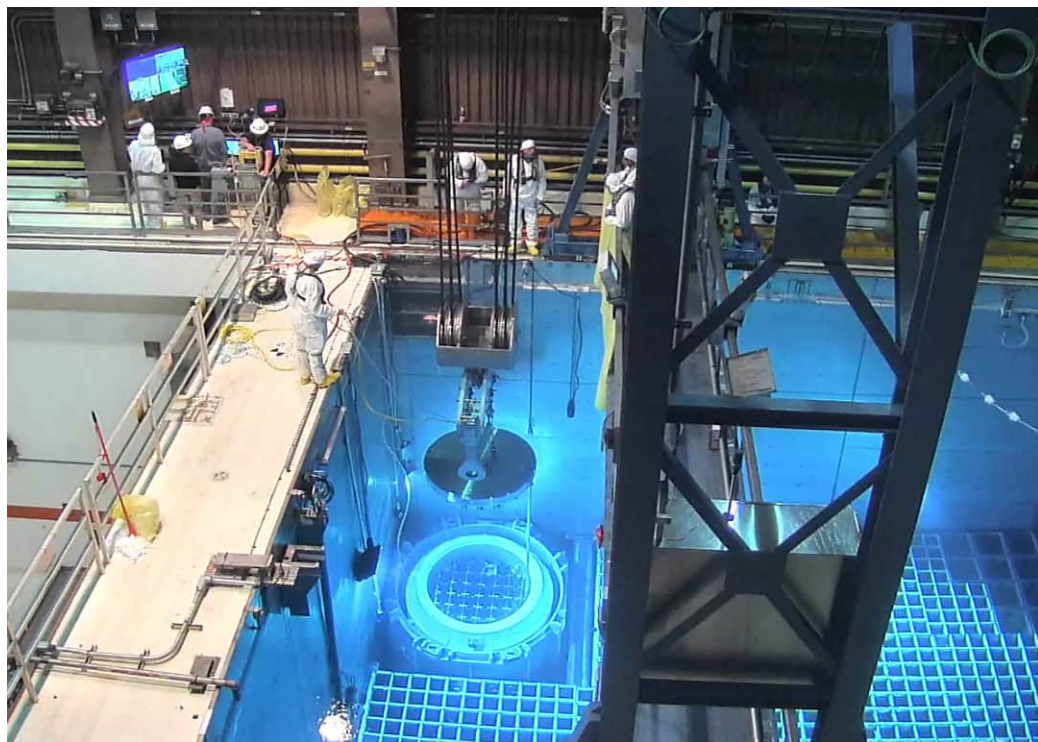


Public

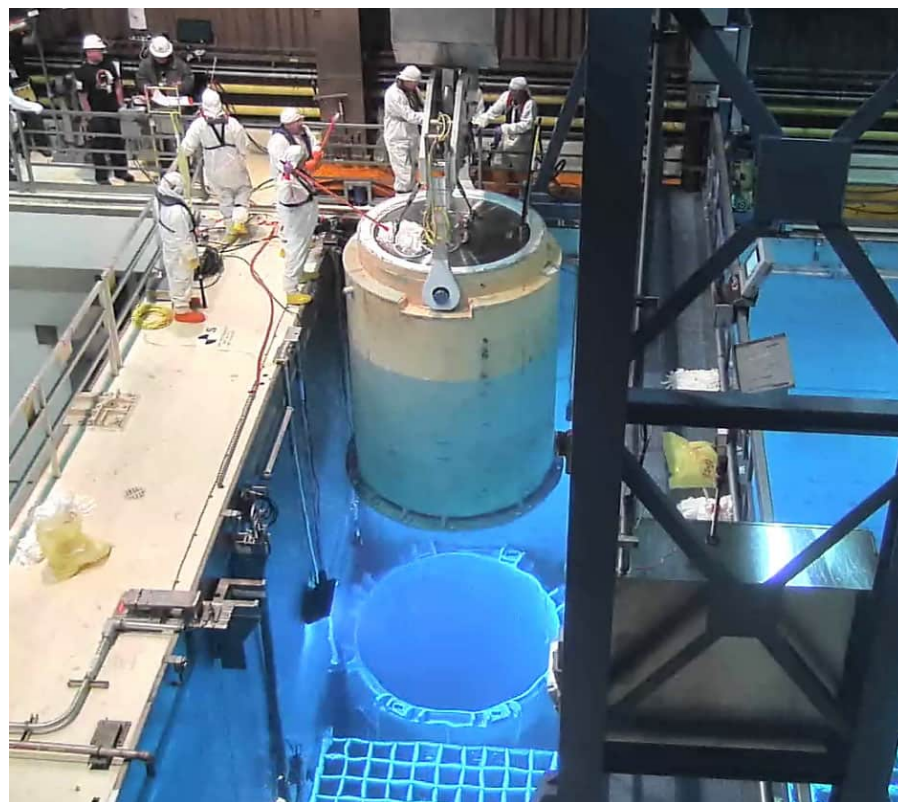


Overview of Loading Campaign

Installing the MPC Lid After Completion of Fuel Loading



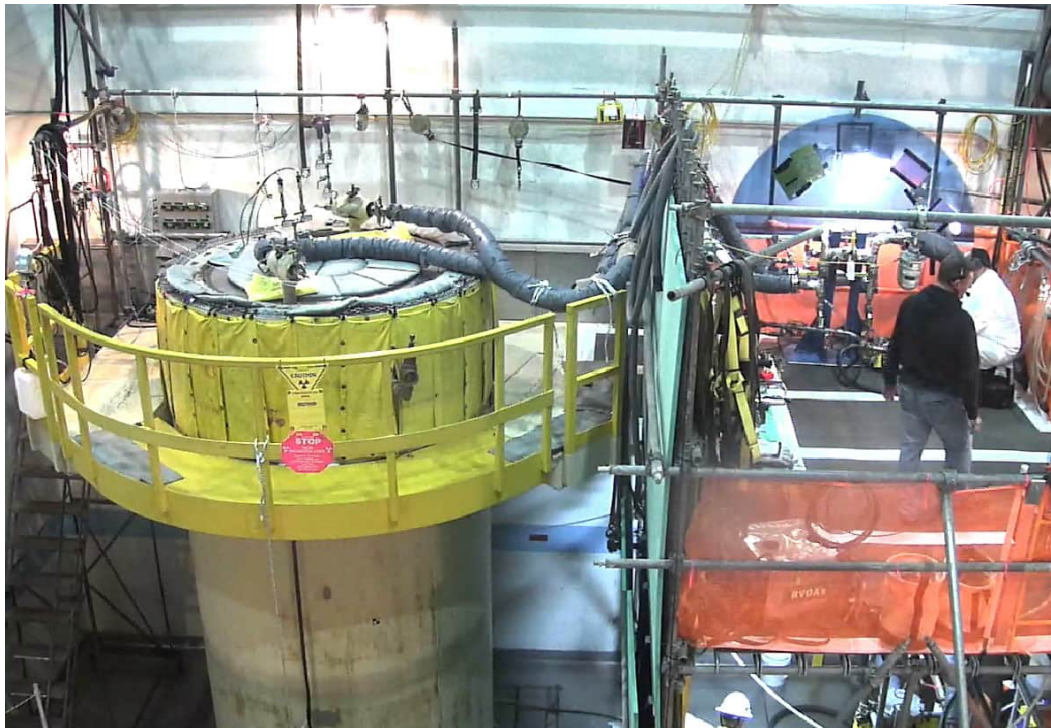
Removing the Transfer Cask from Spent Fuel Pool with Loaded MPC-32



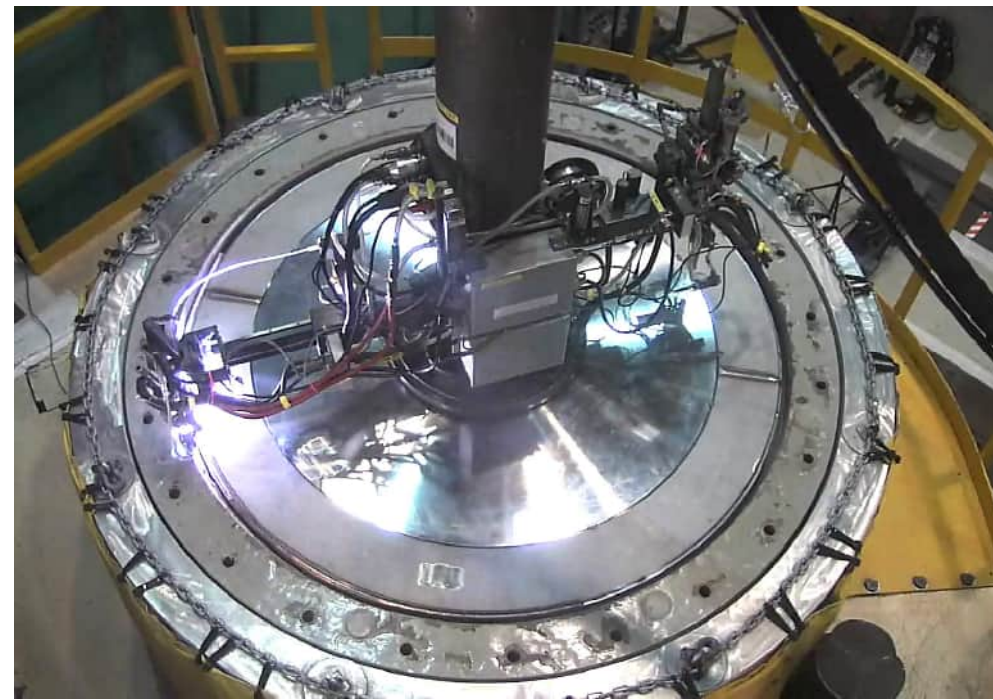


Overview of Loading Campaign

**Loaded Transfer Cask in Seismic Restraint
for Welding, Dehydration and Helium Backfill**



Automated MPC Closure Welding





Overview of Loading Campaign

Transporting Loaded MPC
in Transfer Cask to ISFSI



Transferring MPC from Transfer Cask
(Hi-TRAC) to Storage Cask (Hi-STORM)



