PROJECT BRIEF

GEOVision geophysical services

GEOPHYSICAL CHARACTERIZATION
UPPER BORREGO VALLEY, CALIFORNIA

Project Description

The Kajima Southern California Strong Motion Network is part of a larger NUPEC* - sponsored project to determine the seismic design criteria for nuclear power plants sited on quaternary sediments in Japan. The specific purpose of this earthquake monitoring network is to provide measured soil site earthquake response data, to be used in the confirmation of various analytical and numerical modeling techniques for estimation of earthquake ground motion on soil sites. One of the sites consisting of both a horizontal and vertical array of strong motion accelerometers (SMAs) in located near Borrego Springs, in Southern California. The locations of the vertical array (Main Station) and horizontal array SMAs are shown on the attached Site Map.

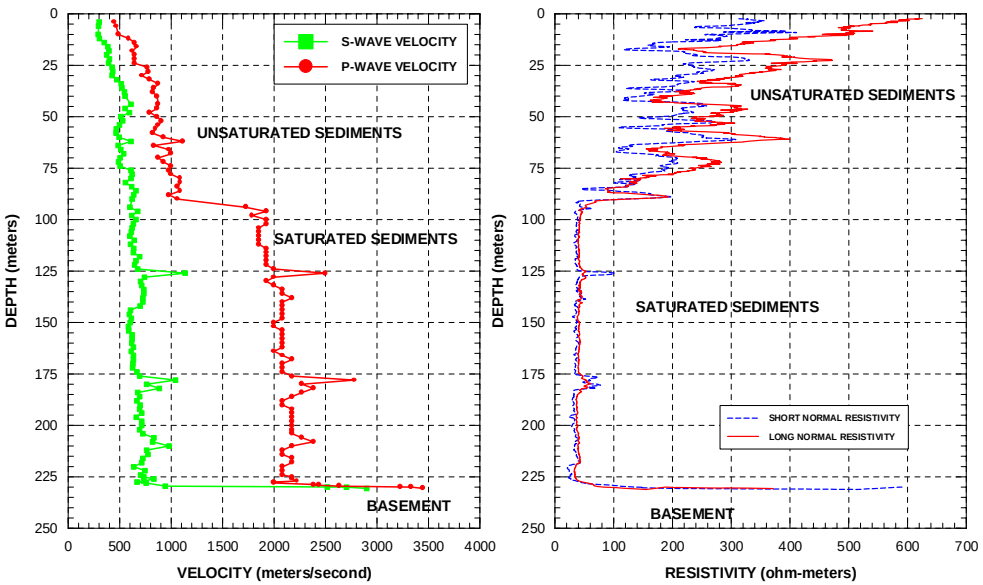
In support of the analytical and modeling effort, detailed geological, geotechnical, and geophysical studies were carried out to characterize the site. This brief outlines the geophysical investigations performed.

Work Performed

The purpose of the geophysical investigation was to develop a 3D model of depth to groundwater and crystalline basement in the north portion of the valley. This model was used in conjunction with borehole P- and S-wave velocity measurements and soil sample density measurements to develop a 3D model of density, P- and S-wave velocity for the shallow basin.

Oyo PS Suspension velocity logs were obtained in two deep boreholes at the site (Main Station and Oasis Well) to develop a velocity-depth model for the basin. Resistivity, spontaneous potential and natural gamma logs were also obtained in these boreholes.

Several surface geophysical methods were used during this investigation to map depth to groundwater and/or base-ment including time-domain electromagnetic (TDEM), seis-mic refraction, seismic reflec-tion, and gravity.



OYO PS Suspension Log and Resistivity Log at the Main Station

Thirty-five TDEM soundings were conducted at selected locations in the valley to map depth to groundwater and basement. Seismic refraction soundings were conducted at 16 locations to determine approximate depth to ground-water. Additionally, two long seismic refraction lines were conducted near the Main Station to characterize depth to groundwater and bedrock.

A seismic reflection survey was conducted along the horizontal array in an attempt to characterize bedrock topography. Over 600 gravity stations were occupied on a 100-by 400-meter grid. The gravity modeling was constrained using depth to bedrock estimates from the TDEM and seismic surveys and known bedrock depths in two boreholes.

