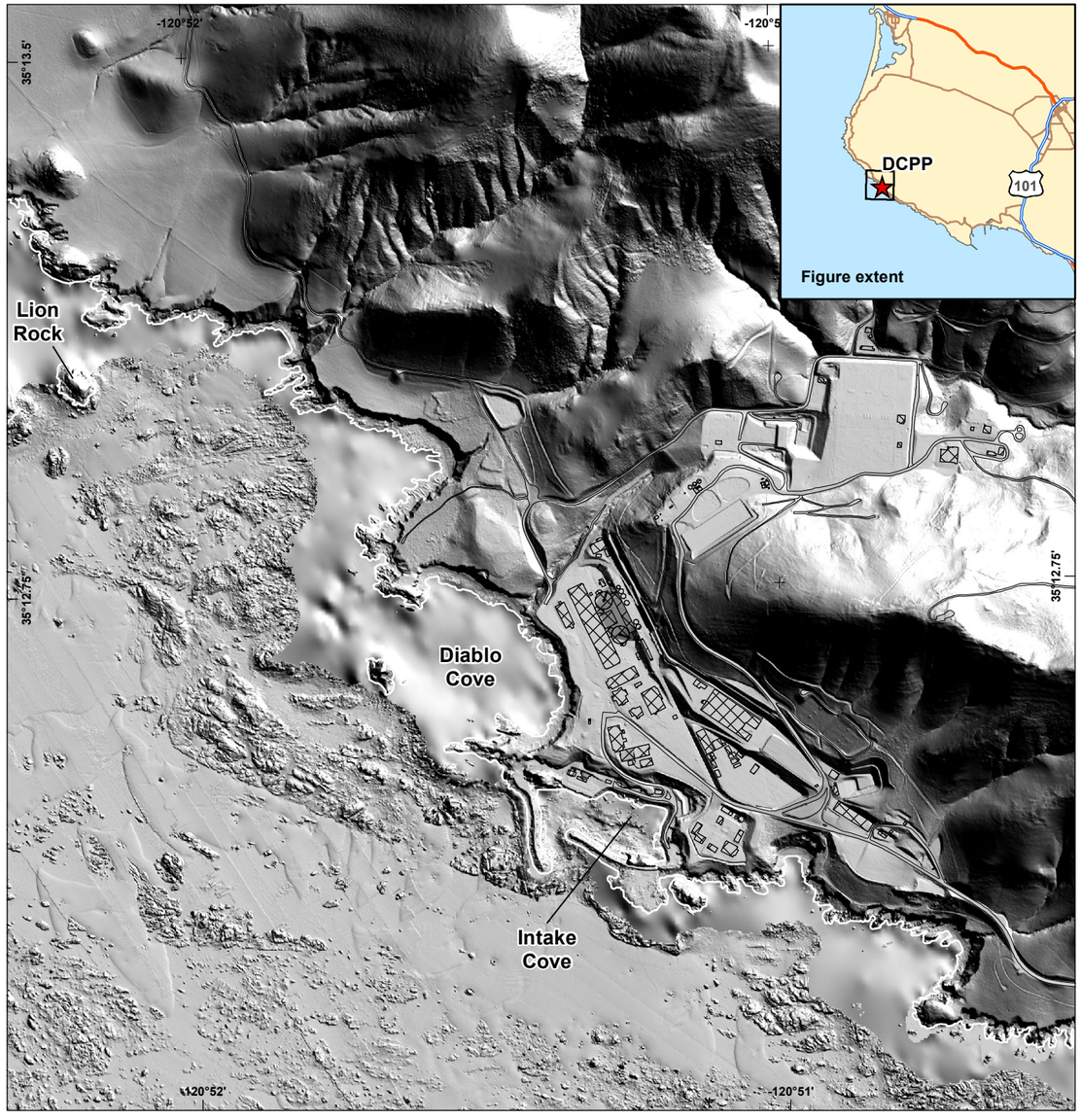
(a) Onshore-offshore hillshade image without Kelpfly MBES data



Base map: Composite DEM, version 6 (DCPP Geodatabase, 2011).
Artificial sunlight azimuth and inclination: 045° / 45°.

Note: The Kelpfly data fill in areas between the earlier MBES data and the coast.

(b) Onshore-offshore hillshade image with Kelpfly MBES data

Base map: Composite DEM, version 7 (DCPP Geodatabase, 2013). Artificial sunlight azimuth and inclination: 315° / 45°.

N
W E
S

0 1,000 2,000 ft.
0 500 1,000 m

Map projection and scale: NAD 83 / UTM Zone 10N, 1:15,000

Onshore-Offshore Hillshade Image of the DCPP Area Showing Improved Coverage in the Nearshore with the Kelpfly MBES Data

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-1**

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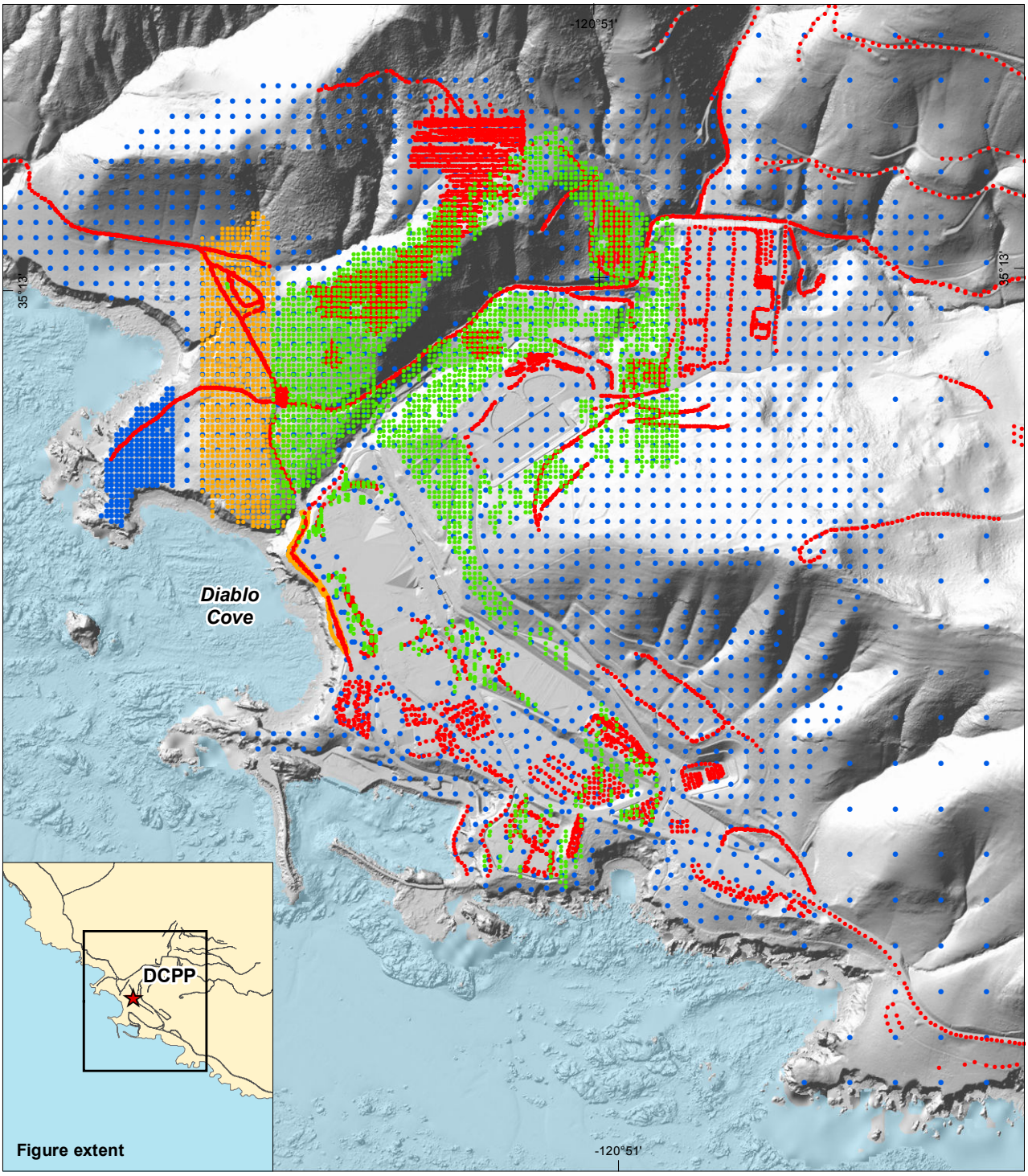


EXPLANATION

- Live ZLand location
- Live Sigma location
- Live Seistronix location
- Vibe source location

Source: Fugro (2014a).

Map projection and scale: NAD 83 / UTM Zone 10N, 1:12,000

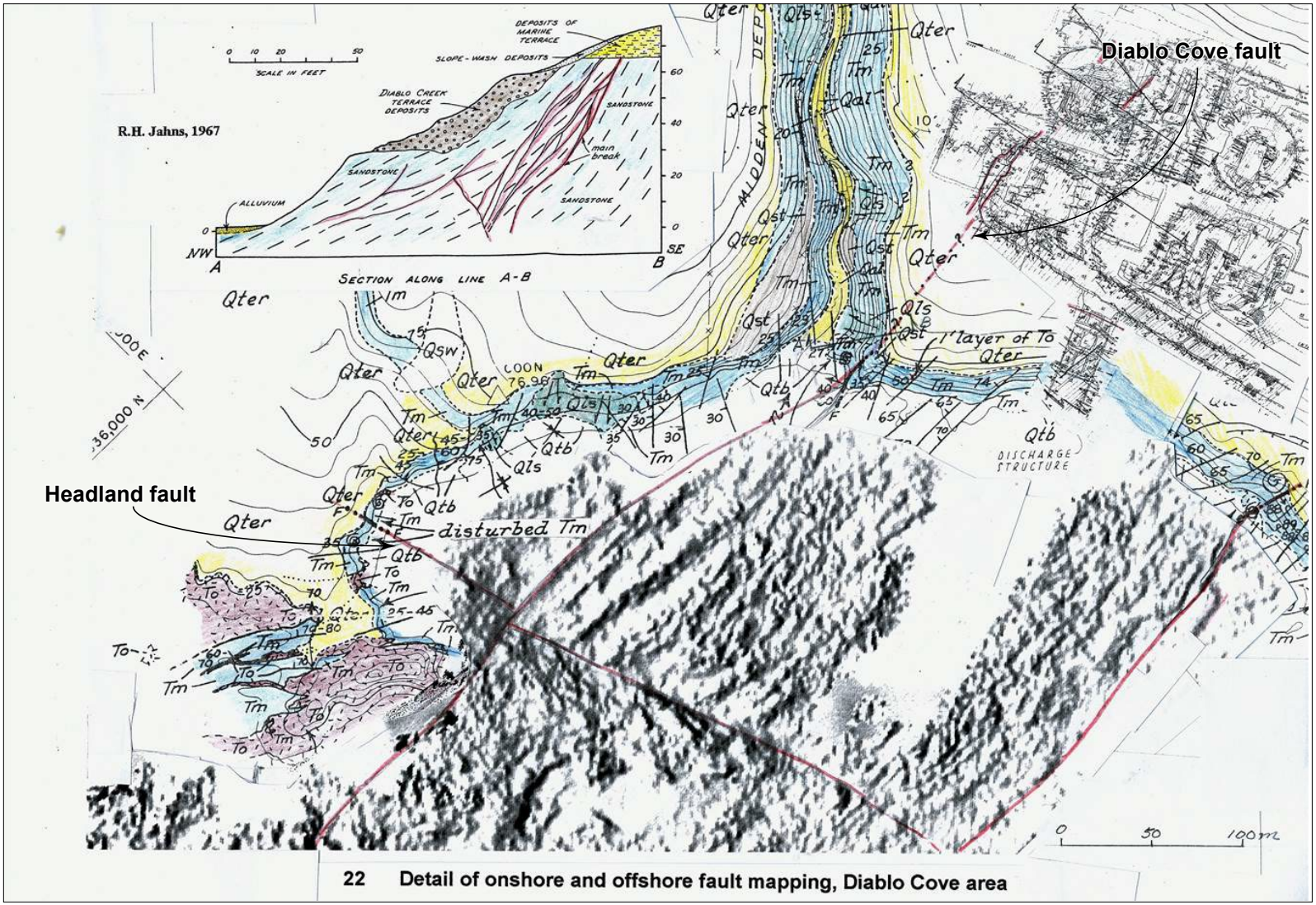
Locations of Sources and Receivers in the DCPP Area for the 2012 3D Seismic Survey

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company

Figure **6-2**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-02.mxd; Date: 07/31/2014; User: Serkan Bozkurt, LCI



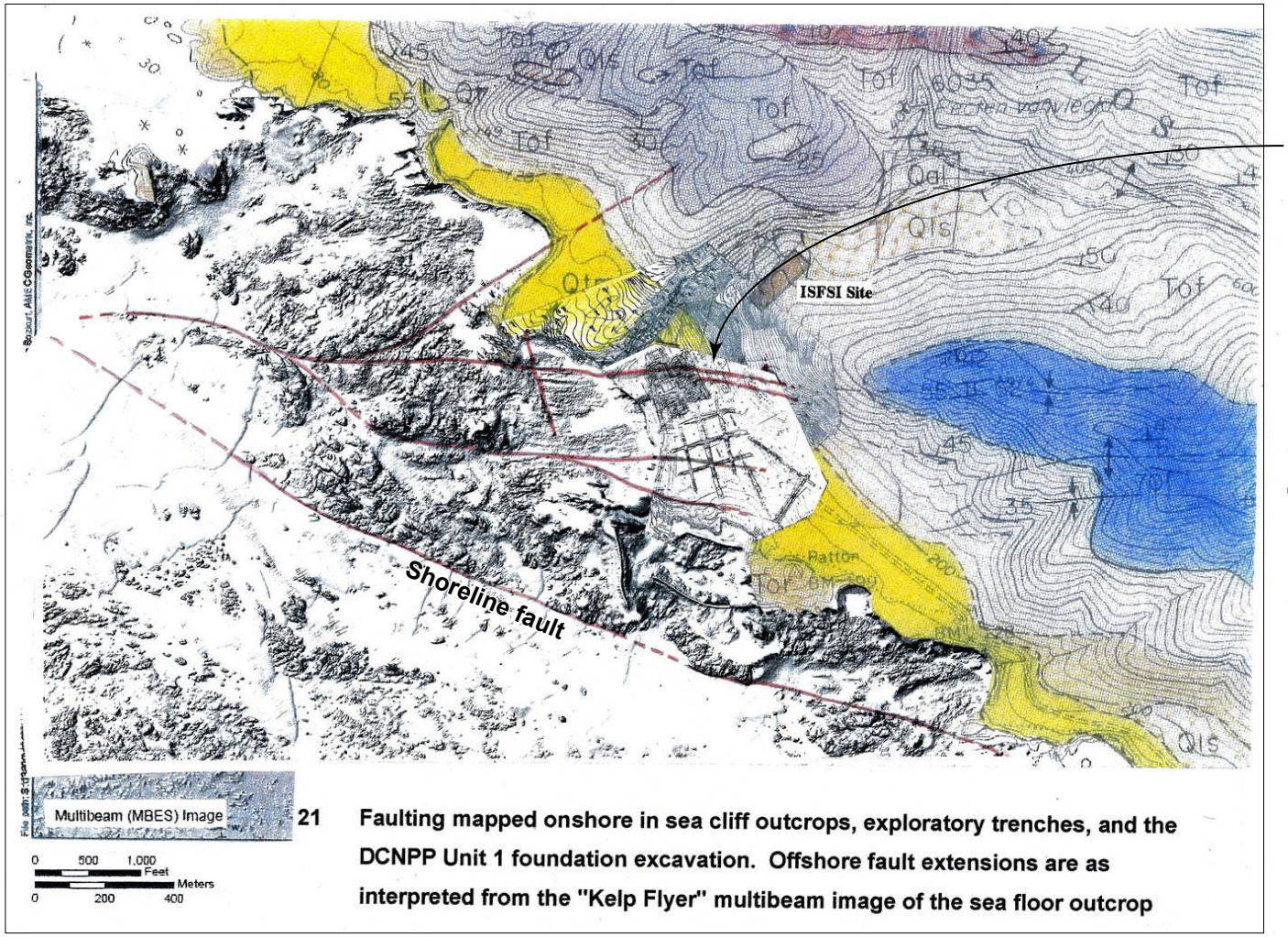
22 Detail of onshore and offshore fault mapping, Diablo Cove area

Note: Modified from slide 22 of Dr. Hamilton's presentation at DCPP SSHAC Workshop No. 2 (November 2012). Fault names were added by PG&E.

Interpretation of the Diablo Cove Fault Across the DCPP Site and Diablo Cove from Hamilton (2012c)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-3**



21 **Faulting mapped onshore in sea cliff outcrops, exploratory trenches, and the DCNPP Unit 1 foundation excavation. Offshore fault extensions are as interpreted from the "Kelp Flyer" multibeam image of the sea floor outcrop**

Note: Modified from slide 21 of Dr. Hamilton's presentation at DCPP SSHAC Workshop No. 2 (November 2012). Fault names were added by PG&E.

Interpretation of the Diablo Cove Fault Across the DCPP Site Area and Offshore to the Shoreline Fault Zone from Hamilton (2012c)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-4**

(a)

Map boundary

Map boundary

DCPP

Figure extent

(b)

af

fracture zone

Qaf

Qm

C

B

A

D

Diablo Cove fault

40°-60°

42°

45°

50°

55°

78°

A'

B'

C'

D'

Qm

af

Qaf

Q

Qm

Qm

Tmor

Tmofb

Qaf

Tmor

Note pertaining to panel (a):
- Bedding schematically drawn; underlined numbers are elevation in feet.

Notes pertaining to panel (b):
- See Figure 6-7 for explanation of geologic symbols.
- Building footprint from TetraTech (2011), not reviewed by DCPP.

Sources: Jahns (1966, 1967a, 1967b, 1968); Jahns et al. (1973); PG&E (2014b).

EXPLANATION

A A' Geologic cross sections shown on Figure 6-9

N

0 200 400 ft.

0 50 100 m

Map projection and scale: NAD 83 / UTM Zone 10N, 1:2,000

Geologic Map of the DCPP Site Area Showing Faults Identified During Pre-Construction Studies: (a) Jahns et al. (1966-1973) and (b) PG&E (2014b).

RESPONSE TO DR. HAMILTON'S TESTIMONY

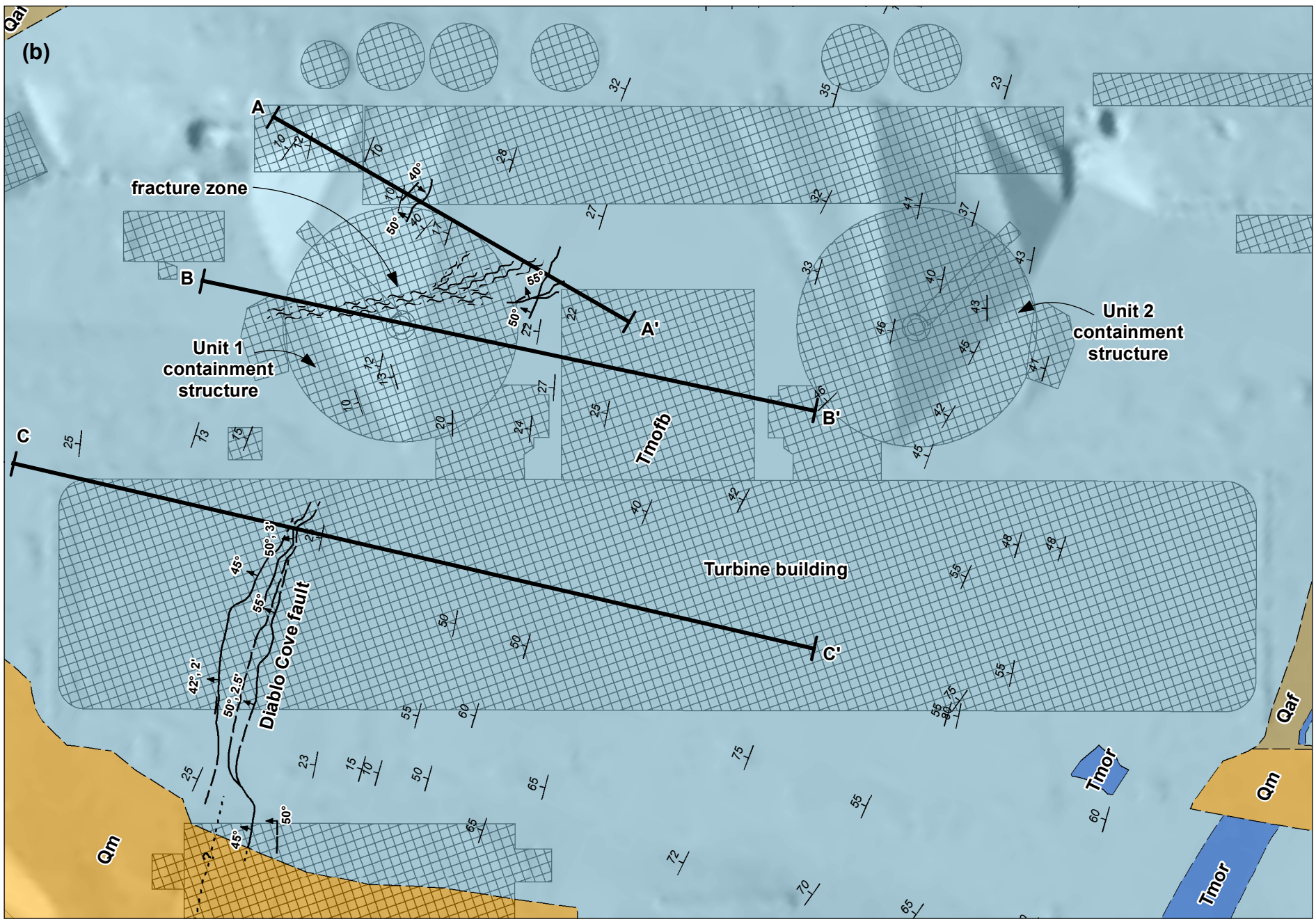
Pacific Gas and Electric Company

Figure **6-5**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-05.mxd; Date: 07/30/2014; User: Alex Remar, LCI; Rev.1

(a)

(b)



Notes pertaining to panel (b):
- See Figure 2.5-12 (PG&E, 1974) for explanation of secondary structural features (e.g., joints)
- The number of strikes and dips shown are selected to be representative of those shown in Panel (a), hence the reduced number.
- See Figure 6-7 for explanation of geologic symbols.
- Building footprint from TetraTech (2011), not reviewed by DCPP.

Sources: Jahns (1966, 1967a, 1967b, 1968); Jahns et al. (1973); PG&E (2014b).

EXPLANATION

A — A' Geologic cross sections shown on Figure 6-9

N

0 100 200 ft.

0 20 40 m

Map projection and scale: NAD 83 / UTM Zone 10N, 1:1,000

Geologic Map of the DCPP Site Showing Faults Identified During Pre-Construction Studies: (a) PG&E (1974) and (b) PG&E (2014b).

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company

Figure **6-6**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-06.mxd; Date: 07/30/2014; User: Alex Remar, LCI; Rev:1

EXPLANATION

Geologic Units

Quaternary

- **af** — **Artificial fill:** fill material emplaced locally during construction and improvement activities. Shallow fills not shown; bedrock with trenches and excavation for power block shown; filled with af.
- **Qsw** — **Sand wave deposits**, **offshore:** unlithified sheets of sand that form migrating marine dunes.
- **Qal** — **Alluvial deposits:** unlithified silt, sand, and gravel valley fill deposited during overbank flooding, channel backfilling, and construction of debris flow levees.
- **Qaf** — **Alluvial fan deposits:** unlithified silt, sand, and gravel deposited in fans along valley margins (only shown near DCPP).
- **Qls** — **Landslide deposits:** unlithified masses of displaced bedrock and/or soil; may be active or inactive.
- **Qt** — **Fluvial terrace deposits:** unlithified silt, sand, and gravel deposited in stream valleys.
- **Qm** — **Marine terrace deposits:** unlithified to weakly lithified marine sand and gravel deposited above wave-cut platforms in the Pleistocene and commonly overlain by alluvial fan and colluvial deposits.

Neogene — Miocene

- **Tmm** — **Monterey Formation:** tuffaceous, siliceous, and diatomaceous siltstone and shale, gray and brown (weathers to chalky white), thinly bedded and well-lithified, includes common chert laminations.
- **Tmo** — **Obispo Formation**, **undifferentiated:** tuffaceous, dolomitic siltstone and fine sandstone rare diatomaceous siltstone, tuff, and resistant zeolitized tuff.
  - **Tmod** — **Obispo Formation**, **diabase:** brown, aphanitic to phaneritic, intrusive in dikes and sills.
  - **Tmof** — **Obispo Formation, fine-grained member:** Bedded tuffaceous to diatomaceous, fine to medium-bedded siltstone, sandstone, and rare shale; commonly dolomitic. Locally includes tuff beds.
  - **Tmofb** — **Obispo Formation, fine-grained sub-member b:** Bedded tuffaceous, dolomitic, fine to medium-bedded siltstone and fine sandstone.
  - **Tmofc** — **Obispo Formation, fine-grained sub-member c:** Bedded shale and siltstone, very fine bedded silty shale with medium bedded, dolomitic siltstone interbeds.
  - **Tmor** — **Obispo Formation, resistant member:** Bedded to massive zeolitic tuff, tuff breccia, and tuffaceous sandstone.

Jurassic/Cretaceous

- **Ks** — **Cretaceous Sandstone:** arkosic to lithic sandstone, brown, bedded, well-lithified, fine- to course-grained, includes minor shale.
- **KJf** — **Franciscan Complex, undifferentiated**

Geologic Structures

From previous mapping and GMP

- **Contact:** solid where well located, long dash where approximate, short dash where inferred, dotted where concealed, queried where uncertain.
- Boundary (contact) between Obispo diabase and tuffaceous rocks interpreted from helicopter magnetic survey (PG&E, 2011). Line may not follow exact contact of rock at surface.
- **Syncline:** dashed where approximate, dotted where concealed. Arrow points in direction of plunge.
- **Anticline:** dashed where approximate, dotted where concealed. Arrow points in direction of plunge.
- **Fault:** solid where well located, long dash where approximate, short dash where inferred, dotted where concealed, queried where uncertain. Arrow indicates dip direction of fault or shear surface. Numbers indicate measured dip and stratigraphic separation in feet where present.
- Zone of blocky fracturing

From GMP

- Inclined bedding

From previous mapping

- Inclined bedding
- Vertical bedding orientation
- Overturned bedding
- Inclined fault
- Vertical fault

Geographical Features

- Roads
- Buildings
- Coastline (white line) at mean lower low water (approximate sea level)

Note: This explanation is for the larger Irish Hills area hence not all units and symbols apply to Figures 6-5b, 6-6b, 6-13, 6-16, and 6-51.

Explanation to Accompany Geologic Maps Based on PG&E (2014b)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-7**

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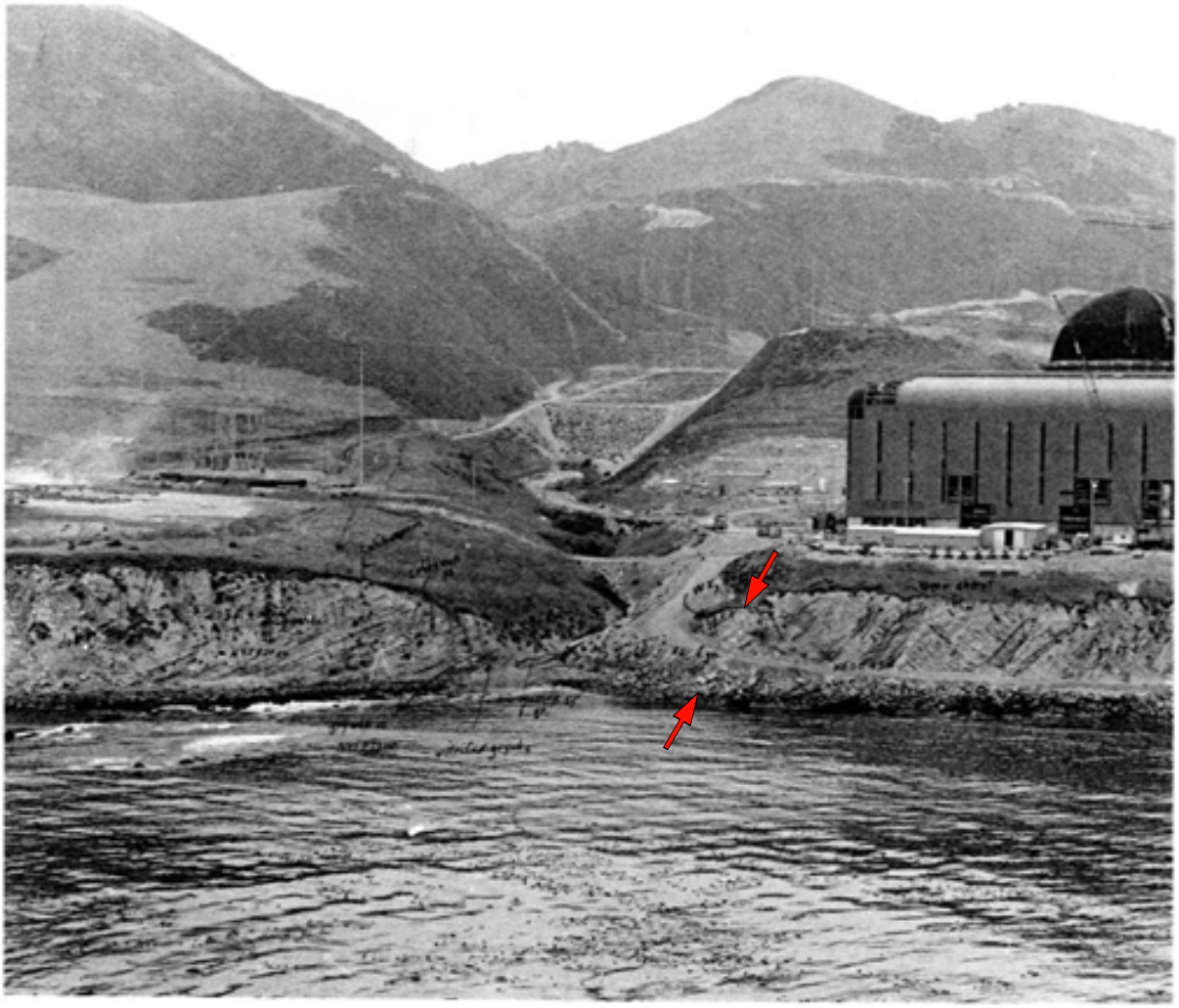


19 Photograph of mouth of Diablo Creek in 1972, showing south headland exposure graded away by construction of beach access road

EXPLANATION

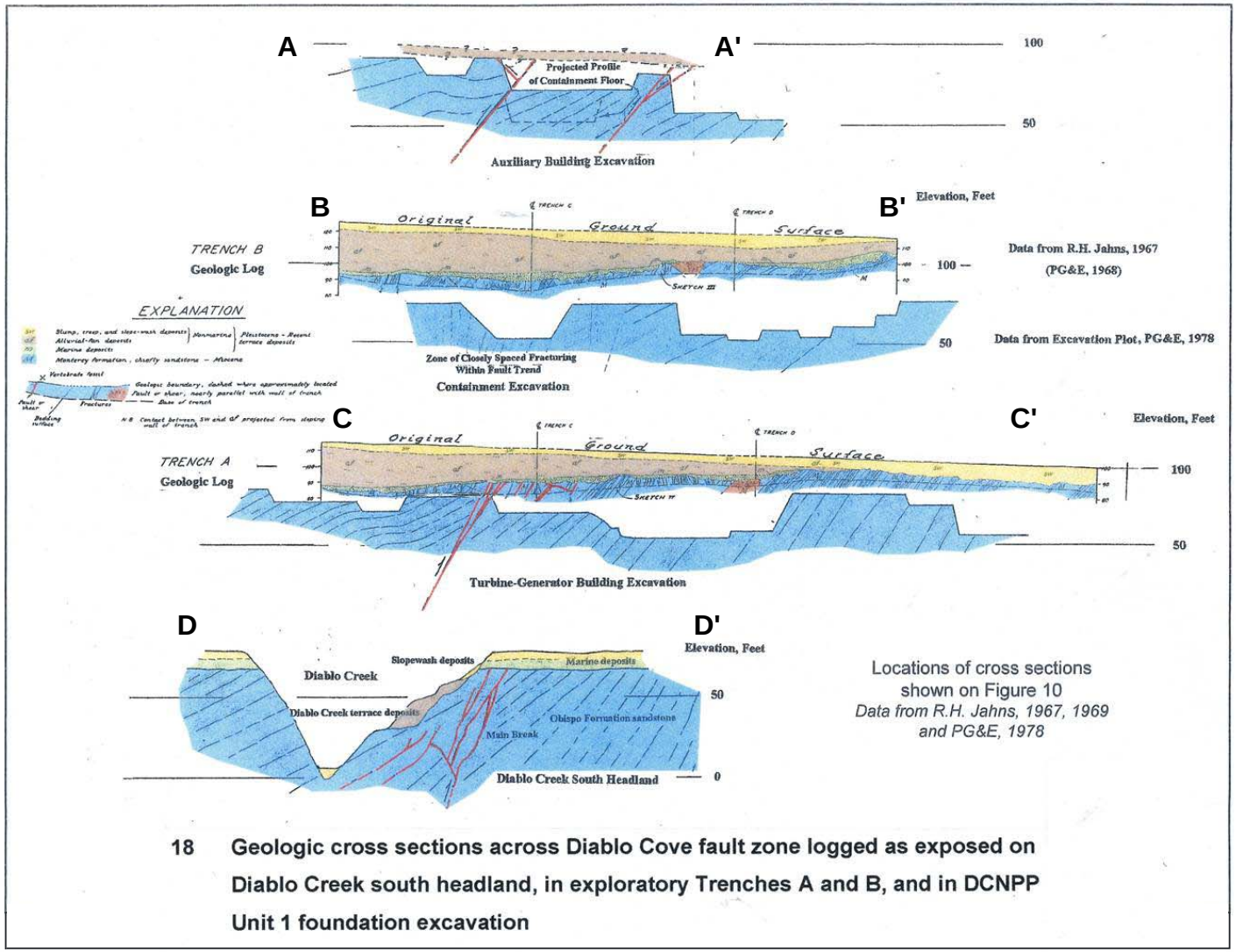
→ Diablo Cove fault exposed in sea cliff (added by PG&E to this figure).

