Southern California Edison
ELM Project A.18-05-007

DATA REQUEST SET A1805007-ED-SCE-DEF-001

To: ENERGY DIVISION
Prepared by: Rey Gonzales
Title: Environmental Project Manager
Dated: 07/17/2018

Question 50A (B-26):

Provide a copy of geotechnical investigation if completed, including known and potential geologic hazards such as ground shaking, subsidence, liquefaction, etc.

SCE states that a geotechnical report will be provided under separate cover when available.
A. Please provide a copy of the geotechnical report that includes the information enumerated to the left.

Response to Question 50A (B-26):

SCE is currently developing the geotechnical reports for the two mid-line series capacitor locations and the new in-line capacitor location at Mojave Substation. It is anticipated that these reports will be completed and submitted to the CPUC by July 31, 2018.

Additional geotechnical reports are planned for the three fiber optic repeater sites upon receipt of all applicable agency permits and authorizations. Authorization to perform borings for these three fiber optic repeater sites may not come until the start of construction and would validate design assumptions.

The recommendations in these geotechnical reports will be considered and implemented in the final design for the mid-line series capacitors, in-line capacitor at Mojave Substation, and fiber optic repeater sites on the Lugo-Mojave line.

Southern California Edison
ELM Project A.18-05-007

DATA REQUEST SET A1805007-ED-SCE-DEF-001

To: ENERGY DIVISION
Prepared by: Rey Gonzales
Title: Environmental Project Manager
Dated: 07/17/2018

Question 50A (B-26) Supplemental:

Provide a copy of geotechnical investigation if completed, including known and potential geologic hazards such as ground shaking, subsidence, liquefaction, etc.

SCE states that a geotechnical report will be provided under separate cover when available.
A. Please provide a copy of the geotechnical report that includes the information enumerated to the left.

Response to Question 50A (B-26) Supplemental:

SCE had previously responded that geotechnical reports would later be submitted in SCE's responses to Questions 50A and 50C. Copies of those geotechnical reports are now attached for the Ludlow(Capacitor), Newberry Springs (Capacitor), and the Mohave Substation locations.

Attachment: Geotech Reports_Final.zip

Southern California Edison
ELM Project A.18-05-007

DATA REQUEST SET A1805007-ED-SCE-DEF-001

To: ENERGY DIVISION
Prepared by: Rey Gonzales
Title: Environmental Project Manager
Dated: 07/17/2018

Question 50B (B-26):

Provide a copy of geotechnical investigation if completed, including known and potential geologic hazards such as ground shaking, subsidence, liquefaction, etc.

PEA Section 4.6. Geology, Soils, and Seismic Potential has numerous problems that need to be rectified:

B. The references that are included in the reference list are not cited anywhere in the text; the few reference citations that are included on the figures and tables appear to be incorrect or are not included in the reference list. Please rectify.

Response to Question 50B (B-26):

The references cited on the figures presented in Section 4.6 Geology, Soils, and Seismic Potential were provided in error. The appropriate references are as follows:

Figure 4.6-1: Geologic Formations in the Proposed Project Area

- United States Geologic Survey (USGS). (2018a). California geologic map data for California. Retrieved June 15, 2018, from http://mrdata.usgs.gov/geology/state/state.php?state=CA.
- USGS. (2018b). California geologic map data for Nevada. Retrieved June 15, 2018, from https://mrdata.usgs.gov/geology/state/state.php?state=NV.

Figure 4.6-2: Soils in the Proposed Project Area

- United States Department of Agriculture (USDA). Natural Resources Conservation Service. (2018). Geospatial Data Gateway. Retrieved June 15, 2018, from https://datagateway.nrcs.usda.gov/.

Figure 4.6-3: Active and Potentially Active Faults in the Proposed Project Area

- USGS. (2018c). Faults. Retrieved June 15, 2018. https://earthquake.usgs.gov/hazards/qfaults/.

The references cited under the tables presented in Section 4.6 Geology, Soils, and Seismic Potential are correct; however, the following references should be added to create a comprehensive list.

Table 4.6-1: Soils in the Proposed Project Area

- USDA. Natural Resources Conservation Service. (2018). Geospatial Data Gateway. Retrieved June 15, 2018, from https://datagateway.nrcs.usda.gov/.

Table 4.6-2: Active and Potentially Active Faults in the Vicinity of New Proposed Project Structures

- California Institute of Technology. Southern California Earthquake Data Center. 2018. Retrieved July 11, 2018, from http://scedc.caltech.edu/significant/fault-index.html.

Some of the references presented in Section 4.6 Geology, Soils, and Seismic Potential were used as reference material and for background research. As a result, they were not cited directly in the body of the section.

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To: ENERGY DIVISION
Prepared by: Rey Gonzales
Title: Environmental Project Manager
Dated: 07/17/2018

Question 50C (B-26):

Provide a copy of geotechnical investigation if completed, including known and potential geologic hazards such as ground shaking, subsidence, liquefaction, etc.

PEA Section 4.6. Geology, Soils, and Seismic Potential has numerous problems that need to be rectified:

C. A project Geotechnical Report is referenced several times in the section as related to future project design and to reduce potential geologic impacts by following recommendations in the geotechnical report. The report needs to be provided.

Response to Question 50C (B-26):

As described previously in response to Question 50A, the geotechnical reports for the two mid-line series capacitor locations and the new in-line capacitor location at Mojave Substation will be provided to the CPUC by July 31, 2018.

Additional geotechnical reports are planned for the three fiber optic repeater sites upon receipt of all applicable agency permits and authorizations which may not occur until the start of construction.

Southern California Edison
ELM Project A.18-05-007

DATA REQUEST SET A1805007-ED-SCE-DEF-001

To: ENERGY DIVISION
Prepared by: Rey Gonzales
Title: Environmental Project Manager
Dated: 07/17/2018

Question 50D (B-26):

Provide a copy of geotechnical investigation if completed, including known and potential geologic hazards such as ground shaking, subsidence, liquefaction, etc.

PEA Section 4.6. Geology, Soils, and Seismic Potential has numerous problems that need to be rectified:
D. Subsection 4.6.1.1 Geologic Setting provides a brief summary of the geologic units in the project area and a figure that shows the aerial distribution of the units, however it does not include any description of the units that specifically underlie the proposed project components. Please provide.

Response to Question 50D (B-26):

A table of the geologic units and their associated descriptions underlying Project components is included in the attached file:

"ELM_Q#50D_5.6 Geology, Soils, and Seismic Potential - Attach F - Geologic Unit Descriptions.docx"

ATTACHMENT F: GEOLOGIC UNIT DESCRIPTIONS

Geologic Unit	Description and Source
C: limestone (Mississippian to Early Permian)	Shale, sandstone, conglomerate, limestone, dolomite, chert, hornfels, marble, quartzite; in part pyroclastic rocks
C: marble (Late Proterozoic to Pennsylvanian)	Shale, sandstone, conglomerate, limestone, dolomite, chert, hornfels, marble, quartzite; in part pyroclastic rocks
Ca: sandstone (Late Proterozoic to Middle Devonian)	Sandstone, shale, limestone, dolomite, chert, quartzite, and phyllite; includes some rocks that are possibly Precambrian
D: limestone (Middle to Late Devonian)	Limestone and dolomite, sandstone and shale; in part tuffaceous
gb: gabbro (Triassic to Cretaceous)	Gabbro and dark dioritic rocks; chiefly Mesozoic
gr-m: plutonic rock (phaneritic) (Early Proterozoic to Late Cretaceous)	Granitic and metamorphic rocks, mostly gneiss and other metamorphic rocks injected by granitic rocks. Mesozoic to Precambrian.
grMz: granodiorite (Permian to Tertiary; most Mesozoic)	Mesozoic granite, quartz monzonite, granodiorite, and quartz diorite
grpC: granite (Early Proterozoic to Miocene)	Precambrian granite, syenite, anorthosite, and gabbroic rocks in the San Gabriel Mountains; also various Precambrian plutonic rocks elsewhere in southeastern California.
J: orthoquartzite (Jurassic)	Shale, sandstone, minor conglomerate, chert, slate, limestone; minor pyroclastic rocks.
m: schist (Early Proterozoic to Cretaceous)	Undivided pre-Cenozoic metasedimentary and metavolcanic rocks of great variety. Mostly slate, quartzite, hornfels, chert, phyllite, mylonite, schist, gneiss, and minor marble.
Mc: sandstone (Oligocene to Pleistocene)	Sandstone, shale, conglomerate, and fanglomerate; in part Pliocene and Oligocene.

