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December 2, 2015

PG&E Letter DCL-15-138

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555-0001

10 CFR 50.54(f)

Docket No. 50-275, OL-DPR-80
Docket No. 50-323, OL-DPR-82
Diablo Canyon Units 1 and 2
Seismic Data Request from NRC – Southwest Research Institute

References: 1. PG&E Letter DCL-15-035, "Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Seismic Aspects of Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident: Seismic Hazard and Screening Report," dated March 11, 2015 (ADAMS Accession No. ML15071A046)

2. PG&E Letter DCL-14-081, "Central Coastal California Seismic Imaging Project, Shoreline Fault Commitment," dated September 10, 2014, with Enclosure titled "Central Coastal California Seismic Imaging Project - Report to the California Public Utilities Commission," (ADAMS Accession No. ML14260A387)

Dear Mr. DiFrancesco:

On March 11, 2015, Pacific Gas and Electric Company (PG&E) submitted the Diablo Canyon Power Plant (DCPP) Seismic Hazards and Screening Report (SHSR), "Response to NRC Request for Information Pursuant to 10 CFR 50.54(f) Regarding the Seismic Aspects of Recommendation 2.1 of the Near-Term Task Force Review of Insights from the Fukushima Dai-ichi Accident: Seismic Hazard and Screening Report," (Reference 1) to the NRC.

The NRC and its contractor (Southwest Research Institute) conducted an audit of the Seismic Source Characterization (SSC) studies associated with the DCPP SHSR (ML15217A356) on August 26 and 27, 2015. Subsequently, the NRC conducted an audit of the Ground Motion Characterization (GMC) studies associated with the DCPP SHSR (Reference ML15244B099) on September 11, 2015. As a

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follow up to the SSC audit, as further clarified during the GMC audit, the staff requested additional data for their review.

The following specific information was requested by the staff to support their evaluation of the Half Graben structure as described in the Chapter 4 (Interpretation of Seismic-Reflection Data, Point Buchon to San Simeon Point) of the Central Coastal California Seismic Imaging Project (CCCSIP) Report (Reference 2):

- Depth-corrected seismic reflection data - CM lines from COMAP 1986
- PBS Lines from United States Geologic Survey (USGS) 2008 seismic survey
- PBS Lines from USGS 2009 seismic survey
- Bathymetric data - Multi-Beam Echo Sounder (MBES) bathymetric data within the area shown in Plate 7 from the CCCSIP report
- Depth corrected interpreted horizons - The two mapped unconformities within the Half Graben basin, HG1 and HG2
- Isopach map - The isopach map showing the thickness of the sediment section within the Half Graben basin
- Earthquake data - most recent interpretation of the hypocentral locations of these (Earthquake epicenters plotted on Plate 5) and any other events in the vicinity of the Half Graben structure

The requested data is provided in the Attachment to the Enclosure, which includes two data disks. The Enclosure describes the files contained on the two data disks in more detail.

PG&E makes no new or revised regulatory commitments (as defined by NEI 99-04) in this letter. This letter includes no revisions to existing regulatory commitments.

If you have any questions, or require additional information, please contact Mr. Hossein Hamzehee at (805) 545-4720.

I have been delegated the authority of Barry S. Allen, Vice President – Nuclear Services, during his absence. I state under penalty of perjury that the foregoing is true and correct.

Executed on December 2, 2015.

Sincerely,

Adam Peck
Director, Nuclear Engineering

mjrm/50657817-06/4557
Enclosure:
cc: Diablo Distribution
cc/enc: Marc L. Dapas, NRC Region IV Administrator
Nicholas J. DiFrancesco, NRR/JLD Project Manager
Thomas R. Hipschman, NRC Senior Resident Inspector
Siva P. Lingam, NRR Project Manager
Gonzalo L. Perez, Branch Chief, California Department of Public Health
Frankie Vega, NRR/JLD Project Manager

Response to Seismic Data Request from NRC – Southwest Research Institute (Two Data Diskettes)

Attached are two data diskettes, labelled **"GIS_data"** and **"SegY_export"**, containing the following information:

A. Data Disk 1, "GIS_Data"

Contents

The folder titled **"GIS_Data"** contains following subfolders:

1. Subfolder **"DEMs"**: Digital elevation models (DEMs) for two separate areas:

   a. "DEM_for_Plate_7": This corresponds with the area shown on Plate 7 of Chapter 4 of the Central Coastal California Seismic Imaging Project (CCCSIP) Report (Reference 2).

      The DEMs were compiled and resampled from many data sets. These datasets used to create the DEM for Plate 7 are listed in Table A1.

   b. "DEM_for_site_area": This corresponds to the Diablo Canyon Power Plant (DCPP) Site Area.