Note: Modified from slide 16 of Dr. Hamilton's presentation at DCPPSSHAC Workshop No. 2 (November, 2012).

Photograph of Mouth of Diablo Canyon Creek and Diablo Cove Fault Exposed in the Sea Cliff from Hamilton (2012c)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-8**



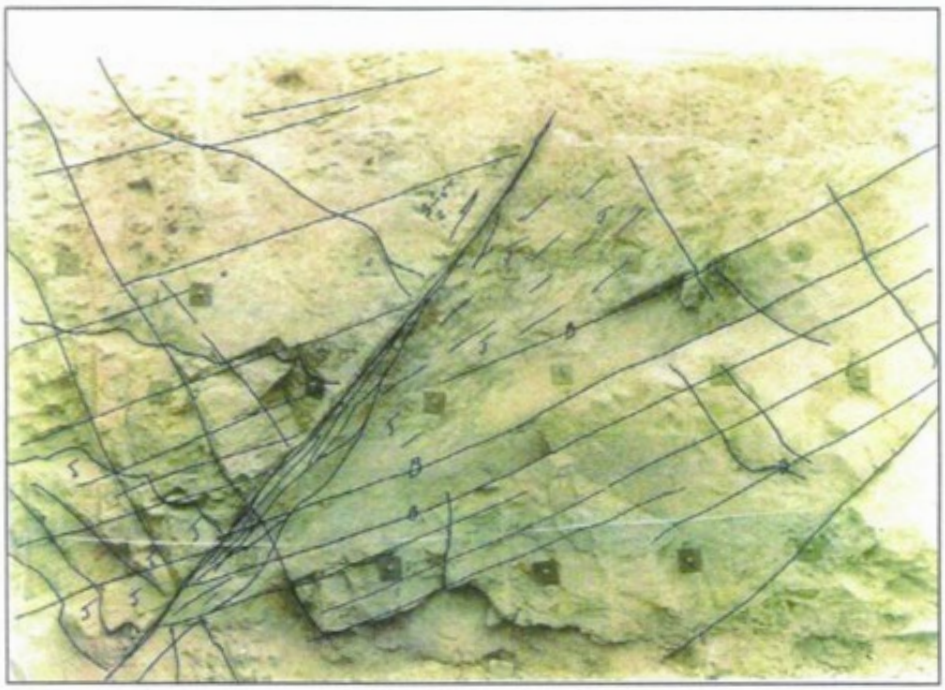
18 **Geologic cross sections across Diablo Cove fault zone logged as exposed on Diablo Creek south headland, in exploratory Trenches A and B, and in DCNPP Unit 1 foundation excavation**

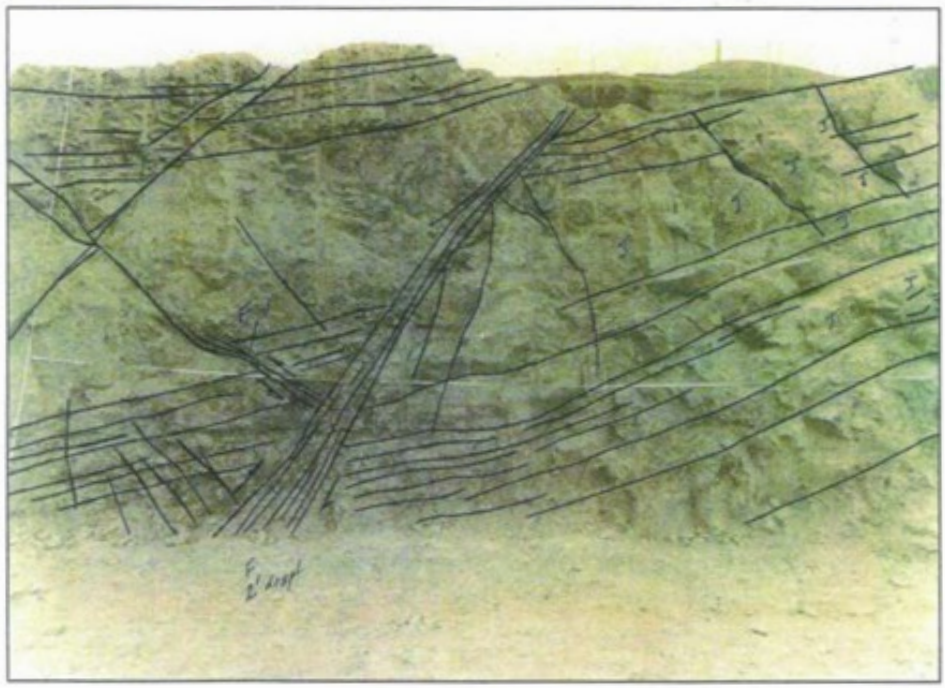
Notes:
- Modified from slide 18 of Dr. Hamilton's presentation at DCPP SSHAC Workshop No. 2 (November 2012). Section line letters were assigned by PG&E.
- Locations of cross sections are shown on Figures 6-5 and 6-6.

Diablo Cove Fault as Mapped in the Excavations for the Turbine Building, Unit 1 Containment, and Sea Cliff from Hamilton (2012c)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-9**





17 Photographs of faulting exposed in bedrock cut slopes of DCNPP Unit 1 foundation excavation, 1969; logging annotations by Prof. R. H. Jahns

Note: Slide 17 of Dr. Hamilton's presentation at DCPP SSHAC Workshop No. 2 (November 2012).

Photographs of Faulting in the Foundation Excavations for Unit 1 from Hamilton (2012c)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-10**

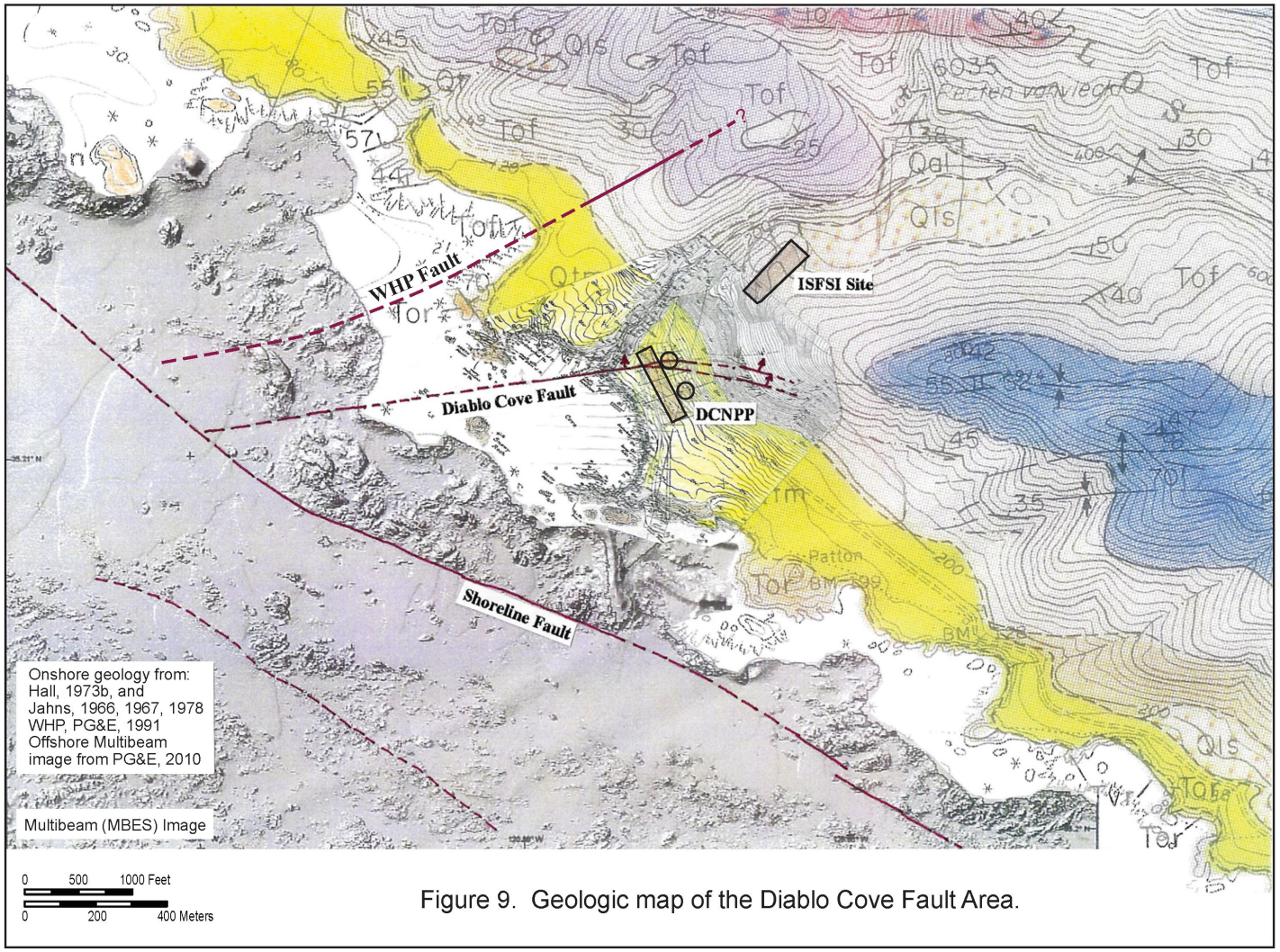


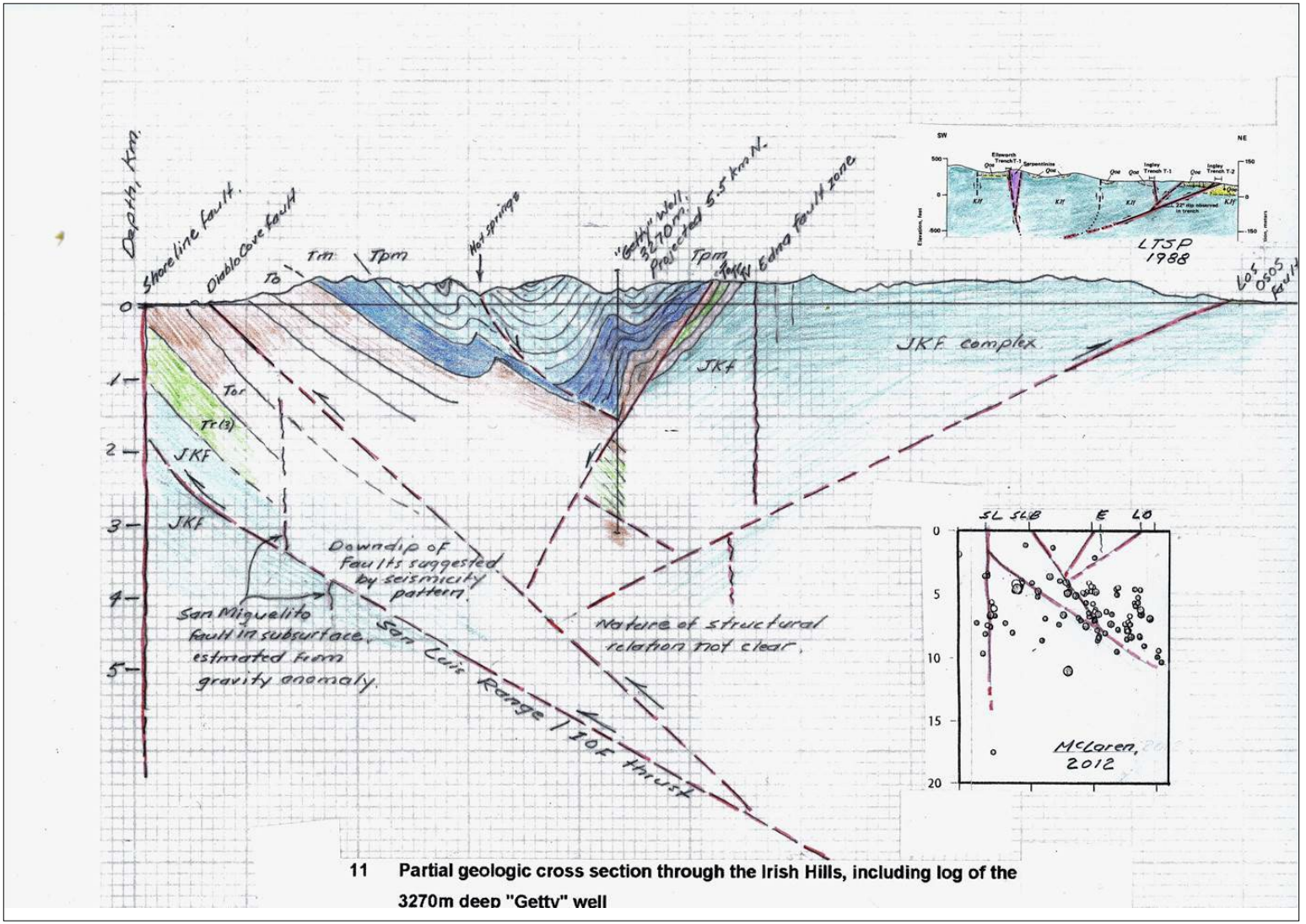
Figure 9. Geologic map of the Diablo Cove Fault Area.

Note: Figure 9 from Dr. Hamilton's testimony (February 2012).

Interpretation of the Diablo Cove Fault Prior to Offshore Kelpfly Data from Hamilton (2012a)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-11**



11 **Partial geologic cross section through the Irish Hills, including log of the 3270m deep "Getty" well**

Note: Slide 11 from Dr. Hamilton's presentation at DCPP SSHAC Workshop No. 2 (November 2012).

Geologic Cross Section of the Irish Hills from Hamilton (2012c)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-12**

Ch12.GEO.DCPP.TR.14.07 R0

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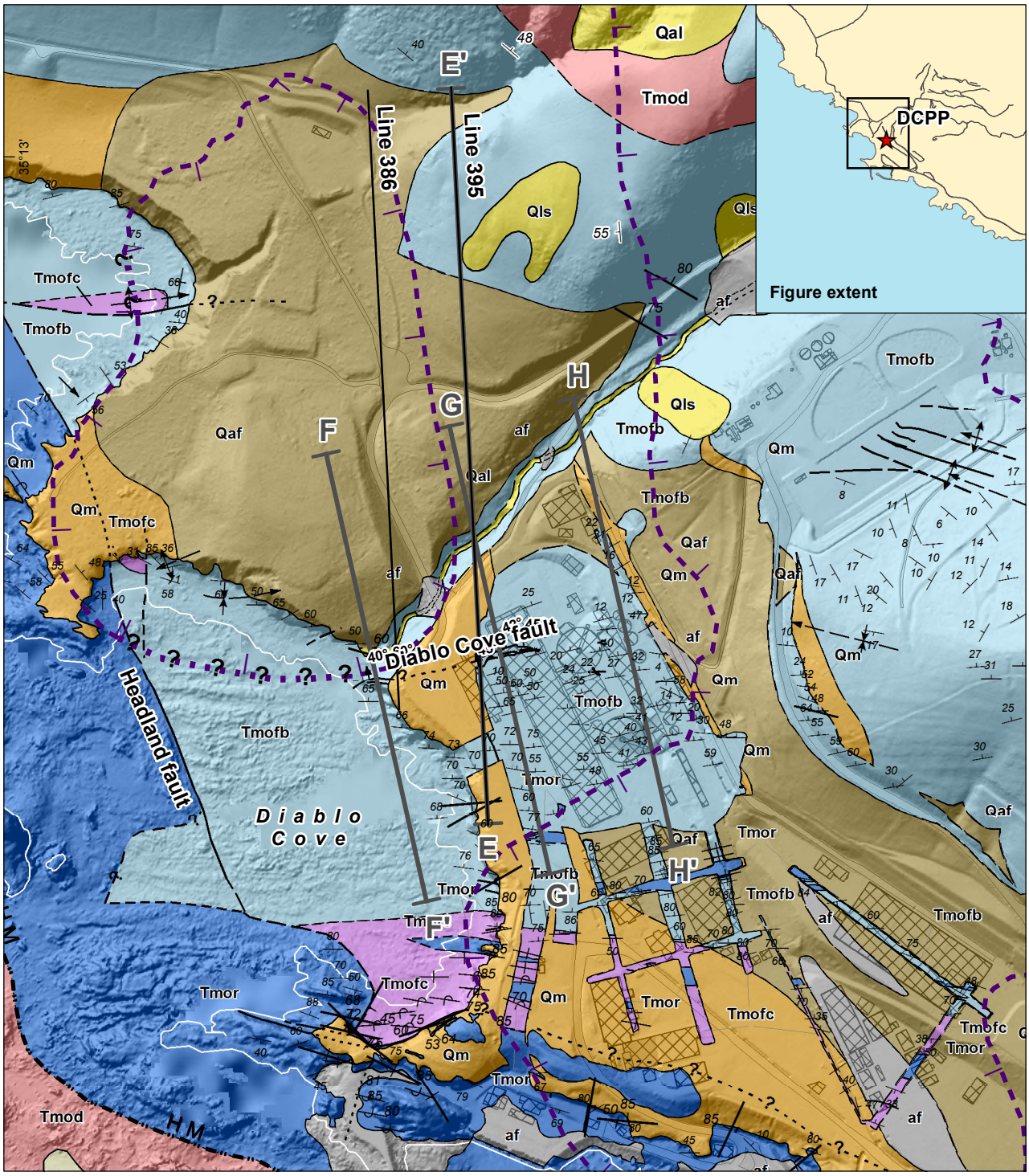


EXPLANATION

Projection of diabase extent based on 100 ft. thick contour, queried where extrapolated offshore (see Figure 6-14a); hachures indicate side of boundary where diabase is present

Geologic cross section

Seismic lines from FCL (2014b)

Notes:
- See Figure 6-7 for explanation of geologic symbols.
- See Figures 6-5 and 6-6 for more detailed geologic interpretations of the DCPP site area.

Sources:
- PG&E (2014b).
- FCL (2014b).

N

0 400 800 ft.

0 100 200 m

Map projection and scale: NAD 83 / UTM Zone 10N, 1:6,000

Geologic Map of the DCPP Site Area Showing Locations of Seismic Lines and Shallow Geologic Cross Sections

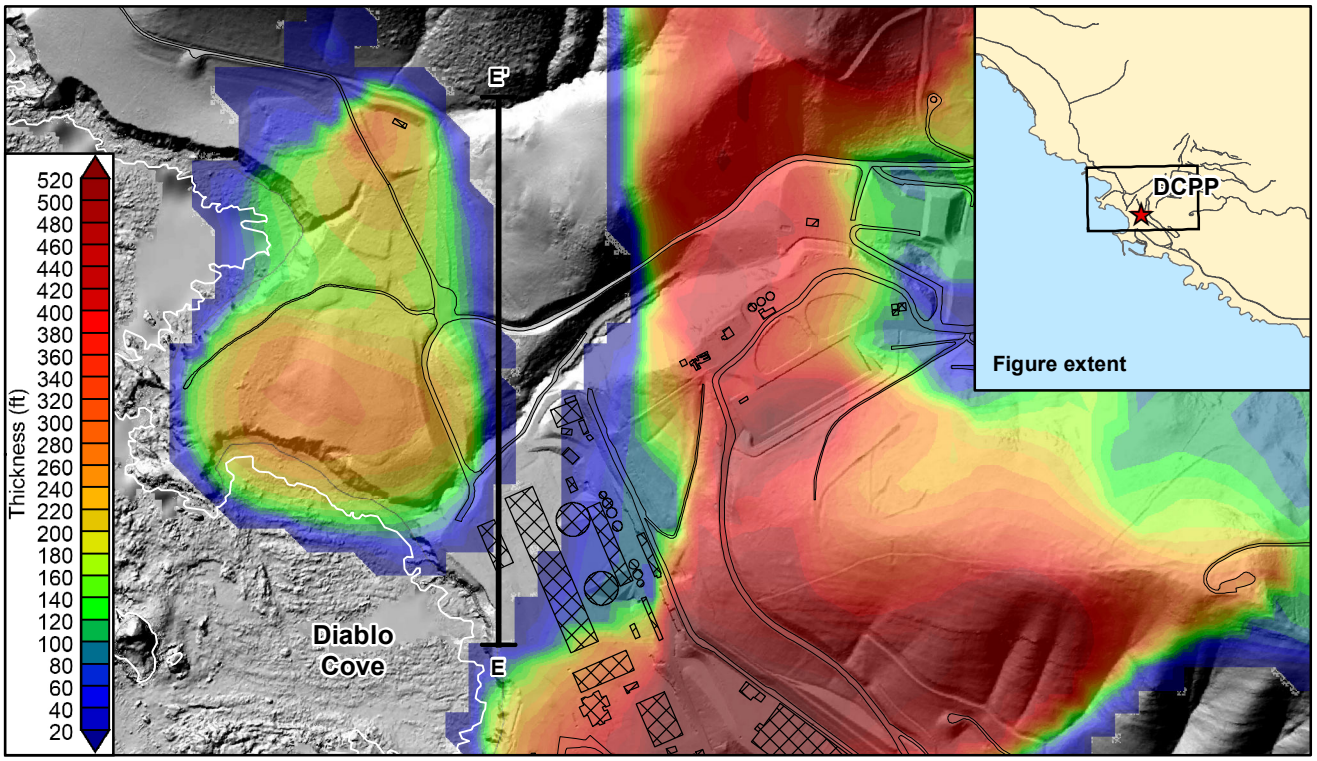
RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company

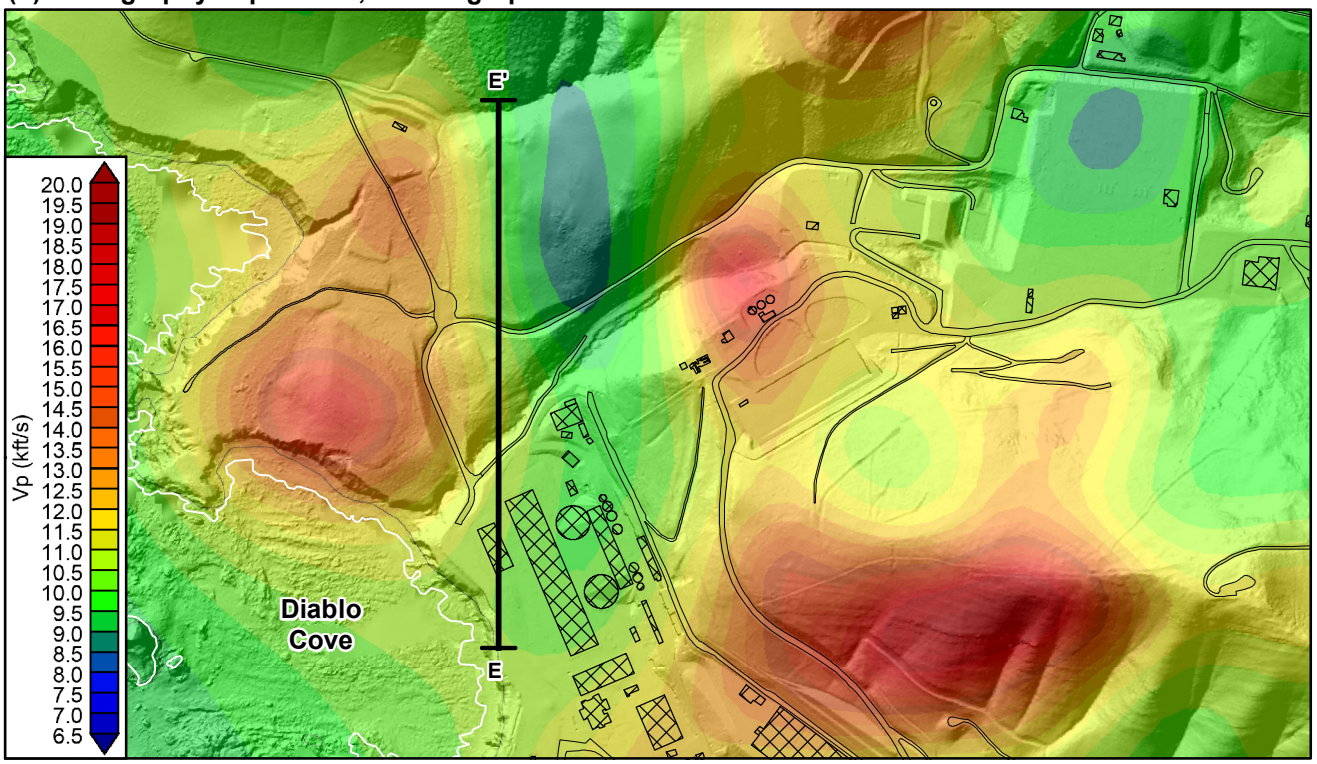
Figure **6-13**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-13.mxd; Date: 07/31/2014; User: Alex Remar, LCI; Rev.1

(a) Isopach of diabase above -750 ft. elevation, assuming Vp of diabase ≥11.5 kft/s



(b) Tomography depth slice, showing Vp at -400 ft elevation



EXPLANATION

Geologic cross section E-E', seismic line CL 395

Note pertaining to panel b:
- Vp above 11.5 kft/s may represent diabase; Vp between 9.5 and 11.5 kft/s may represent alteration zones.

Source: FCL (2014b)

N

0 500 1,000 ft.

0 200 400 m

Map projection and scale: NAD 83 / UTM Zone 10N, 1:10,000

Map of the DCPP Area Showing Areas of High P-Wave Velocities Associated with Buried Diabase Bodies

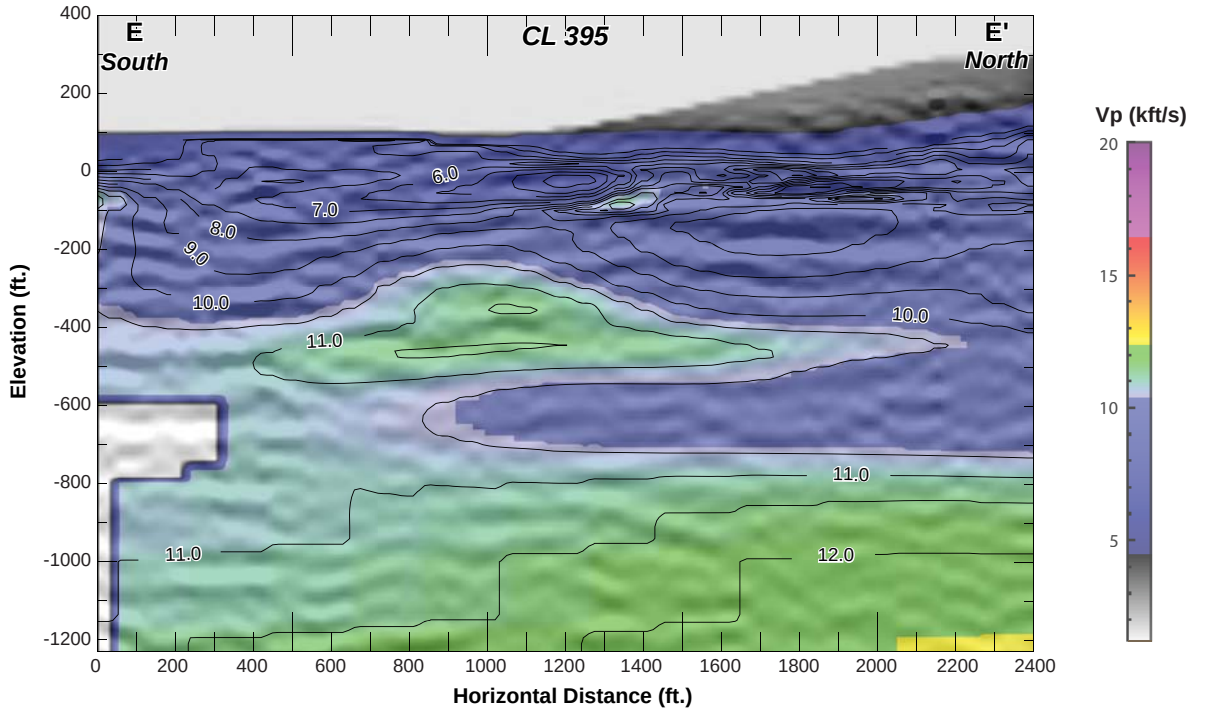
RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company

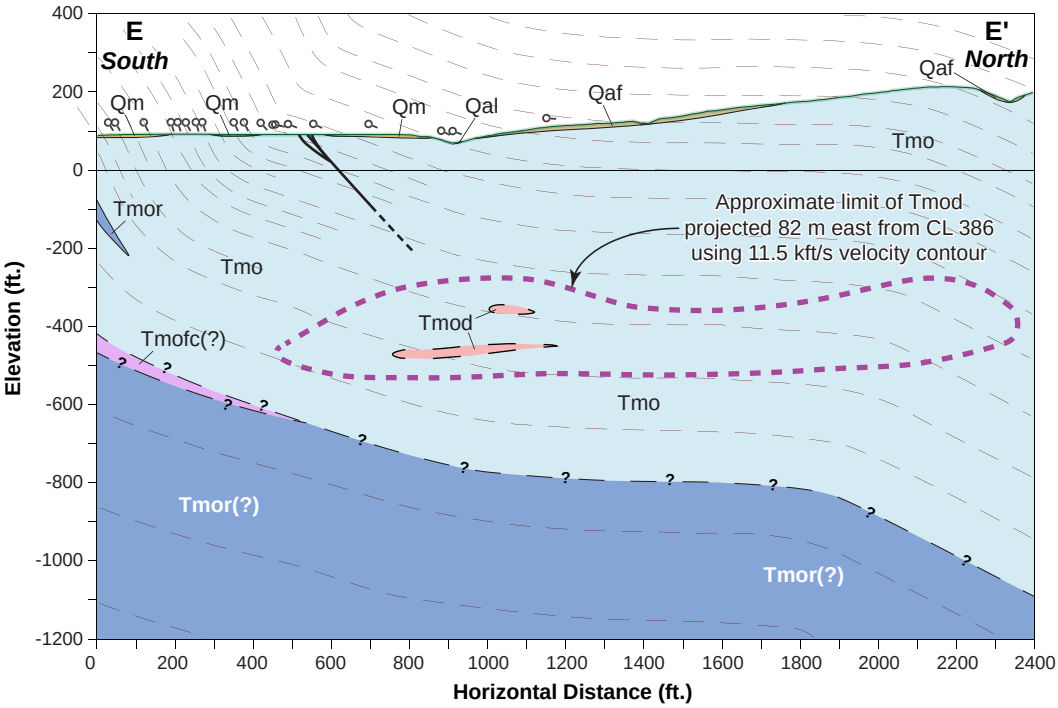
Figure **6-14**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-14.mxd; Date: 07/31/2014; User: Alex Remar, LCI; Rev.1

(a) Seismic Reflection Profile CL 395 and Tomography (FCL, 2014b)



(b) Geologic Data and Interpretation



Note: See Figure 6-17 for explanation of geologic symbols used on cross section.

EXPLANATION

Qal	Alluvial deposits	Tmo	Obispo Formation, tuffaceous siltstone and sandstone
Qaf	Alluvial fan deposits	Tmofc	Obispo Formation, tuffaceous siltstone and shale
Qm	Marine terrace deposits	Tmor	Obispo Formation, resistant tuff
Tmod	Obispo Formation, intrusive diabase		

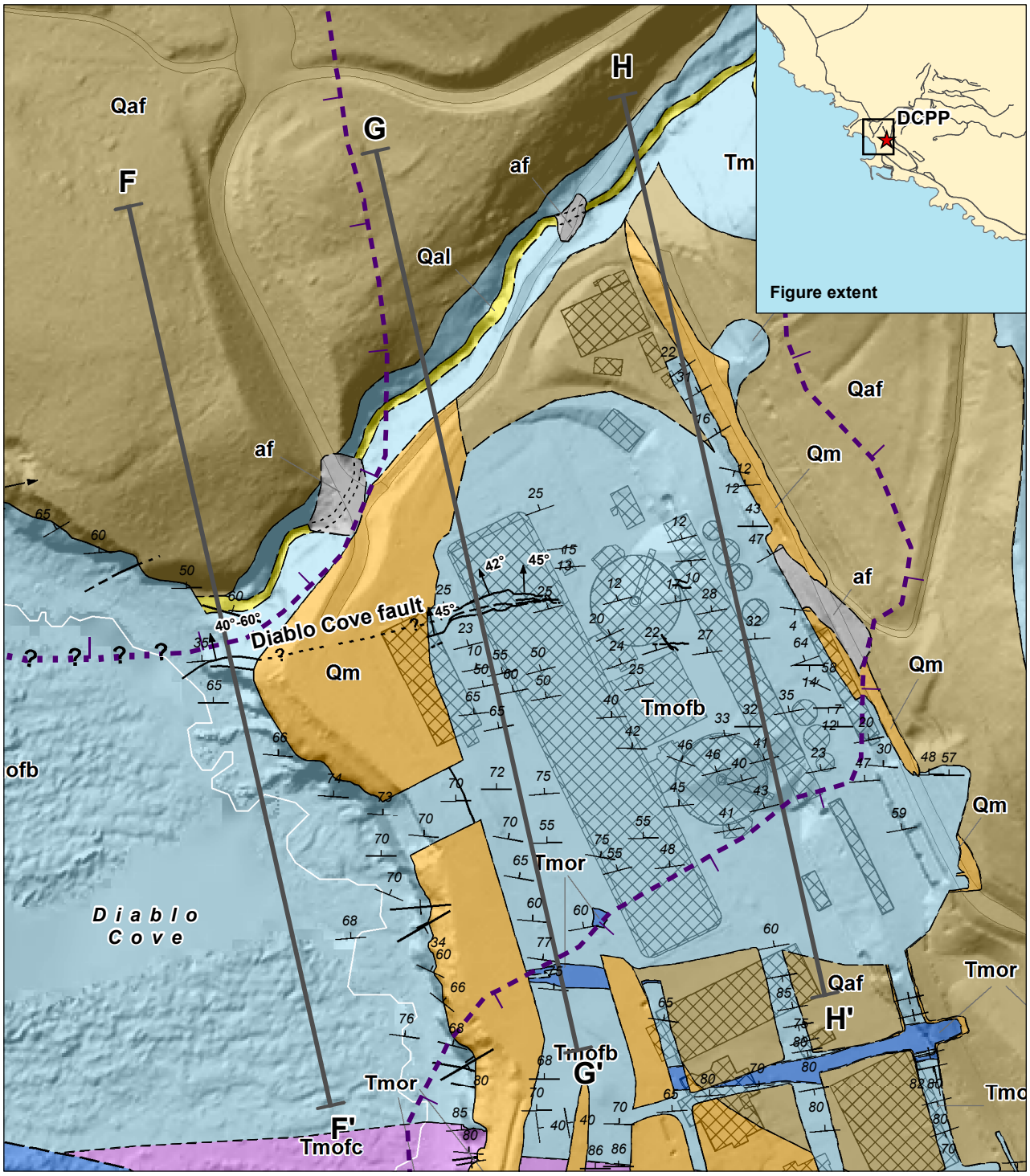
Seismic Profile CL 395 and Geologic Interpretation, Cross Section E-E'

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company

Figure **6-15**

File path: S:\1005\051\Figures\Response_Figures\MXD_for_AI\Figure_6-15.ai; Date: 07/30/2014; User: Alex Remar, LCI; Rev.1



EXPLANATION

Projection of diabase extent based on 100 ft. thick contour, queried where extrapolated offshore (see Figure 6-14a); hachures inidicate side of boundary where diabase is present

Geologic cross section

N

0 200 400 ft.