Geologic Unit	Description and Source
Mzv: felsic volcanic rock (Triassic to Cretaceous)	Undivided Mesozoic volcanic and metavolcanic rocks. Andesite and rhyolite flow rocks, greenstone, volcanic breccia and other pyroclastic rocks; in part strongly metamorphosed. Includes volcanic rocks of Franciscan Complex: basaltic pillow lava, diabase, greenstone, and minor pyroclastic rocks.
P: limestone (Pennsylvanian to Triassic)	Shale, conglomerate, limestone and dolomite, sandstone, slate, hornfels, quartzite; minor pyroclastic rocks.
pC: gneiss (Early Proterozoic to Miocene)	Conglomerate, shale, sandstone, limestone, dolomite, marble, gneiss, hornfels, and quartzite; may be Paleozoic in part.
pCc: gneiss (Early Proterozoic to Miocene)	Complex of Precambrian igneous and metamorphic rocks. Mostly gneiss and schist intruded by igneous rocks; may be Mesozoic in part.
PZ: limestone (Late Proterozoic to Jurassic)	Undivided Paleozoic metasedimentary rocks. Includes slate, sandstone, shale, chert, conglomerate, limestone, dolomite, marble, phyllite, schist, hornfels, and quartzite.
Q: alluvium (Pliocene to Holocene)	Alluvium, lake, playa, and terrace deposits; unconsolidated and semi-consolidated. Mostly nonmarine, but includes marine deposits near the coast.
Qa: alluvium (Quaternary)	Unit is present in all counties. Some counties divided the alluvium into younger and older units, and some did not. For those that did not, or used other generalized terms for Quaternary rocks, the unit Qal has been used for the general undivided alluvium. Additionally, when polygons have been edited and changed to alluvium, Qal was used as the general value; hence it now is present in all counties. Qya-Younger alluvium: Map unit is used in Churchill, Elko, Esmeralda, Eureka, Humboldt, Lander, and Lincoln Counties where geologic information suggests better-defined younger versus older alluvium. It is mostly interchangeable with Qal, except that it implies some specifically younger Quaternary deposits.
Qp: playa (Quaternary)	Playa, lake bed, and flood plain deposits.
QPc: sandstone (Miocene to Pleistocene)	Pliocene and/or Pleistocene sandstone, shale, and gravel deposits; in part Miocene.

Geologic Unit	Description and Source
Qrv: tephrite (basanite) (Holocene)	Recent (Holocene) volcanic flow rocks; minor pyroclastic deposits; in part Pleistocene.
Qs: dune sand (Quaternary)	Extensive marine and nonmarine sand deposits, generally near the coast or desert playas.
QToa: alluvium (Miocene to Quaternary)	Unit is present in all counties. Some counties divided the alluvium into younger and older units, and some did not. For those that did not, or used other generalized terms for Quaternary rocks, the unit Qal has been used for the general undivided alluvium. Additionally, when polygons have been edited and changed to alluvium, Qal was used as the general value; hence it now is present in all counties. Qya-Younger alluvium: Map unit is used in Churchill, Elko, Esmeralda, Eureka, Humboldt, Lander, and Lincoln Counties where geologic information suggests better-defined younger versus older alluvium. It is mostly interchangeable with Qal, except that it implies some specifically younger Quaternary deposits.
Qv: basalt (Quaternary)	Quaternary volcanic flow rocks; minor pyroclastic deposits; in part Pliocene and Miocene.
Ta3: andesite (Late Miocene to Middle Miocene)	Includes some rocks mapped as the Kate Peak and Alta Formations on the Washoe South map; Wahmonie and Salyer Formations on the Nye South map; Gilbert Andesite on the Esmeralda map; pyroxene, hornblende phenoandesite, and phenodacite on the Elko map; and other unnamed units. It corresponds to the unit Ta3 on the 1978 State map. It is present everywhere except Eureka and White Pine Counties.
Tba: basalt (Early Miocene to Early Pliocene)	Generally poorly age constrained. This unit includes rocks originally mapped as the Pyramid sequence in Washoe County, the Mizpah Trachyte in Nye County, the Malpais Basalt, Rabbit Spring Formation, and Mira Basalt in Esmeralda County, and many other poorly dated unnamed basaltic and andesitic rocks around the State. It corresponds to unit Tba on the 1978 State map.
Tc: conglomerate (Paleocene to Pliocene)	Undivided Tertiary sandstone, shale, conglomerate, breccia, and ancient lake deposits.

Geologic Unit	Description and Source
Ti: alkali-granite (alaskite) (Early Miocene to Middle Miocene)	Tertiary felsic intrusive rocks are widely scattered in every county across the State. They are generally described as granitic rocks, granodiorite, monzonite, quartz monzonite, alaskitic granite, quartz diorite, dacite, and rhyodacite in the places where they are shown separately on county maps.
Ti: rhyolite (Tertiary)	Tertiary intrusive rocks; mostly shallow (hypabyssal) plugs and dikes. Includes some Mesozoic rocks.
Tt3: rhyolite (Middle Miocene to Late Miocene)	Includes units mapped as the High Rock sequence on the Washoe North map; the Timber Mountain, Paintbrush, Crater Flat, and Belted Range Tuffs, and Indian Trail Formation (now abandoned) on the Nye South map; the Thirsty Canyon Tuff on the Nye South and Esmeralda maps; and other unnamed units. Locally it includes tuffaceous sedimentary rocks interstratified with tuffs. It is present in the northernmost part and southernmost parts of the State, and is not exposed in the central region. It corresponds to unit Tt3 on the 1978 State map, although a few rocks also mapped as Trt on the 1978 State map also are included. It is present in Clark, Churchill, Washoe, Nye, Lincoln, Lyon, Douglas, Carson, Esmeralda, Elko, Humboldt, Pershing, and Mineral Counties.
Tv: rhyolite (Tertiary)	Tertiary volcanic flow rocks; minor pyroclastic deposits.
Tvp: rhyolite (Tertiary)	Tertiary pyroclastic and volcanic mudflow deposits.
Xm: gneiss (Early Proterozoic)	Exposed mostly in Clark and Lincoln Counties, with two small outliers in southern Nye County. Proterozoic basement rocks - Gneiss and schist.
Ygr: granite (Middle Proterozoic)	Mostly porphyritic biotite granite with large microcline phenocrysts, with local fine-grained border phases and aplite. Associated pegmatite and quartz veins are rare. This unit forms large plutons, including the Oracle Granite, Ruin Granite, granite in the Pinnacle Peak - Carefree area northeast of Phoenix, and several bodies west of Prescott. (1400-1450 Ma)

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To: ENERGY DIVISION
Prepared by: Rey Gonzales
Title: Environmental Project Manager
Dated: 07/17/2018

Question 50E (B-26):

Provide a copy of geotechnical investigation if completed, including known and potential geologic hazards such as ground shaking, subsidence, liquefaction, etc.