      The DEMs were compiled and resampled from many data sets. The datasets used to create the DEM for the DCPP Site Area are listed in Table A2.

2. Subfolder **"Earthquake_data"**: Shapefile of the earthquake catalog provided by Dr. Jeanne Hardebeck (USGS) to PG&E in 2014. Details about the catalog are provided in Appendix F of the DCPP Seismic Source Characterization report (Reference 3).

3. Subfolder **"Sediment_Thickness_Contour"**: Shapefile with the offshore isopach map, which is presented on Plate 7 of Chapter 4 of the CCCSIP Report (Reference 5). This map was created by taking the difference in the two way travel time (TWTT) between the seafloor reflector and the interpreted top-of-rock, and using an assumed seismic velocity of 1600 meters per second.

Table A1 – Data Sources for the Portion of the Offshore DEM on Plate 7 of CCCSIP Chapter 4 (Reference 2)		
Layer file name	**Description**	**Title and Citation**
southern calif crm v1	NGDC's U.S. Coastal Relief Model (CRM) providing 3 arc seconds (roughly 90 meters) comprehensive view of the U.S. coastal zone integrating offshore bathymetry with land topography of the coastline. Horizontal Coordinate System: World Geodetic System (WGS) 1984. Ellipsoid Name: Geodetic Reference System (GRS) GRS-80 Available at: http://www.ngdc.noaa.gov/mgg/coastal/grddas06/grddas06.htm	Coastal Relief Model of the Southern California. NOAA, (2003)
port san luis public navd88.asc	One third arc-second DEM covering onshore and offshore region of Port San Luis, CA. Horizontal Coordinate System: WGS 1984. Vertical Coordinate System: North American Vertical Datum of 1988 (NAVD88) Port San Luis, CA 1/3 arc-second NAVD 88 Available at: http://www.ngdc.noaa.gov/dem/squareCellGrid/download/3164	Port San Luis, CA 1/3 arc-second DEM data including onshore and offshore DEM. NOAA (2011).
Area 02 UTM 10 B1 LiDAR	One meter grid size onshore Hydro-flattened Bare Earth DEM data. Horizontal Coordinate System: Universal Transverse Mercator (UTM) Zone 10, North American Datum (NAD) NAD83 (2007). Vertical Coordinate System: NAVD88 Available at: https://catalog.data.gov/dataset/2009-2011-ca-coastal-conservancy-coastal-lidar-project-hydro-flattened-bare-earth-dem	2009 - 2011 CA Coastal Conservancy Coastal Lidar Project: Hydro-flattened Bare Earth DEM. NOAA (2012)
PG&E 2013 LiDAR	One meter grid size onshore LiDAR DEM data. Horizontal Coordinate System: UTM Zone 10, NAD83 (2011). Vertical Coordinate System: NAVD88 Available at: http://www.pge.com/mybusiness/edusafety/systemworks/dcpp/SSHAC/legacy_documents/datasets/index.shtml	2009 - 2011 CA Coastal Conservancy Coastal Lidar Project: Hydro-flattened Bare Earth DEM. NOAA (2012)

Table A1 – Data Sources for the Portion of the Offshore DEM on Plate 7 of CCCSIP Chapter 4 (Reference 2)		
Layer file name	**Description**	**Title and Citation**
scc07 2mbathy scc07 5mallbt scc08 2mbathy scc08 5mallbt scc09 2mbathy scc09 5mallbt scc10 2mbathy scc10 5mallbt scc11 2mbathy scc11 5mallbt scc12 2mbathy	Two meter and five meter cell size DEM grids including offshore multibeam bathymetry data sets. Horizontal Coordinate System: UTM Zone 10, NAD83 (1983). Vertical Coordinate System: NAVD88 Available at: http://seafloor.otterlabs.org/SFMLwebDATA_SURVEYMAP.htm	Bathymetric DEM data collected using multibeam, sidescan and sub-bottom sonar technologies by The California Seafloor Mapping Project (CSMP). Seafloor Mapping Lab of California State University Monterey Bay (2009, 2010, and 2011)
USGS UTM NAD83 grid	Two meter grid size offshore multibeam bathymetry data set published by USGS as Open-File Report 2013–1225. Horizontal Coordinate System: UTM Zone 10, NAD83 (2011). Vertical Coordinate System: NAVD88 Available at: http://pubs.usgs.gov/of/2013/1225/	Bathymetry and Acoustic Backscatter Data - Estero Bay, California. Open-File Report 2013–1225, USGS (2013)