0 50 100 m

Map Projection: NAD 83 / UTM Zone 10N, 1:3,000

Notes:
- See Figure 6-7 for explanation of geologic symbols.
- See Figures 6-5 and 6-6 for more detailed geologic interpretations of the DCPP site area.

Source: PG&E (2014b).

Geologic Map of the DCPP Site Area Showing Shallow Locations of Geologic Cross Sections F-F', G-G', and H-H'

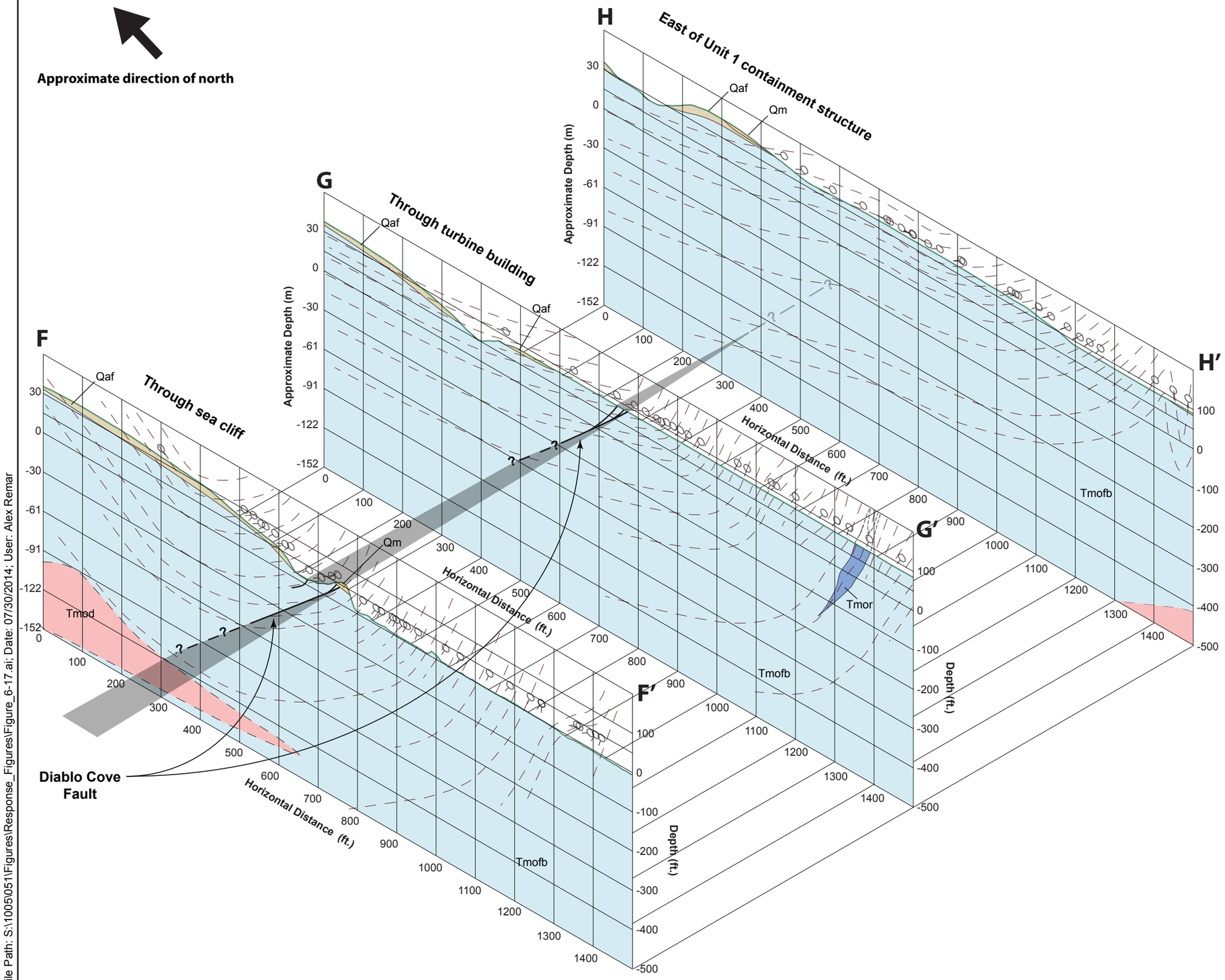
RESPONSE TO DR. HAMILTON'S TESTIMONY

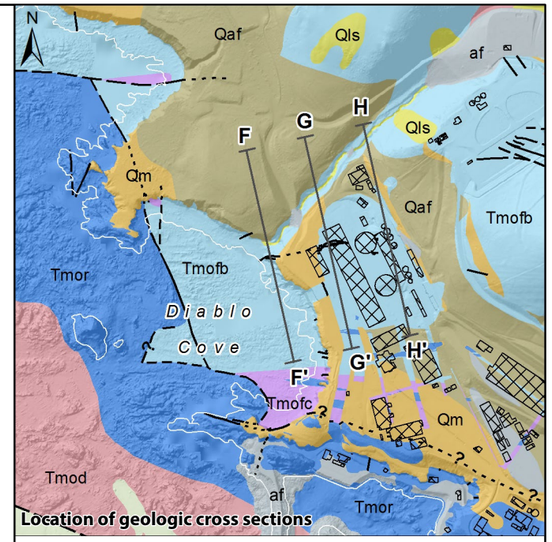
Pacific Gas and Electric Company

Figure **6-16**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-16.mxd; Date: 07/31/2014; User: Alex Remar, LCI; Rev.1

Approximate direction of north





EXPLANATION

- Fault: solid where well located, dashed where approximately located, dotted where concealed, queried where uncertain. Transparent shade represents fault plane and continuity along strike.
- Lithologic contact
- Form line
- Apparent dip

Geologic Units

af	Artificial fill
Qls	Landslide deposits
Qaf	Alluvial fan deposits
Qm	Marine terrace deposits
Tmod	Obispo Formation, intrusive diabase
Tmofb	Obispo Formation, tuffaceous siltstone and sandstone
Tmofc	Obispo Formation, tuffaceous siltstone and shale
Tmor	Obispo Formation, resistant tuff

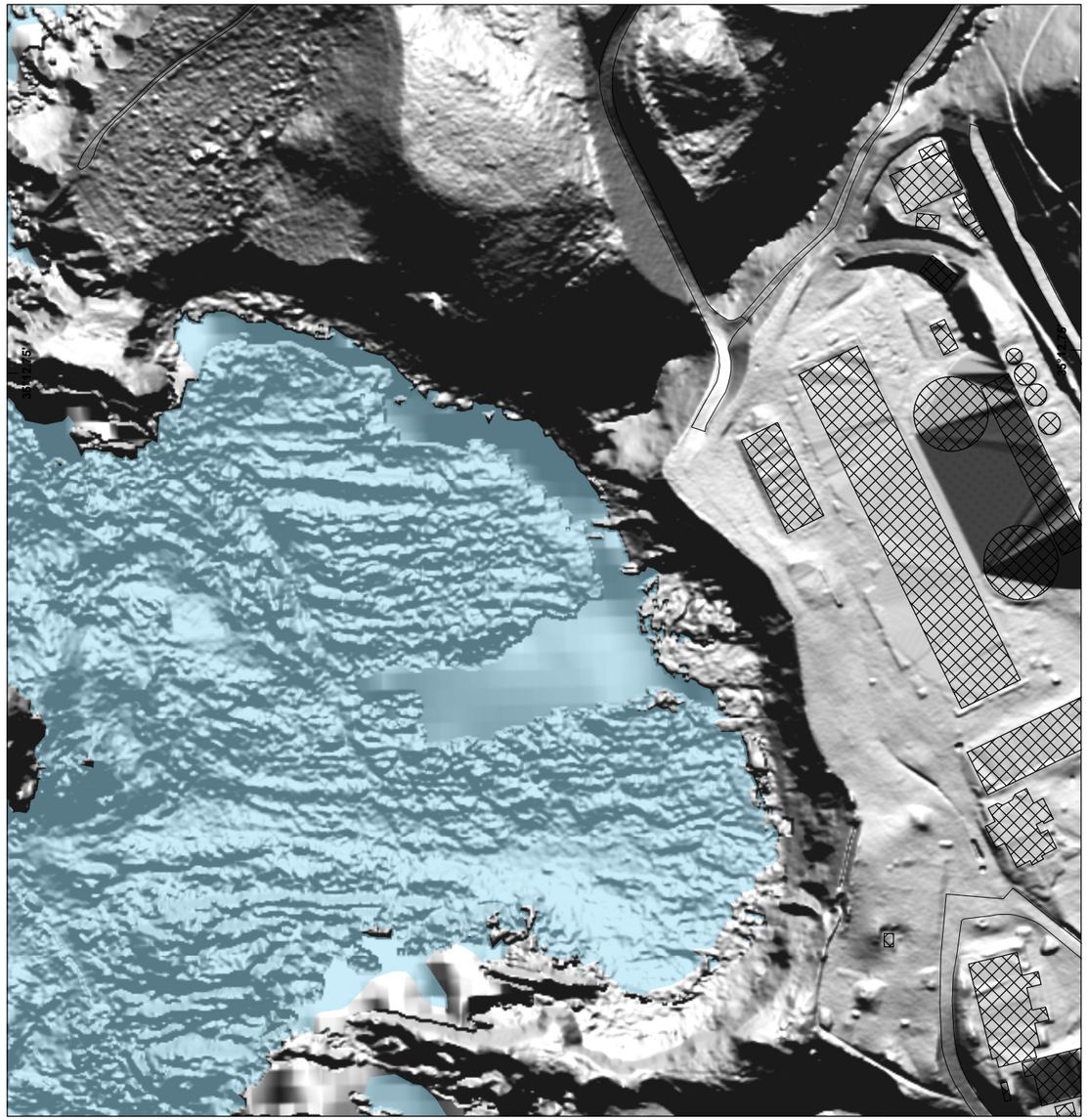
Shallow Geologic Cross Sections F-F', G-G', and H-H'

RESPONSE TO DR. HAMILTON'S TESTIMONY

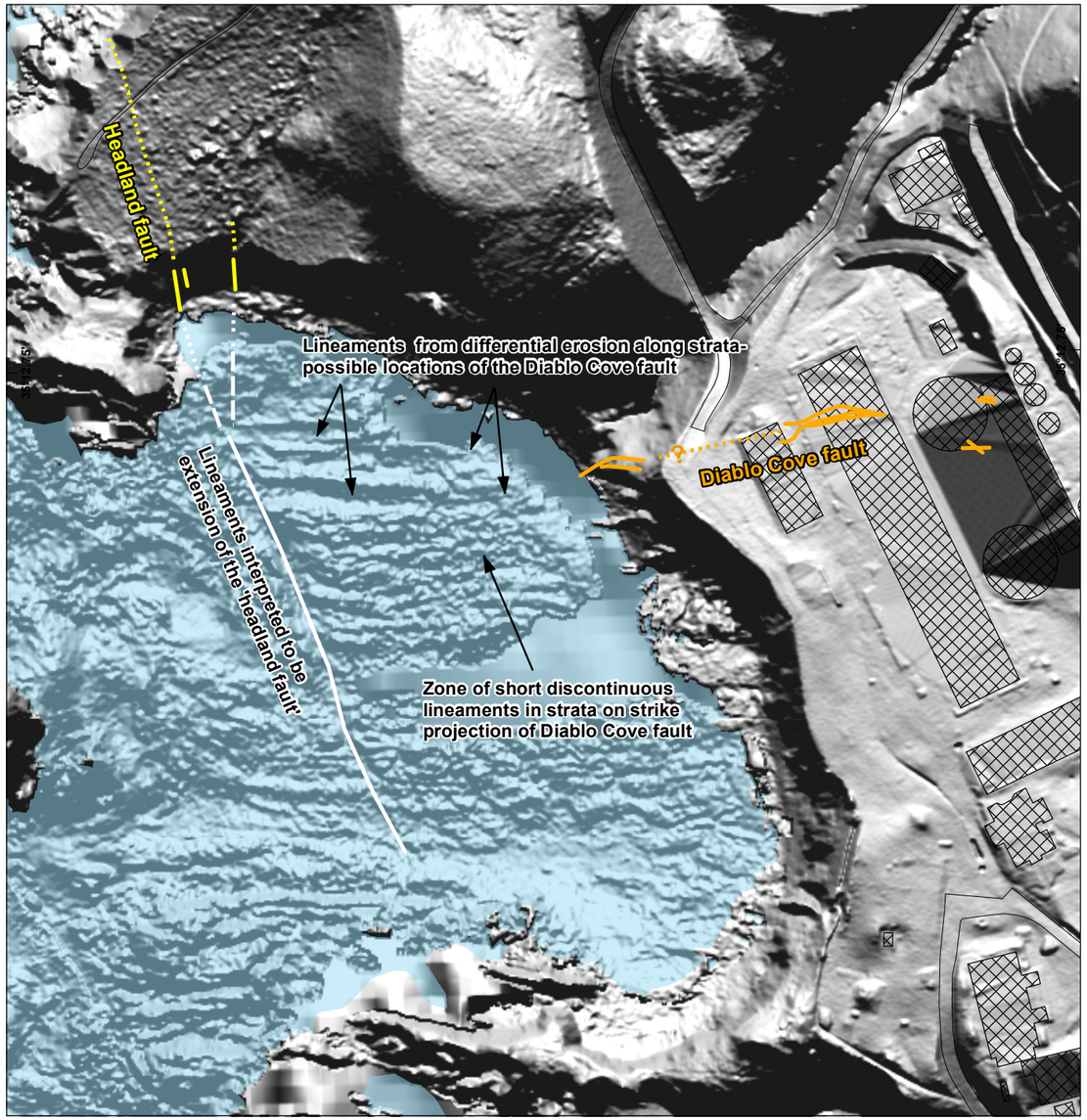
Pacific Gas and Electric Company | Figure **6-17**

File Path: S:\1005\051\Figures\Response_Figures\Figure_6-17.ai; Date: 07/30/2014; User: Alex Remar

(a) Uninterpreted



(b) PG&E Interpretation



Base map: Composite DEM, version 7 (DCPP Geodatabase, 2013). Artificial sunlight azimuth and inclination: 000° / 45°. Vertical exaggeration: 10X

N W E S

0 400 800 ft.

0 100 200 m

Map projection and scale: NAD 83 / UTM Zone 10N, 1:3,500

MBES-LiDAR Hillshade Image of Diablo Cove: (a) Uninterpreted and (b) Showing the Diablo Cove and Headland Faults

RESPONSE TO DR. HAMILTON'S TESTIMONY

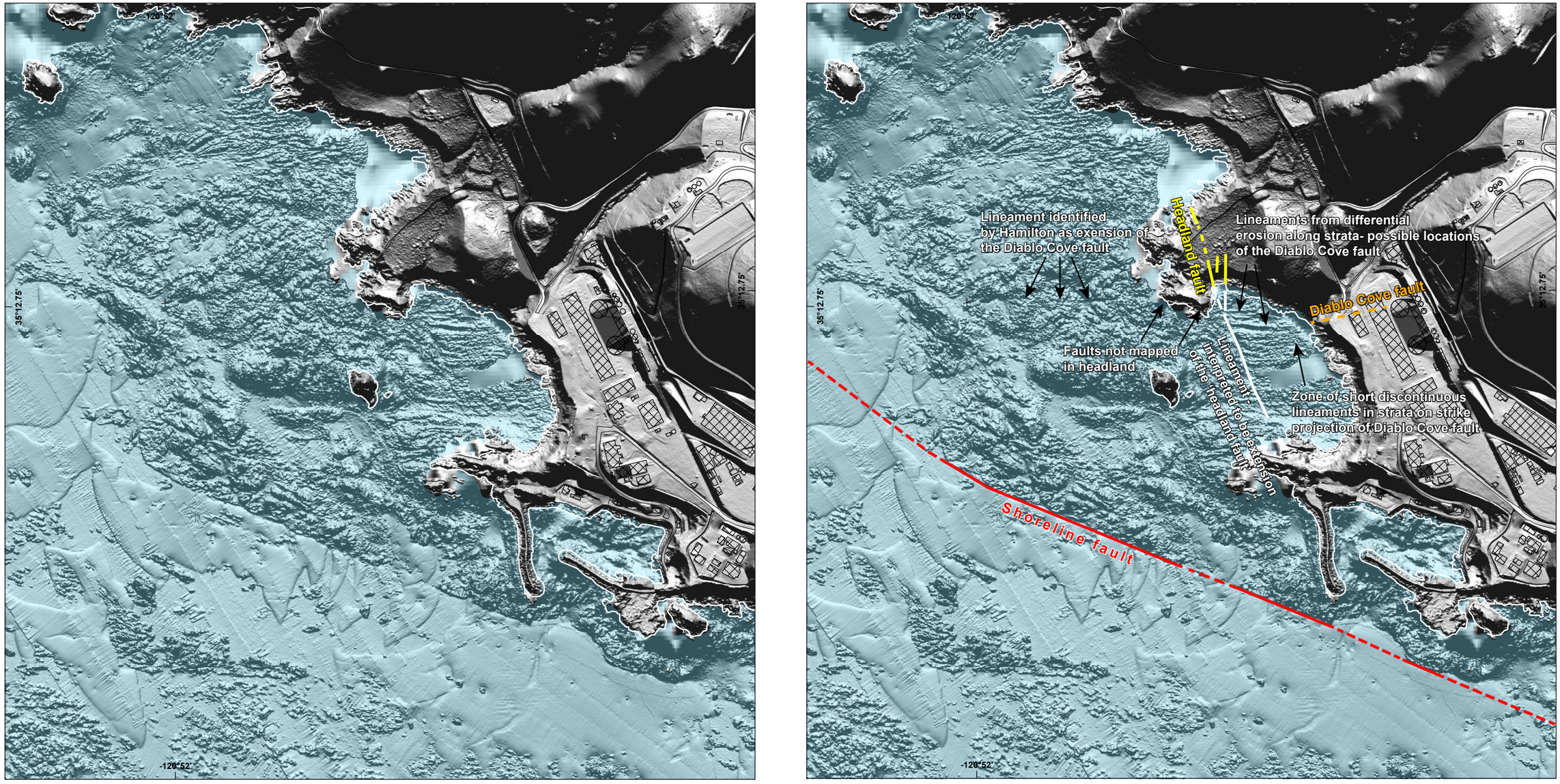
Pacific Gas and Electric Company

Figure **6-18**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-18.mxd; Date: 07/30/2014; User: Alex Remar, LCI

(a) Uninterpreted

(b) PG&E interpretation



Base map: Composite DEM, version 7 (DCPP Geodatabase, 2013). Artificial sunlight azimuth and inclination: (000° / 45°). Vertical exaggeration: 10X

N W E S

0 1,000 2,000 ft.

0 400 800 m

Map projection and scale: NAD 83 / UTM Zone 10N, 1:10,000

MBES-LiDAR Hillshade Image of the DCPP and Offshore Area: (a) Uninterpreted and (b) Showing the Diablo Cove, Headland, and Shoreline Faults

RESPONSE TO DR. HAMILTON'S TESTIMONY

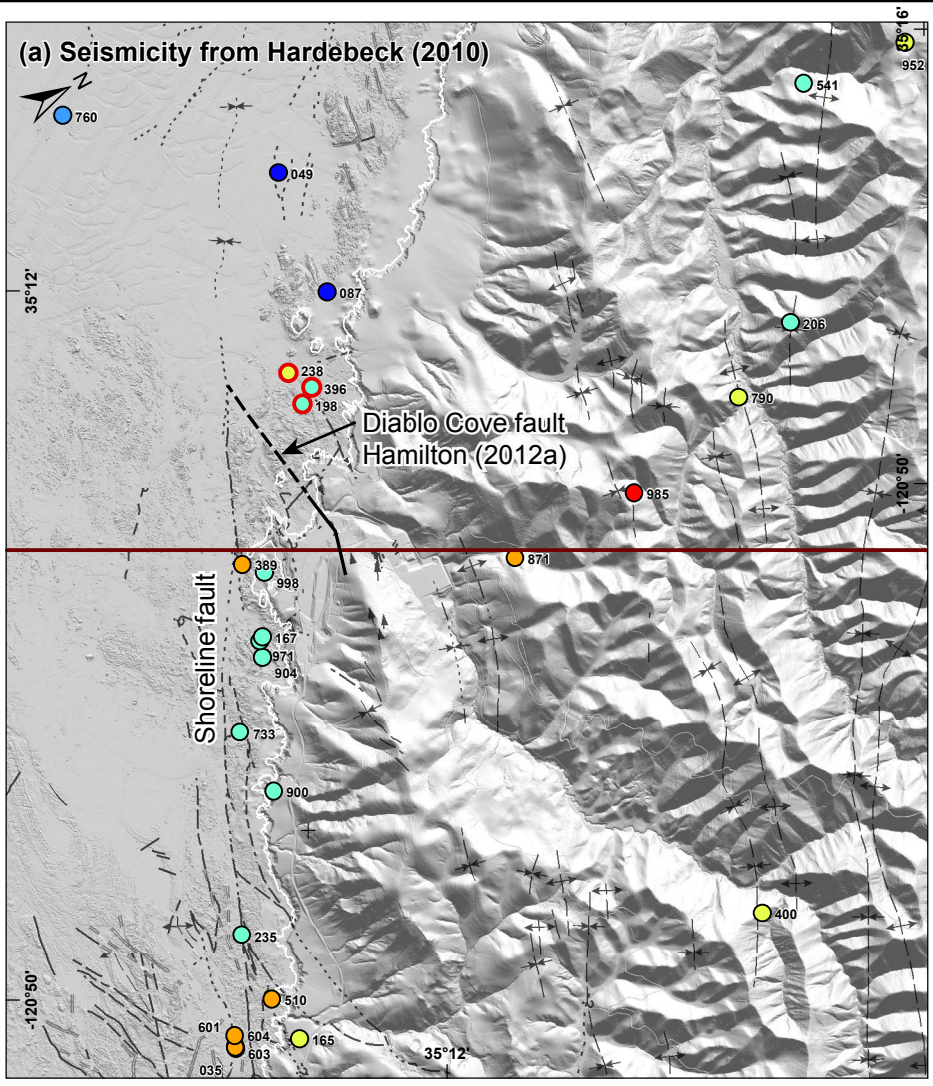
Pacific Gas and Electric Company

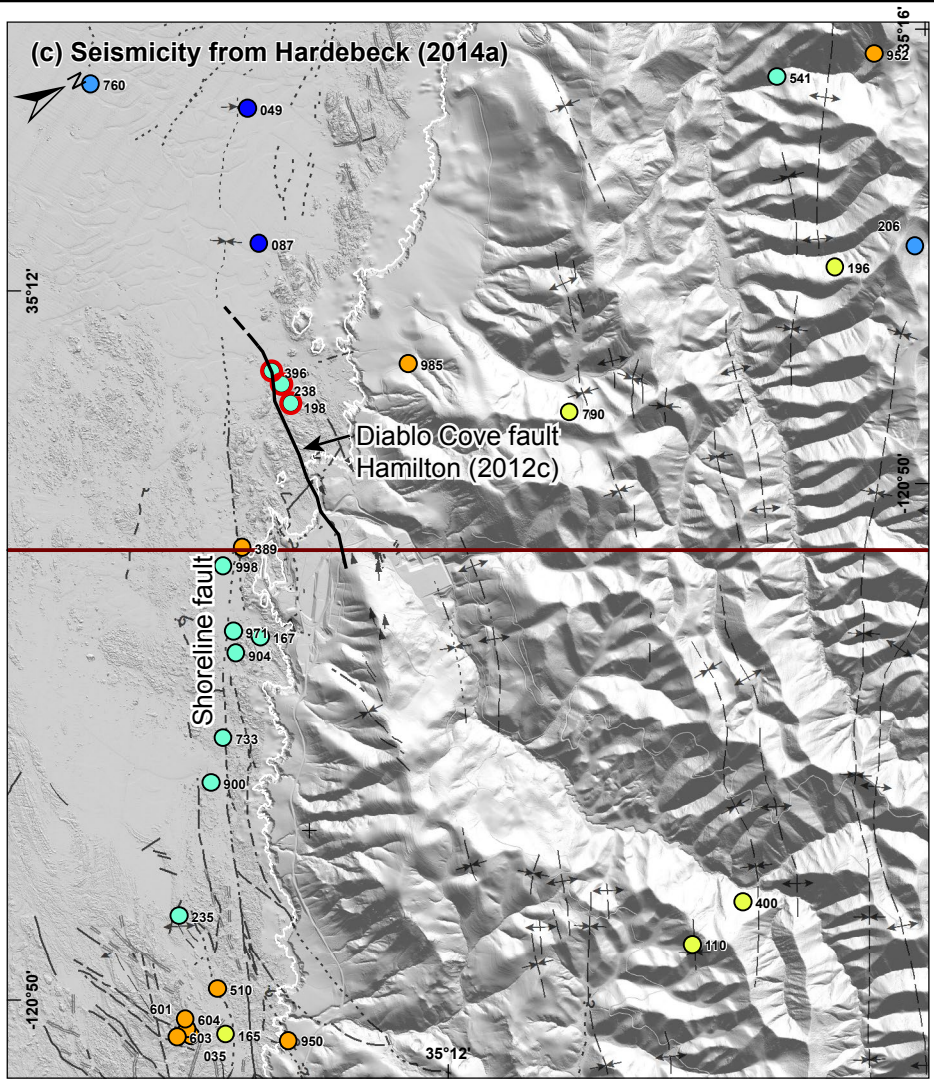
Figure **6-19**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-19.ai; Date: 07/30/2014; User: Alex Remar, LCI

(a) Seismicity from Hardebeck (2010)

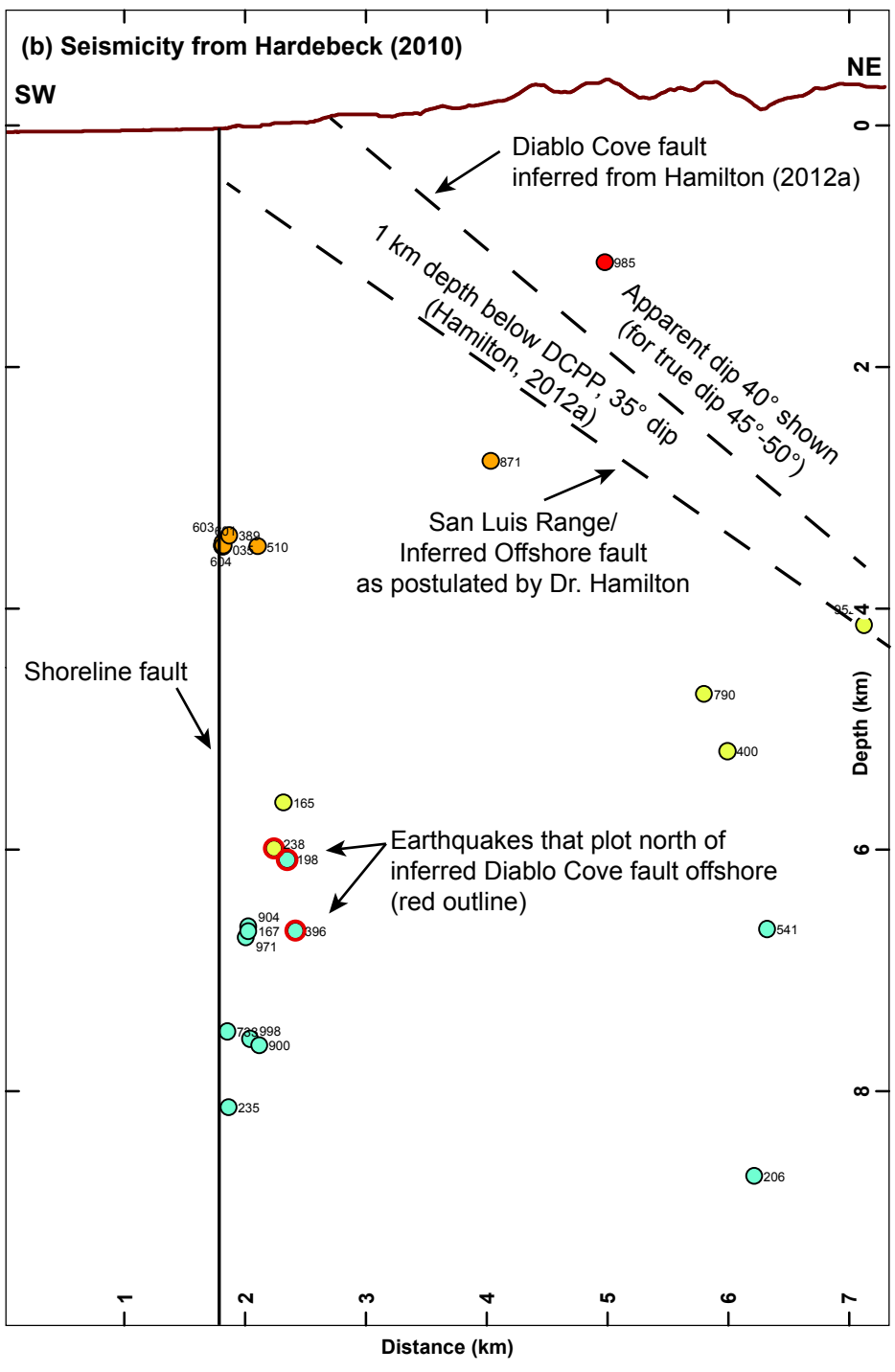
(c) Seismicity from Hardebeck (2014a)

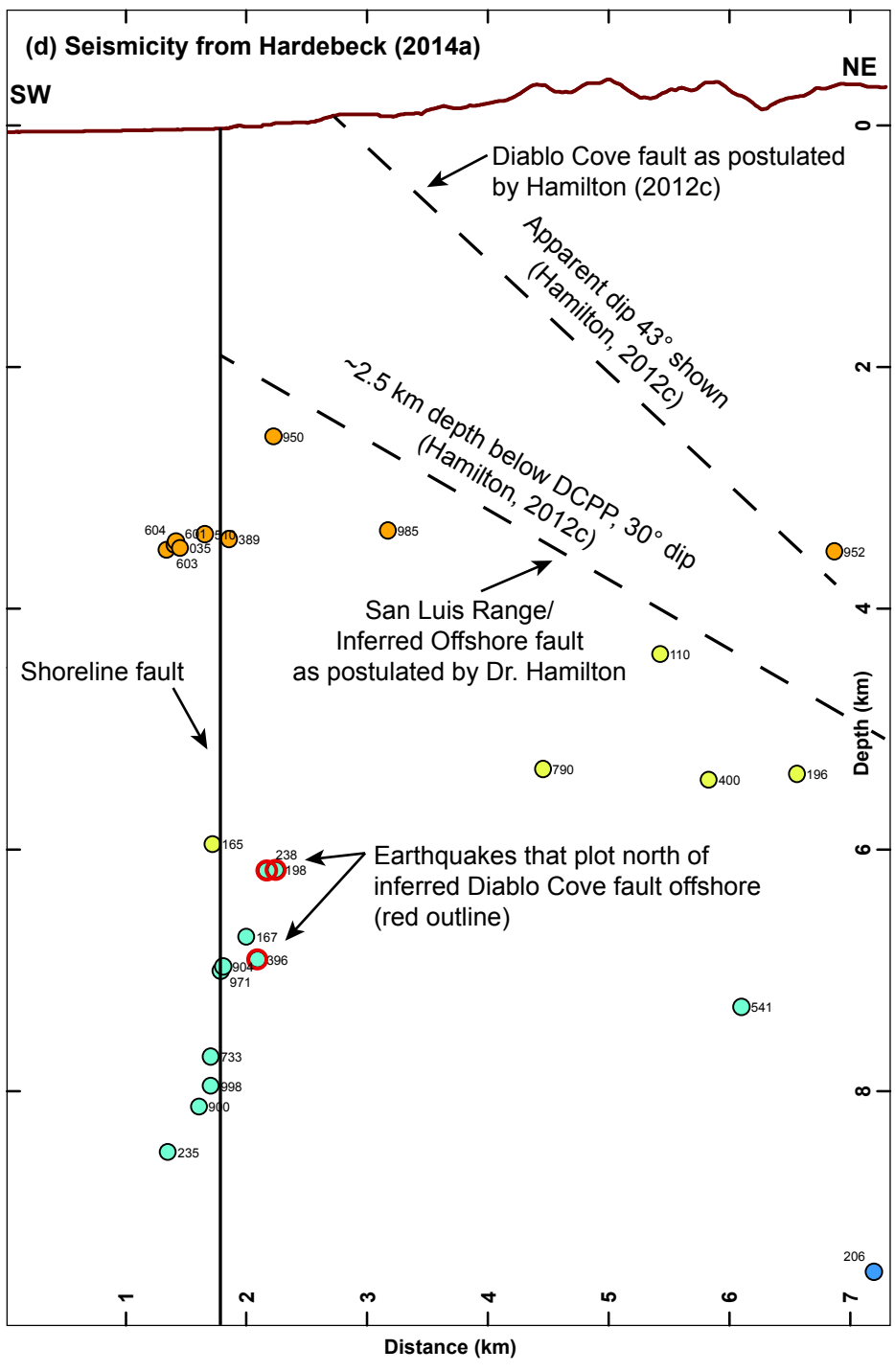




(b) Seismicity from Hardebeck (2010)

(d) Seismicity from Hardebeck (2014a)





EXPLANATION

Seismicity

< 2	###	###
2 - 4	###	
4 - 6	###	
6 -9	###	
9 - 12	###	
> 12	###	

Earthquakes noted by Hamilton (2012a)

Number refers to last three digits of event ID per Hardebeck (2010, 2014a)

Depth in km

Fault: solid where well located, dashed where approximate

0 5,000 10,000 ft.

