4.2 SOILS, GEOLOGY, AND MINERALS

This section is an analysis of the direct impacts from the proposed action and the indirect impacts from the proposed action.

Proposed Action

Direct Impacts

Proposed Exploratory Wells and Water Well

Each exploratory well's drilling area (300 ft x 150 ft) would involve just over 1 acre of disturbance. All ten exploratory wells would total 10.3 acres of disturbance. Three miles of newly developed road would be constructed to access the proposed drill sites (Figure 2-1). Each new access road would be approximately 10 feet wide for an area of disturbance of 3.6 acres. Construction of the potential water well would involve the disturbance of an area of 100 ft x 100 ft (.23 acres).

Soils in the vicinity of the exploratory wells are either rocky or alkaline or have other limitations that make them unsuitable as farmland. There are no prime farmlands soils that would be impacted by the proposed action. The direct impacts of the proposed action to soils would be low.

Indirect Impacts

If a productive geothermal resource is discovered, deep exploration drilling which would require expanding the associated well pad to an area of 400 ft x 400 ft or 3.7 acres per well or a total of 38 acres if all ten wells were expanded.

The total direct and indirect impacts to soils would be up to 40 acres of disturbance.

In much of the project area, the land is sparsely vegetated and surface soils are "armored" with a layer of pebbles and gravel called "desert pavement," which has resulted from years of wind erosion winnowing the soils. The desert pavement stabilizes the surface soil, and when disturbed the soil becomes more vulnerable to erosion. The chemistry and properties of surface soils may be much different than the subsurface soils at shallow depth. With little rainfall, desert soils tend to develop and evolve over long periods so that scars from soil disturbance may remain for many years. These characteristics of desert soils can lead to slow recovery vegetation in disturbed areas. In general, soil disturbance can be minimized through the use of best management practices.

Seismicity. In general, ground shaking in a large earthquake, could damage drilling structures. Geothermal resources tend to occur in areas of geologically recent volcanic activity. Often these areas contain active faults, and often geothermal fluids circulate from deep to shallow depths because of fault-related fracturing. Also, some faults that may be distant from the geothermal area may produce earthquakes large enough to cause severe ground shaking in the project area. Although seismic hazards may exist at a site, the short time frame over which the activities would occur reduces the level of hazard to less than significant levels.

Mineral Resources. Geothermal areas are sometimes also areas of hydrothermal mineral deposition. Heated groundwater circulating through fractured rock dissolves metals from the rock and re-deposits them in the fractures, which over long periods can create significant ore deposits. The locations proposed for exploratory wells do not have known mineral resources.

Indirect Impacts Based on a Reasonably Foreseeable Development Scenario

Should deep exploratory drilling prove that the resource may be suitable, a geothermal power plant could be built. The disturbance associated with any future plant would depend on the plant's size and design. While such a power plant has not been designed, the potential impacts would include the short-term construction of wells, pipelines, roads, the power plant, and transmission lines. The amount of land disturbed could vary from 1.5 acres to more than 20 acres.

Subsequent NEPA analysis would determine the actual impact to soils, geology and mineral resources.

No Action Alternative

No impacts on soils, geology and mineral resources are expected from implementing the No Action Alternative.