PEA Section 4.6. Geology, Soils, and Seismic Potential has numerous problems that need to be rectified:

E. Subsection 4.6.1.2 Soils lists the primary soil types underlying the proposed project and provides a table of soil characteristics. However, this section does not include any discussion of erodible or expansive (shrink-swell) soils as they relate to the proposed project. Table 4.6-1 Soils in the Proposed Project Area presents soil characteristics, however it does not present any soil expansion data, which can be obtained from the SSURGO soil database shrink-swell data. Some soils in the general project area are known to have moderate to high expansion potential. Please provide this information.

Response to Question 50E (B-26):

While the Project spans several soil types as presented in Table 4.6-1: Soils in the Proposed Project Area, grading will only take place at eight distinct locations. Of these eight locations, two (between Towers M4-T2 and M4-T3 and between Towers M29-T3 and M30-T1 on the Lugo-Mohave 500 kV Transmission Line) will require grading to reduce the clearance between existing contours and overhead transmission line conductors and no new facilities will be constructed in these areas. As a result, the shrink-swell characteristics in these areas will not impact the required grading.

The remaining six locations will involve the installation of two new mid-line series capacitors, one replacement series capacitor at Mojave Substation, and three new telecommunication repeater sites. Because new facilities will be constructed at these locations, the shrink-swell characteristics of the underlying soils in these areas will be considered in the design. As discussed in the response to Question 50A, site-specific geotechnical reports are being developed for each of these locations and these reports will be provided to the CPUC once complete. These reports will include site-specific shrink-swell potentials for these facilities. While these reports are under development, the SSURGO soil database was examined and the shrink-swell characteristic are provided as follows:

- Newberry Springs Series Capacitor: LEP_R = 1.5 (low shrink-swell class)
- Ludlow Series Capacitor: LEP_R = 1.5 (low shrink-swell class)
- Mojave Substation: LEP_R = 0.6, 0.8, and 1 (low shrink-swell class)
- Lanfair Telecommunications Repeater: LEP_R = 1.5 (low shrink-swell class)
- Kelbaker Telecommunications Repeater: LEP_R = 1.5 (low shrink-swell class)
- Barstow Telecommunications Repeater: LEP_R = 1.5 (low shrink-swell class)

As a result, all new facilities will be located in areas classified as having low shrink-swell classifications.

Southern California Edison
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DATA REQUEST SET A1805007-ED-SCE-DEF-001

To: ENERGY DIVISION
Prepared by: Rey Gonzales
Title: Environmental Project Manager
Dated: 07/17/2018

Question 50F (B-27):

Provide a copy of geotechnical investigation if completed, including known and potential geologic hazards such as ground shaking, subsidence, liquefaction, etc.

PEA Section 4.6. Geology, Soils, and Seismic Potential has numerous problems that need to be rectified:

F. It is not clear what type of erosion information is presented in the table, as the SSURGO soil databases contains data for both wind and water erosion. Please specify or present both types of erosion information.

Response to Question 50F (B-27):

The erosion information included in the PEA was intended to provide wind erosion data. This data was reported incorrectly. A revised version of Table 4.6 1: Soils in the Proposed Project Area including the correct wind erosion data has been included in the attached file:

"ELM_Q#50F_5.6 Geology, Soils, and Seismic Potential - Attach G - Revised Soil Data.docx"

ATTACHMENT G: REVISED SOIL DATA

Soil Type	Slope	Permeability	Drainage	Wind Erodibility Index (tons per acre per year)	Approximate Length of the Proposed Project Crossed by Soil Type (Miles)
Arizo Association	0 to 4	High	Excessively drained	38	4.4
Arizo Gravelly Loamy Sand	2 to 9	Very High	Excessively drained	134	0.7
Arizo-Peskah-Crosgrain Association	2 to 4	Very High	Well drained	0	3.7
Arrastre-Rock Outcrop Complex	30 to 50	High	Well drained	86	7.2
Avawatz-Oak Glen Association, Gently Sloping	2 to 9	High	Somewhat excessively drained	86	1.6
Bluepoint-Arizo Association	0 to 4	High	Somewhat excessively drained	134	0.3
Bryman-Cajon Association, Rolling	9 to 15	High	Well drained	220	2.4
Burntshack-Hypoint Association	4 to 15	No Data Listed	Well drained	No Data Listed	4.1
Cajon Gravelly Sand	2 to 15	High	Somewhat excessively drained	220	5.5

Soil Type	Slope	Permeability	Drainage	Wind Erodibility Index (tons per acre per year)	Approximate Length of the Proposed Project Crossed by Soil Type (Miles)
Cajon Sand	0 to 2	High	Somewhat excessively drained	220	3.9
Cajon Sand	2 to 4	No Data Listed	Somewhat excessively drained	No Data Listed	7.2
Cajon Sand	9 to 15	High	Somewhat excessively drained	220	0.0
Cajon-Arizo (S1143)	2 to 5	High	Somewhat excessively drained	No Data Listed	61.6
Cajon-Bitterwater-Bitter-Badland (S1128)	2 to 8	High	Well drained	No Data Listed	3.6
Cajon-Wasco, Cool Complex	2 to 9	High	Somewhat excessively drained	220	3.9
Carrizo Association	2 to 8	Very High	Excessively drained	56	0.4
Carrwash-Riverbend Association	2 to 8	High	Excessively drained	0	2.5
Crosgrain Extremely Gravelly Loam	4 to 15	Moderately High	Well drained	0	0.6
Crosgrain Very Stony Loam	8 to 30	Very Low	Well drained	48	0.7

Soil Type	Slope	Permeability	Drainage	Wind Erodibility Index (tons per acre per year)	Approximate Length of the Proposed Project Crossed by Soil Type (Miles)
Crosgrain-Tenwell Association	4 to 15	High	Well drained	48	1.3
Cushenbury-Crafton-Rock Outcrop Complex	15 to 30	High	Well drained	134	9.3
Dalvord-Rock Outcrop Association	8 to 30	No Data Listed	Somewhat excessively drained	No Data Listed	4.6
Filaree-Seanna Association	4 to 15	High	Well drained	48	3.0
Goldroad-Rock Outcrop Association	30 to 75	No Data Listed	Well drained	No Data Listed	4.6
Gullied Land-Haploxeralfs Association	2 to 9	Very Low	No Data Listed	No Data Listed	9.8
Haleburu Association	15 to 30	High	Well drained	0	1.0
Haleburu Extremely Gravelly Sandy Loam	4 to 15	High	Well drained	0	0.2
Haleburu, Extremely Cobbly-Hiddensun Association	0 to 0	No Data Listed	Well drained	No Data Listed	0.7
Haleburu-Nipton Association, Dry	4 to 15	High	Well drained	0	1.5
Haplargids-Calciorthids Complex	15 to 50	Very Low	No Data Listed	No Data Listed	0.5
Helendale Loamy Sand	0 to 2	High	Well drained	134	1.5

Soil Type	Slope	Permeability	Drainage	Wind Erodibility Index (tons per acre per year)	Approximate Length of the Proposed Project Crossed by Soil Type (Miles)
Helendale Loamy Sand	2 to 5	High	Well drained	134	1.7
Hesperia Loamy Fine Sand	2 to 5	High	Well drained	134	1.1
Hypoint Gravelly Sandy Loam	0 to 4	High	Somewhat excessively drained	56	3.0
Hypoint-Gravesumit Association	8 to 30	No Data Listed	Somewhat excessively drained	No Data Listed	2.5
Kidwell-Tenwell Association	2 to 4	High	Well drained	48	5.8
Kimberlina Gravelly Sandy Loam, Cool	2 to 5	High	Well drained	56	1.5
Kimberlina Loamy Fine Sand, Cool	0 to 2	High	Well drained	134	1.1
Lanip-Kidwell Association	2 to 4	High	Well drained	48	9.0
Lavic Loamy Fine Sand	0 to 5	High	Moderately well drained	134	0.5
Lovelace Loamy Sand	5 to 9	High	Well drained	220	0.1
Newera Association	0 to 0	No Data Listed	Somewhat excessively drained	No Data Listed	2.3