0 1,000 2,000 m

Map projection and scale: NAD 83 / UTM Zone 10N, 1:60,000

Seismicity Cross Sections Drawn Perpendicular to the Shoreline Fault

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company

Figure **6-20**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-20.ai; Date: 07/30/2014; User: Serkan Bozkurt, LCI; Rev.1

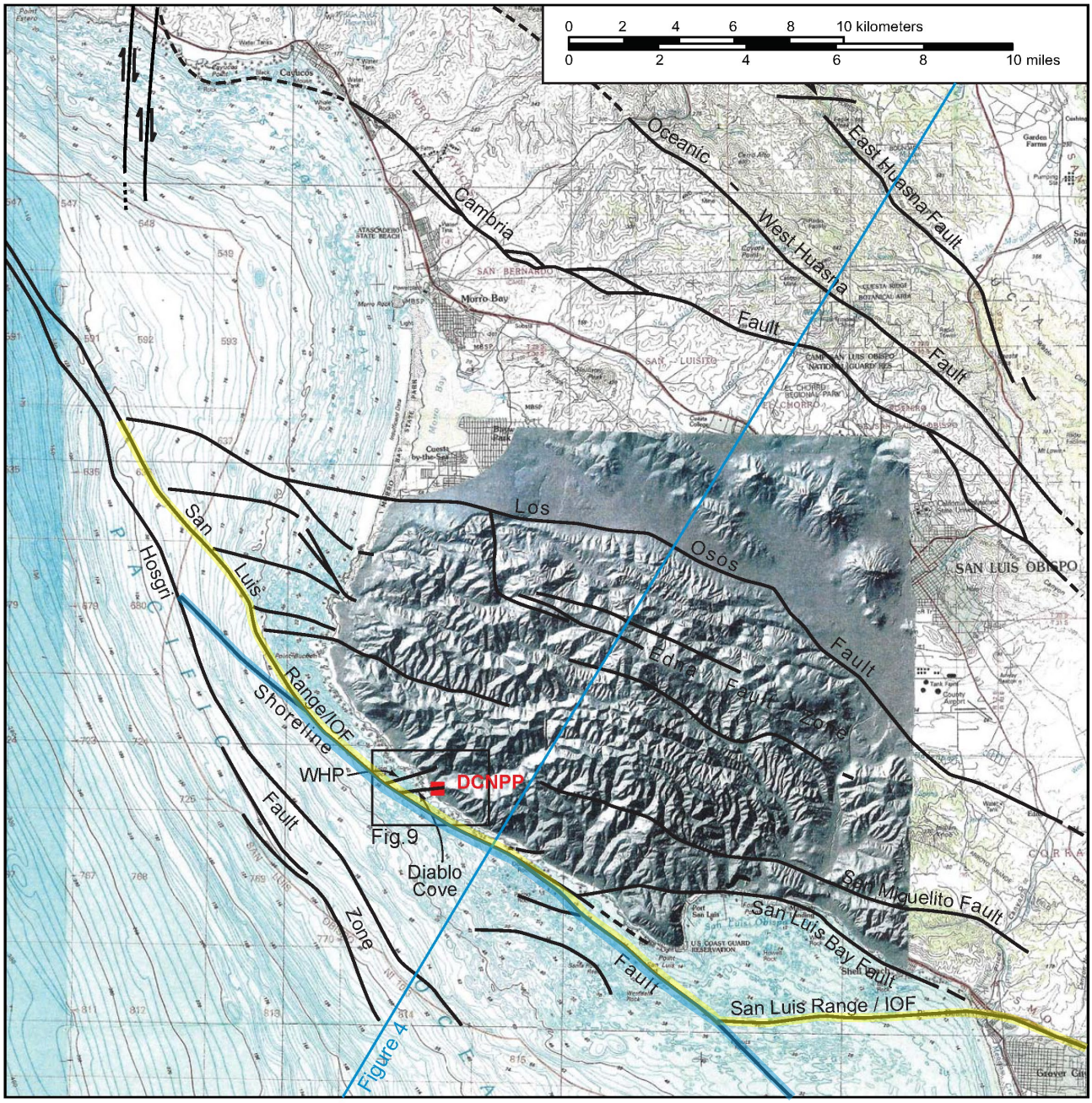


Figure 3. Terrain and faults in the Estero Bay - Irish Hills (Diablo Canyon) - San Luis Obispo region.

Notes: Yellow highlight on San Luis Range / IOF thrust herein referred to as the San Luis Range fault (SLRF) and blue highlight on Shoreline fault added by PG&E to original figure. SLRF thrust interpreted to impinge on the Shoreline fault where the yellow and blue highlights are adjacent.

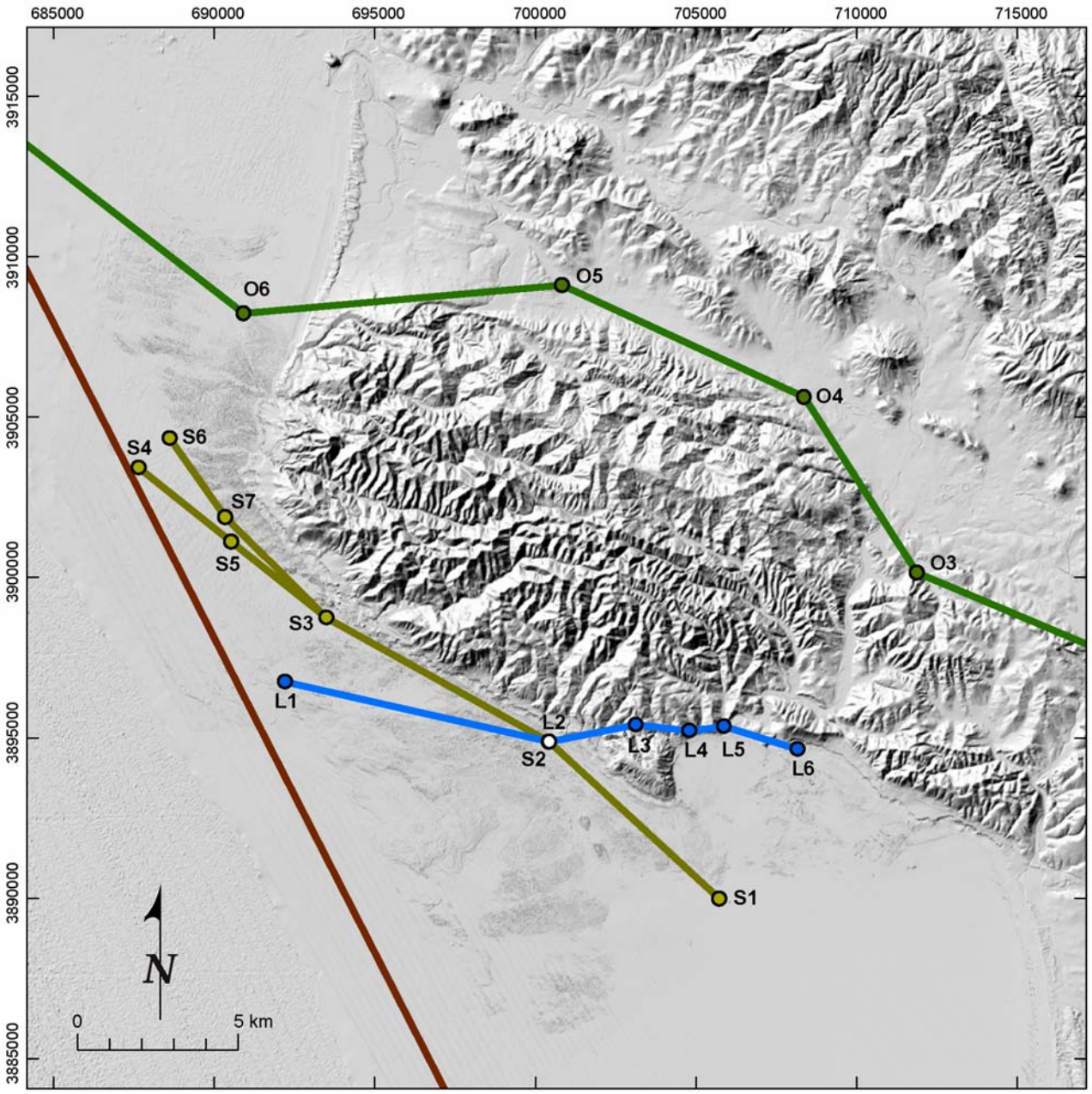
Source: Figure 3 of Hamilton (2012a).

Faults in the Irish Hills and Adjacent Area from Hamilton (2012a), with San Luis Range/IOF Thrust and Shoreline Fault Highlighted

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-21**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-21.ai; Date: 07/30/2014; User: Alex Remar, LCI; Rev.1



Note: Coordinates of fault sources are in Table 5-1

Legend

Seismic Sources

S1 S2 Shoreline

L1 L2 San Luis Bay

O1 O2 Los Osos

Hosgri

Source: Figure 5-1 of PG&E (2011).

Map of Seismic Sources from PG&E (2011)

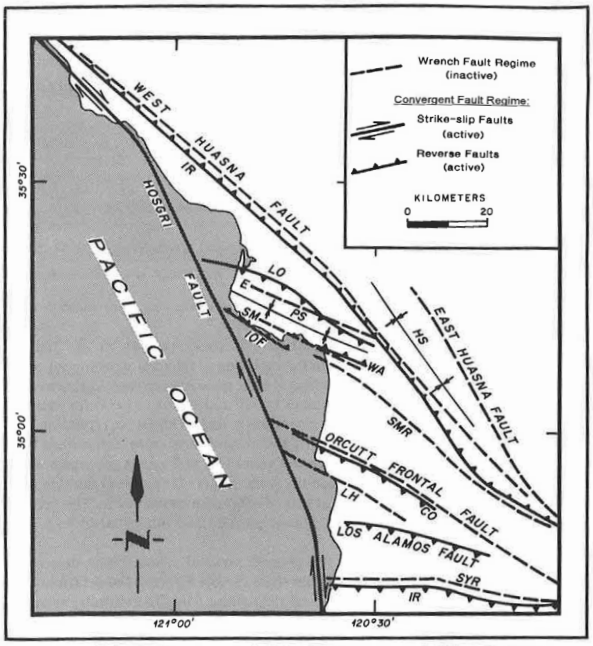
RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company

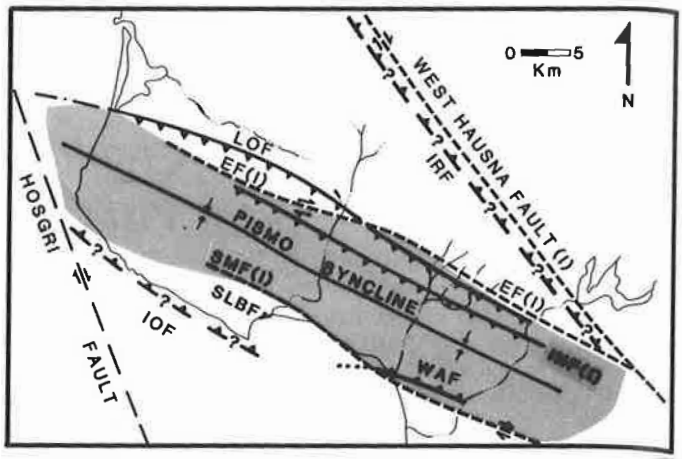
Figure **6-22**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-22.ai; Date: 07/30/2014; User: Alex Remar, LCI; Rev.1

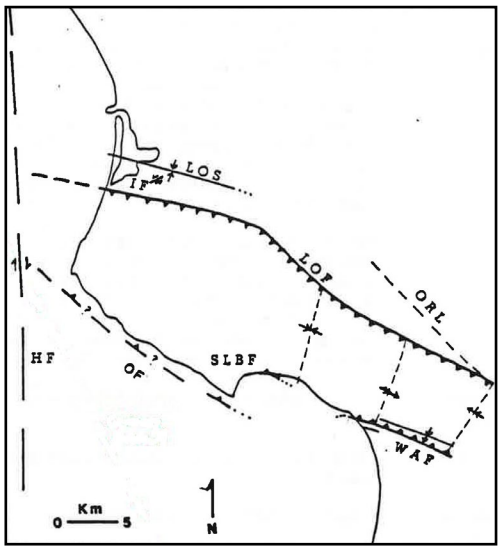
(a) Figure 1 from Vittori et al. (1994)



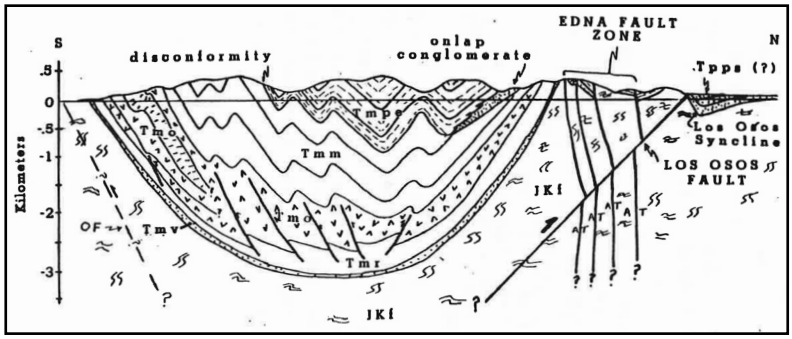
(b) Figure 2 from Nitchman and Slemmons (1994)



(c) Figure 10 from Nitchman (1988)



(d) Figure 31 from Nitchman (1988)



Previous Interpretations of the Inferred Offshore Fault (IOF)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-23**

(a) From PG&E (1988)

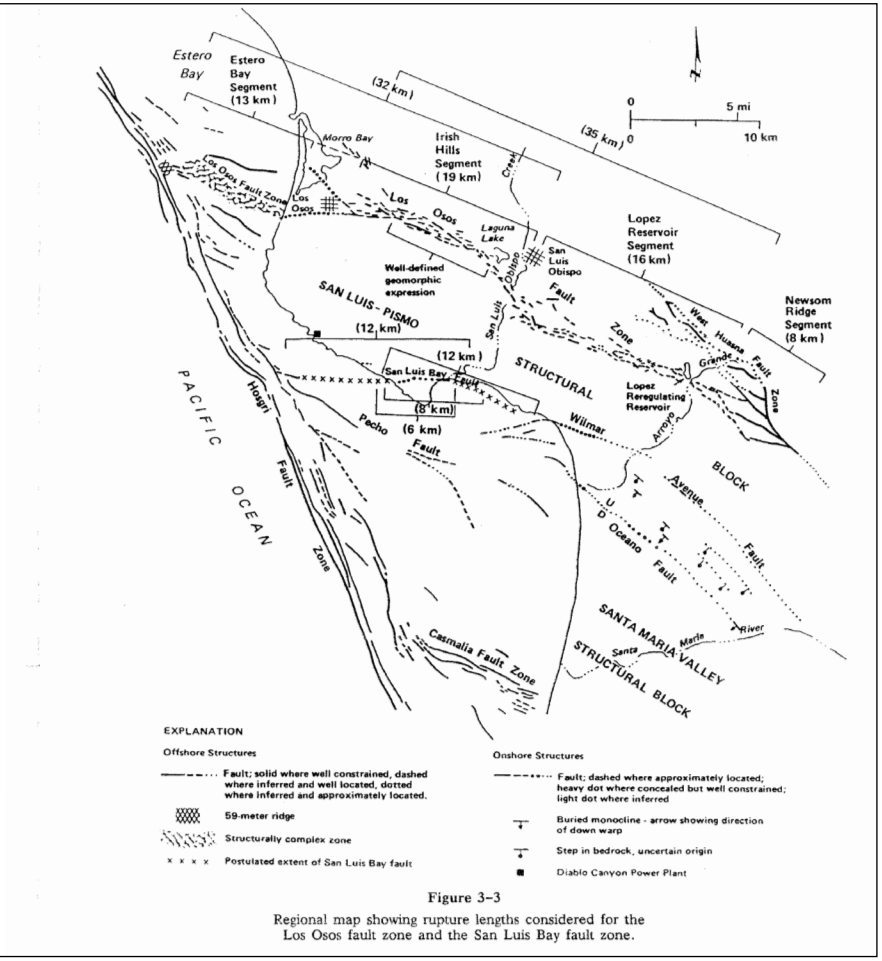
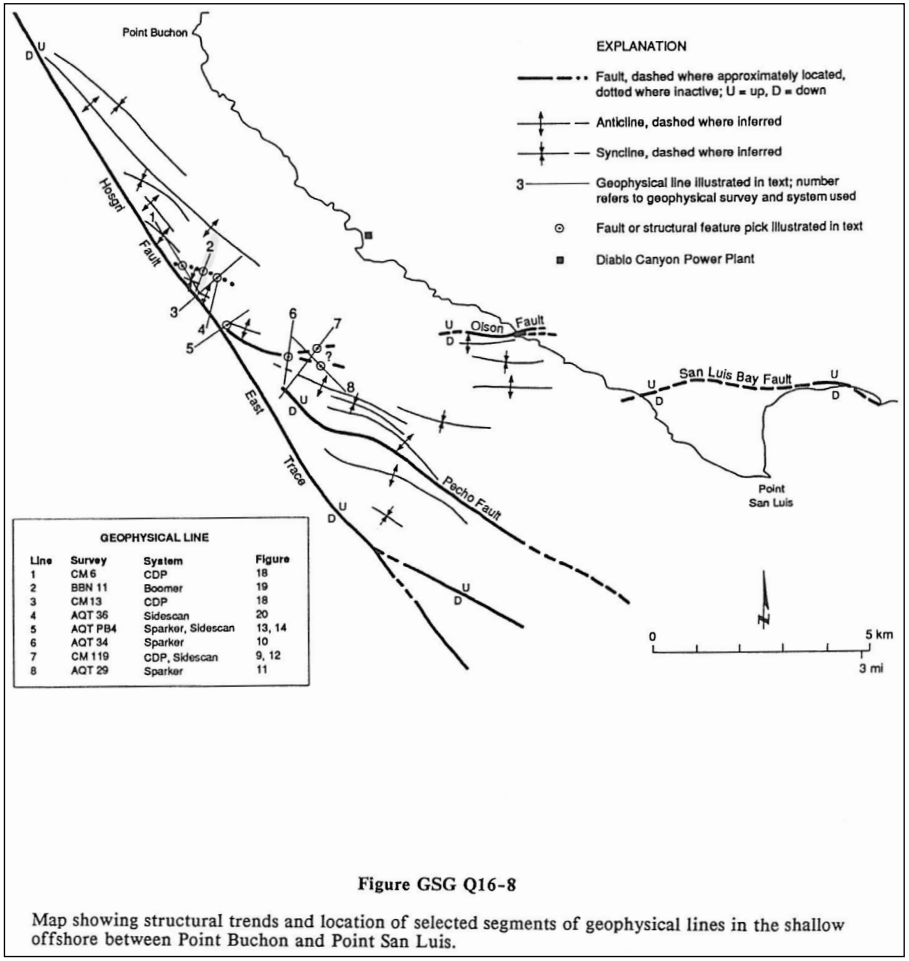


Figure 3–3

Regional map showing rupture lengths considered for the Los Osos fault zone and the San Luis Bay fault zone.

(b) From PG&E (1990)



GEOPHYSICAL LINE

Line	Survey	System	Figure
1	CM 6	CDP	18
2	BBN 11	Boomer	19
3	CM 13	CDP	18
4	AQT 36	Sidescan	20
5	AQT PB4	Sparker, Sidescan	13, 14
6	AQT 34	Sparker	10
7	CM 119	CDP, Sidescan	9, 12
8	AQT 29	Sparker	11

Figure GSG Q16-8

Map showing structural trends and location of selected segments of geophysical lines in the shallow offshore between Point Buchon and Point San Luis.

Onshore Faults Comprising the San Luis Bay Fault Zone and Offshore Faults and Folds East of the Hosgri Fault Zone

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-24**

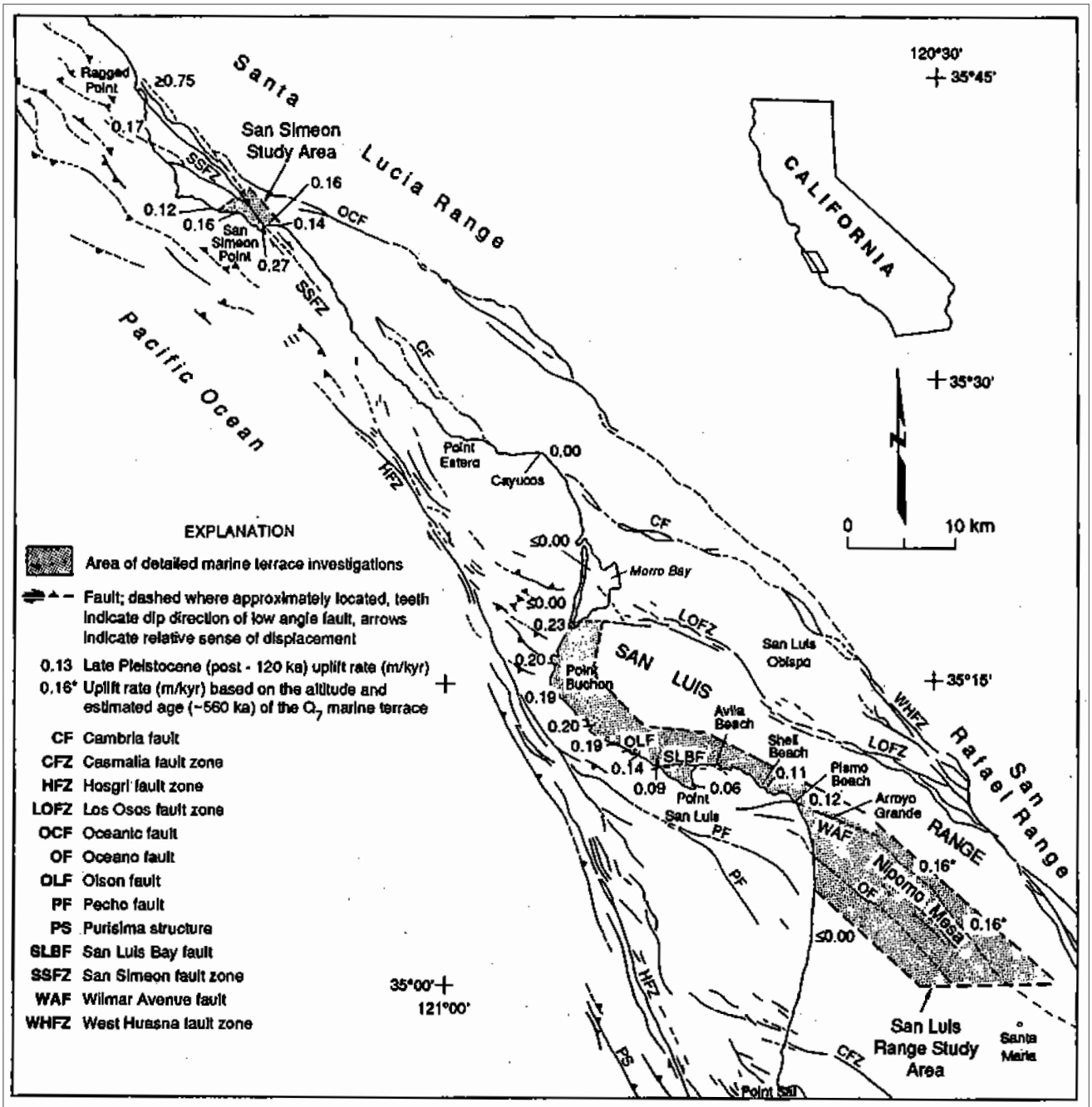


Figure 3. Map showing locations of detailed marine terrace investigations and Pleistocene uplift rates along the south-central coast of California.

Source: Figure 3 of Hanson et al. (1994).

Map of Coastal Uplift Rates as Determined During the LTSP from Hanson et al. (1994)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-25**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-25.ai; Date: 07/30/2014; User: Alex Remar, LCI; Rev.1

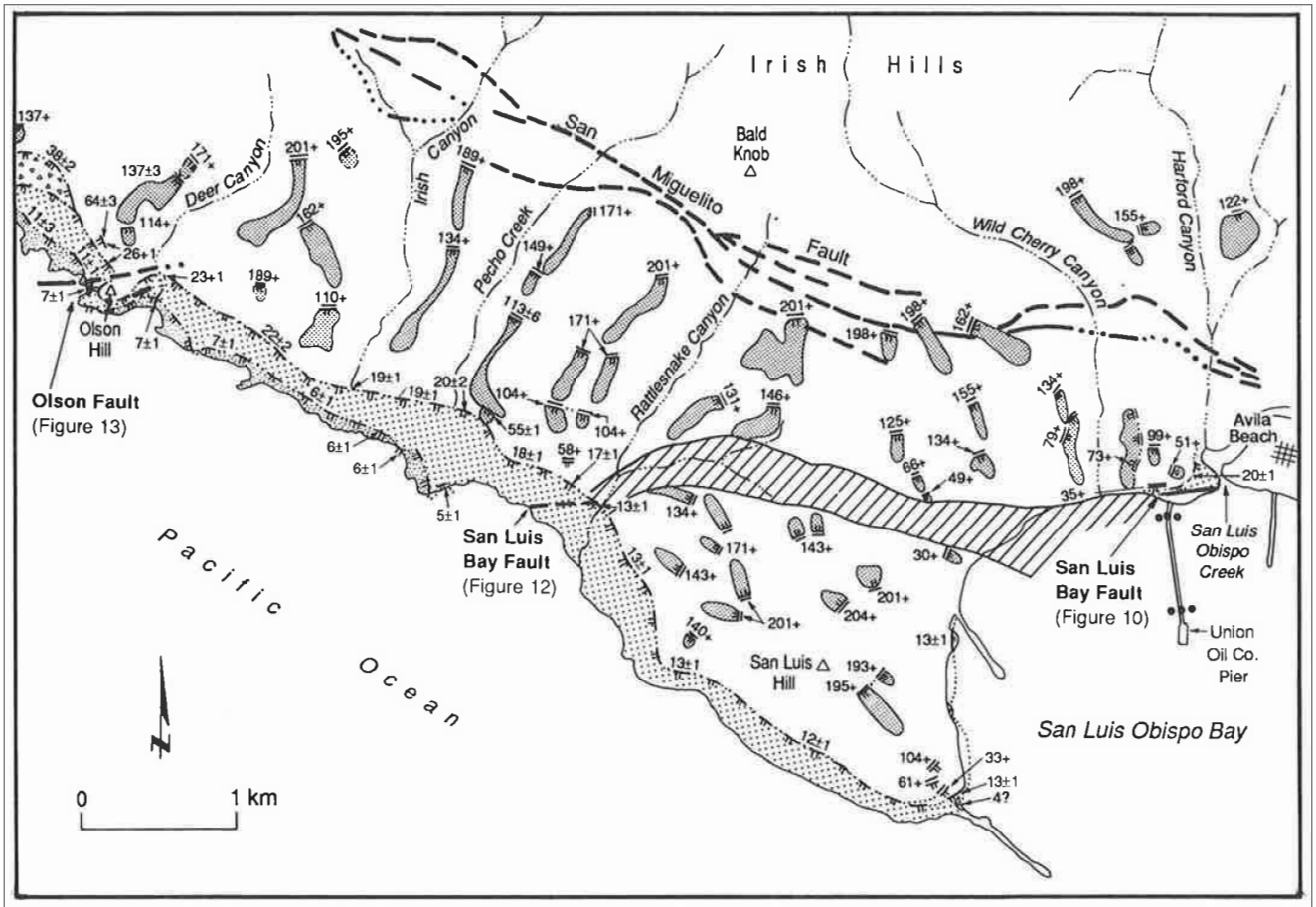


Figure 9. Quaternary geologic map of Point San Luis area showing distribution of marine terrace wave-cut platforms in the vicinity of the San Luis Bay and Olson faults. The two faults vertically displace the Q1 and Q2 marine terraces (Fig. 5).

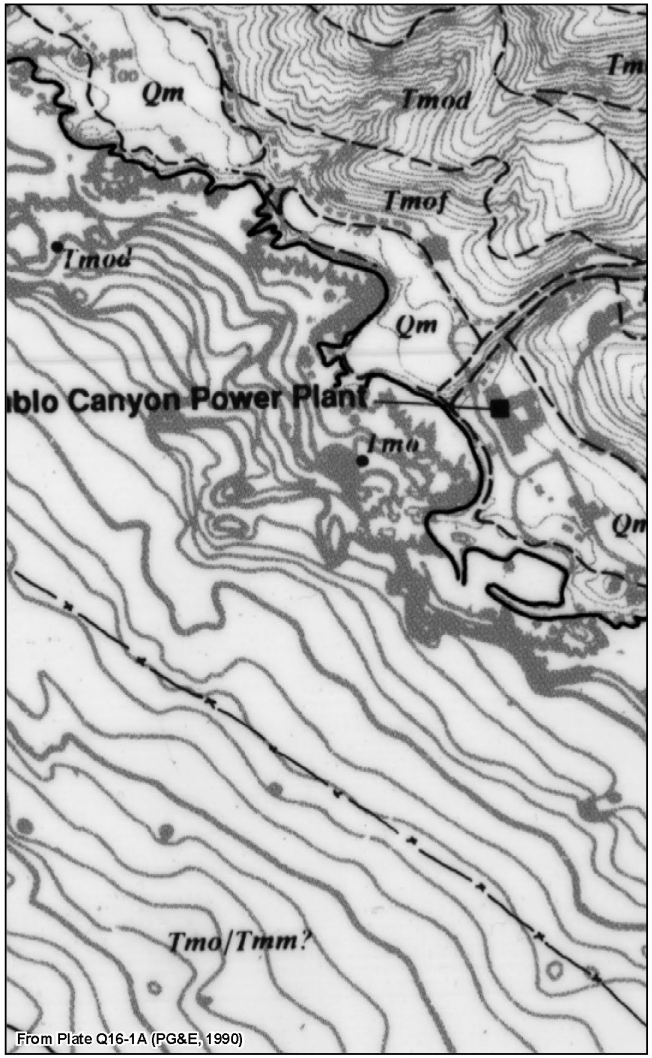
Source: Figure 9 of Lettis et al. (1994).

Map of the San Luis Bay Fault Zone from Lettis et al. (1994)

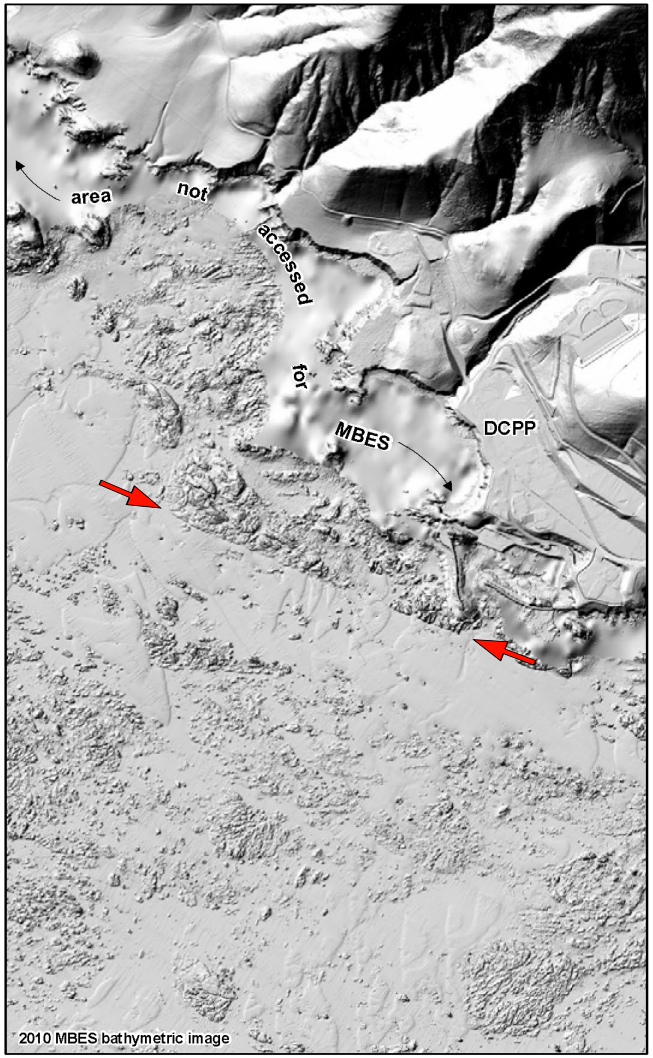
RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-26**

(a) From Plate Q16-1A (PG&E, 1990)



(b) 2010 MBES bathymetric image



EXPLANATION

—x— Inshore limit of marine geophysical data coverage.

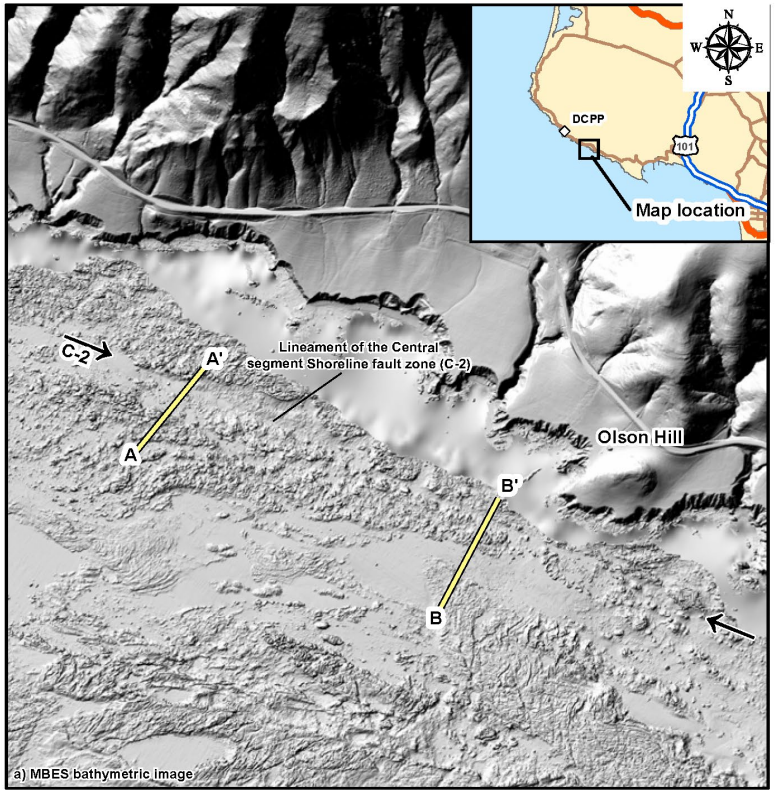
Location of Shoreline fault mapped by PG&E (added to the original figure).

