Project Organizational Chart

DCPP FOUNDATION VELOCITY REPORT

Pacific Gas and Electric Company Figure 1-1
Imagery from NAIP (2009).

EXPLANATION

- Borehole location (Blume, 1968)
- Downhole log location (1978)
- Obispo velocity location
- Source location
- Receiver location
- Containment structure centerpoint
- Boundary of 3D velocity output
- Profile
- 100-ft spacing points along profile

Map projection and scale: NAD 83 State Plane CA Zone V, 1:6,600
EXPLANATION

2012 Phase 1 Data

- Zland receiver locations
- Sigma receiver locations
- Seistronix receiver locations
- Vibroseis source locations
- DDH-C Borehole location of the 1978 investigations

Map projection and scale: NAD 83 State Plane CA Zone V, 1:11,000
Residual fractal range

200-foot offset bins
Mean bin residual
Median Bin residual

Offset (feet)

Residual (s)

Note: 22700351 first break picks: mean residual = -8.08 ms, standard deviation = 25.26 ms

2011 and 2012 Phase 1 Joint Travel-Time-Gravity Inversion Residual Distribution

DCPP FOUNDATION VELOCITY REPORT

Pacific Gas and Electric Company Figure 3-2
Note: 9,172,512 first break picks: mean residual = -1.20 ms, standard deviation = 8.91 ms

2012 Phase 1 Offset <15,000-Foot Travel-Time-Inversion Residual Distribution
Residual fractal range

100-foot offset bins
Mean bin residual •
Median Bin residual ●

Note: 6,380,553 first break picks: mean residual = -0.66 ms, standard deviation = 7.02 ms.

2012 Phase 1 Offset <3,000-Foot Travel-Time-Inversion Residual Distribution
**EXPLANATION**

- Model S time
- Picked S time
- Model P time
- Picked P time

Note: See Figure 2-2 for borehole locations.

**Blume and Associates (1969)**

**Downhole Travel Times**

**DCPP FOUNDATION VELOCITY REPORT**

Pacific Gas and Electric Company | Figure 4-1
These sources are used by more than one group of receivers.
Cable 3 East, NE segment, 120 WET iterations, RMS error 3.7%, 1D-gradient smooth initial model, Version 3.25

Cable 3 East, Center Segment, 120 WET iterations, RMS error 5.6%, 1D-gradient smooth initial model, Version 3.25

Cable 3 East, SE segment, 85 WET iterations, RMS error 3.0%, 1D-gradient smooth initial model, Version 3.25

Notes:
Scaled at 2 times vertical exaggeration.
See Figure 5-1 for profile locations.
1D Lateral Depth Averages of 2D Vp and 3D Vp Compared with 1D Vp-Depth

DCPP FOUNDATION VELOCITY REPORT

Pacific Gas and Electric Company

Figure 5-4
<table>
<thead>
<tr>
<th>Frequency (Hz)</th>
<th>Slowness (s/m)</th>
<th>Phase velocity (m/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.001</td>
<td>0.001</td>
<td>10</td>
</tr>
<tr>
<td>0.002</td>
<td>0.002</td>
<td>20</td>
</tr>
<tr>
<td>0.003</td>
<td>0.003</td>
<td>30</td>
</tr>
<tr>
<td>0.004</td>
<td>0.004</td>
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<td>0.005</td>
<td>50</td>
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<tr>
<td>0.006</td>
<td>0.006</td>
<td>60</td>
</tr>
<tr>
<td>0.007</td>
<td>0.007</td>
<td>70</td>
</tr>
<tr>
<td>0.008</td>
<td>0.008</td>
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<td>90</td>
</tr>
<tr>
<td>0.010</td>
<td>0.010</td>
<td>100</td>
</tr>
</tbody>
</table>

**Seistronix northeast**

FCL IMASW Version 2.1.0: First to last stack of 23 of 23 records

**Sigma northeast**

FCL IMASW Version 2.1.0: First to last stack of 18 of 18 records

**Seistronix central east**

FCL IMASW Version 2.1.0: First to last stack of 20 of 20 records

**Sigma northwest**

FCL IMASW Version 2.1.0: First to last stack of 7 of 7 records

**Seistronix southeast**

FCL IMASW Version 2.1.0: First to last stack of 30 of 30 records

**Sigma southwest**

FCL IMASW Version 2.1.0: First to last stack of 7 of 7 records
Comparison of IMASW Vs Depth with GeoTomo 3D Vs Depth

DCPP FOUNDATION VELOCITY REPORT

Pacific Gas and Electric Company Figure 5-7

EXPLANATION

- Log mean
- DDH-1
- DDH-2
- DDH-3
- DDH-4

DCPP FOUNDATION VELOCITY REPORT

Pacific Gas and Electric Company Figure 5-8
GeoTomo Vs Profile A-A' sites using Vp/Vs depth relation

GeoTomo Vs Profile B-B' sites using Vp/Vs depth relation

GeoTomo Vs Profile C-C' sites using Vp/Vs depth relation

GeoTomo Vs Profile D-D' sites using Vp/Vs depth relation

Note: See Figure 2-2 for profile locations.

DCPP Vs Depth Profiles Along Transects A–D
GeoTomo Vp-Elevation Profiles from Five Obispo Formation Sites

Note: See Figure 2-2 for profile locations.
Vs Elevation Profiles from Five Obispo Formation Sites Using Vp/Vs=2.45

 PACIFIC GAS AND ELECTRIC COMPANY

 Figure 6-3
APPENDIX A

DCPP 3D Velocity Model Electronic Files

Three DCPP 3D velocity models are provided in a text format to ensure that the files can be inspected with a standard text editor. The files contain all the geographic and velocity information as ASCII text. Coordinates are in North American Datum of 1983 (NAD 83) State Plane Zone 5 meters. Coordinates and velocities are provided in meters and meters/second.