Soil Type	Slope	Permeability	Drainage	Wind Erodibility Index (tons per acre per year)	Approximate Length of the Proposed Project Crossed by Soil Type (Miles)
Newera-Rock Outcrop Association	0 to 0	No Data Listed	Somewhat excessively drained	No Data Listed	0.4
Nickel-Bitter-Arizo (S1142)	8 to 15	Moderately High	Well drained	No Data Listed	20.9
Nipton-Highland-Rock Outcrop Association	15 to 50	Moderately High	Well drained	0	0.1
Nolena-Rock Outcrop Association	30 to 75	Very Low	Well drained	0	1.0
Pahrump-Wodavar-Vegastorm Association	4 to 15	Moderately High	Well drained	56	0.4
Peskah-Crosgrain Association	2 to 8	High	Well drained	0	1.4
Pits	0 to 3	No Data Listed	No Data Listed	No Data Listed	0.2
Riverbend-Carrwash Association	2 to 8	High	Excessively drained	48	2.8
Riverwash	0 to 2	Very Low	No Data Listed	No Data Listed	0.8
Rock Outcrop-Lithic Torriorthents (S1130)	2 to 15	High	No Data Listed	No Data Listed	3.5
Rock Outcrop-Lithic Torriorthents Complex	15 to 50	Very Low	No Data Listed	No Data Listed	3.4
Rositas-Carrizo (S1137)	0 to 5	High	Excessively drained	No Data Listed	20.9
Seanna-Goldroad-Rock Outcrop Association	30 to 50	High	Well drained	0	5.3

Soil Type	Slope	Permeability	Drainage	Wind Erodibility Index (tons per acre per year)	Approximate Length of the Proposed Project Crossed by Soil Type (Miles)
Skyhaven-Rillito-Mead-Mccullough-Ireteba-Bluepoint (S1144)	0 to 2	Moderately Low	Well drained	No Data Listed	2.9
Tenwell Very Gravelly Sandy Loam	0 to 2	High	Well drained	0	1.8
Tenwell-Crosgrain Association	4 to 15	Moderately High	Well drained	0	1.2
Tenwell-Lanip Association	2 to 8	High	Well drained	48	1.4
Tenwell-Shamock Association	2 to 4	High	Well drained	86	5.1
Tonopah-Arizo Association	2 to 8	High	Excessively drained	0	2.3
Trigger-Rock Outcrop-Calvista (S1134)	15 to 30	High	Well drained	No Data Listed	18.9
Upspring-Sparkhule-Rock Outcrop (S1127)	15 to 30	High	No Data Listed	No Data Listed	8.1
Urban Land-Riverbend-Huevi Association	2 to 15	No Data Listed	No Data Listed	No Data Listed	0.5
Wasco Sandy Loam, Cool	0 to 2	High	Well drained	86	3.5
Wasco Sandy Loam, Cool	2 to 5	High	Well drained	86	1.7
Wasco-Helendale-Bryman (S1032)	2 to 5	High	Well drained	No Data Listed	7.2

Soil Type	Slope	Permeability	Drainage	Wind Erodibility Index (tons per acre per year)	Approximate Length of the Proposed Project Crossed by Soil Type (Miles)
Wasco-Rosamond-Cajon (S1024)	0 to 2	High	Somewhat excessively drained	No Data Listed	9.0

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Question 50G (B-26):

Provide a copy of geotechnical investigation if completed, including known and potential geologic hazards such as ground shaking, subsidence, liquefaction, etc.

PEA Section 4.6. Geology, Soils, and Seismic Potential has numerous problems that need to be rectified:

G. The text of subsection 4.6.1.2 notes that soil data (SSURGO data from the USDA was used) was not available for a portion of the proposed project, which leaves large areas of the proposed project without soils information. However more generalized soil data for the missing areas can be found in the USDA's STATSGO2 database. Please provide this information.

Response to Question 50G (B-26):

Generalized soil data from the USDA STATSGO2 database was retrieved and analyzed for areas where data from the SSURGO database was missing. The soil types in these locations are summarized in the following file which was included as an attachment in SCE's response to Question No. 50F:

"ELM_Q#50F_5.6 Geology, Soils, and Seismic Potential - Attach G - Revised Soil Data.docx".

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Question 50H (B-26):

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PEA Section 4.6. Geology, Soils, and Seismic Potential has numerous problems that need to be rectified:

H. The numbering for subsection Faults, Seismicity, and Related Hazards
seems to be missing (should be 4.6.1.3), as it is it appears to be part of the Soils subsection. Some of the seismic hazard subsections are numbered and some are not. Please renumber the subsections appropriately.

Response to Question 50H (B-26):

The "**Faults, Seismicity, and Related Hazards**" subsubsection does belong to subsection **4.6.1 Environmental Setting**. In order to correct the error, SCE numbered this subsubsection as 4.6.1.3a at page 4.6-51 and renumbered the **Liquefaction** SubSubSection from 4.6.1.3 to 4.6.1.3b at page 4.6-65. The replacement pages have been attached in the following files:

ELM_Q#50H_5.6 Geology, Soils, and Seismic Potential_PEA Section 4.6.1.3a.pdf
ELM_Q#50H_5.6 Geology,Soils, and Seismic Potential_PEA Section 4.6.1.3b.pdf

Due to format limitations in the PEA document, the subsubsections of the document are limited to a maximum of four numbers (e.g., 4.6.1.3) and a fifth or greater number (e.g., 4.6.1.3.1) results in the subsubsection being unnumbered.

4.6.1.3b Liquefaction

Liquefaction is the process in which the soil below the water table becomes converted to a fluid state and loses its strength when sufficiently shaken or vibrated during a seismic event. The soil types considered most susceptible to liquefaction are granular, low-plasticity, fine-grained soils that are saturated and have a density that ranges from loose to medium. In addition, the presence of shallow groundwater increases the potential for liquefaction. Adverse effects of liquefaction include loss of bearing strength, lateral spreading, sand boils, ground oscillation, and settlement when liquefied ground reconsolidates following the seismic event.

According to the USGS, liquefaction-prone areas are defined by historical occurrences of liquefaction and local geological, geotechnical, and groundwater conditions that indicate a potential for permanent ground displacement. Liquefaction-prone areas have not been evaluated or identified by the CGS for the majority of the Proposed Project area. Therefore, liquefaction-prone characteristics, such as shallow groundwater, were evaluated to determine the potential for liquefaction in the Proposed Project area.

Static groundwater levels were obtained from wells identified on the USGS National Water Information System Mapper as well as the Water Resources Map provided by the State of Nevada Division of Water Resources. Static groundwater levels in the vicinity of Proposed Project components lacking CGS data are provided in Table 4.6-4: Depth to Groundwater in the Proposed Project Area. As presented in Table 4.6-4: Depth to Groundwater in the Proposed Project Area, shallow groundwater is not present in the vicinity of the Proposed Project components located in Nevada. Additional detail on soil characteristics is provided in Section 4.6.1.2, Soils.