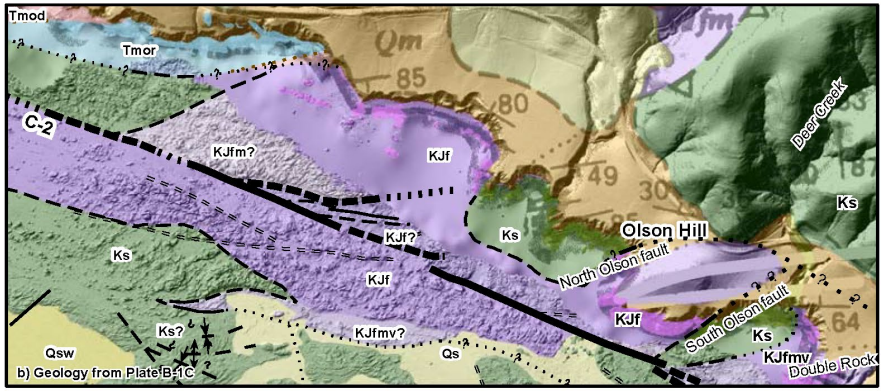
Source: PG&E (2011).

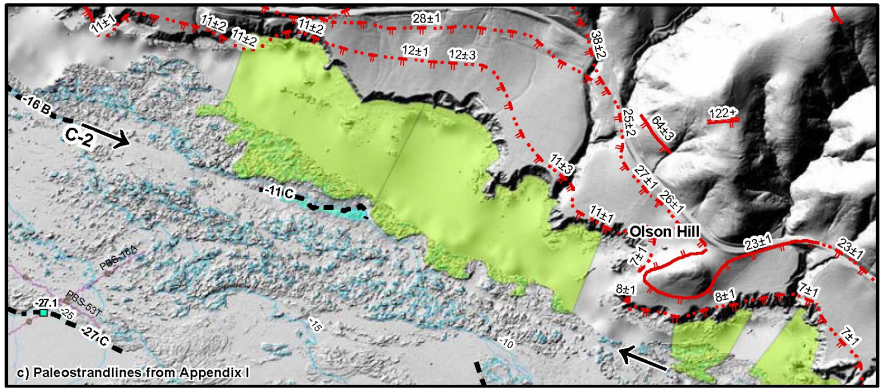
Map of Available Bathymetry (a) During the LTSP and (b) During the Shoreline Fault Investigation

RESPONSE TO DR. HAMILTON'S TESTIMONY

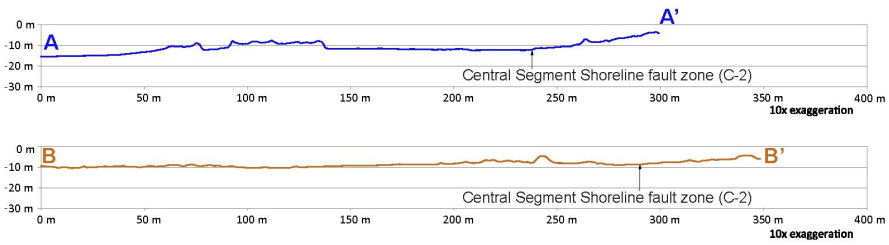
Pacific Gas and Electric Company | Figure **6-27**







Note: See legend on Plate 1 for geology and Appendix I Plate I-1A for paleostrandlines



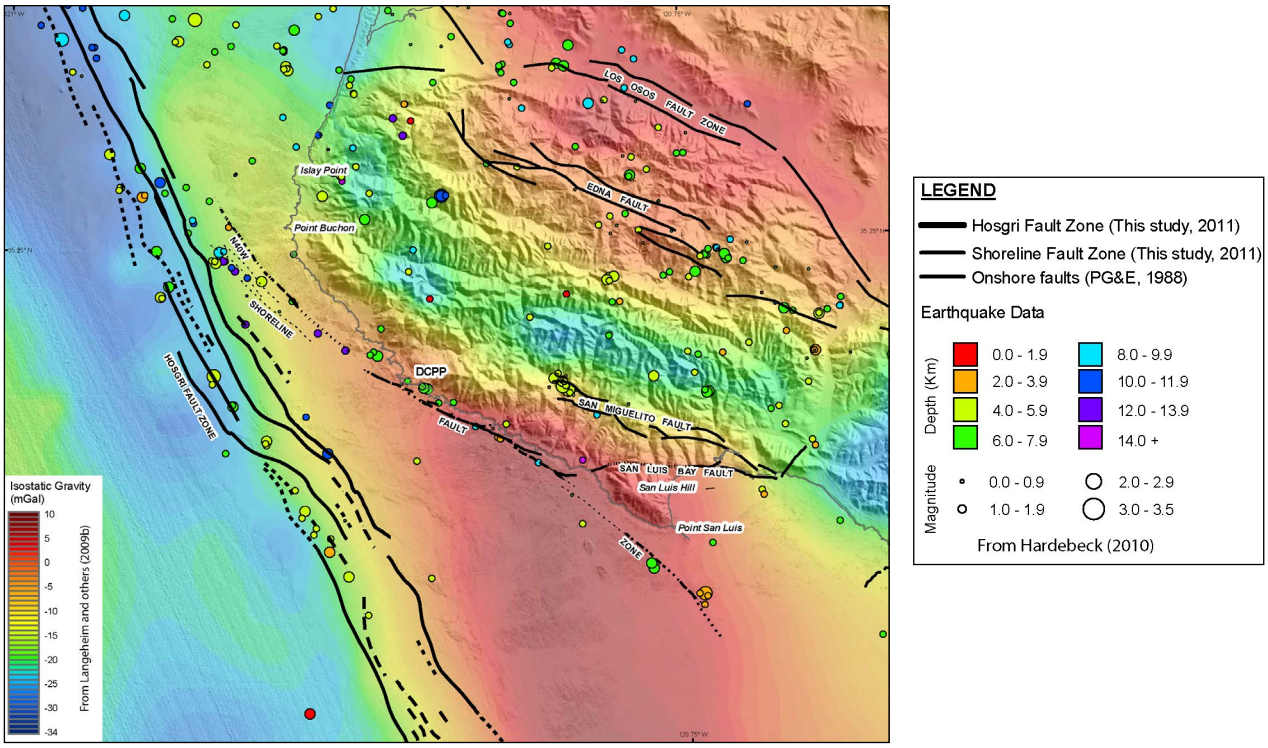
Source: Figure 4-13 of PG&E (2011).

Maps and Profiles of the Central Segment of the Shoreline Fault from PG&E (2011)

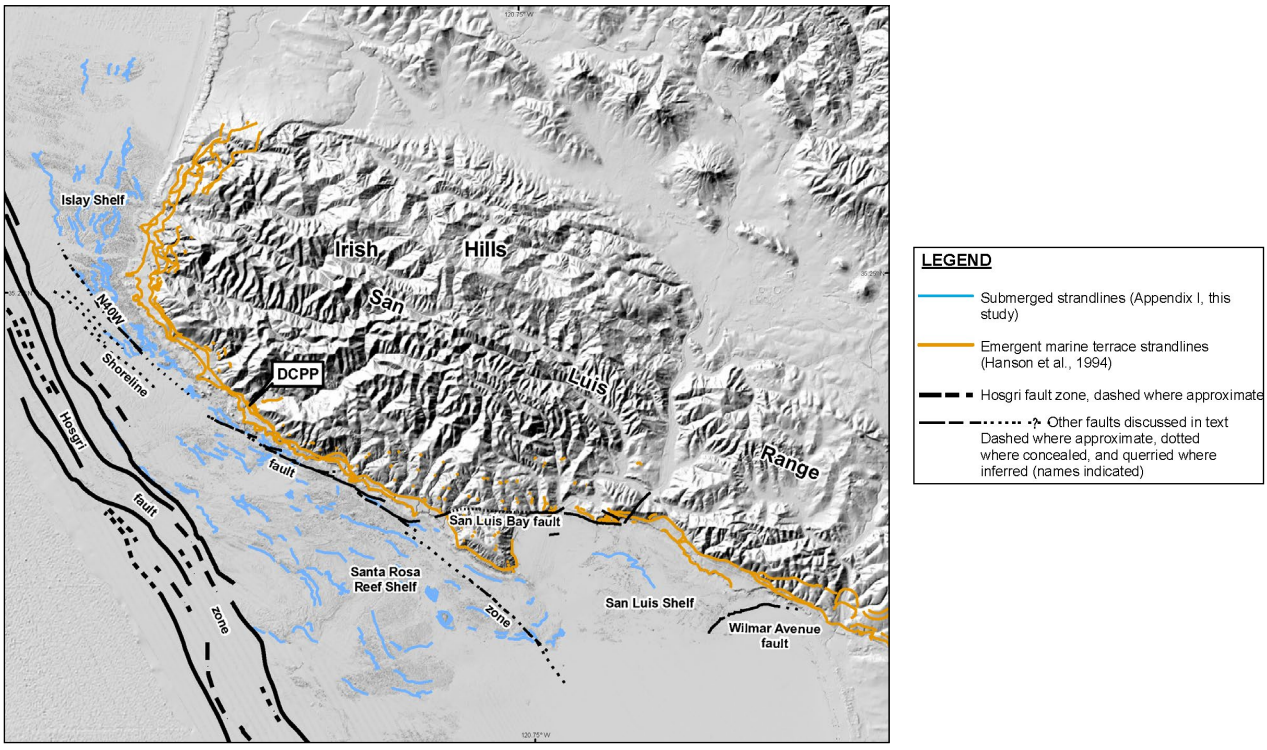
RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-28**

(a) Figure 4-16



(b) Figure 4-12



Source: Figures 4-16 and 4-12 of PG&E (2011).

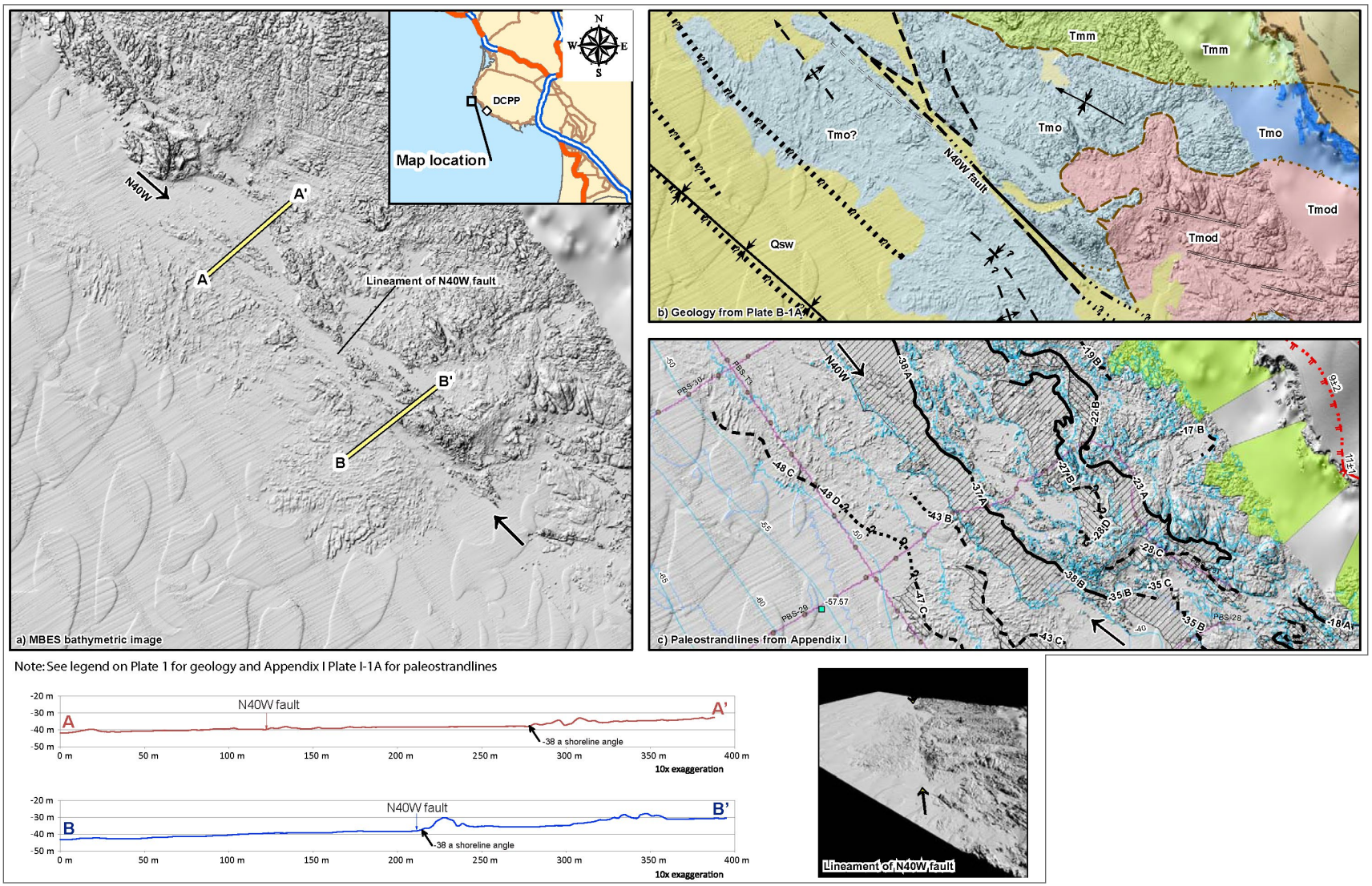
Maps Showing the Shoreline and N40W Faults with Bathymetric and other Geophysical and Geomorphic Data from PG&E (2011)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company

Figure **6-29**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-29.ai; Date: 07/30/2014; User: Alex Remar, LCI; Rev.1



Source: Figure 4-9 of PG&E (2011).

Maps and Profiles of the N40W Fault, Later Renamed the East Branch of the Point Buchon Fault, from PG&E (2011)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-30**

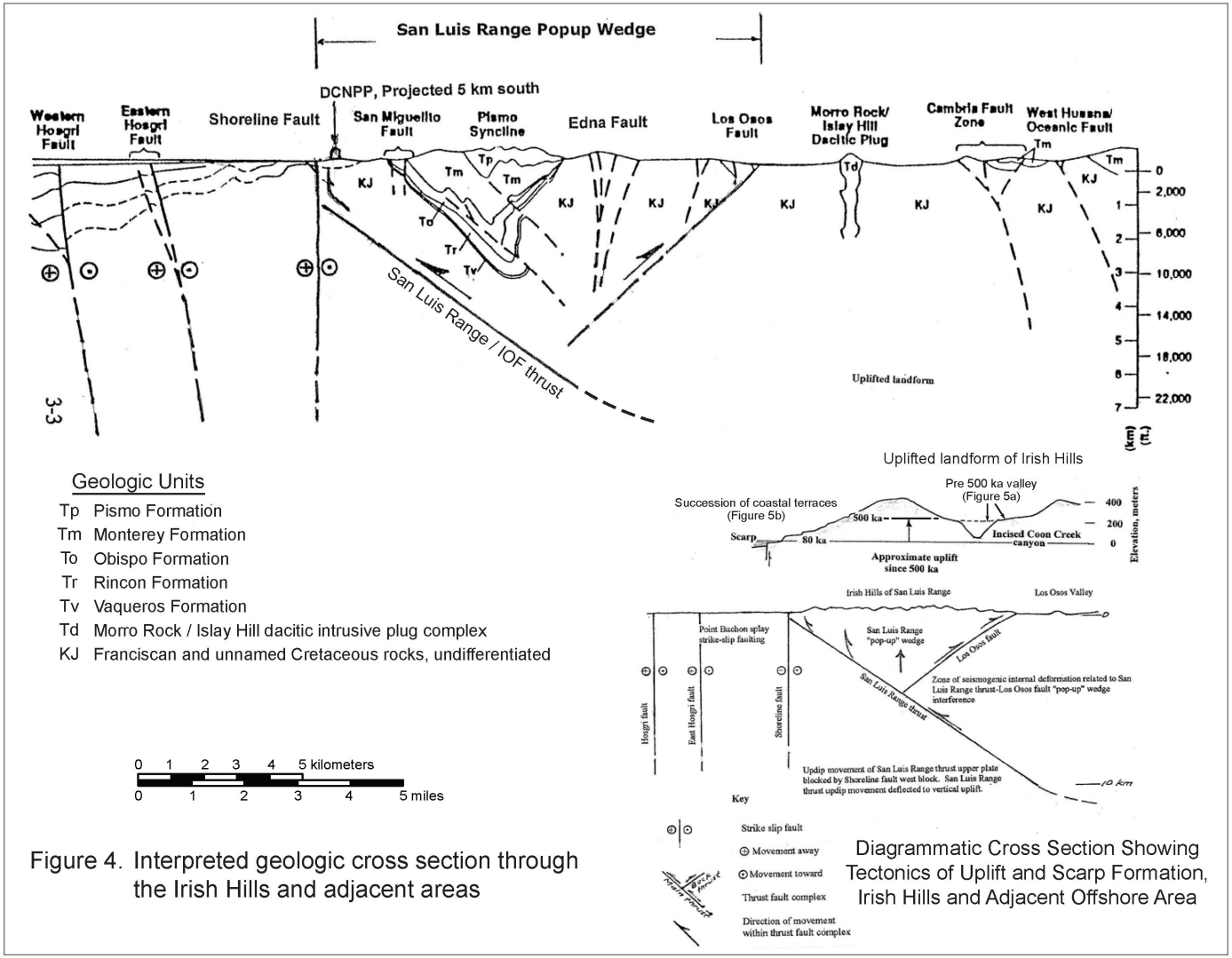


Figure 4. Interpreted geologic cross section through the Irish Hills and adjacent areas

Diagrammatic Cross Section Showing Tectonics of Uplift and Scarp Formation, Irish Hills and Adjacent Offshore Area

Source: Figure 4 of Hamilton (2012c).

Geologic Cross Sections Showing the Interpreted San Luis Range/IOF Thrust from Hamilton (2012c)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-31**

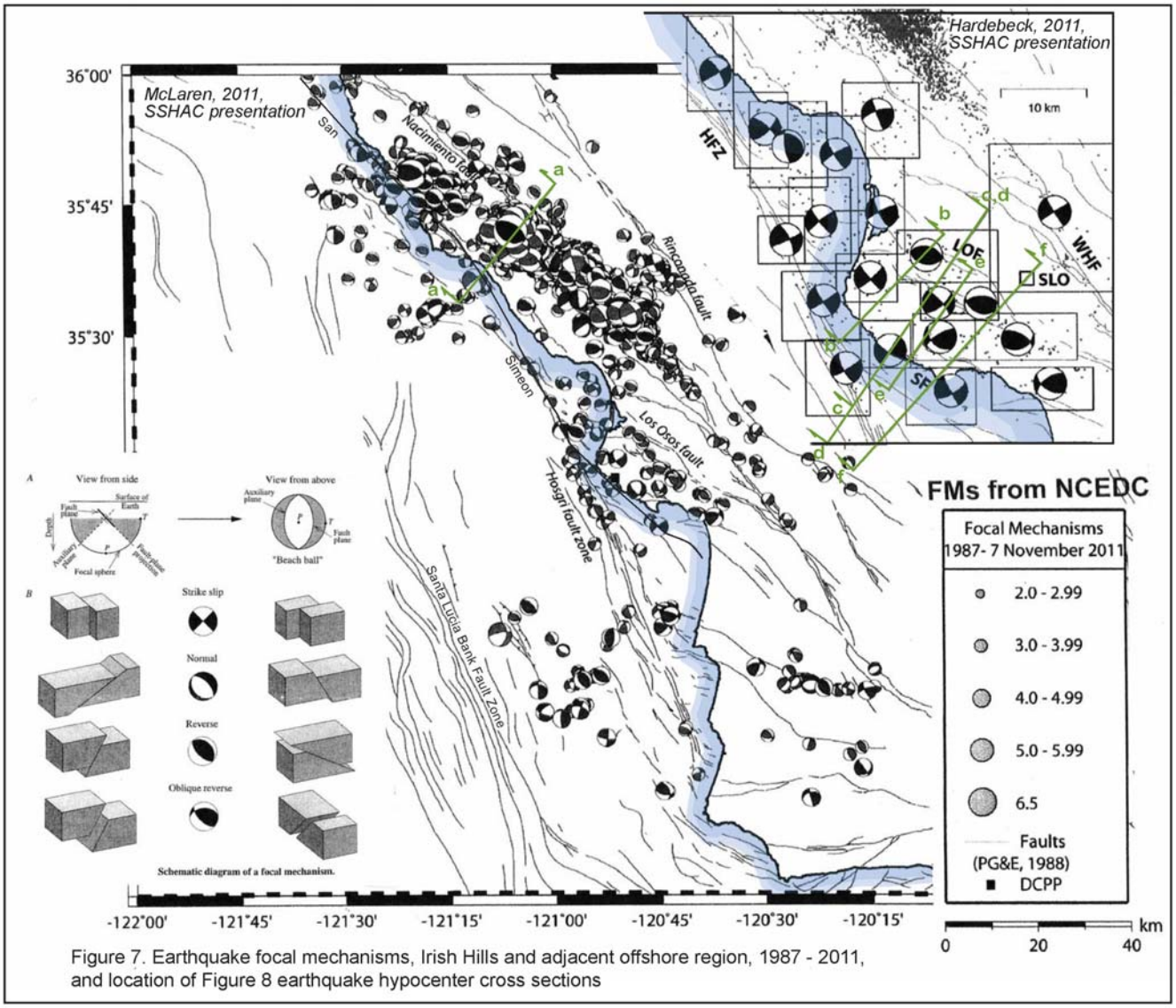


Figure 7. Earthquake focal mechanisms, Irish Hills and adjacent offshore region, 1987 - 2011, and location of Figure 8 earthquake hypocenter cross sections

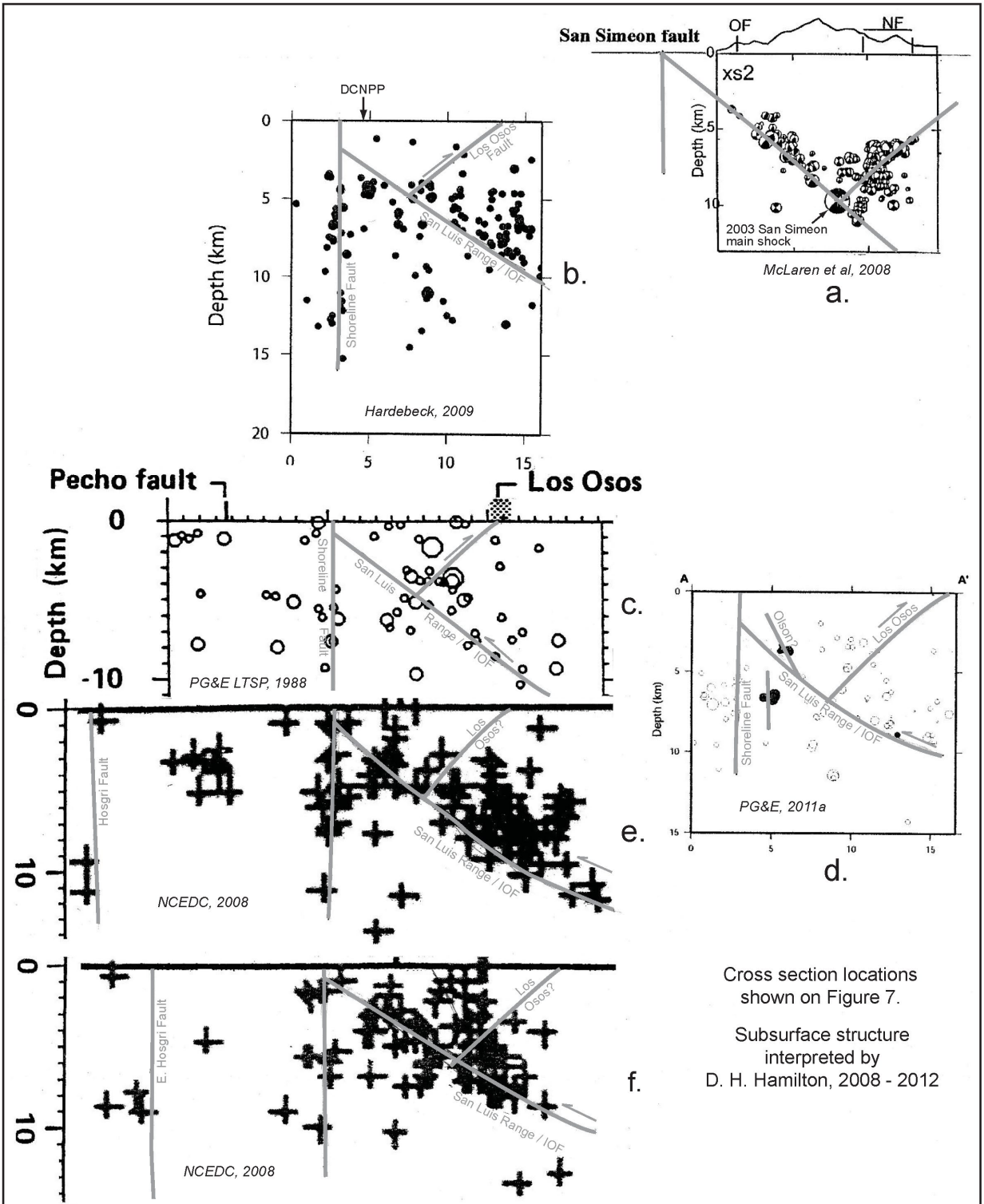
Source: Figure 7 of Hamilton (2012a).

Earthquake Focal Mechanisms, Epicenters, and Seismicity Profile Locations from Hamilton (2012a)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-32**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-32.ai; Date: 07/30/2014; User: Alex Remar, LCI; Rev.1



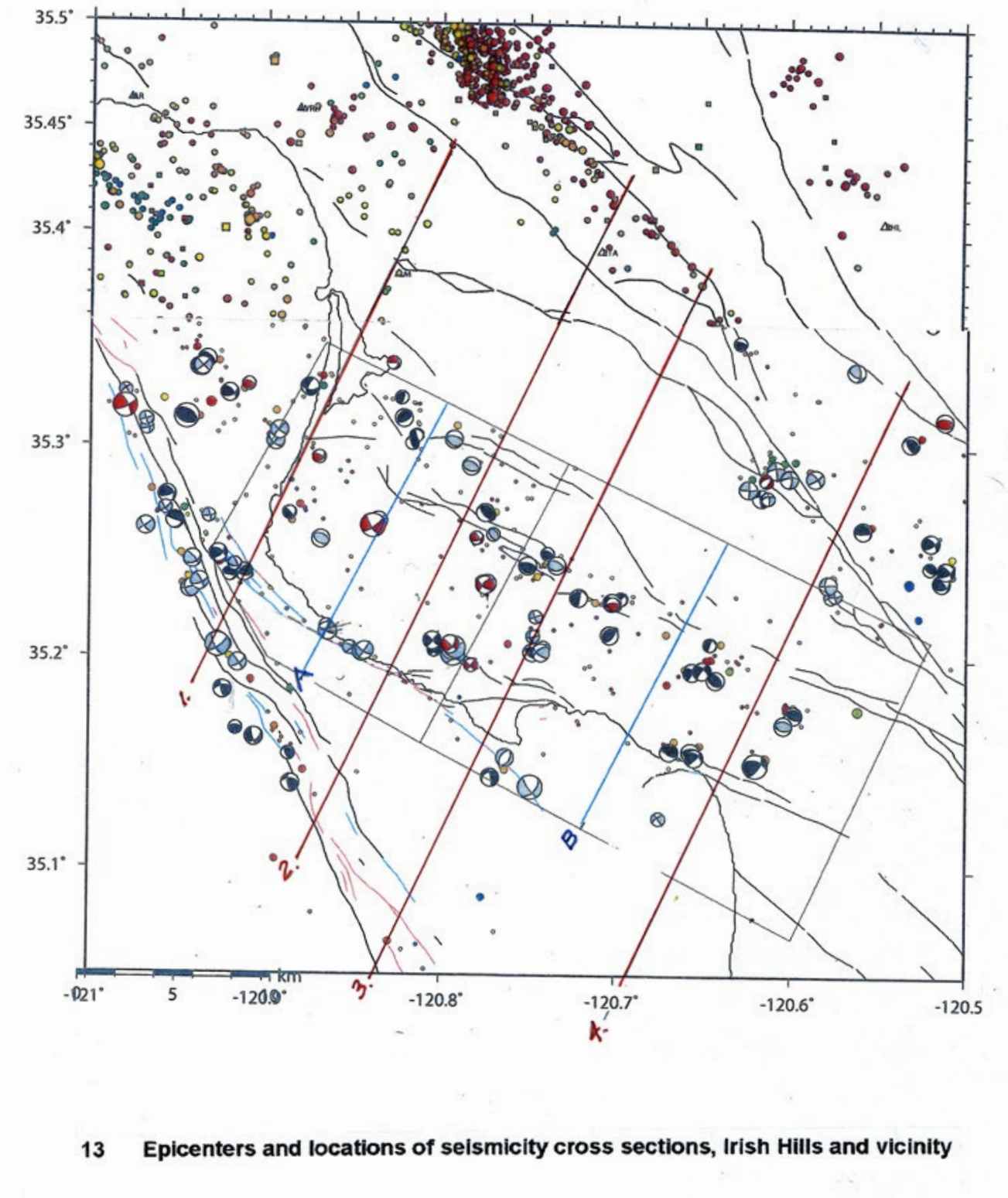
8. Figure 8. Earthquake hypocenter cross sections through the Irish Hills and adjacent areas; 1988, 2008, 2009, 2011, and 2003 San Simeon earthquake epicentral area.

Source: Figure 8 of Hamilton (2012a).

Seismicity Cross Sections from Hamilton (2012a)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-33**



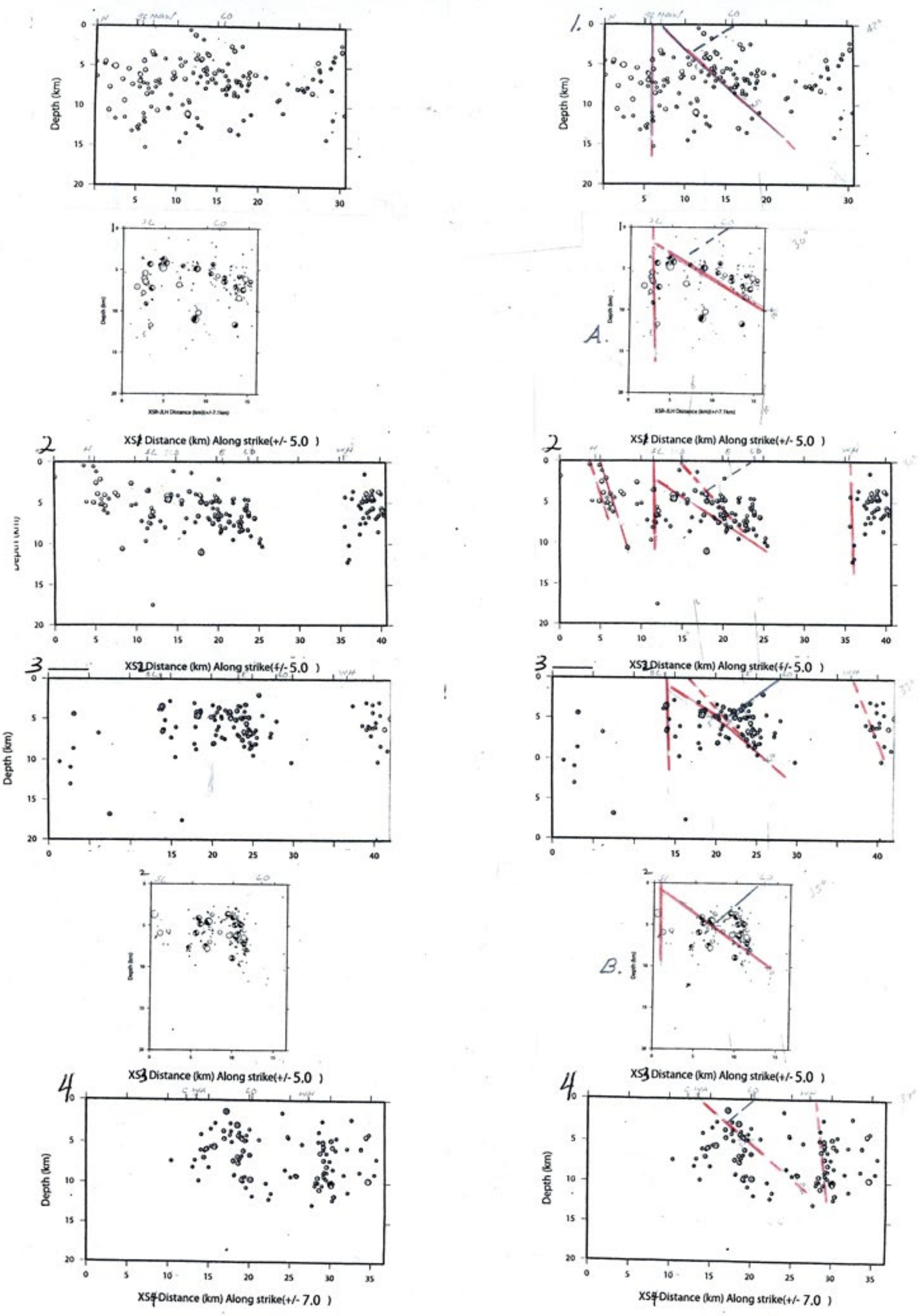
13 Epicenters and locations of seismicity cross sections, Irish Hills and vicinity

Source: Figure 13 of Hamilton (2012c).