Table A2– Data Sources for the DCPP Site Area DEM		
Layer file name	**Description**	**Title and Citation**
port san luis public navd88.asc	One-third arc-second DEM covering onshore and offshore region of Port San Luis, CA. Horizontal Coordinate System: Geographic WGS 1984. Vertical Coordinate System: NAVD88 Port San Luis, CA 1/3 arc-second NAVD 88 Available at: http://www.ngdc.noaa.gov/dem/squareCellGrid/download/3164	Port San Luis, CA 1/3 arc-second DEM data including onshore and offshore DEM. NOAA (2011).
Area 02 UTM 10 C1 LiDAR	One meter grid size onshore Hydro-flattened Bare Earth DEM data. Horizontal Coordinate System: UTM Zone 10, NAD83 (2007). Vertical Coordinate System: NAVD88 Available at: https://catalog.data.gov/dataset/2009-2011-ca-coastal-conservancy-coastal-lidar-project-hydro-flattened-bare-earth-dem	09 - 2011 CA Coastal Conservancy Coastal Lidar Project: Hydro-flattened Bare Earth DEM. NOAA (2012)
PG&E 2010 LiDAR	One meter grid size onshore LiDAR DEM data. Horizontal Coordinate System: UTM Zone 10, NAD83 (2011). Vertical Coordinate System: NAVD88 Available at: http://www.pge.com/mybusiness/edusafety/systemworks/dcpp/SSHAC/legacy_documents/datasets/index.shtml	2010 Diablo Canyon LiDAR Survey. PG&E (2010)
PG&E 2011 LiDAR	One meter grid size onshore LiDAR DEM data. Horizontal Coordinate System: UTM Zone 10, NAD83 (2011). Vertical Coordinate System: NAVD88 Available at: http://www.pge.com/mybusiness/edusafety/systemworks/dcpp/SSHAC/legacy_documents/datasets/index.shtml	2011 Los Osos-Edna Valley LiDAR Survey. PG&E (2011)

Table A2– Data Sources for the DCPP Site Area DEM		
Layer file name	**Description**	**Title and Citation**
PG&E 2013 LiDAR	One meter grid size onshore LiDAR DEM data. Horizontal Coordinate System: UTM Zone 10, NAD83 (2011). Vertical Coordinate System: NAVD88 Available at: http://www.pge.com/mybusiness/edusafety/systemworks/dcpp/SSHAC/legacy_documents/datasets/index.shtml	San Simeon and Cambria Faults LiDAR Survey. PG&E (2013)
pb 25mbathy pb 2mbathy cc bb 1mbthy cc bb 2mbthy cc bb 5mallbt cc bc 1mbthy cc bc 2mbthy cc bc 5mallbt	One meter, two meter, five meter and twenty-five meter cell size DEM grids including offshore multibeam bathymetry data sets. Horizontal Coordinate System: UTM Zone 10, NAD83 (1983). Vertical Coordinate System: NAVD88 Available at: http://seafloor.otterlabs.org/SFMLwebDATA_SURVEYMAP.htm	Bathymetric DEM data collected using multibeam, sidescan and sub-bottom sonar technologies by The California Seafloor Mapping Project (CSMP). Seafloor Mapping Lab of California State University Monterey Bay (2009, 2010, and 2011)

B. Data Disk 2, "SegY_export"

Contents

The folder titled **"SegY_export"** includes the following items in subfolders:

- Seismic reflection profiles
- Interpreted seismic horizons HG1 and HG2
- Interpreted seismic horizons H10, H30, and H40
- Interpreted faults

1. Subfolder **Seismic Reflection Profiles "COMAP_Lines"**: SegY files from the COMAP, 1986 Survey. These seismic lines were interpreted as part of Chapter 4 of the CCCSIP report (Reference 2): The following lines are included:

1986 COMAP Survey Lines
35
37
39
41
43
45
47
49
51
55

These lines are provided in the UTM coordinate system, meters, relative to the WGS 1984 horizontal datum. They include seismic reflection amplitude data in TWTT. None of these lines have been depth corrected.

2. Subfolder **Seismic Reflection Profiles "PBS Lines"**: SegY files for the following seismic lines:

USGS 2008 Survey	USGS 2009 Survey
PBS-08B	PBS-203
PBS-37A	PBS-204
PBS-37T	PBS-204A
PBS-38A	PBS-206
PBS-38T	PBS-207
PBS-39A	PBS-209
PBS-39T	PBS-210
PBS-40	PBS-212
PBS-49	PBS-220
PBS-50	PBS-229
	PBS-230
	PBS-232
	PBS-233
	PBS-235
	PBS-236
	PBS-237
	PBS-238
	PBS-238A
	PBS-238B
	PBS-255
	PBS-256
	PBS-258
	PBS-259
	PBS-260
	PBS-261
	PBS-278

These profiles were exported from IHS Kingdom software and are provided in the UTM coordinate system, meters, relative to the WGS 1984 horizontal datum. They include seismic reflection amplitude data in TWTT. None of these lines have been depth corrected. Additional information about the Point Buchon Sparker (PBS) lines collected by the USGS is provided in "High-Resolution Seismic Reflection and Marine Magnetic Data Along the Hosgri Fault Zone, Central California" (Reference 4).