Table 4.6-4: Depth to Groundwater in the Proposed Project Area

Proposed Project Component	Approximate Depth to Groundwater in Nearby Wells
Lugo-Mohave 500 kV Transmission Line from Pisgah Substation to Mohave Substation	37 to 73 feet bgs
Mohave Substation	190 to 240 feet bgs
Eldorado-Mohave 500 kV Transmission Line between Mile 12 and Mile 25	180 to 425 feet bgs
Eldorado-Mohave 500 kV Transmission Line between Mile 33 and Mile 36	180 to 365 feet bgs
Eldorado Substation	310 to 350 feet bgs

Source: USGS (2015f)

4.6.1.3a Faults, Seismicity, and Related Hazards

The State of California considers a fault to be active if the fault is well-defined and if there is evidence of surface displacement along the fault during the Holocene epoch (i.e., within the past 11,000 years).[4] In addition, potentially active faults are those that have demonstrated activity within the Quaternary period (i.e., approximately the past 1.6 million years).

Proposed Project components involving the installation of new structures—including the mid-line series capacitors, fiber optic repeaters, and the replacement of equipment within the existing Eldorado, Lugo, and Mohave Substations—are not located on any active faults in the Proposed Project area. The closest active fault to a Proposed Project component involving the installation of new structures is mapped within the Lavic Lake fault zone, which is located approximately 1.7 miles west of the Newberry Springs Series Capacitor site. In addition, the Proposed Project is located within 10 miles of active faults within the San Andreas and San Jacinto fault zones, which are considered to be two of the most active fault zones in California. Faults located within 25 miles of new Proposed Project structures and their approximate distance from the nearest new Proposed Project structure are listed in Table 4.6-2: Active and Potentially Active Faults in the Vicinity of New Proposed Project Structures. Active and potentially active faults in the Proposed Project area are depicted in Figure 4.6-3: Active and Potentially Active Faults in the Proposed Project Area.

[4] The USGS considers a fault to be active if it has moved one or more times in the past 10,000 years.

ATTACHMENT H: USGS EARTHQUAKE HAZARDS PROGRAM FAULT DATA

Fault Zone or Fault (Fault Section)	Active or Potentially Active	Approximate Distance from Nearest New Proposed Project Structure to Fault (Miles)	Nearest New Proposed Project Structure	Approximate Fault Length (Miles)	Maximum Estimated Earthquake Magnitude	Physiographic Province(s)	Average Strike	Sense of Movement	Dip Direction	Most Recent Prehistoric Deformation	Slip-rate Category (MM per Year)
California											
Lavic Lake fault zone	Active	1.7 miles west	Newberry Springs Series Capacitor	33.4	--	Basin and Range	N12°W	Right lateral	V	latest Quaternary (<15 ka)	Between 0.2 and 1.0
Cleghorn fault zone (Southern Cleghorn Section)	Active	3.7 miles southwest	Lugo Substation	29.9	6.8	Pacific Border	N82°W	Left lateral	85°	late Quaternary (<130 ka)	Between 1.0 and 5.0
Pisgah-Bullion fault zone (Pisgah Section)	Active	4.3 miles southwest	Ludlow Series Capacitor	24.3	7.3	Basin and Range	N24°W	Right lateral	V	latest Quaternary (<15 ka)	Between 0.2 and 1.0
Cleghorn fault zone (Northern Cleghorn Section)	Potentially Active	4.8 miles southeast	Lugo Substation[1]	15.2	6.8	Pacific Border	N85°W	Left lateral	70° NW. to vertical	late Quaternary (<130 ka)	Between 0.2 and 1.0
Helendale-South Lockhart fault zone (Helendale Section)	Active	5.0 miles southwest	Barstow Fiber Optic Repeater	50.9	7.4	Basin and Range	N39°W	Right lateral	V	latest Quaternary (<15 ka)	Between 0.2 and 1.0
Cady fault	Potentially Active	7.1 miles north	Newberry Springs Series Capacitor	9.4	--	--	--	Left lateral	--	undifferentiated Quaternary (<1.6 Ma)	Unspecified
North Frontal thrust system (Western Section)	Active	7.1 miles east	Lugo Substation	53.3	7.2	Basin and Range Pacific Border	N87°W	Thrust	30–35° S	latest Quaternary (<15 ka)	Between 0.2 and 1.0
San Andreas fault zone (San Bernardino Mountains)	Active	7.5 miles southwest	Lugo Substation	156.5	8.2	Pacific Border Basin and Range	N79°W	Right lateral	90–35° N	latest Quaternary (<15 ka)	Greater than 5.0
Lenwood-Lockhart fault zone (Lenwood Section)	Active	8.2 miles east	Barstow Fiber Optic Repeater	60.6	7.5	Basin and Range	N31°W	Right lateral	V	latest Quaternary (<15 ka)	Between 0.2 and 1.0

[1] Though the substations already exist, equipment within the substations would be replaced.

Fault Zone or Fault (Fault Section)	Active or Potentially Active	Approximate Distance from Nearest New Proposed Project Structure to Fault (Miles)	Nearest New Proposed Project Structure	Approximate Fault Length (Miles)	Maximum Estimated Earthquake Magnitude	Physiographic Province(s)	Average Strike	Sense of Movement	Dip Direction	Most Recent Prehistoric Deformation	Slip-rate Category (MM per Year)
Rodman fault	Potentially Active	8.5 miles southwest	Newberry Springs Series Capacitor	11.3	--	Basin and Range	--	Right lateral	--	undifferentiated Quaternary (<1.6 Ma)	Unspecified
Ludlow fault	Potentially Active	9.0 miles east	Ludlow Series Capacitor	40.9	--	--	--	Right lateral	--	undifferentiated Quaternary (<1.6 Ma)	Unspecified
San Andreas fault zone (Mojave Section)	Active	9.1 miles southwest	Lugo Substation	26.1	8.2	Pacific Border Basin and Range	N67°W	Right lateral	V	latest Quaternary (<15 ka)	Greater than 5.0
San Jacinto fault zone (San Bernardino Section)	Active	9.4 miles southwest	Lugo Substation	98.0	7.9	Pacific Border	--	Right lateral	NE; SW	latest Quaternary (<15 ka)	Greater than 5.0
Waterman Canyon fault	Potentially Active	9.9 miles south	Lugo Substation	13.8	--	Pacific Border	--	Unspecified	--	late Quaternary (<130 ka)	Unspecified
Tunnel Ridge fault	Potentially Active	10.1 miles southeast	Lugo Substation	11.2	--	Pacific Border	--	Unspecified	--	undifferentiated Quaternary (<1.6 Ma)	Unspecified
Calico-Hidalgo fault zone (Calico Section)	Active	10.6 miles southwest	Ludlow Series Capacitor	63.5	7.4	Basin and Range	N28°W	Right lateral	vertical, locally 50° to 70° NE	latest Quaternary (<15 ka)	Between 0.2 and 1.0
Icehouse Canyon fault	Potentially Active	11.1 miles southwest	Lugo Substation	16.5	--	--	--	--	--	undifferentiated Quaternary (<1.6 Ma)	Unspecified
Stoddard Canyon fault	Potentially Active	11.6 miles southwest	Lugo Substation	13.5	--	Pacific Border	--	Left lateral	V	undifferentiated Quaternary (<1.6 Ma)	Unspecified
Arrastre Canyon Narrows fault	Potentially Active	11.9 miles east	Lugo Substation	13.2	--	--	--	--	--	late Quaternary (<130 ka)	Unspecified
Bowen Ranch fault	Potentially Active	11.9 miles east	Lugo Substation	4.3	--	--	--	--	--	late Quaternary (<130 ka)	Unspecified
Pisgah-Bullion fault zone (Bullion Section)	Active	11.9 miles southwest	Ludlow Series Capacitor	16.3	7.3	Basin and Range	N40°W	Right lateral	V	latest Quaternary (<15 ka)	Between 0.2 and 1.0