Earthquakes Epicenters, Focal Mechanisms, and Locations of Seismicity Profiles from Hamilton (2012c)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-34**



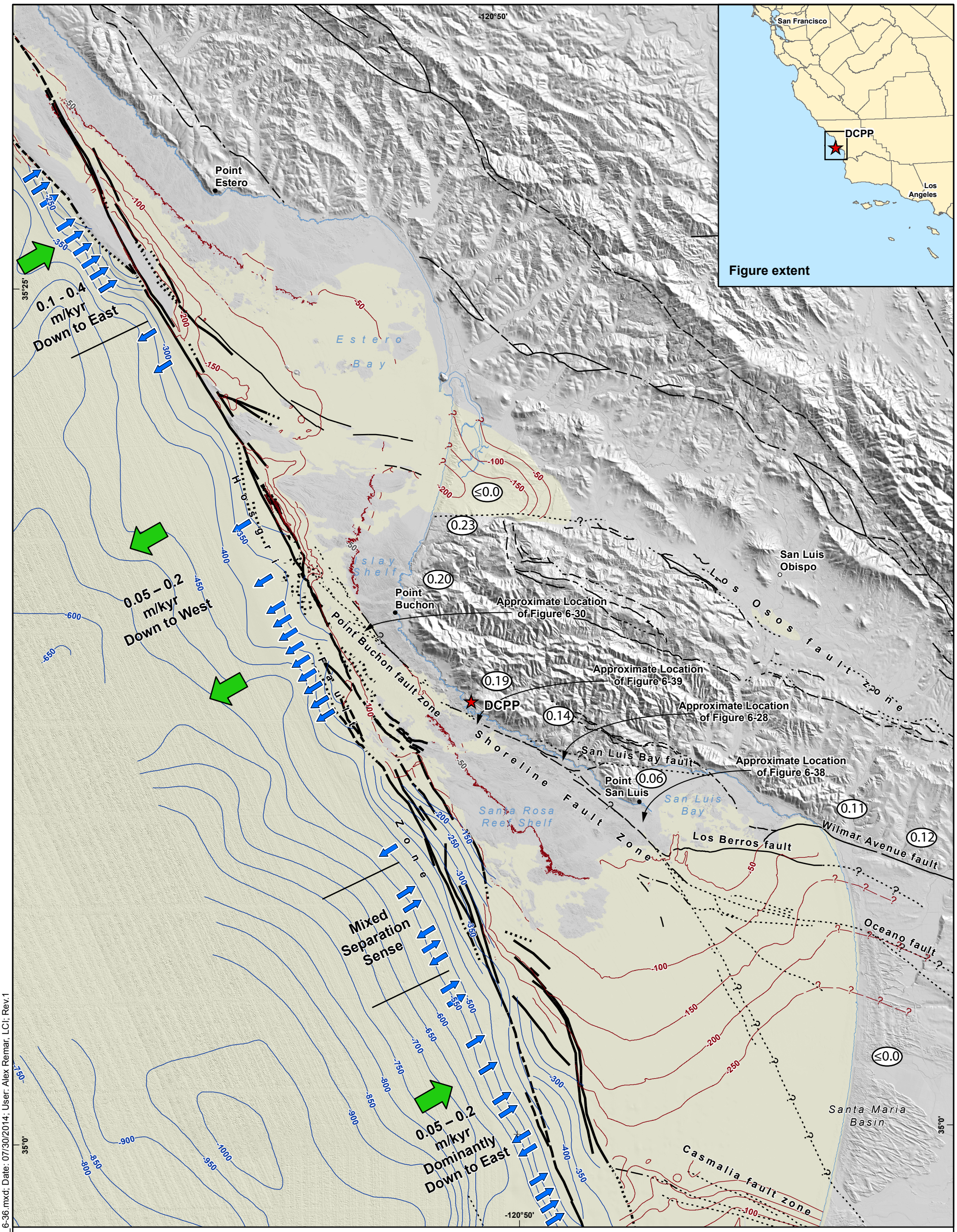
14 Cross Section Plots of earthquake hypocenters, Irish Hills and vicinity

Source: Figure 14 of Hamilton (2012c).

Seismicity Cross Sections from Hamilton (2012c)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-35**



EXPLANATION

- DCPP
- Quaternary fault: solid where well located, dashed where approximately located, dotted where concealed, short dashed where inferred, queried where existence uncertain. Heavy lines are traces of the Hosgri fault zone.
- Contours on early-late Pliocene unconformity (ELP) Meters below sea level
- Contours on top of Pre-Quaternary Rock Meters below sea level
- Quaternary sedimentary basins
- Measurement location, arrow head indicates downthrown direction.
- 0.05-0.2 — Range of late Quaternary vertical separation rates (m/kyr). Arrow indicates downthrown direction.
- 0.11 — Late Quaternary uplift rate in m/kyr (modified from Hanson et al. (1994))

Notes:
- Selected offshore faults compiled from PG&E (2011, 2013, and 2014).
- Separation rate data modified from PG&E (2013, 2014)
- Contours on ELP from Willingham et al. (2013)

N

0 4 8 mi.
0 6 12 km

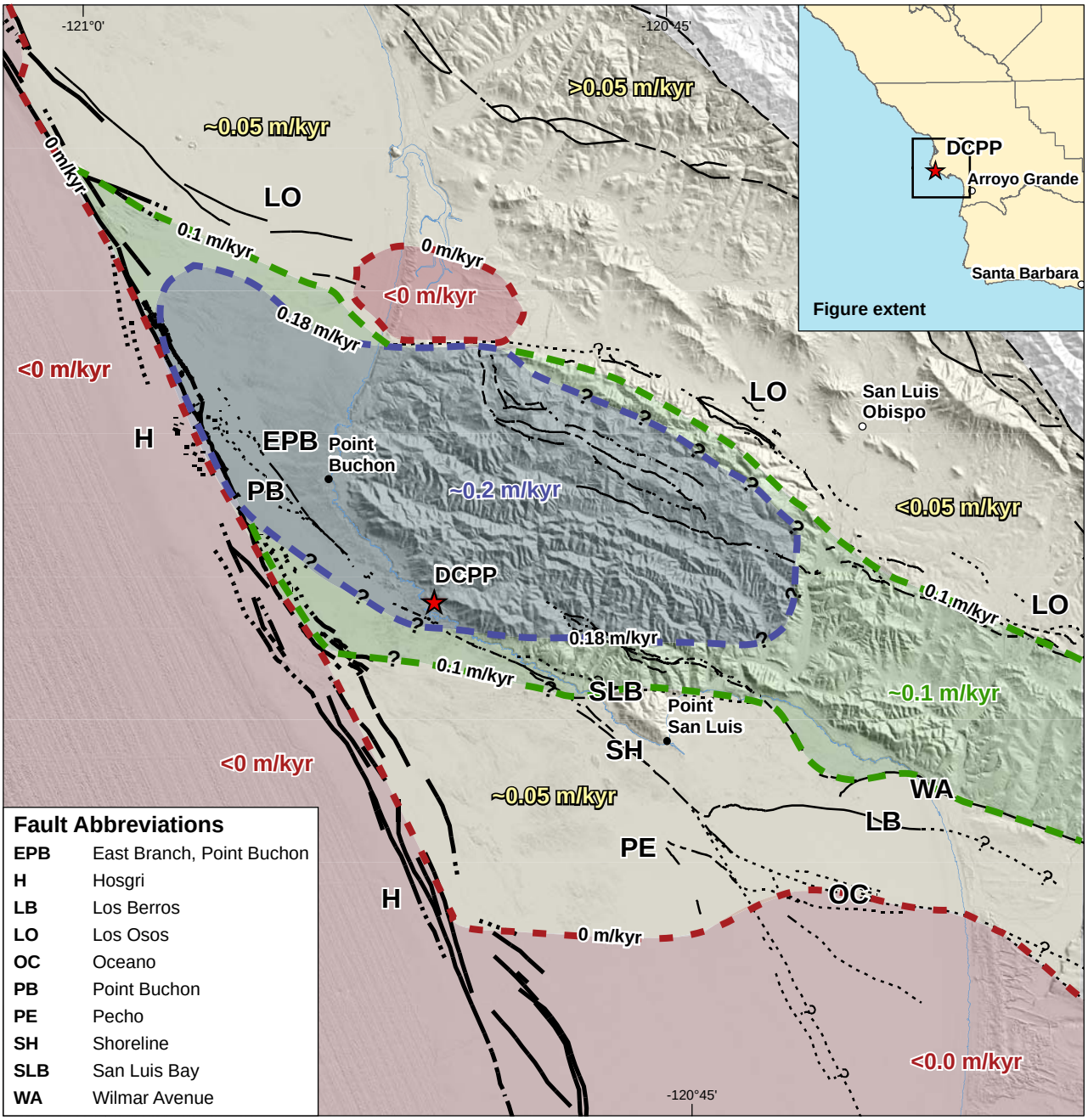
Map projection and scale: WGS 84 / UTM Zone 10N, 1:200,000

Quaternary Faults and Sedimentary Basins in the Vicinity of the San Luis Range

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-36**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-36.mxd; Date: 07/30/2014; User: Alex Remar, LCI; Rev.1



Fault Abbreviations

EPB	East Branch, Point Buchon
H	Hosgri
LB	Los Berros
LO	Los Osos
OC	Oceano
PB	Point Buchon
PE	Pecho
SH	Shoreline
SLB	San Luis Bay
WA	Wilmar Avenue

EXPLANATION

Fault interpreted from USGS seismic profiles, solid where well located, dashed where approximately located, dotted where inferred, queried where existence uncertain. Heavy lines are traces of the Hosgri fault zone.

Uplift rate contours (m/kyr)

location approximate

- 0.18
- 0.1
- 0

Uplift rate areas (m/kyr)

- > 0.18
- > 0.1 to 0.18
- 0 to 0.1
- < 0

Note: Approximately located contours of constant late Quaternary uplift rate, in m/kyr, based on information from PG&E (1988, 2013, 2014c) and AMEC (2012).

N

0 4 8 mi.

0 8 16 km

Map Projection: NAD 83 / UTM Zone 10N , 1:250,000

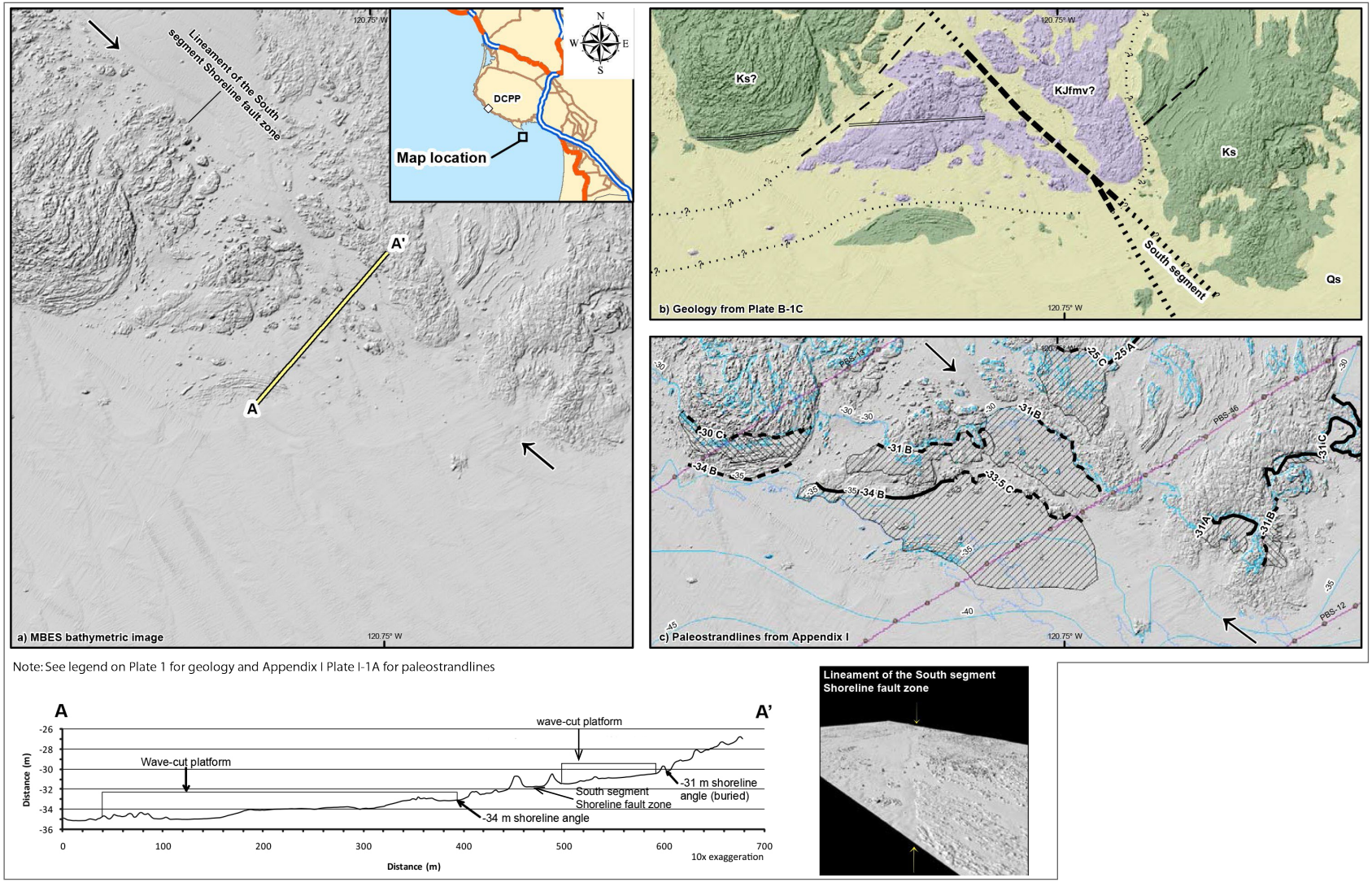
Uplift Rate Contour Map of the San Luis Range Area

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company

Figure **6-37**

File path: S:\1005\051\Figures\Response_Figures\Figure_6-37.ai; Date: 07/31/2014; User: Alex Remar, LCI; Rev.1

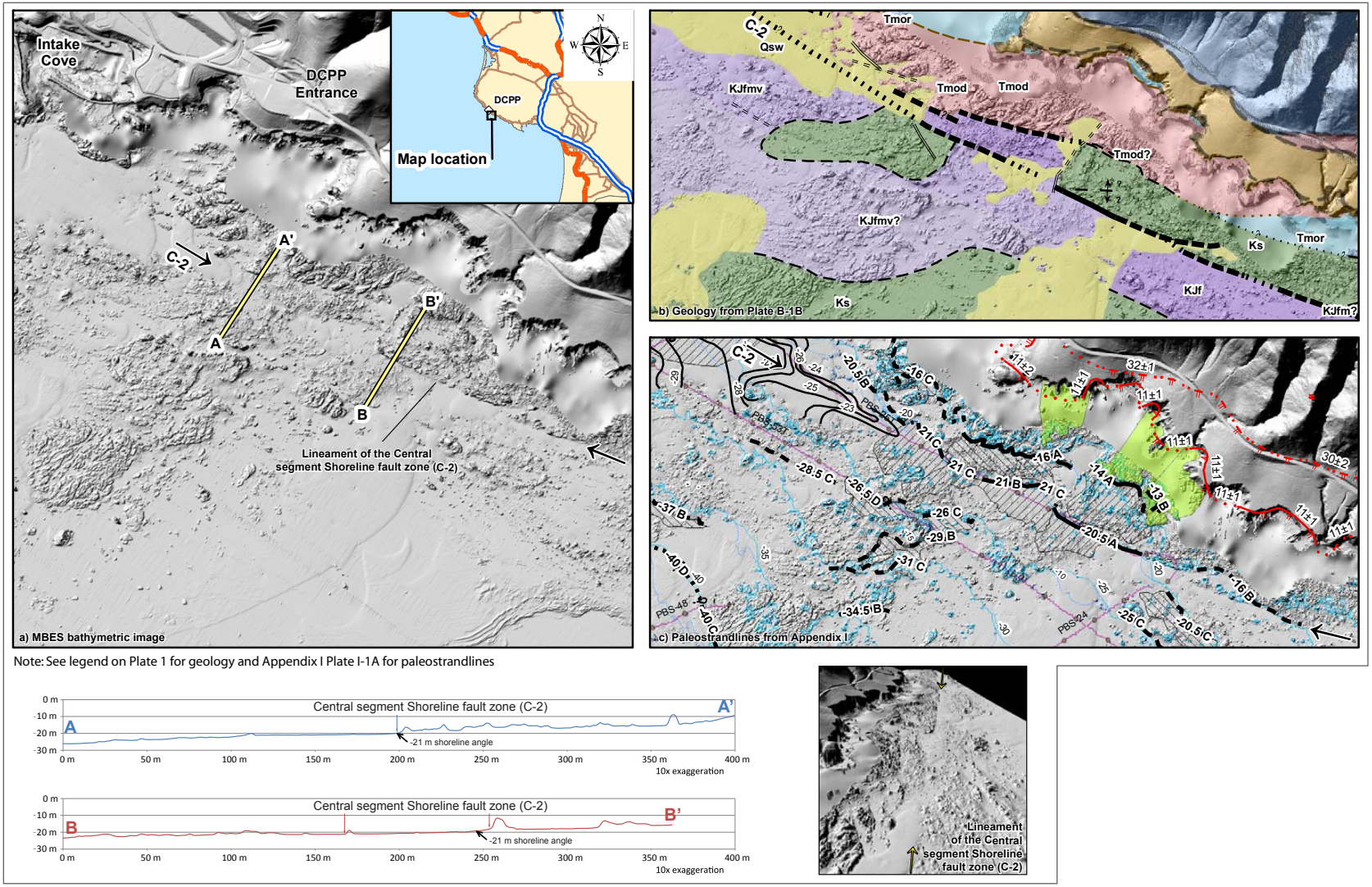


Source: Figure 4-15 of PG&E (2011).

Maps and Profiles of the Shoreline Fault South of Point San Luis from PG&E (2011)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-38**



Note: See legend on Plate 1 for geology and Appendix I Plate I-1A for paleostrandlines

Source: Figure 4-11 of PG&E (2011).

Maps and Profiles of the Shoreline Fault Southeast of the DCPP from PG&E (2011)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-39**

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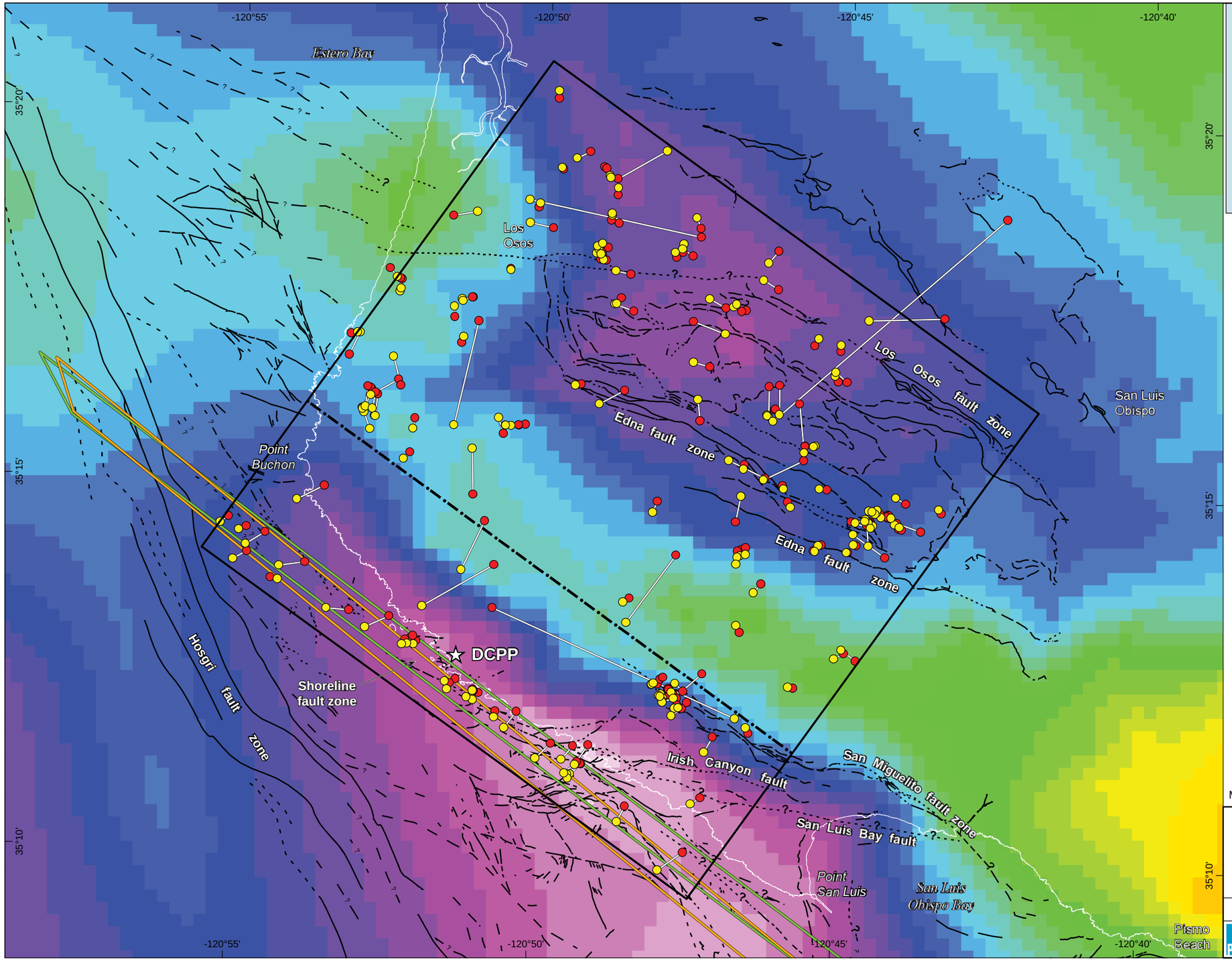
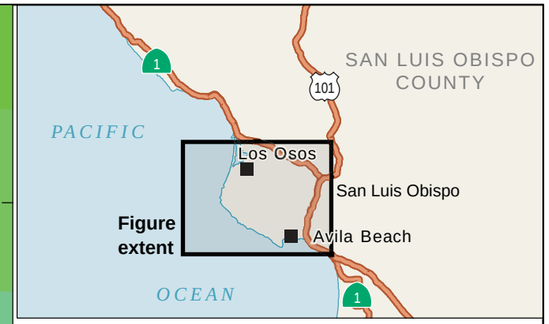




EXPLANATION

Complete Bouguer Gravity Anomaly (mGal)

- 17 to 19
- 15 to 17
- 13 to 15
- 11 to 13
- 9 to 11
- 7 to 9
- 5 to 7
- 3 to 5
- 1 to 3
- -1 to 1
- -3 to -1
- -5 to -3
- -7 to -5
- -9 to -7
- -11 to -9
- -13 to -11
- -15 to -13
- -17 to -15
- -19 to -17
- -21 to -19
- -23 to -21
- -25 to -23
- -27 to -25
- -29 to -27
- -32 to -29
- -34 to -32
- -36 to -34
- -38 to -36
- -40 to -38
- -42 to -40
- -44 to -42
- -46 to -44

- Selected epicenter (Hardebeck, 2014a)
- Selected epicenter (Hardebeck, 2010)
- 2010-2014 epicenter vector
- South margin of blind north-dipping faults below the Pismo syncline
- Shoreline fault, tomo DD
- Shoreline fault, hypo DD
- Seismicity analysis area
- Fault, dashed where approximate, queried where uncertain

Notes: Gravity data from Langenheim (2014). Faults from PG&E (2011, 2014b).

N W E S

0 1 2 mi.

0 1 2 km

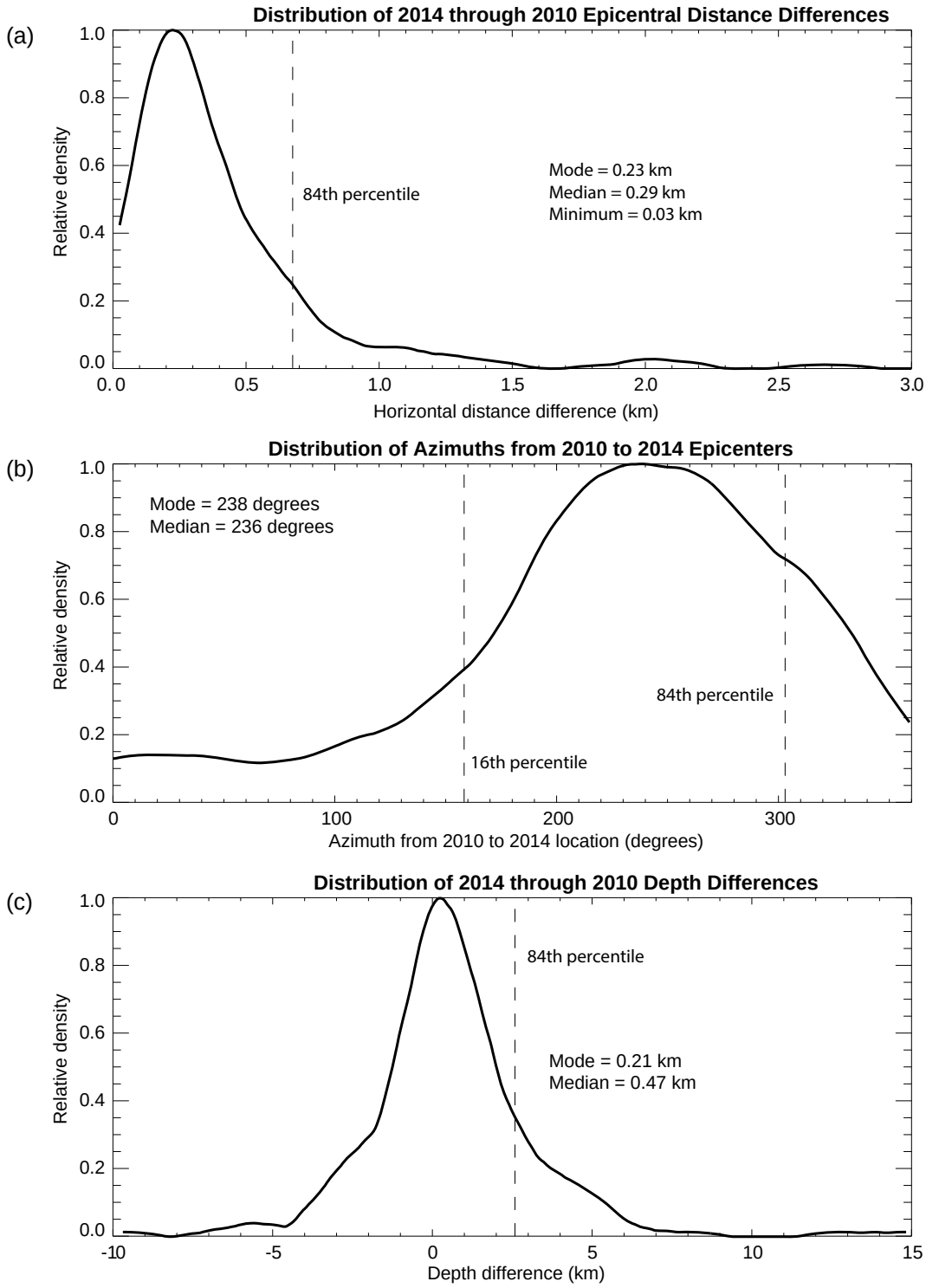
Map projection and scale: NAD 83 State Plane CA Zone V, 1:100,000

Difference Between Hardebeck (2010) and Hardebeck (2014a) Epicenter Locations in the Vicinity of the Irish Hills

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-40**

P:\Projects\Nuclear\79_225400_PGE_WE2_Onshore_2011_Ph1_Processing\04_GIS\MXD\Figures\PGE_R\DCPP_PGE_Gravity_Seismicity_EQDifference.mxd; ticci; 07.31.14



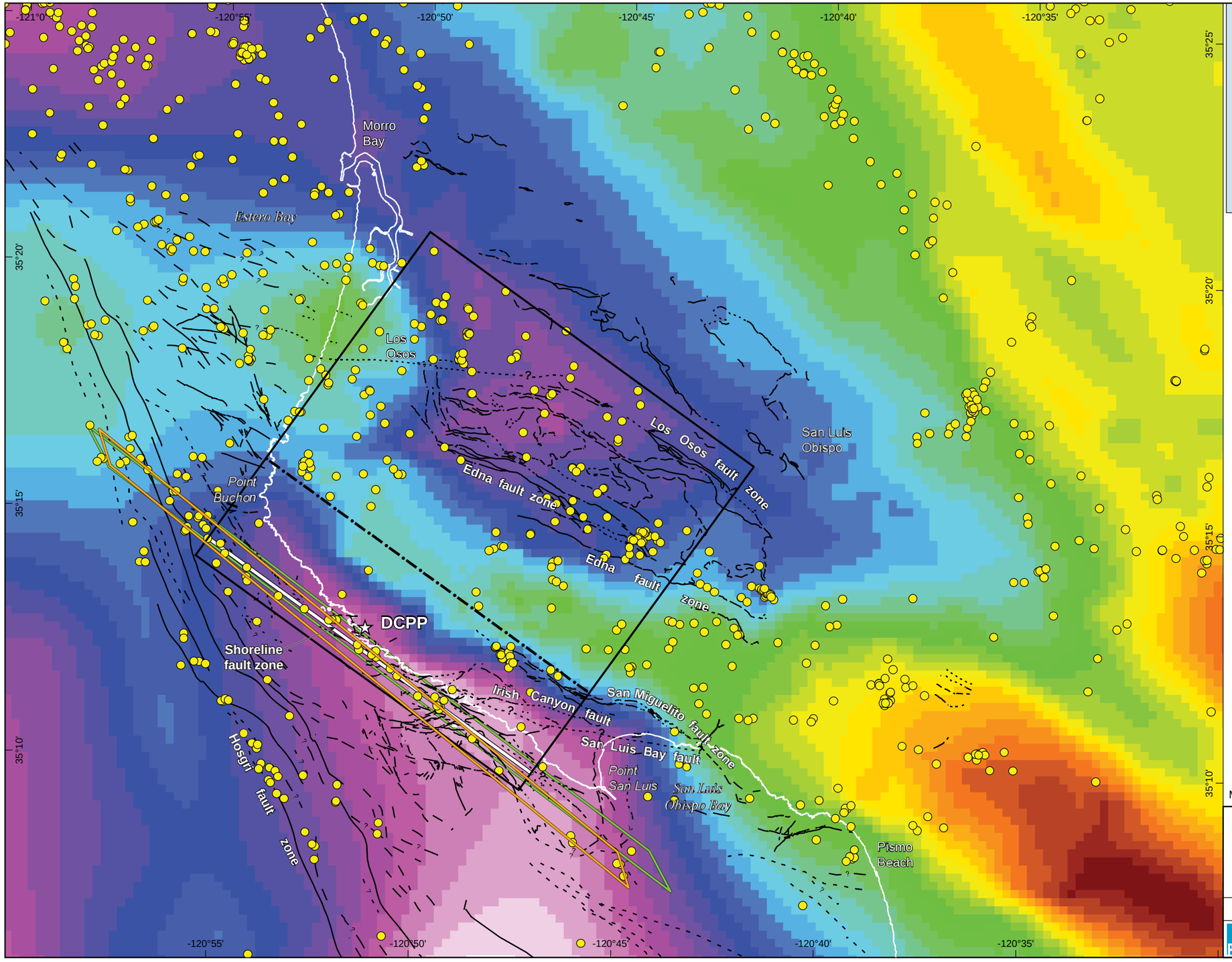
Earthquake Location Difference Statistics Between Hardebeck (2010) and Hardebeck (2014a)

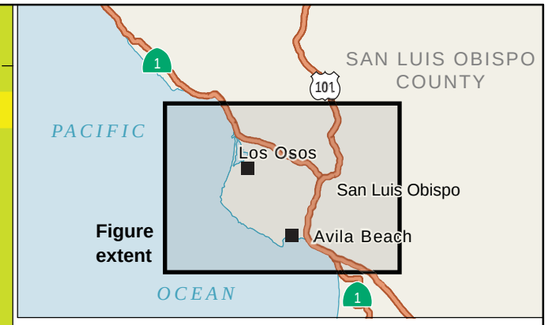
RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company

Figure **6-41**

fwla-lk-file/DATA/Projects/79_225400_PGE_WE2_Onshore_2011_Ph1_Processing/05_Graphics, 07.30.14





EXPLANATION

Complete Bouguer Gravity Anomaly (mGal)

- 17 to 19
- 15 to 17
- 13 to 15
- 11 to 13
- 9 to 11
- 7 to 9
- 5 to 7
- 3 to 5
- 1 to 3
- -1 to 1
- -3 to -1
- -5 to -3
- -7 to -5
- -9 to -7
- -11 to -9
- -13 to -11
- -15 to -13
- -17 to -15
- -19 to -17
- -21 to -19
- -23 to -21
- -25 to -23
- -27 to -25
- -29 to -27
- -32 to -29
- -34 to -32
- -36 to -34
- -38 to -36
- -40 to -38
- -42 to -40
- -44 to -42
- -46 to -44

- Epicenter (Hardebeck, 2014a)
- South margin of blind north-dipping faults below the Pismo syncline
- Shoreline fault, vertical plane
- Shoreline fault, tomo DD
- Shoreline fault, hypo DD
- Seismicity analysis area
- Fault, dashed where approximate, queried where uncertain

Notes: Gravity data from Langenheim (2014). Faults from PG&E (2011, 2014b).

N W E S

0 1 2 mi.