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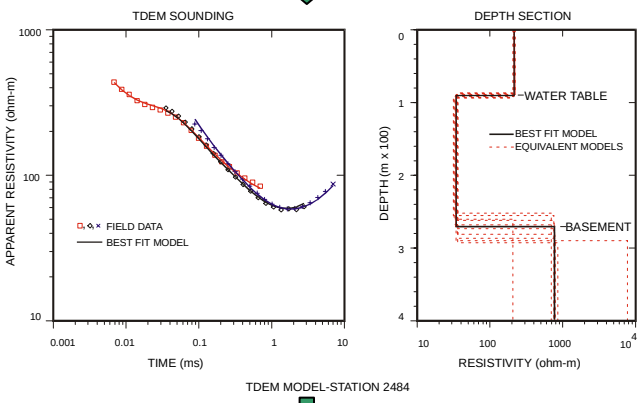
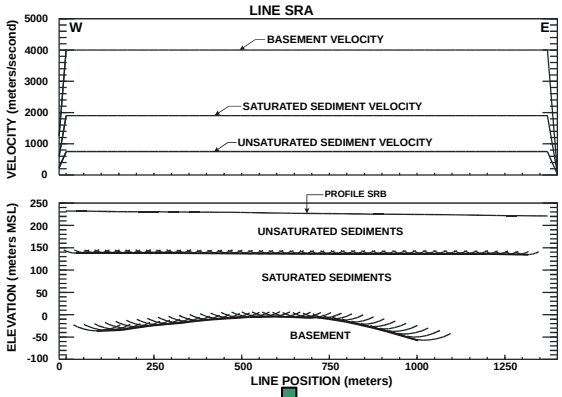
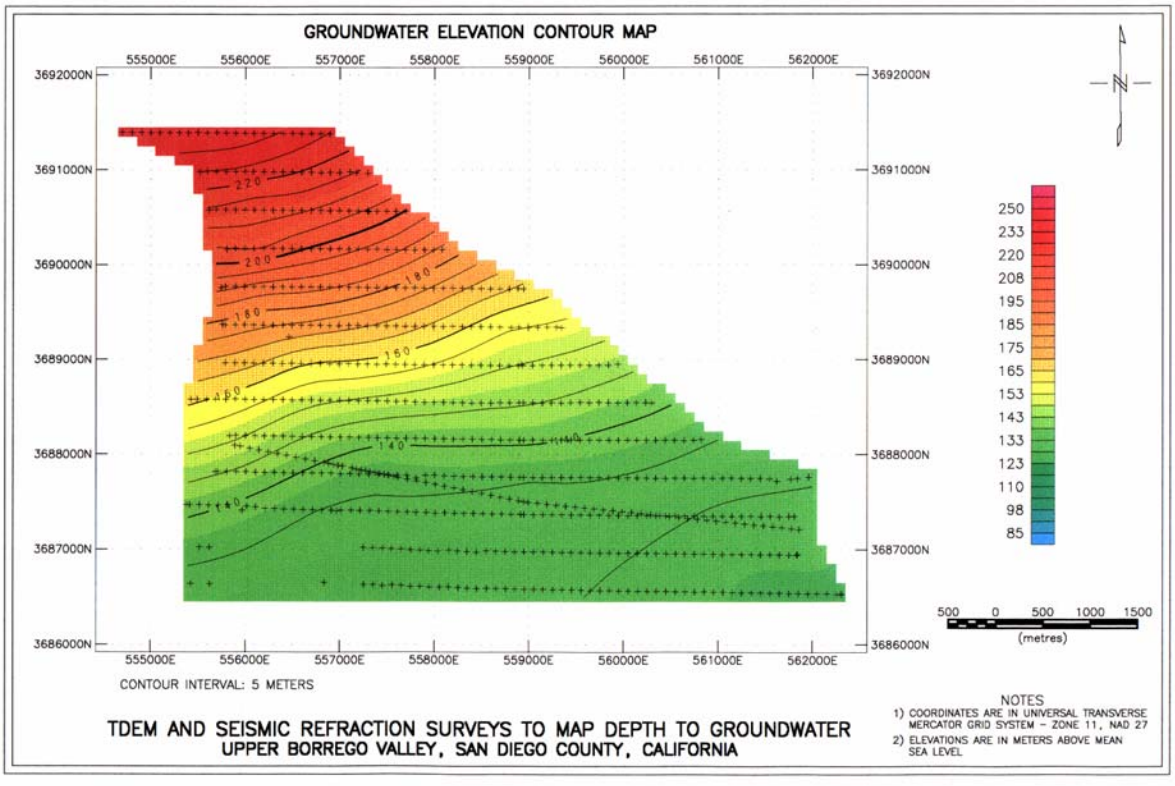
TDEM SURVEY