Fault Zone or Fault (Fault Section)	Active or Potentially Active	Approximate Distance from Nearest New Proposed Project Structure to Fault (Miles)	Nearest New Proposed Project Structure	Approximate Fault Length (Miles)	Maximum Estimated Earthquake Magnitude	Physiographic Province(s)	Average Strike	Sense of Movement	Dip Direction	Most Recent Prehistoric Deformation	Slip-rate Category (MM per Year)
Calico-Hidalgo fault zone (West Calico Section)	Active	12.0 miles southwest	Newberry Springs Series Capacitor	40.8	7.4	Basin and Range	N32°W	Right lateral	V	latest Quaternary (<15 ka)	Between 0.2 and 1.0
San Gabriel fault zone	Potentially Active	12.9 miles southwest	Lugo Substation	38.0	7.3	Pacific Border	--	Right lateral, Normal	55°–75° N	late Quaternary (<130 ka)	Between 0.2 and 1.0
North Frontal thrust system (Eastern Section)	Active	13.3 miles southeast	Barstow Fiber Optic Repeater	34.3	7.0	Basin and Range	N70°W	Thrust	10° to 50° S	latest Quaternary (<15 ka)	Between 0.2 and 1.0
Sierra Madre fault zone (Cucamonga Section)	Active	13.4 miles southwest	Lugo Substation	33.6	7.3	Pacific Border	N78°E (for section)	Thrust	43–60° N	latest Quaternary (<15 ka)	Between 1.0 and 5.0
Silver Reef fault	Active	13.4 miles southeast	Barstow Fiber Optic Repeater	5.5	--	Basin and Range	--	Right lateral	V	latest Quaternary (<15 ka)	Unspecified
Arrowhead fault	Potentially Active	13.5 miles southeast	Lugo Substation	9.9	--	Colorado Plateaus	N35°W	Normal	81°	late Quaternary (<130 ka)	Less than 0.2
Johnson Valley fault zone (Northern Johnson Valley Section)	Active	13.8 miles east	Barstow Fiber Optic Repeater	51.3	6.9	Basin and Range	N31°W	Right lateral	V	latest Quaternary (<15 ka)	Between 0.2 and 1.0
Old Woman Springs fault	Active	14.2 miles southeast	Barstow Fiber Optic Repeater	8.8	7.5	Basin and Range	--	Right lateral	V	latest Quaternary (<15 ka)	Unspecified
Manix fault	Active	14.8 miles northwest	Newberry Springs Series Capacitor	25.2	--	--	--	Left lateral	--	latest Quaternary (<15 ka)	Unspecified
Helendale-South Lockhart fault zone (Northern San Bernardino Mountains Section)	Potentially Active	15.1 miles southeast	Barstow Fiber Optic Repeater	19.1	7.4	Basin and Range Pacific Border	N42°W	Reverse	30°SW to near vertical	undifferentiated Quaternary (<1.6 Ma)	Between 0.2 and 1.0
Camp Rock-Emerson-Copper Mountain fault zone (Camp Rock Section)	Active	15.4 miles northeast	Barstow Fiber Optic Repeater	24.1	--	Basin and Range	N50°W	Right lateral	V	latest Quaternary (<15 ka)	Between 0.2 and 1.0

Fault Zone or Fault (Fault Section)	Active or Potentially Active	Approximate Distance from Nearest New Proposed Project Structure to Fault (Miles)	Nearest New Proposed Project Structure	Approximate Fault Length (Miles)	Maximum Estimated Earthquake Magnitude	Physiographic Province(s)	Average Strike	Sense of Movement	Dip Direction	Most Recent Prehistoric Deformation	Slip-rate Category (MM per Year)
Santa Ana fault	Potentially Active	15.8 miles southeast	Lugo Substation	31.9	6.9	Pacific Border	--	--	--	undifferentiated Quaternary (<1.6 Ma)	Unspecified
Red Hill-Etiwanda Avenue fault	Active	16.5 miles southwest	Lugo Substation	8.6	--	Pacific Border	--	Unspecified	--	latest Quaternary (<15 ka)	Unspecified
Camp Rock-Emerson-Copper Mountain fault zone (Emerson Section)	Active	16.6 miles east	Barstow Fiber Optic Repeater	76.4	--	Basin and Range Pacific Border	N25°W	Right lateral	V	latest Quaternary (<15 ka)	Between 0.2 and 1.0
San Antonio fault	Potentially Active	17.2 miles southwest	Lugo Substation	13.3	--	Pacific Border	--	Unspecified	--	late Quaternary (<130 ka)	Unspecified
South Bristol Mountains fault	Potentially Active	17.2 miles southwest	Kelbaker Fiber Optic Repeater	17.3	--	Pacific Border	--	--	--	undifferentiated Quaternary (<1.6 Ma)	Unspecified
Bullion Mountains fault zone	Active	17.3 miles southeast	Ludlow Series Capacitor	27.7	7.3	--	--	Right lateral	--	latest Quaternary (<15 ka)	Unspecified
Homestead Valley fault zone	Active	20.4 miles southwest	Ludlow Series Capacitor	55.8	--	Basin and Range	N12°W	Right lateral	V; W	latest Quaternary (<15 ka)	Between 0.2 and 1.0
Mirage Valley fault zone	Potentially Active	21.1 miles northwest	Lugo Substation	23.7	--	Basin and Range	--	--	--	late Quaternary (<130 ka)	Unspecified
Calico-Hidalgo fault zone (Hidalgo Section)	Active	21.3 miles southeast	Ludlow Series Capacitor	8.0	7.4	Basin and Range Pacific Border	N21°W	Right lateral	V	latest Quaternary (<15 ka)	Between 0.2 and 1.0
Pipes Canyon fault	Potentially Active	21.8 miles southeast	Barstow Fiber Optic Repeater	7.7	--	Pacific Border Basin and Range	--	--	--	undifferentiated Quaternary (<1.6 Ma)	Unspecified
Harper fault zone	Potentially Active	22.4 miles northwest	Barstow Fiber Optic Repeater	3.4	7.1	Basin and Range	--	Right lateral	V	latest Quaternary (<15 ka)	Unspecified
Broadwell Lake fault	Potentially Active	22.5 miles southwest	Kelbaker Fiber Optic Repeater	7.5	--	--	--	--	--	latest Quaternary (<15 ka)	Unspecified
Pisgah-Bullion fault zone (East Bullion Section)	Active	22.5 miles southeast	Ludlow Series Capacitor	20.4	7.3	Basin and Range	N36°W	Right lateral	E	latest Quaternary (<15 ka)	Between 0.2 and 1.0