The three files are as follows:

- slower_vp_rev3_draft_dcpp_3d_foundation_velocity_grid.txt
- faster_vp_rev3_draft_dcpp_3d_foundation_velocity_grid.txt
- GeoTomo_vp_rev3_draft_dcpp_3d_foundation_velocity_grid.txt

The file faster_vp_rev3_draft_dcpp_3d_foundation_velocity_grid.txt contains the faster estimates of shallow Vp velocity that are probably closer to current DCPP conditions than the file slower_vp_rev3_draft_dcpp_3d_foundation_velocity_grid.txt that contains slower shallow Vp that correspond more to a pre-construction foundation condition. A minimum Vp corresponding to a saturated soil condition (Vp=1,600 m/s) is imposed below mean sea level when original 3D Vp is <1,600 m/s. The original GeoTomo Vp in the GeoTomo_vp_rev3_draft_dcpp_3d_foundation_velocity_grid.txt file has been modified to enforce the Vp=1,600 m/s saturation condition below sea level. Cell x and y coordinates correspond to cell centers, and cell elevations refer to the top of the cell. The original GeoTomo 3D velocity model started at an elevation of 2,107 feet above mean sea level to account for topography. Consequently, all elevations fall on 2- or 7-foot steps in the right-hand digit because the vertical cell size is 5 feet. All elevations are rounded to the closest cell top elevation.

The file format uses text lines above data to document the data following the text line. To illustrate the format, the first several lines of the following file are reproduced below with line numbers preceding each line of file context:

- faster_vp_rev3_draft_dcpp_3d_foundation_velocity_grid.txt

Example first 11 lines of file format:

- Line 1: Cell-centered draft DCPP Vp and Vs velocity grid with units in meters and meters/second
- Line 2: Cell-centered NAD 83 State Plane Zone 5 lower-left origin in meters
- Line 3: 1739470.8 693153.31
- Line 4: Horizontal constant-velocity cell size in meters
- Line 5: 15.2400
- Line 6: Vertical constant-velocity cell size in meters
The entire sequential lists of text lines without the intervening data are produced below:

- Cell-centered draft DCPP Vp and Vs velocity grid with units in meters and meters/second
- Cell-centered NAD 83 State Plane Zone 5 lower-left origin in meters
- Horizontal constant-velocity cell size in meters
- Vertical constant-velocity cell size in meters
- Number of vertical velocity profiles
- Number of elevation points in each velocity profile
- Elevation values in meters (positive above sea level) of velocity cell tops (124 points)
- Distance east from lower-left cell center to each x,y cell center in meters (2,695 points)
- Distance north from lower-left cell center to each x,y cell center in meters (2,695 points)
- Vp value that indicates an elevation sample is above topography
- Vs value that indicates an elevation sample is above topography
- Vp elevations profiles in meters/second (2,695 lines with 124 velocity values per line)
- Vs elevations profiles in meters/second (2,695 lines with 124 velocity values per line)

The example Interactive Display Language (IDL) command set below illustrates an approach to read a DCPP 3D velocity file:

```idl
str=""
ifile='slower_vp_rev3_draft_dcapp_3d_foundation_velocity_grid.txt'
openr,unit1,ifile,/get_lun
readf,unit1,str
readf,unit1,str
xorigm=0d0
yorigm=0d0
readf,unit1,xorigm,yorigm
readf,unit1,str
hcellsizem=0d0
readf,unit1,hcellsizem
readf,unit1,str
```
Figure A1 shows the geographic extent of the 3D foundation velocity model shown in 3D map view in Figure A2 and the depth profile location shown in Figure A3. Figures A2 and A3 illustrate how the 3D model will appear when read correctly. Figure A2 shows a FLAC3D rendering of the model topography. Figure A3 shows a 2D elevation Vs west-to-east cross section 381 m north of the south end of the model.
Imagery from NAIP (2009).
DCPP FLAC3D Model (Jigsaw Model)

Note: See Figure A1 for model location.
Vs Profile @ Y of 381 m
(South End of Plant Area)

Note: See Figure A1 for model location.
APPENDIX B
DCPP VS-DEPTH PROFILES ALONG TRANSECTS A-D
(Total 4-Figures)
GeoTomo Vs Profile A-A’ sites using Vp/Vs depth relation

Note: See Figure 2-2 for profile locations.
GeoTomo Vs Profile B-B' sites using Vp/Vs depth relation

Note: See Figure 2-2 for profile locations.

DCPP Vs Depth Profiles Along Transect B-B'

CENTRAL COASTAL CALIFORNIA SEISMIC IMAGING PROJECT

Pacific Gas and Electric Company | Figure B-2
GeoTomo Vs Profile C-C' sites using Vp/Vs depth relation

Note: See Figure 2-2 for profile locations.
GeoTomo Vs Profile D-D' sites using Vp/Vs depth relation

Table:

<table>
<thead>
<tr>
<th>Site</th>
<th>East (ft.)</th>
<th>North (ft.)</th>
<th>Elev. (ft.)</th>
</tr>
</thead>
<tbody>
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<td>0</td>
<td>5708609.3</td>
<td>2275152.4</td>
<td>72.8</td>
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<td>2275266.5</td>
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<tr>
<td>900</td>
<td>5709441.7</td>
<td>2275494.8</td>
<td>199.9</td>
</tr>
</tbody>
</table>

Note: See Figure 2-2 for profile locations.

DCPP Vs Depth Profiles Along Transect D-D'