TDEM MODEL-STATION 2484

SEISMIC REFRACTION SURVEY





TDEM AND SEISMIC REFRACTION SURVEYS TO MAP DEPTH TO GROUNDWATER
UPPER BORREGO VALLEY, SAN DIEGO COUNTY, CALIFORNIA

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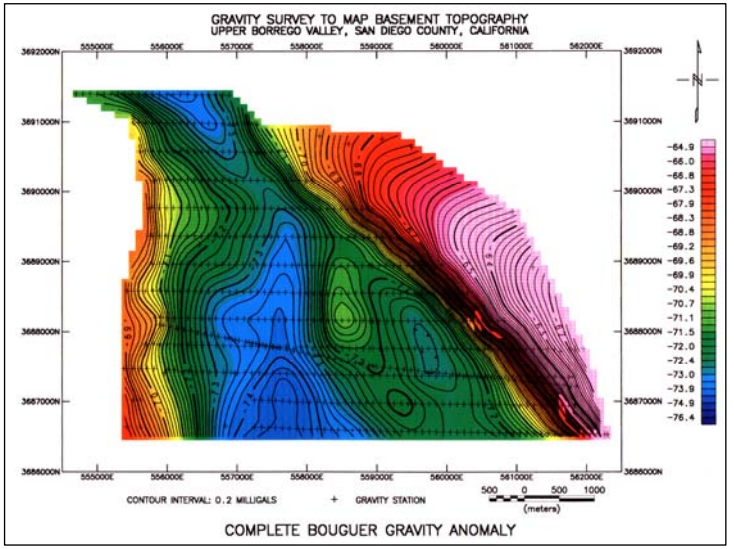
GRAVITY SURVEY

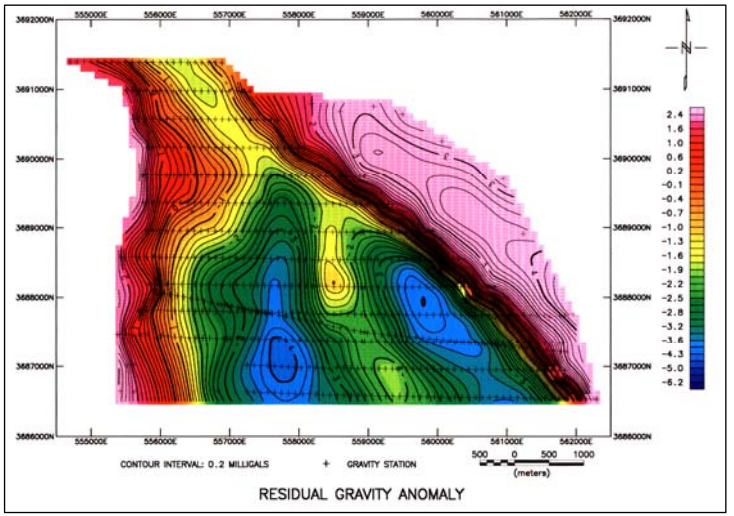
DATA ACQUISITION

DATA REDUCTION

- Tide Correction
- Drift Correction
- Latitude Correction
- Free-air Correction
- Bouguer Correction
- Digital Terrain Correction



REGIONAL-RESIDUAL SEPARATION



DATA MODELLING