0 1 2 km

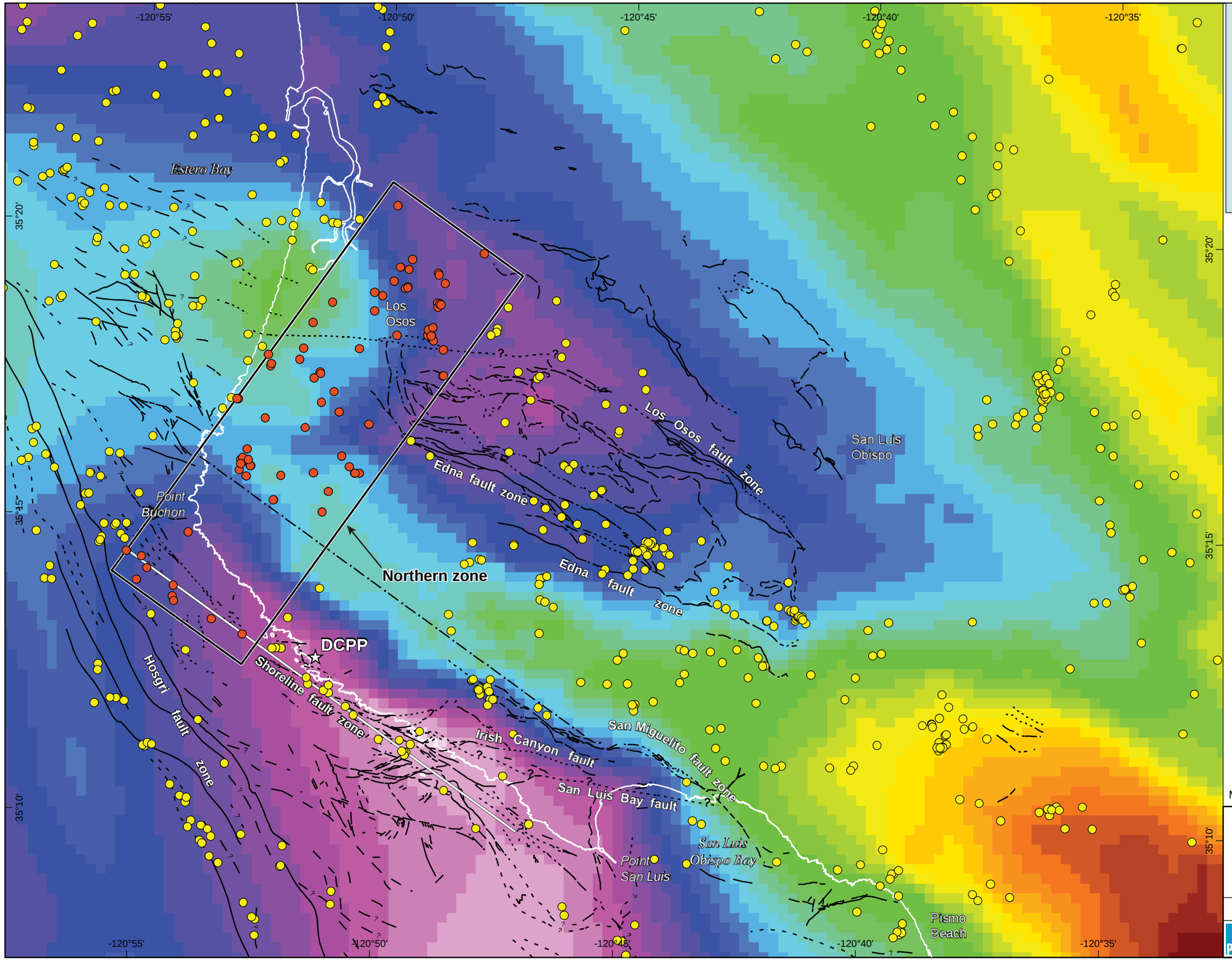
Map projection and scale: NAD 83 State Plane CA Zone V, 1:150,000

P:\Projects\Nuclear\79_225400_PGE_WE2_Onshore_2011_Ph1_Processing\04_GIS\MXD\Figures\PGE_RIDCPP_PGE_Gravity_Seismicity_Overview.mxd; ticci; 07.31.14

Overview of Irish Hills Seismicity

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-42**



EXPLANATION

Complete Bouguer Gravity Anomaly (mGal)

- 17 to 19
- 15 to 17
- 13 to 15
- 11 to 13
- 9 to 11
- 7 to 9
- 5 to 7
- 3 to 5
- 1 to 3
- -1 to 1
- -3 to -1
- -5 to -3
- -7 to -5
- -9 to -7
- -11 to -9
- -13 to -11
- -15 to -13
- -17 to -15
- -19 to -17
- -21 to -19
- -23 to -21
- -25 to -23
- -27 to -25
- -29 to -27
- -32 to -29
- -34 to -32
- -36 to -34
- -38 to -36
- -40 to -38
- -42 to -40
- -44 to -42
- -46 to -44

- Epicenter (Hardebeck, 2014a)
- Epicenter inside zone (Hardebeck, 2014a)
- South margin of blind north-dipping faults below the Pismo syncline
- Shoreline fault, vertical plane
- Seismicity zone extent
- Fault, dashed where approximate, queried where uncertain

Notes: Gravity data from Langenheim (2014). Faults from PG&E (2011, 2014b).

N W E S

0 1 2 mi.

0 1 2 km

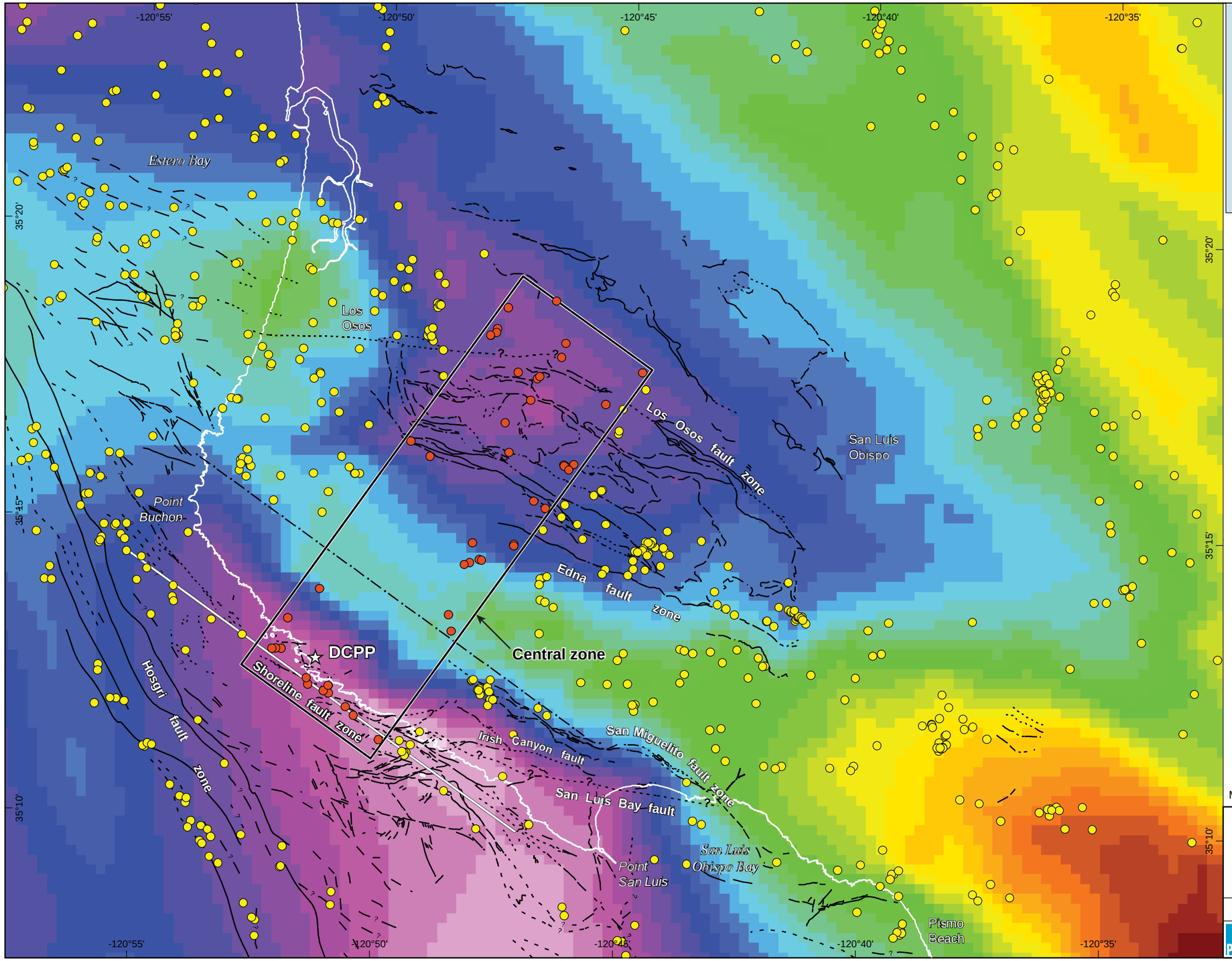
Map projection and scale: NAD 83 State Plane CA Zone V, 1:125,000

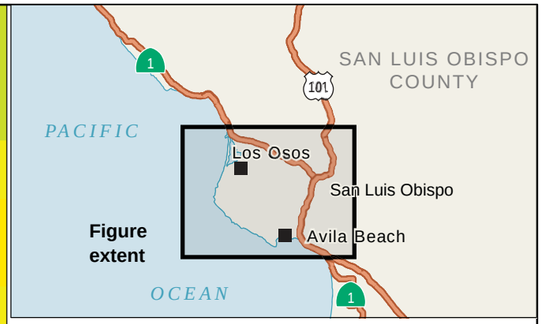
Northern Zone Seismicity

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-43**

P:\Projects\Nuclear\79_225400_PGE_WE2_Onshore_2011_Ph1_Processing\04_GIS\MXD\Figures\PGE_RtDCPP_PGE_Gravity_Seismicity_North.mxd; ticci; 7.3.14





EXPLANATION

Complete Bouguer Gravity Anomaly (mGal)

- 17 to 19
- 15 to 17
- 13 to 15
- 11 to 13
- 9 to 11
- 7 to 9
- 5 to 7
- 3 to 5
- 1 to 3
- -1 to 1
- -3 to -1
- -5 to -3
- -7 to -5
- -9 to -7
- -11 to -9
- -13 to -11
- -15 to -13
- -17 to -15
- -19 to -17
- -21 to -19
- -23 to -21
- -25 to -23
- -27 to -25
- -29 to -27
- -32 to -29
- -34 to -32
- -36 to -34
- -38 to -36
- -40 to -38
- -42 to -40
- -44 to -42
- -46 to -44

- Epicenter (Hardebeck, 2014a)
- Epicenter inside zone (Hardebeck, 2014a)
- South margin of blind north-dipping faults below the Pismo syncline
- Shoreline fault, vertical plane
- Seismicity zone extent
- Fault, dashed where approximate, queried where uncertain

Notes: Gravity data from Langenheim (2014). Faults from PG&E (2011, 2014b).

N W E S

0 1 2 mi.

0 1 2 km

Map projection and scale: NAD 83 State Plane CA Zone V, 1:125,000

Central Zone Seismicity

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-44**

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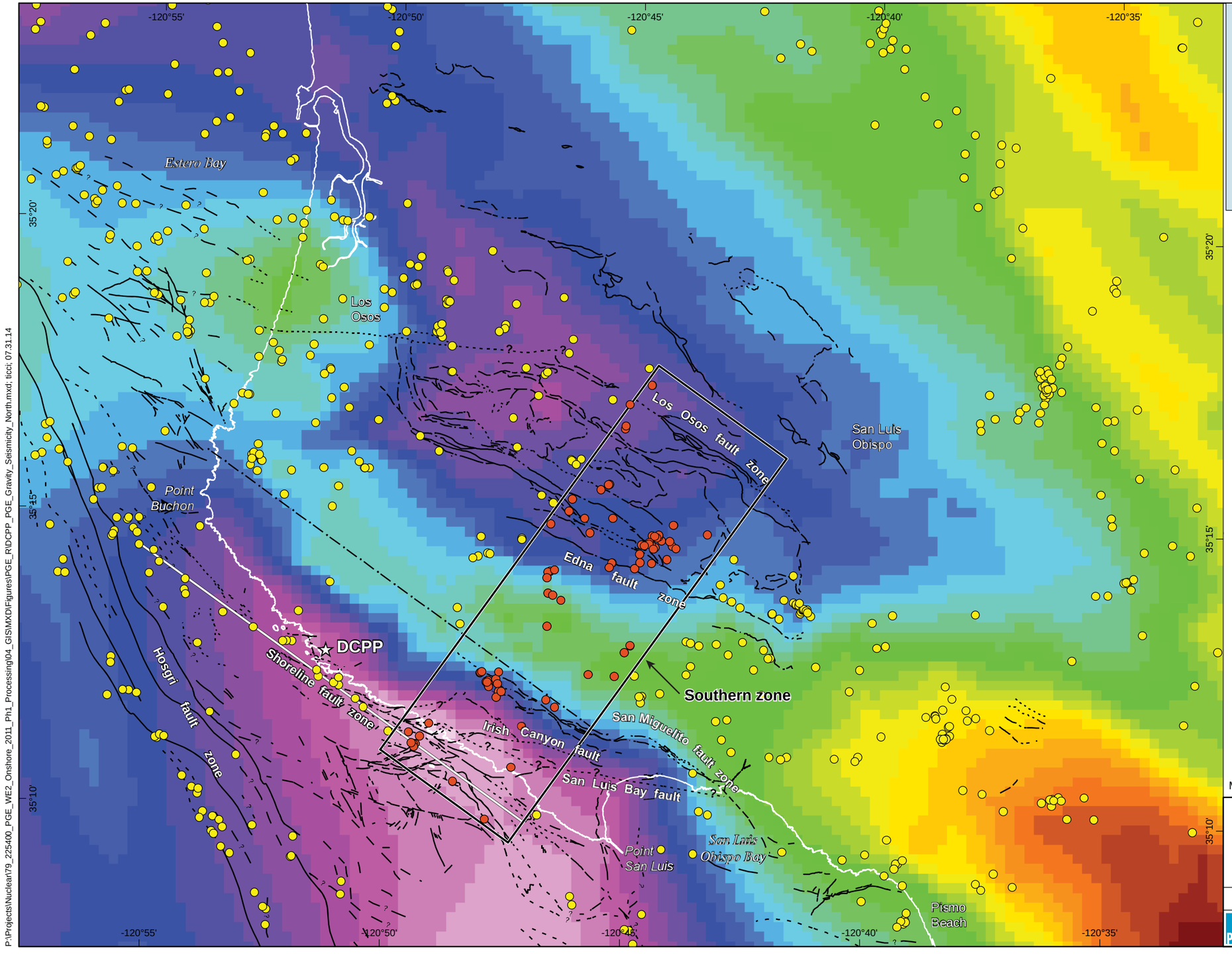
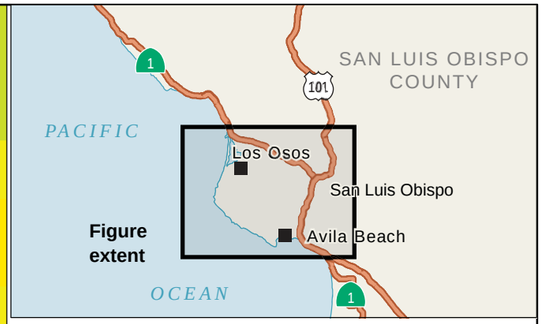
P:\Projects\Nuclear\79_225400_PGE_WE2_Onshore_2011_Ph1_Processing\04_GIS\MXD\Figures\PGE_RDCPP_PGE_Gravity_Seismicity_North.mxd; ticci; 07.31.14





EXPLANATION

Complete Bouguer Gravity Anomaly (mGal)

- 17 to 19
- 15 to 17
- 13 to 15
- 11 to 13
- 9 to 11
- 7 to 9
- 5 to 7
- 3 to 5
- 1 to 3
- -1 to 1
- -3 to -1
- -5 to -3
- -7 to -5
- -9 to -7
- -11 to -9
- -13 to -11
- -15 to -13
- -17 to -15
- -19 to -17
- -21 to -19
- -23 to -21
- -25 to -23
- -27 to -25
- -29 to -27
- -32 to -29
- -34 to -32
- -36 to -34
- -38 to -36
- -40 to -38
- -42 to -40
- -44 to -42
- -46 to -44

- Epicenter (Hardebeck, 2014a)
- Epicenter inside zone (Hardebeck, 2014a)
- South margin of blind north-dipping faults below the Pismo syncline
- Shoreline fault, vertical plane
- Seismicity zone extent
- Fault, dashed where approximate, queried where uncertain

Notes: Gravity data from Langenheim (2014). Faults from PG&E (2011, 2014b).

N W E S

0 1 2 mi.

0 1 2 km

Map projection and scale: NAD 83 State Plane CA Zone V, 1:125,000

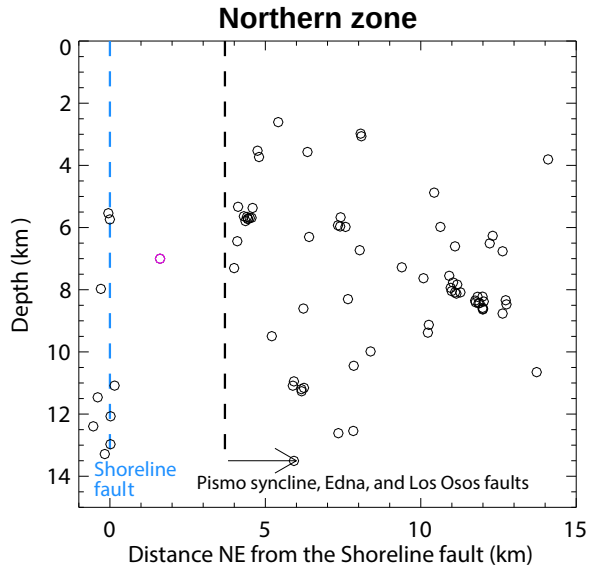
Southern Zone Seismicity

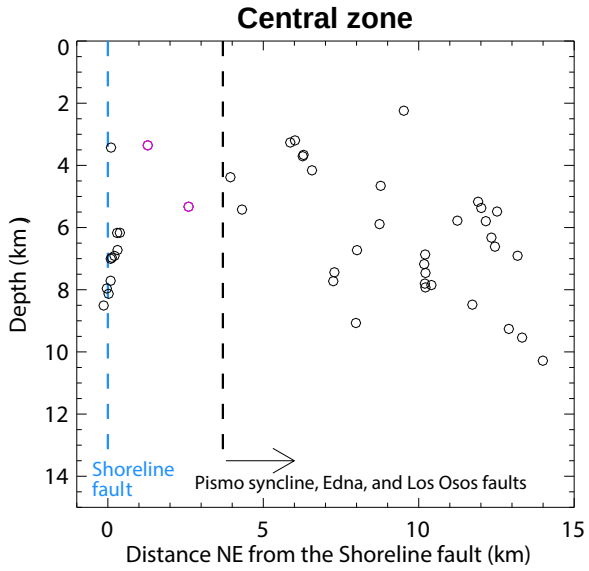
RESPONSE TO DR. HAMILTON'S TESTIMONY

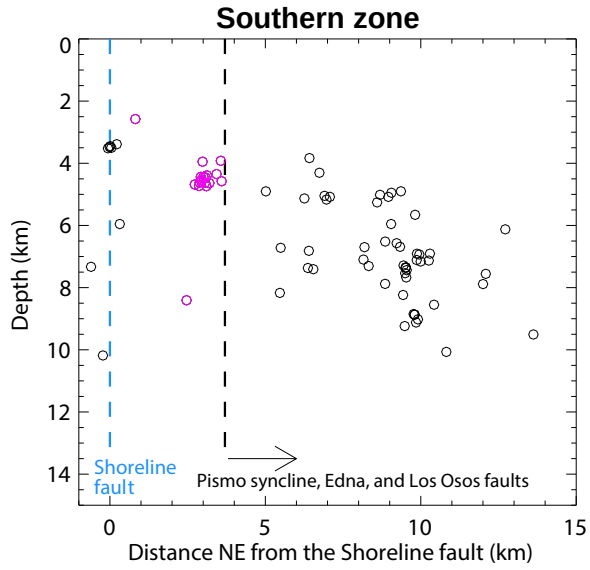
Pacific Gas and Electric Company

Figure **6-45**

P:\Projects\Nuclear\79_225400_PGE_WE2_Onshore_2011_Ph1_Processing\04_GIS\MXD\Figures\PGE_R\DCPP_PGE_Gravity_Seismicity_North.mxd; ticci; 07.31.14







Number of Earthquakes in Zone

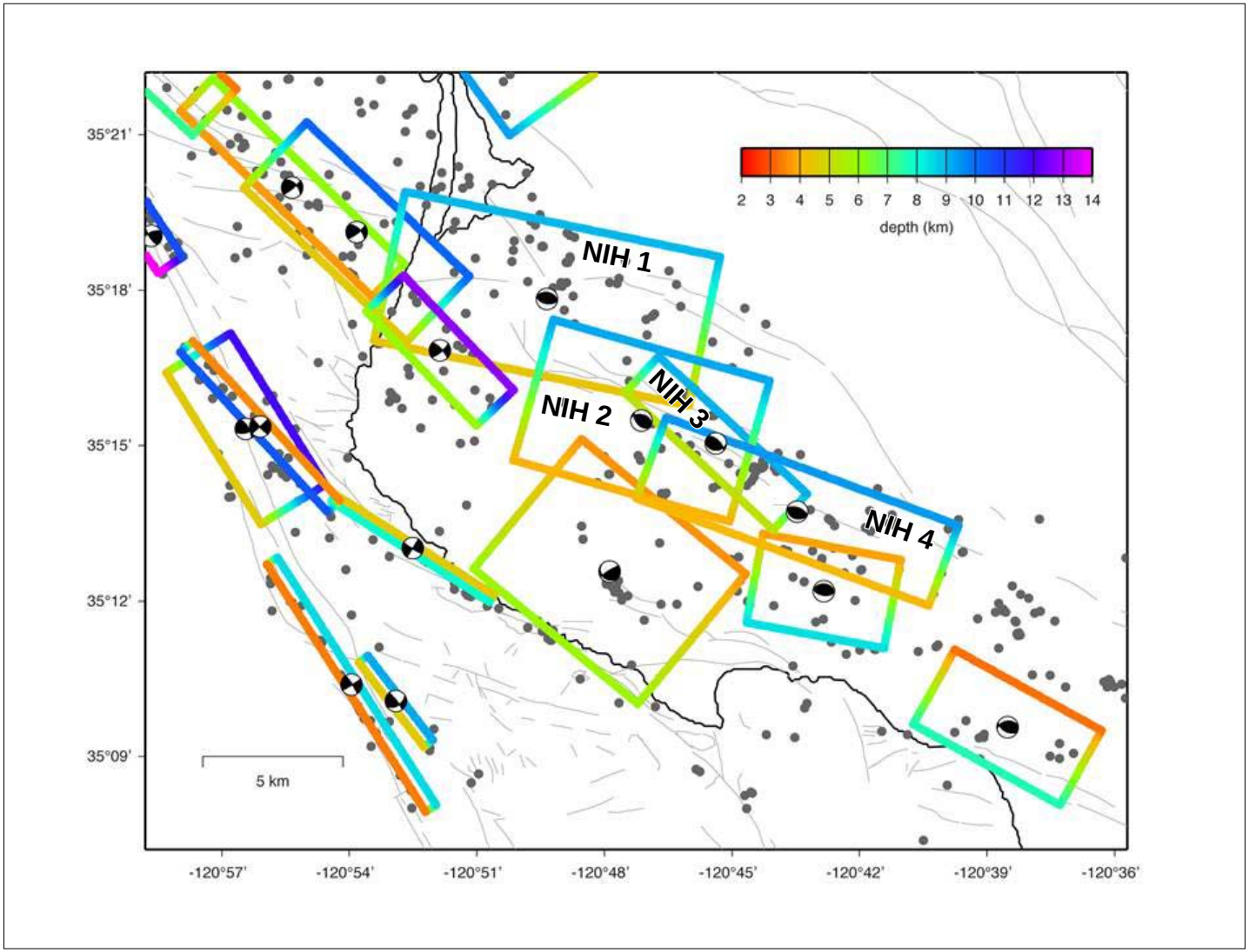
Fault Association	Southern	Central	Northern
Within fault zone	80	45	80
Outside fault zone	20	2	1

Notes: One earthquake in the southern zone is at 17.26 km depth, approximately 2 km below the plot.
Seismicity from Hardebeck (2014a).

Seismicity Cross Sections Perpendicular to the Shoreline Fault

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-46**



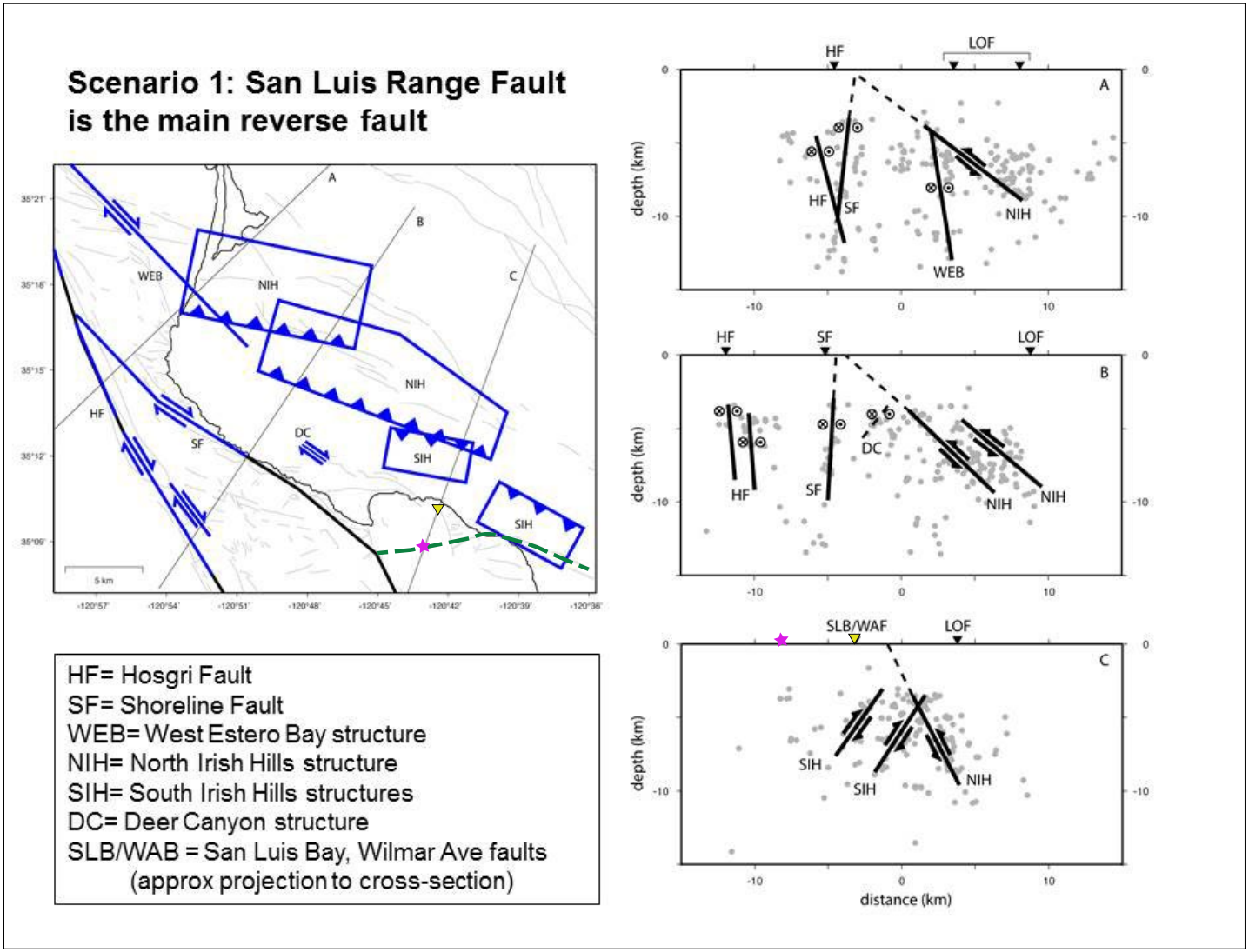
Notes:
- Image from slide 15 of Hardebeck's presentation at SSHAC Workshop No. 3, 2014.
- Labels and tabulated data added by PG&E to this figure based on data provided by Hardebeck (personal communication, 2014).

Name	Strike	Strike ±	Dip	Dip ±
NIH 1	N78°W	18°	40°N	5°
NIH 2	N74°W	18°	45°N	9°
NIH 3	N47°W	11°	65°NE	7°
NIH 4	N70°W	11°	60°N	6°

OADC-FM Solution Planes Fit to Seismicity from Hardebeck (2014b)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-47**

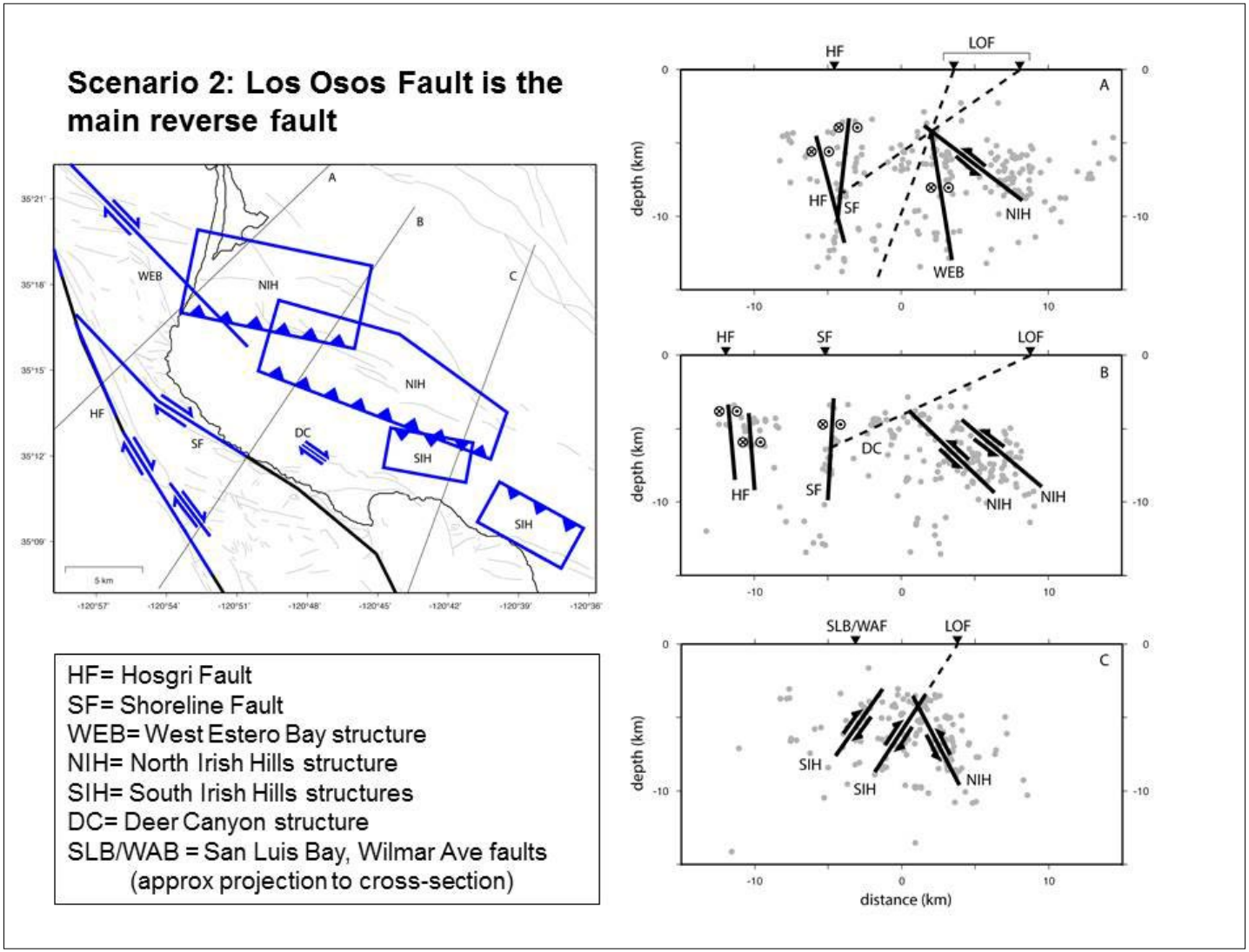


Notes:
- Image from Slide 21 of Hardebeck's presentation at SSHAC Workshop No. 3, 2014.
- Dashed green line and yellow triangles on map, and magenta star on map and Profile C added by PG&E to this figure.

Structural Interpretation of OADC-FM Solution, Scenario 1, from Hardebeck (2014b)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-48**

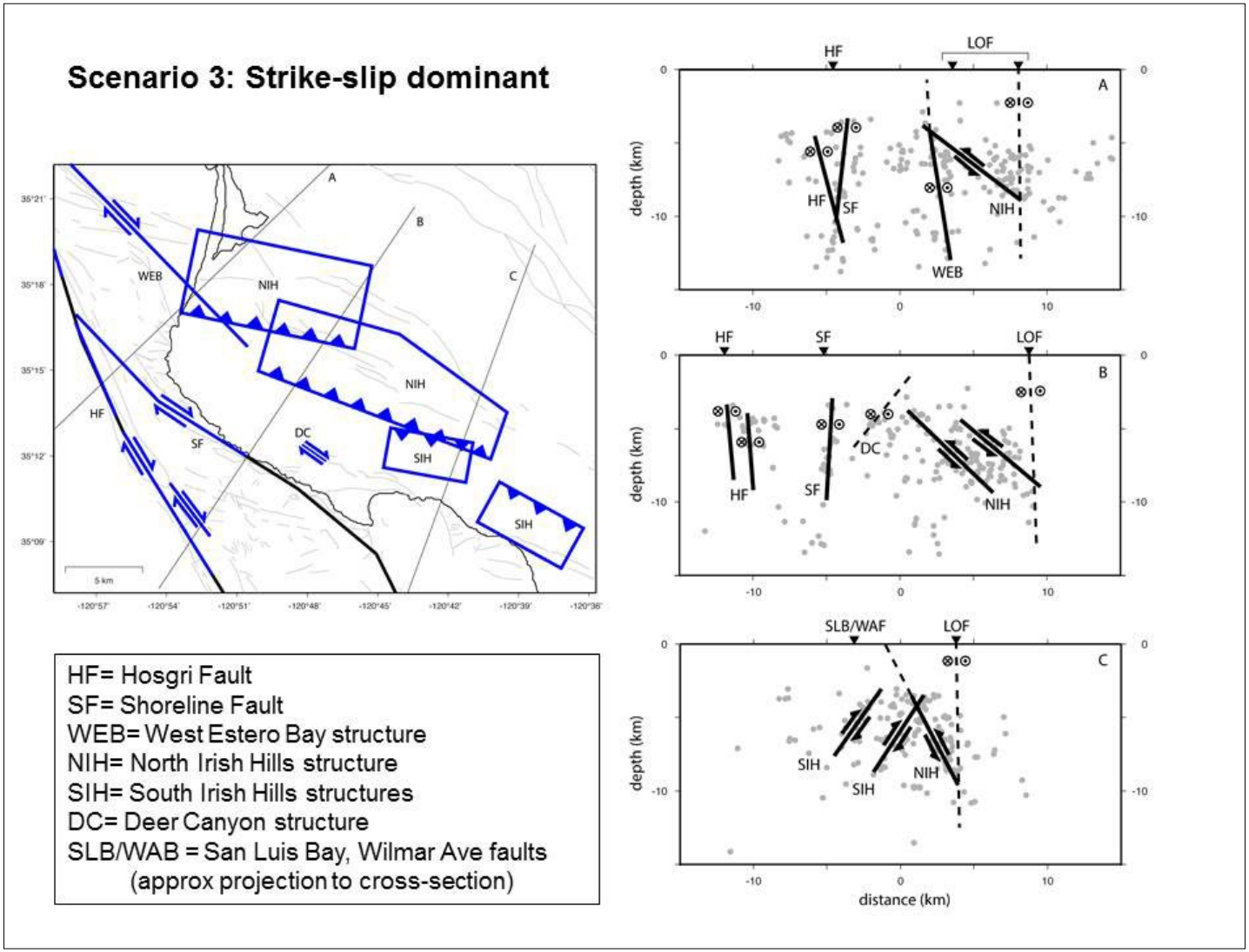


Note: Image from slide 22 of Hardebeck's presentation at SSHAC Workshop No. 3, 2014.