Fault Zone or Fault (Fault Section)	Active or Potentially Active	Approximate Distance from Nearest New Proposed Project Structure to Fault (Miles)	Nearest New Proposed Project Structure	Approximate Fault Length (Miles)	Maximum Estimated Earthquake Magnitude	Physiographic Province(s)	Average Strike	Sense of Movement	Dip Direction	Most Recent Prehistoric Deformation	Slip-rate Category (MM per Year)
Pisgah-Bullion fault zone (West Bullion Section)	Active	22.6 miles southeast	Ludlow Series Capacitor	9.2	7.3	Basin and Range	--	Right lateral	W	latest Quaternary (<15 ka)	Between 0.2 and 1.0
Mount General fault	Potentially Active	22.9 miles northwest	Barstow Fiber Optic Repeater	3.2	--	Basin and Range	--	Right lateral	--	latest Quaternary (<15 ka)	Unspecified
Sierra Madre fault zone (Sierra Madre E Section)	Potentially Active	23.9 miles southwest	Lugo Substation	5.5	7.3	Pacific Border	N87°E (for section)	Thrust	25° N	late Quaternary (<130 ka)	Between 1.0 and 5.0
Crafton Hills fault zone	Potentially Active	24.0 miles southeast	Lugo Substation	29.9	--	--	--	--	--	late Quaternary (<130 ka)	Unspecified
Red Pass fault	Active	24.1 miles northwest	Newberry Springs Series Capacitor	10.4	--	Basin and Range	--	--	SW; NE	latest Quaternary (<15 ka)	Unspecified
Llano fault	Active	24.8 miles northwest	Lugo Substation	2.1	--	Basin and Range	--	Reverse	S	latest Quaternary (<15 ka)	Unspecified
Coyote Lake fault	Potentially Active	25.5 miles northwest	Newberry Fiber Optic Repeater	24.7	--	--	--	Left lateral	--	undifferentiated Quaternary (<1.6 Ma)	Unspecified
Mesquite Lake fault	Active	26.0 miles southeast	Ludlow Series Capacitor	2.2	7.3	Basin and Range	N27°W	Right lateral	V	latest Quaternary (<15 ka)	Between 0.2 and 1.0
San Gorgonio Mountain fault	Potentially Active	28.6 miles southeast	Barstow Fiber Optic Repeater	2.4	--	Pacific Border	--	Unspecified	--	late Quaternary (<130 ka)	Unspecified
Johnson Valley fault zone (Southern Johnson Valley Section)	Active	29.1 miles southwest	Ludlow Series Capacitor	29.4	6.9	Basin and Range Pacific Border	N10°E	Right lateral	70° W. to vertical	latest Quaternary (<15 ka)	Between 0.2 and 1.0
Nevada											
Black Hills fault	Active	6.8 miles northwest	Eldorado Substation	5.5	6.2	Basin and Range	N31°E	Normal	SE	latest Quaternary (<15 ka)	Less than 0.2
Las Vegas Valley faults (Class B)	Potentially Active	16.7 miles northwest	Eldorado Substation	--	--	Basin and Range	N6°W	Normal	E; SE	late Quaternary (<130 ka)	Less than 0.2
Frenchman Mountain fault	Potentially Active	21.2 miles north	Eldorado Substation	6.6	6.8	Basin and Range	N1°E	Normal	35–60°W	late Quaternary (<130 ka)	Less than 0.2

Fault Zone or Fault (Fault Section)	Active or Potentially Active	Approximate Distance from Nearest New Proposed Project Structure to Fault (Miles)	Nearest New Proposed Project Structure	Approximate Fault Length (Miles)	Maximum Estimated Earthquake Magnitude	Physiographic Province(s)	Average Strike	Sense of Movement	Dip Direction	Most Recent Prehistoric Deformation	Slip-rate Category (MM per Year)
Mead Slope fault	Active	23.8 miles northeast	Eldorado Substation	--	--	Basin and Range	N44°E	Reverse	SE; V	latest Quaternary (<15 ka)	Less than 0.2
Stateline fault	Potentially Active	24.7 miles southwest	Eldorado Substation	--	--	Basin and Range	--	Right lateral	--	undifferentiated Quaternary (<1.6 Ma)	Unspecified
Arizona											
Needles graben faults	Potentially Active	24.6 miles southeast	Mohave Substation	2.1	--	Basin and Range	N31°W	Normal	NE; SW	late Quaternary (<130 ka)	Less than 0.2

Southern California Edison
ELM Project A.18-05-007

DATA REQUEST SET A1805007-ED-SCE-DEF-001

To: ENERGY DIVISION
Prepared by: Rey Gonzales
Title: Environmental Project Manager
Dated: 07/17/2018

Question 50I (B-26):

Provide a copy of geotechnical investigation if completed, including known and potential geologic hazards such as ground shaking, subsidence, liquefaction, etc.

PEA Section 4.6. Geology, Soils, and Seismic Potential has numerous problems that need to be rectified:

I. The Faults, Seismicity, and Related Hazards subsection presents a very brief discussion of faults near the proposed project with no description of the individual faults or fault zones, except for Table 4.6-2 which presents minimal information for the faults as related to the proposed project. The section should include some description of the faults that are closest to the proposed project. Table 4.6-2 presents Maximum Estimated Earthquake Magnitude, however only a few faults have data presented and the data that are presented is out of date; more current data for the faults and data for more of the faults can be found on the USGS Earthquake Hazards Program website. Please update this section.

Response to Question 50I (B-26):

Data from the USGS Earthquake Hazards Program website, California Geological Survey website, and the California Institute of Technology's Southern California Earthquake Data Center's website was reviewed and analyzed for the Project. The resulting information for faults in the vicinity of the Project is presented in the following attached file:

ELM_Q#50I_5.6 Geology, Soils, and Seismic Potential - Attach H USGS Faults_v3.docx

For information regarding the geotechnical investigation, please see the response provided for Question No. 50A.

Southern California Edison
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DATA REQUEST SET A1805007-ED-SCE-DEF-001

To: ENERGY DIVISION
Prepared by: Rey Gonzales
Title: Environmental Project Manager
Dated: 07/17/2018

Question 50J (B-26):

PEA Section 4.6. Geology, Soils, and Seismic Potential has numerous problems that need to be rectified:

J. The Strong Ground Motion subsection presents peak ground acceleration (PGA) data for the Project alignment segments and substations as 10 percent probability of exceedance in 50 years (10% in 50 years, which corresponds to a return interval of 475 years for a maximum considered earthquake) for the proposed project alignment. Please note that the current California Building Code uses the 2% probability of exceedance in 50 years (2% in 50 years) for design calculations (which corresponds to a return interval of 2,475 years and for a maximum considered earthquake). Table 4.6-3 presents Earthquake Intensity information including comparative peak ground acceleration ranges. Please specify in the table whether these are 2% in 50 years or 10% in 50 years PGS numbers.

Response to Question 50J (B-26):

Table 4.6-3: Earthquake Intensity Scale depicts the Modified Mercalli site intensity, which is intended to qualify earthquake intensities in terms of potential effects on people and structures. Each index is correlated to an average peak acceleration range, not the probability for an earthquake to occur. However, the peak ground accelerations described in Section 4.6. Geology, Soils, and Seismic Potential, subsection Strong Ground Motion, are based on a 10 percent probability of exceeding a peak acceleration in a 50-year period. A revised version of this discussion using 2 percent in 50-year probabilities is included as follows:

The intensity of ground motions induced by earthquakes can be described using peak site accelerations, represented as a fraction of the acceleration of gravity (g). CGS Probabilistic Seismic Hazard Assessment (PSHA) maps were used to estimate peak ground accelerations within the vicinity of the Proposed Project area. PSHA maps indicate that there is an approximately 2-percent probability of exceeding a peak site acceleration of 0.583g and 0.784g in a 50-year period at the Pisgah and Lugo Substations, respectively. Based on the same criteria, the peak ground accelerations along the existing Eldorado-Lugo and Lugo-Mohave 500 kV Transmission Lines range from 0.113g to 0.784g, and the peak ground accelerations in the vicinity of Mohave Substation and the Eldorado-Mohave 500 kV Transmission Line range from 0.113g to 0.1931g.

PSHA maps indicate that there is an approximately 2-percent probability of exceeding a peak site acceleration of 0.557g and 0.577g in a 50-year period at the Ludlow and Newberry Series Capacitor sites, respectively. Based on the same criteria, peak ground accelerations at the Barstow, Kelbaker, and Lanfair Fiber Optic Repeater are 0.468g, 0.206g, and 0.118g respectively.