Public



Overview of Loading Campaign

Removing Loaded Storage Cask from the Cask Transfer Facility

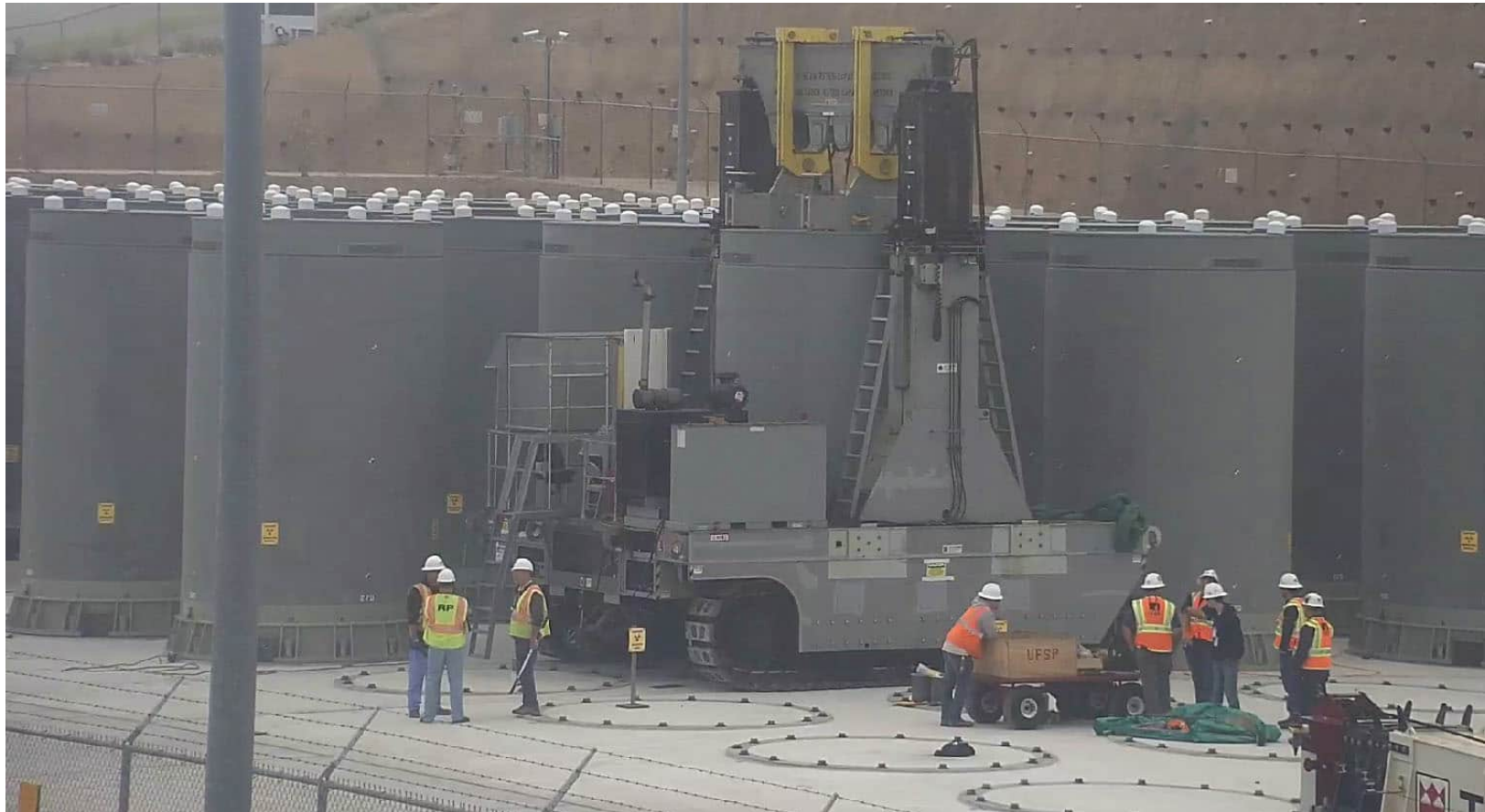


Public



Overview of Loading Campaign

Installing and Anchoring the Loaded Storage Cask on ISFSI Pad



Public



Overview of Loading Campaign

Hi-STORMs on ISFSI Pad



Public



2024 Fuel Offload Campaign

Current Status

- 2024 Campaign #8 (underway) adds 12 casks (384 used fuel assemblies).
 - 2 more casks to finish. MPC #11 is in progress, will be added to the ISFSI later in the week.
 - At the end of this campaign, ISFSI will contain a total of 70 casks (2240 used fuel assemblies).
- As of today: The ISFSI pad contains 68 storage casks (2,176 used fuel assemblies)
 - This includes 10 casks from current on-going campaign.
 - Work has been performed safely, and without incident.
 - NRC site inspection yielded no violations. Provided positive observations.
 - ALARA goals are being met.
 - Lessons learned / improvements are being captured > as we go <

Thank You

Al Bates
Diablo Canyon Power Plant
Director, Nuclear Fuel and Decommissioning

