5.7 GEOLOGICAL RESOURCES

5.7.1 Significance Criteria

In accordance with the CEQA Guidelines, Appendix G, impacts related to geological resources would be considered potentially significant if Segment 1 of the Antelope Transmission Project would result in:

- Unstable earth conditions or changes in geologic substructures
- Disruptions, displacements, compaction, or overcovering of the soil
- Change in topography or ground surface relief features
- The destruction, covering, or modification of any unique geologic or physical features
- Any increase in wind and water erosion of soils, either on or off the site
- Changes in deposition or erosion of beach sands, or changes in siltation, deposition or erosion, which may modify the channel of a river or stream or the bed of the ocean or any bay, inlet, or lake
- Exposure of people or property to geologic hazards, such as earthquakes, landslides, mudslides, ground failure, or similar hazards

5.7.2 Geologic Hazards

5.7.2.1 Strong Ground Shaking

During the design life of the proposed project, moderate to high levels of ground shaking are possible given the seismic setting of the project area. Design level studies would identify the hazard levels and present engineering recommendations to support appropriate seismic designs. Overhead T/Ls and substation equipment can be engineered and constructed to withstand strong motions and moderate ground deformation. For example, specific requirements for seismic design would be followed based on the Institute of Electrical and Electronic Engineers' 693 "Recommended Practices for Seismic Design of Substation". Strong ground shaking is considered during substation design, but is not as relevant to T/L tower design because wind design criteria, which are considered, are more conservative than ground shaking considerations.

5.7.2.2 Ground Rupture

While ground ruptures and ground acceleration due to fault activity may impart significant loads onto transmission line structures, loads imparted by wind on transmission structures are considered a greater force and more likely to cause damage to these structures. Therefore, wind loads would be used as the governing force in the design of the proposed transmission structures.

5.7.2.3 Liquefaction

Potential liquefaction hazards have been identified along the T/L routes and underlying the Pardee Substation, based on recent CGS hazard mapping. Liquefaction hazards would be evaluated during site specific design-level studies for the project. In general, liquefaction hazards in this setting for these kinds of structures can be mitigated with appropriate foundation design.

5.7.2.4 Expansive and Collapsible Soils

Engineering studies would evaluate the presence and extent of expansive or collapsible soil, if present within the proposed foundation areas of proposed structures. Standard design practices are available to mitigate these soil conditions, if encountered.

5.7.2.5 Subsidence

Subsidence has been documented in the southern end of the project area within the Santa Clara River valley. Design-level studies should address the potential hazard from subsidence. The rate of subsidence reported is not great and the phenomenon is a regional one. Because the subsidence-related ground movements are relatively small and occur over a very wide area, they are not likely to represent a significant potential for differential settlements within or between the foundation zones of project components. Therefore, the hazard to the electrical T/Ls or substation equipment resulting from subsidence in the Santa Clara River valley is considered remote.

5.7.2.6 Erosion

The construction of T/L structures would require grading to create pads for tower sites and grading to expand the existing access road system to reach the tower sites. This would result in some soil disturbance and loss of vegetation that would in turn promote a short term increase in erosion. Erosion control measures and Best Management Practices would be implemented during construction to minimize erosion and sedimentation during grading. Any

new spur roads would be laid out to maximize use of existing access roads for construction of the T/Ls. Design-level studies would address erosion and sediment control issues during construction and operation of the project. In addition, the project would be constructed in accordance with the conditions (including BMPs) in the construction SWPPP for the project. No significant impacts are anticipated as a result of the project.

5.7.3 Mitigation Measures

The following are applicant-proposed measures to limit geological resource related impacts to less than significant levels:

APM Geo-1. For new substation construction (e.g., expansion of Antelope Substation), specific requirements for seismic design will be followed based on the Institute of Electrical and Electronic Engineers' 693 "Recommended Practices for Seismic Design of Substation".

APM Geo-2. Prior to final design of substation facilities and T/L tower foundations, a geotechnical study would be performed to identify site-specific geologic conditions in enough detail to support good engineering practice.

APM Geo-3. T/L and substation construction activities would be performed in accordance with the soil erosion/water quality protection measures specified in the Construction SWPPP.