PSHA maps indicate that there is an approximately 10-percent probability of exceeding a peak site acceleration of 0.278g and 0.285g in a 50-year period at the Ludlow and Newberry Series Capacitor sites, respectively. Based on the same criteria, peak ground accelerations at the Barstow, Kelbaker, and Lanfair Fiber Optic Repeater are 0.261g, 0.105g, and 0.061g respectively.

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DATA REQUEST SET A1805007-ED-SCE-DEF-001

To: ENERGY DIVISION
Prepared by: Rey Gonzales
Title: Environmental Project Manager
Dated: 07/17/2018

Question 50K (B-28):

PEA Section 4.6. Geology, Soils, and Seismic Potential has numerous problems that need to be rectified:

K. Subsection 4.6.1.3 Liquefaction does not correctly associate geologic units and groundwater levels with liquefaction potential. The subsection refers to soil characteristics that were presented in the Soils subsection and groundwater levels. Liquefaction analysis should be based on presence of shallow water (less than 50 feet depth) and density of the underlying geologic units (not the surficial soils), i.e. loose alluvial materials with shallow groundwater would be liquefiable. Shallow groundwater is known to present near the playas Rabbit Lake and Lucerne Lake. Please verify that the San Bernardino County Hazard Maps do not map any liquefaction hazard areas at the proposed project components.

Response to Question 50K (B-28):

The San Bernardino County Hazard Maps were reviewed for areas liquefaction susceptibility. The nearest area of liquefaction susceptibility is located approximately 9.2 miles southwest of Lugo Substation. To further assess liquefaction, SCE reviewed groundwater depths as the lack of shallow groundwater would preclude the potential for liquefaction. Based on the groundwater depths in the Project area alone, it was estimated that the liquefaction potential is low and impacts resulting from liquefaction would be less than significant. Potential for liquefaction at two new mid-line series capacitors, one replacement series capacitor at Mojave Substation, and three new telecommunication repeater sites will be discussed in final site-specific geotechnical reports. The reports for the series capacitors are expected to be submitted to the CPUC on July 31, 2018, while the report for the repeater sites is expected closer to the beginning of construction in June 2019 to validate design assumptions.

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DATA REQUEST SET A1805007-ED-SCE-DEF-001

To: ENERGY DIVISION
Prepared by: Rey Gonzales
Title: Environmental Project Manager
Dated: 07/17/2018

Question 50L (B-28):

PEA Section 4.6. Geology, Soils, and Seismic Potential has numerous problems that need to be rectified:

L. Subsection 4.6.1.4 Slope Instability only discusses soil characteristics as they pertain to slope instability, however characteristics of the geologic units are just as or more important to slope stability issues and needs to also be discussed in this section. Additionally, please verify that the County of San Bernardino Hazard Maps do not include mapped landslide hazard areas near the project components.

Response to Question 50L (B-28):

As described in response to Question 50D, a table of the geologic units and their associated descriptions underlying Project components was included in file "ELM_Q#50D_5.6 Geology, Soils, and Seismic Potential - Attach F - Geologic Unit Descriptions.docx" which was attached in SCE's response to Question 50D.

The County of San Bernardino Hazard Maps indicate that there are some limited areas of mapped existing landslides between 1,000 and 3,700 feet of the Eldorado-Lugo and Lugo-Mojave 500 kV Transmission Lines. The Project work in these locations will be limited to the installation of optical ground wire on existing structures and no modifications will be made to the existing towers. Lugo Substation is located approximately 20,000 feet north of an area mapped as having a low-moderate landslide susceptibility. All projects areas with new structures are located in flat terrain with very low landslide hazard.

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To: ENERGY DIVISION
Prepared by: Rey Gonzales
Title: Environmental Project Manager
Dated: 07/17/2018

Question 50M (B-28):

PEA Section 4.6. Geology, Soils, and Seismic Potential has numerous problems that need to be rectified:

M. Subsection 4.6.1.5 Differential Settlement needs to also discuss the potential for differential settlement of soils and surficial geologic units due to seismic shaking that may not be directly tied to liquefaction but to differential compaction of varying unit types due to the shaking.

Response to Question 50M (B-28):

Section 4.6.1.5 describes the existing conditions and provides a brief description of what differential settling is. The existing conditions section of the PEA does not analyze the potential impacts to the Proposed Project from geological hazards. Potentially significant impacts resulting from subsidence are described in the Section 4.6.4 Impact Analysis section.

As described in response to Question 50A, SCE is currently developing the geotechnical reports for the two mid-line series capacitor locations and the new in-line capacitor location at Mojave Substation. It is anticipated that these reports will be completed and submitted to the CPUC by July 31, 2018. Additional geotechnical reports are planned for the three fiber optic repeater sites upon receipt of all applicable agency permits and authorizations. These reports will contain site-specific data identifying the potential for differential settlement and design recommendations to mitigate for it.

Southern California Edison
ELM Project A.18-05-007

DATA REQUEST SET A1805007-ED-SCE-DEF-001

To: ENERGY DIVISION
Prepared by: Rey Gonzales
Title: Environmental Project Manager
Dated: 07/17/2018

Question 50N (B-28):

PEA Section 4.6. Geology, Soils, and Seismic Potential has numerous problems that need to be rectified:
N. Subsection 4.6.1. Subsidence does not correctly correlate subsidence, groundwater withdrawal, and geology. Geologic units at depth subside when the aquifers are overdrafted and the formerly saturated sediments compact into the spaces formerly occupied by water. Regional subsidence does not have anything to do with drainage characteristics of surficial soils as discussed in the subsection. Several areas of known subsidence due to groundwater withdrawal have and are occurring in the Mojave area, including in the Lucerne Valley adjacent to the proposed project. This data is available from the USGS. Please rewrite this section to include the correct informationabout regional subsidence and subsidence that is occurring in the Mojave area near the proposed project.

Response to Question 50N (B-28):

To further evaluate the potential impacts on the Project from subsidence, maps from the USGS's California Water Science Center and San Bernardino County were reviewed. An area of subsidence due to groundwater pumping is located adjacent to the Lugo-Mojave 500 kV Transmission Line between Tower M26-T1 and M-29-T3. With the exception of Tower M27-T3, the towers adjacent to this area of subsidence will receive new OPGW and the existing towers will not be modified. Tower M27-T3, located approximately 2,500 feet northwest of the subsidence area, would receive a ground wire peak modification to accept the new OPGW and no modifications to the foundations will be required.

Based on the lack of foundation modifications to these towers, the distance to this subsidence area, review of existing literature, and land use practices in the immediate vicinity of the Project, it was determined that less than significant impacts would occur as a result of subsidence. Regardless, any new structures will be designed based on the soil type and in accordance with the standards provided in CPUC G.O. 95 and G.O. 128. As a result, subsidence is not expected to have an impact on the Project given design criteria and the geographic location of the alignment.

Southern California Edison
ELM Project A.18-05-007

DATA REQUEST SET A1805007-ED-SCE-DEF-001

To: ENERGY DIVISION
Prepared by: Rey Gonzales
Title: Environmental Project Manager
Dated: 07/17/2018

Question 50O (B-28):

PEA Section 4.6. Geology, Soils, and Seismic Potential has numerous problems that need to be rectified:
O. Subsection 4.6.1.7 Expansive or Collapsible Soils does not include any of the data or information on expansive soils (shrink-swell potential) that is readily available from the SSURGO database, as discussed above in the comments for subsection 4.6.1.2.

Response to Question 50O (B-28):

Additional information regarding the shrink-swell potential of soils in the Project area has been provided in response to Question 50E.