Please note that this list differs slightly from the supplemental data request. Differences between the requested data and those provided on the enclosed data diskette are as follows:

a. Lines PBS-88, PBS-37AT, and PBS-39AT do not exist. There are apparently typographical errors on Plate 7 of Chapter 4 of the CCCSIP report

(Reference 5). In lieu of these requested lines, we instead exported lines PBS-08B, PBS-37T, and PBS-39T.

b. We also included lines PBS-204 and PBS-238B, which are useful lines in this geographical extent.

3. Subfolder **"Interpreted Seismic Horizons"**: Six different interpreted seismic horizons, which were exported from IHS Kingdom software in the following ASCII format:

X Y Line Trace Time Attribute

The regional unconformities H10, H30, and H40 were originally mapped as part of the work described in the seismic stratigraphy report (Reference 1). A description of the mapping is provided in that report. These unconformities were subsequently used for interpretive work described in Chapter 3 of the CCCSIP Report (Reference 2) and the DCPP seismic source characterization report (Reference 3).

ASCII files containing these horizons as interpreted on the USGS seismic reflection profiles listed above (see sub-folder Seismic Reflection Profiles - PBS lines) are provided as .dat files. Note that unconformity H40 is provided as two separate ASCII files, one that includes the part of the horizon located west of the primary traces of the Hosgri fault (named H40_west.dat) and one east of the primary traces of the Hosgri fault (named H40_East.dat). Unconformities HG1 and HG2, which are described in Chapter 4 of the CCCSIP Report (Reference 2), are also included as mapped on the COMAP and USGS lines listed above.

4. Subfolder **"Interpreted Faults"**: Three different ASCII files containing faults interpreted on the seismic reflection profiles listed in the subfolder Seismic Reflection Profiles – COMAP lines and PBS lines).

a. File named "FAULTS_SSHAC.dat": Faults that were mapped on the USGS data as part of the work described in the seismic stratigraphy report (Reference 1) and Chapter 3 of the CCCSIP Report (Reference 2). These faults are shown on the maps in the seismic source characterization report for the Diablo Canyon power plant (Reference 3). These include the following faults: LO1000, SS1000, HF1014, HF1015, HF1016, HF1023, HF1024, HF1030, HF1031, HF1032, HF1033, HF1034, HF1040, HF1045, and HF1051.

b. File named "Faults_Ch_4": Named faults that were mapped on USGS data and COMAP data, as part of the work described in Chapter 4 of the CCCSIP Report (Reference 2).

c. File named "Faults_Ch_4_unassigned": Unassigned faults that were mapped on USGS data and COMAP data, as part of the work described in Chapter 4 of the CCCSIP Report (Reference 2).

References

1. PG&E (2013), "Stratigraphic Framework for Assessment of Fault Activity Offshore of the Central California Coast between Point San Simeon and Point Sal," PG&E Technical Report No. GEO.DCPP.TR.13.01

2. PG&E (2014), "Central Coastal California Seismic Imaging Project - Report to the California Public Utilities Commission," September 2014 (available at: www.pge.com/en/safety/systemworks/dcpp/seismicsafety/report.page)

3. PG&E (2015), "Seismic Source Characterization for Probabilistic Seismic Hazard Analysis for the Diablo Canyon Power Plant, San Luis Obispo, California," Report on the Results of the SSHAC Level 3 Study in Partial Compliance with NRC Letter 50.54(f), March 2015 (available at: http://www.pge.com/en/safety/systemworks/dcpp/sshac/index.page or http://www.pge.com/dcpp-ltsp, see PG&E Seismic Source Characterization SSHAC – Main Report

4. Sliter, R.W., Triezenberg, P.J., Hart, P.E., Watt, J.T., Johnson, S.Y., and Scheirer, D.S. (2010), "High-Resolution Seismic Reflection and Marine Magnetic Data Along the Hosgri Fault Zone, Central California," U.S. Geological Survey Open-File Report 2009-1100, Version 1.1 (available at: pubs.usgs.gov/of/2009/1100)

5. PG&E (2014), Chapter 4: Interpretation of Seismic-Reflection Data, Point Buchon to San Simeon Point, PG&E Technical Report GEO.DCPP.TR.14.05: in Central Coastal California Seismic Imaging Project (CCCSIP) Report to the California Public Utilities Commission (available at: www.pge.com/en/safety/systemworks/dcpp/seismicsafety/report.page)

Attached Data Diskettes

AB1632 – Disk 1 – GIS_data

AB1632 – Disk 2 – SegY_export