Structural Interpretation of OADC-FM Solution, Scenario 2, from Hardebeck (2014b)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-49**

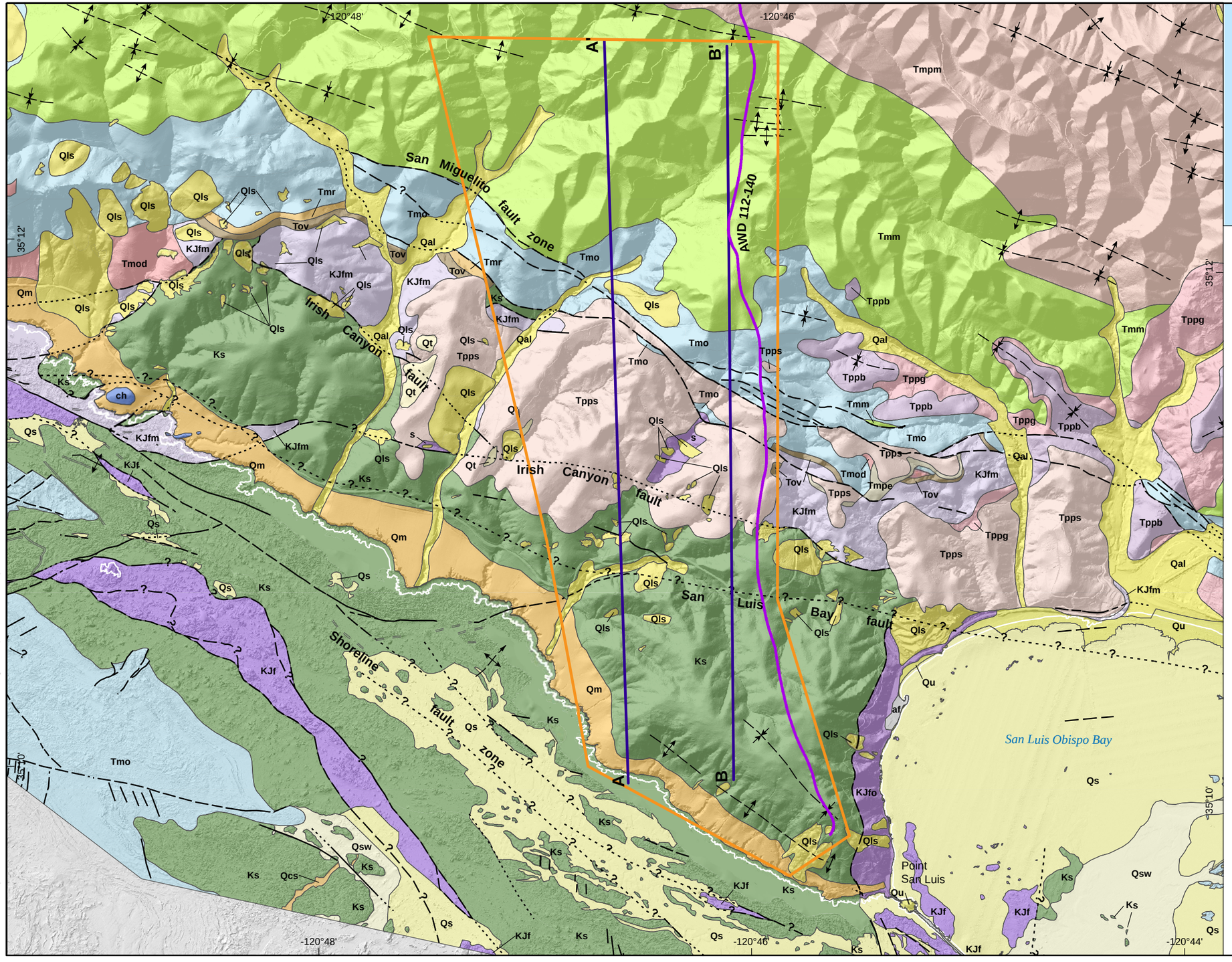


Note: Image from slide 24 of Hardebeck's presentation at SSHAC Workshop No. 3, 2014.

Structural Interpretation of OADC-FM Solution, Scenario 3, from Hardebeck (2014b)

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-50**



Explanation

Seismic Reflection Profile

AWD 112-140 Line from 2011 2D survey (Fugro 2014b; PG&E, 2014d)

A A' Arbritary line from 2011 Vibroseis volume (Fugro, 2014b)

Evaluated subset of the 2011 3D Vibroseis data

Notes: Geologic data from PG&E (2014b).
Shaded relief from LiDAR and multibeam data, PG&E (2014b).
See Figure 6-7 for explanation of geologic units and symbols.

N
W E
S

0 2,000 4,000 ft

0 500 1,000 m

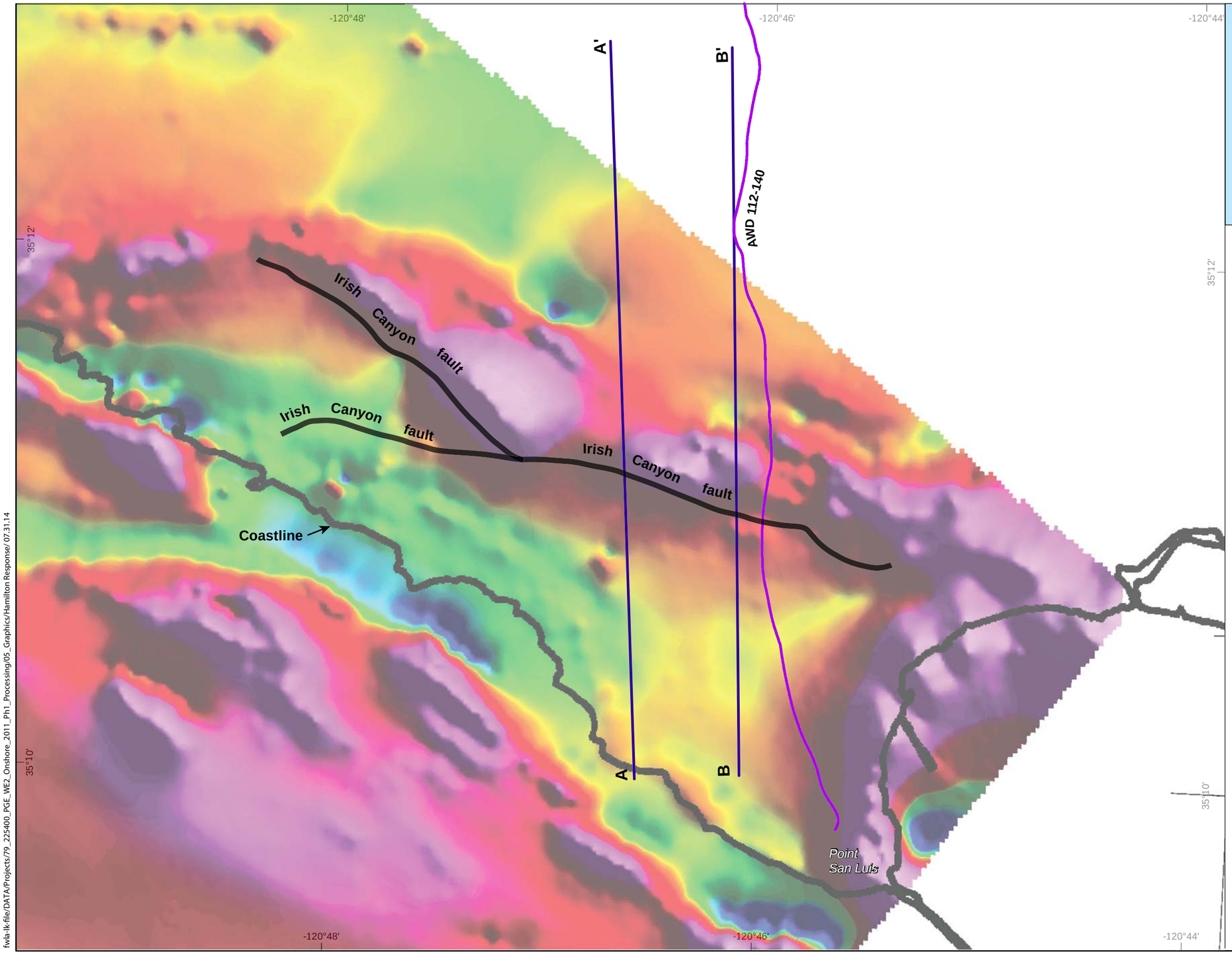
Map projection and scale: NAD 83 State Plane CA Zone V, 1:28,000

Geologic Map of the Point San Luis Area with Seismic Profile Lines

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-51**

fwla-lk-file/DATA/Projects/79_225400_PGE_WE2_Onshore_2011_Ph1_Processing/05_Graphics/Hamilton Response, modified 07.31.14



EXPLANATION

Seismic Reflection Profile

AWD 112-140 Line from 2011 2D survey (Fugro, 2014b)

A **A'** Arbritary line from 2011 Vibroseis volume (Fugro, 2014b; PG&E, 2014d)

Nanoteslas (nT)

47,872
47,834
47,804
47,789
47,779
47,767
47,750
47,731

Notes: Magnetic data from Langenheim et al. (2012)
Fault traces from PG&E (2014b)

N W E S

0 2,000 4,000 ft

0 500 1,000 m

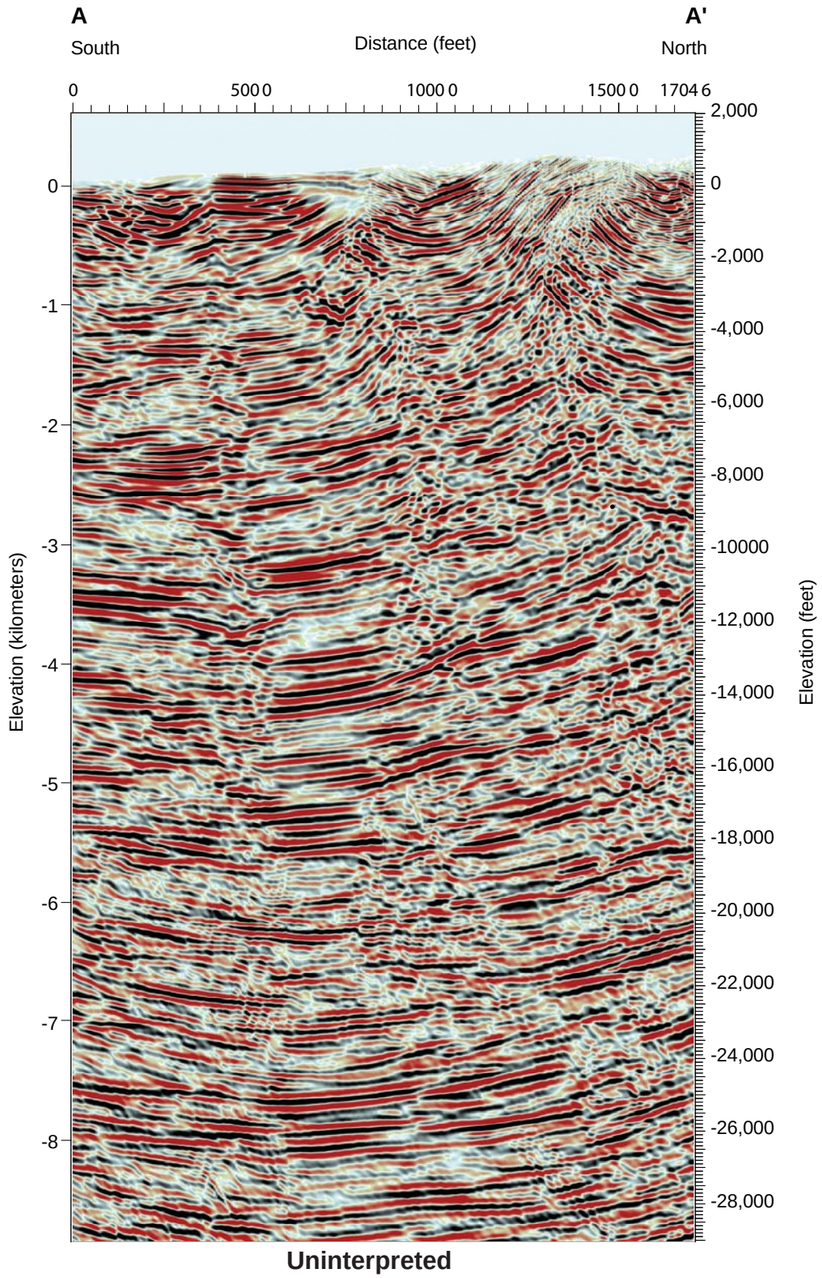
Map projection and scale: NAD 83 State Plane CA Zone V,1:28,000

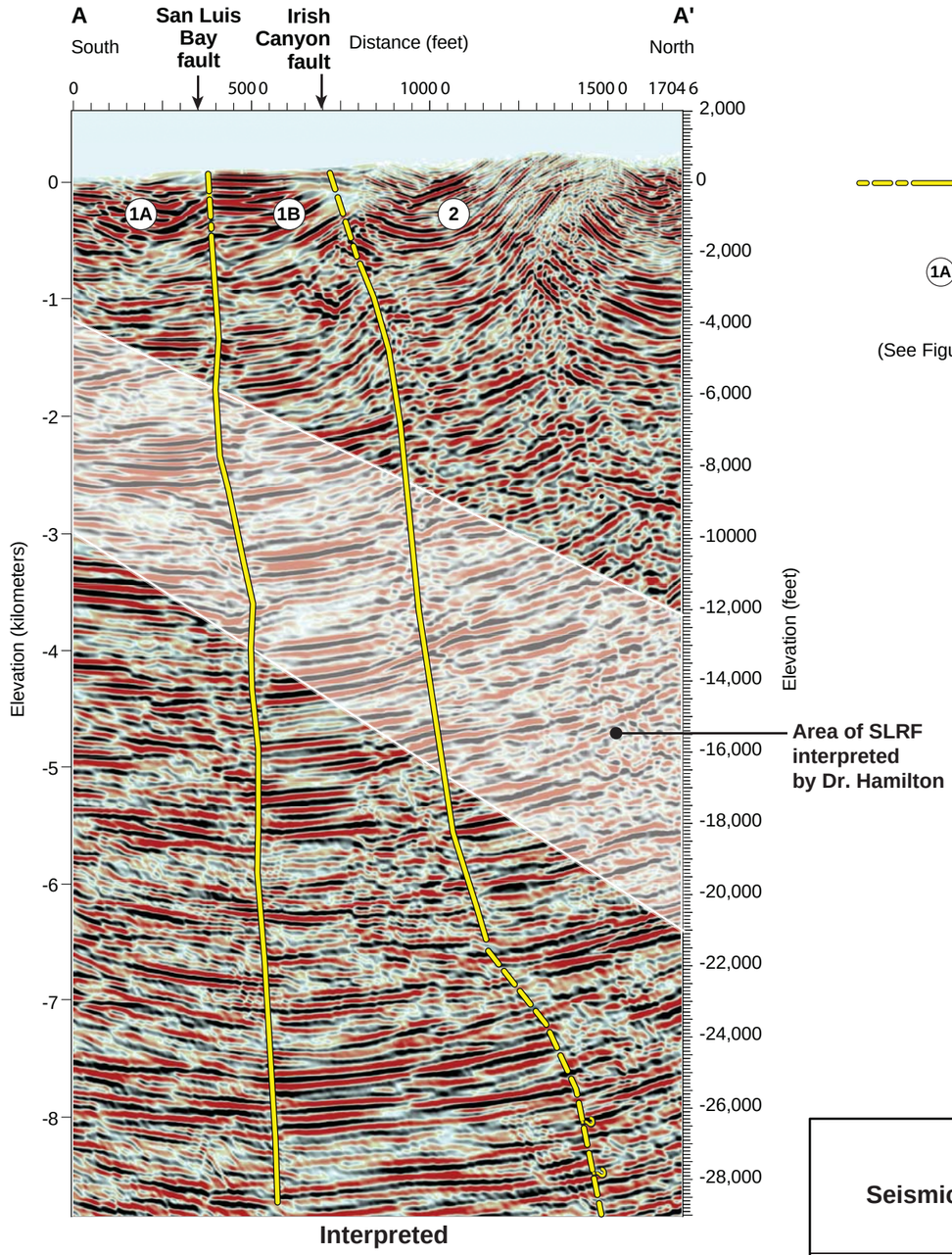
Total Magnetic Field Anomaly, Helicopter Magnetic Survey, Point San Luis Area

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company | Figure **6-52**

fwla-lk-file/DATA/Projects/79_225400_PGE_WE2_Onshore_2011_Ph1_Processing/05_Graphics/Hamilton Response/ 07.31.14





Explanation

Fault, solid where certain, dashed where approximate, queried where uncertain

1A Seismic reflection domain

(See Figure 6-51 for location of profile.)

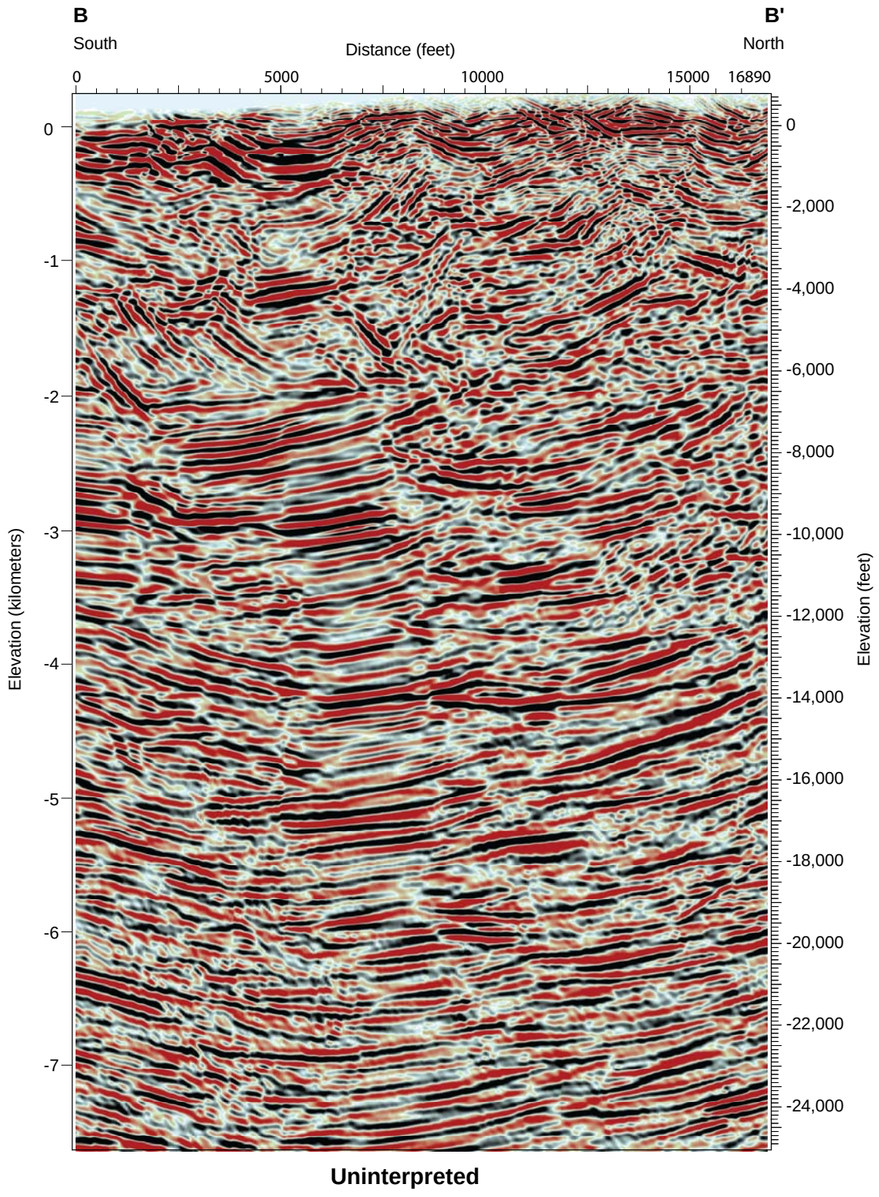
Seismic Reflection Profile, Line A-A'

RESPONSE TO DR. HAMILTON'S TESTIMONY

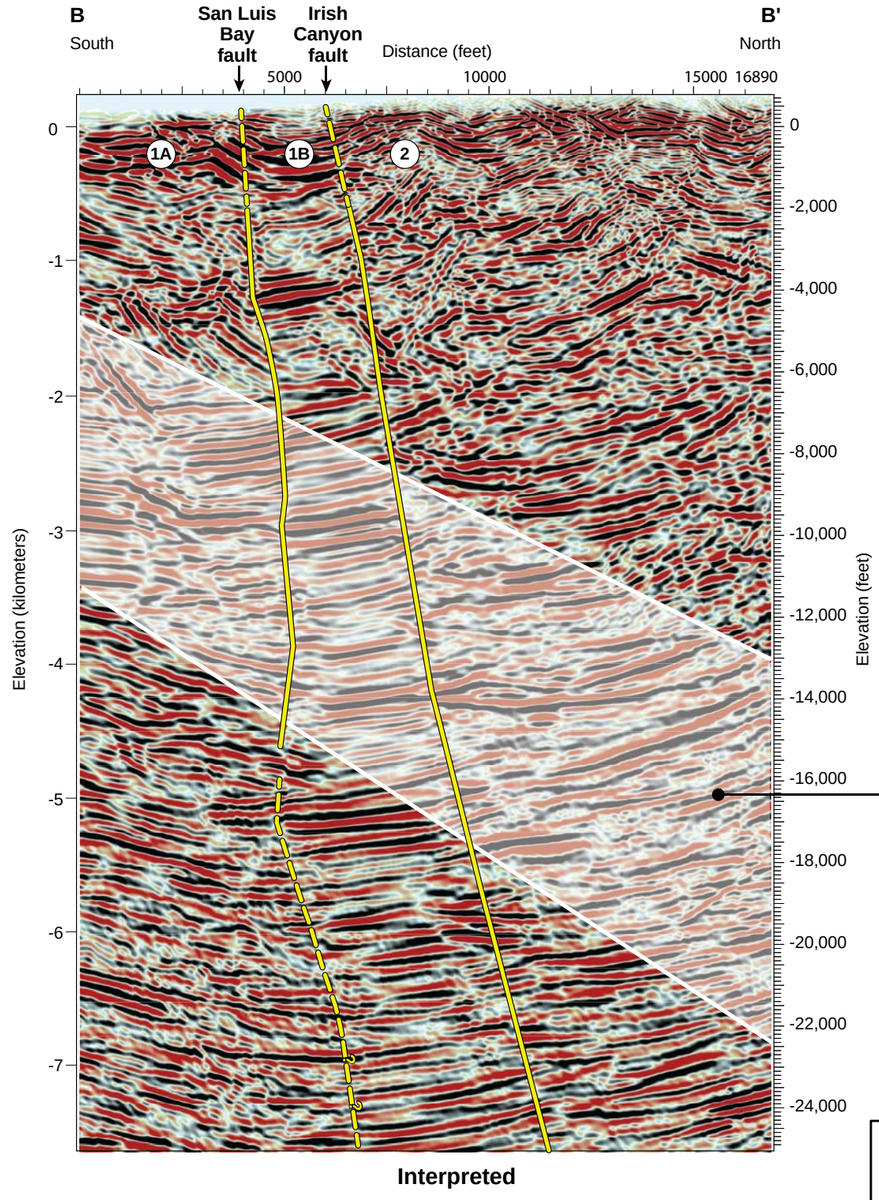
Pacific Gas and Electric Company

Figure **6-53**

fwla-lk-file/DATA/Projects/79_225400_PGE_WE2_Onshore_2011_Ph1_Processing/05_Graphics/Hamilton Response/ 07.31.14



Uninterpreted



Interpreted

Explanation

Fault, solid where certain, dashed where approximate, queried where uncertain

1A Seismic reflection domain

(See Figure 6-51 for location of profile.)

Seismic Reflection Profile, Line B-B'

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company

Figure **6-54**

fwla-lk-file/DATA/Projects/79_225400_PGE_WE2_Onshore_2011_Ph1_Processing/05_Graphic-55amilton Response/ 07.31.14

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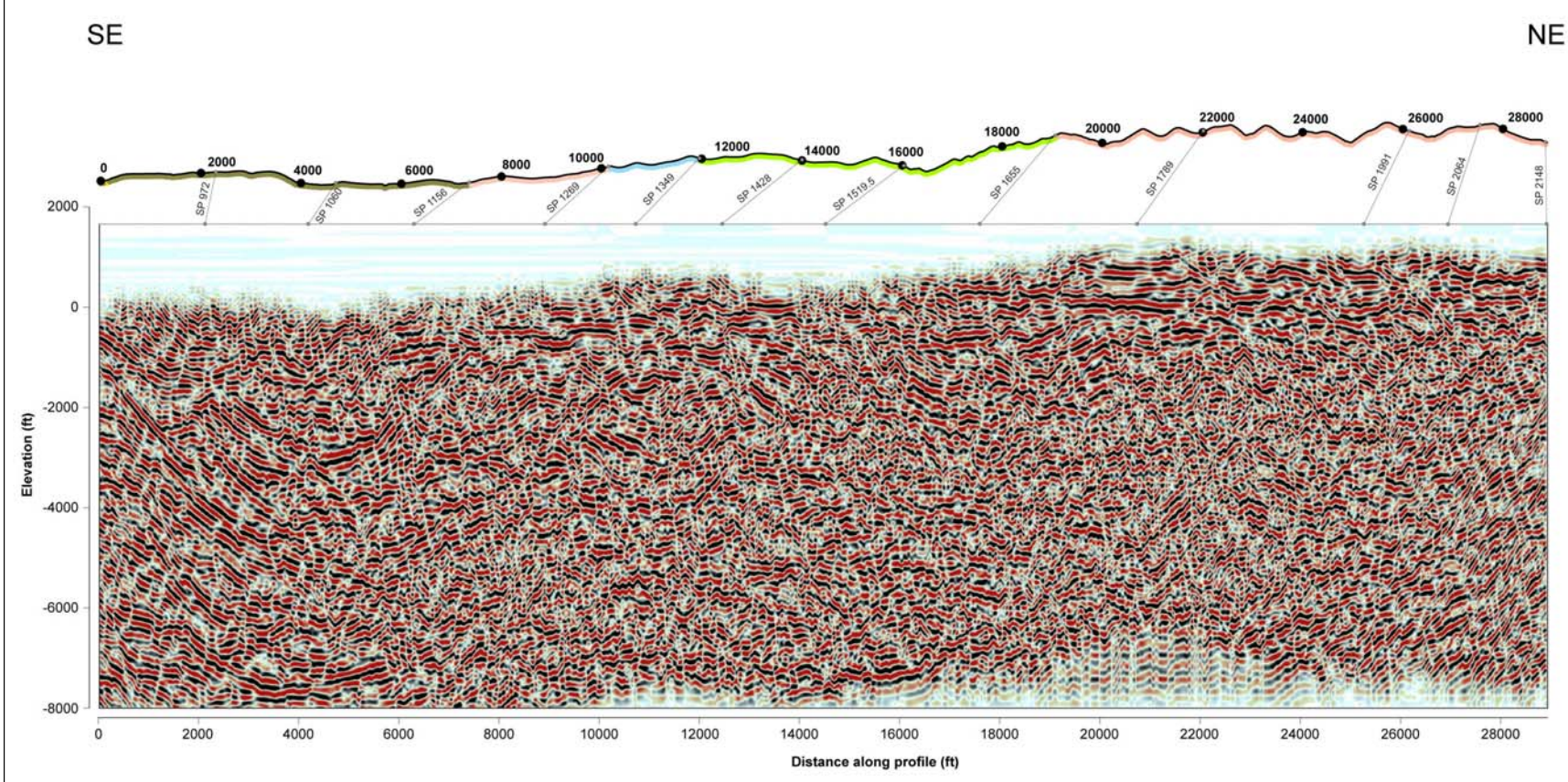
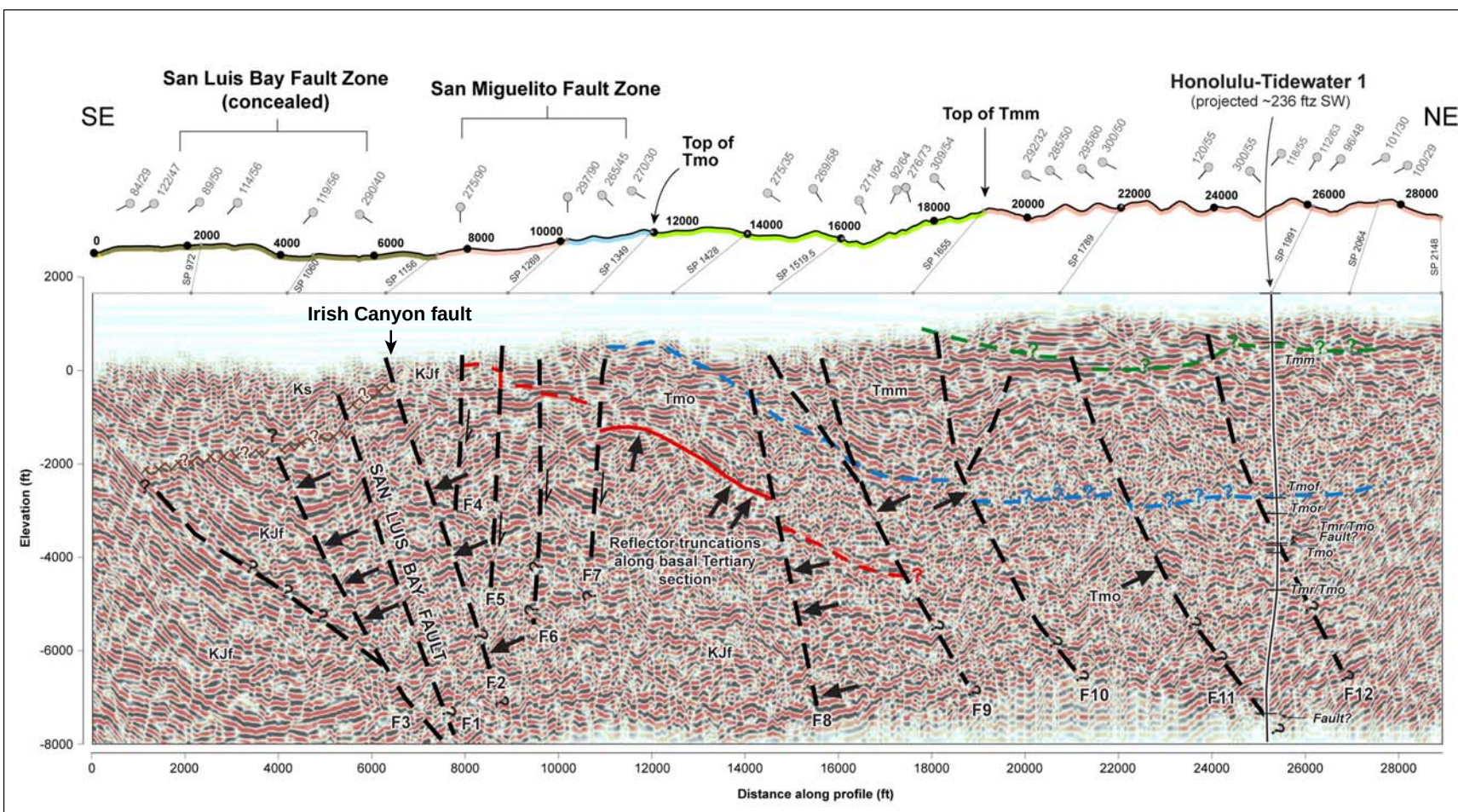
(a) Uninterpreted



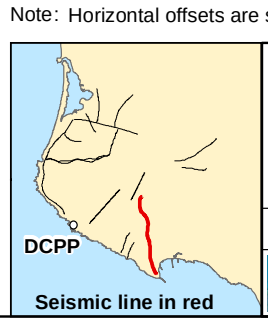
(b) Interpreted



EXPLANATION

- Fault; solid where well located, dashed where approximately located
- *Tmm* — Top of Monterey Formation
- *Tmo* — Top of Obispo Formation
- *KJf* — Top of Mesozoic Basement
- 2000 — Horizontal distance along seismic line, 2,000-foot increment
- Profile strike/dip (True dip, Strike 204/54, Apparent dip)
- SP 1060 — Shot point tie line location
- Arrow marking offset or truncated reflectors

Note: Horizontal offsets are shown along a topographic profile above the seismic line.



Seismic Reflection Profile, Line AWD 112-140

RESPONSE TO DR. HAMILTON'S TESTIMONY

Pacific Gas and Electric Company

Figure **6-55**