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PROTOTYPE ENVIRONMENTAL ASSESSMENT OF THE IMPACTS OF SITING AND CONSTRUCTION  
OF AN SPS GROUND RECEIVING STATION

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This report is a prototype assessment of the environmental impacts of siting and constructing a Satellite Power System (SPS) Ground Receiving Station (GRS). The objectives of the study are: 1) to develop an assessment of the non-microwave-related impacts of the reference system SPS GRS on the natural environment (microwave health and safety and communications impacts were not assessed); 2) to assess the impacts of GRS construction and operations in the context of actual baseline data for a site in the California desert about 250 kilometers north of Los Angeles referred to as Rose Valley/Coso; and 3) to identify critical GRS characteristics or parameters that are most significant in terms of the natural environment.

At the Rose Valley/Coso GRS study site (36°N latitude), the rectenna field, which is the area of the GRS where the microwave energy is collected and converted to electrical energy, would be an ellipse 13.4 km (N-S) by 10.0 km (E-W) and would enclose an area of about 10,500 hectares. An elliptical buffer zone, 1.35 km (N-S) by 1.0 km (E-W) would surround the rectenna field. The rectenna would contain about 2.5 million 3 meter by 10 meter panels connected end-to-end in long continuous rows. Approximately 450 workers would be required for 24-hour/365 days per year operation.

GRS construction is expected to require 25 months, with an average work force of 2,500 and a peak work force of 3,200. Major materials requirements include: 11 million tonnes of aggregates and ballast, 1.4 million tonnes of cement, 6.5 million cubic yards of concrete, 1.7 million tonnes of steel and 170,000 tonnes of aluminum. Other construction phase requirements include: maximum annual water demand of 3-15 million cubic meters (the wide range resulting from uncertainties in dust control and soil stabilization measures), and maximum incremental electrical demand of 16 MW.

Baseline environmental conditions in the Rose Valley/Coso study area are generally typical of the Basin and Range Physiographic Province which encompasses much of the southwestern United States. Air quality is quite good; ambient noise levels are very low. Soils tend to be clayey and silty in the valley bottoms, and more coarse and well drained, as well as sandy to stoney, away from valley bottoms. Surface water flow is predominantly ephemeral; a 400-hectare emergent underflow lake south of the study site is the only perennial surface water body in Rose Valley. The common Cresote Bush Scrub Community and Shad-scale Scrub Community are the predominant vegetative types; no federally listed rare, threatened or endangered plant species are found in Rose Valley. A relatively abundant fauna is present, although without a great species diversity. As the site is along a migratory pathway, a sizable number of migratory birds are observed, for whom Rose Valley water sources are important habitats. No federally-listed endangered or threatened animal species are found in Rose Valley.

Key environmental issues identified include: probable adverse air quality impacts during construction; potentially significant soils and geologic impacts and constraints; substantial water demand during project construction; possible water quality impacts during construction and operation requiring a careful soil stabilization/drainage/erosion/sewage control problem; and total disruption of existing ecosystems at the GRS site, with reestablishment of these ecosystems

quite problematic.

Critical project parameters revealed include: the sheer size and intensity of use of the contiguous land area required by an SPS GRS; the lack of flexibility in siting individual rectenna structures once the rectenna field boundaries are established; the difficulties in finding suitable sites that do not conflict with other societal needs and values; uncertainties relating to re-establishing native ecosystems following total ecosystem modification during construction, and the related need for further research into microclimatic effects near the ground surface beneath the rectenna panels; and the proposed two-year GRS construction schedule, which has significant implications for peak air quality, water supply and biological impacts -- which could be reduced by extending the construction schedule.

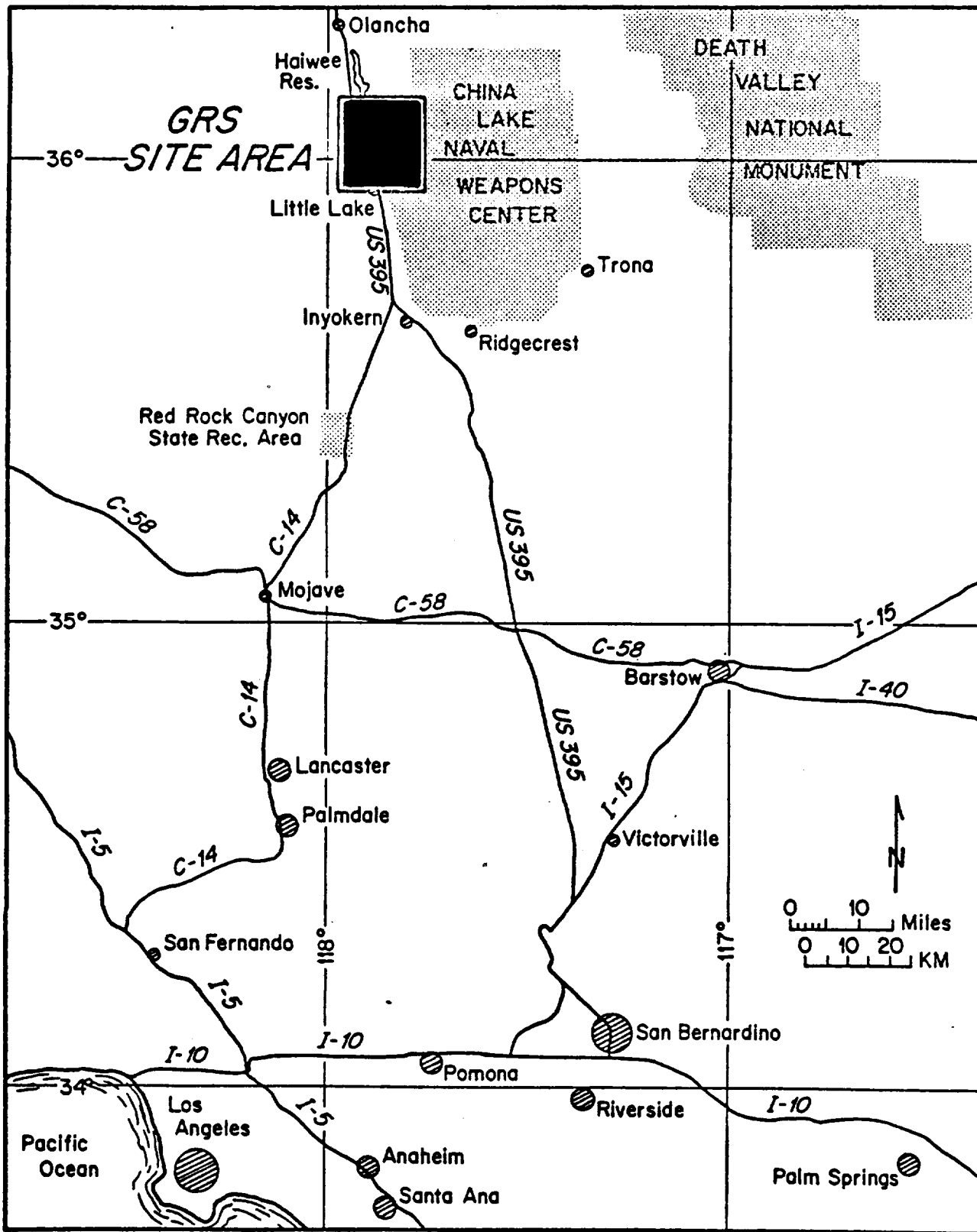
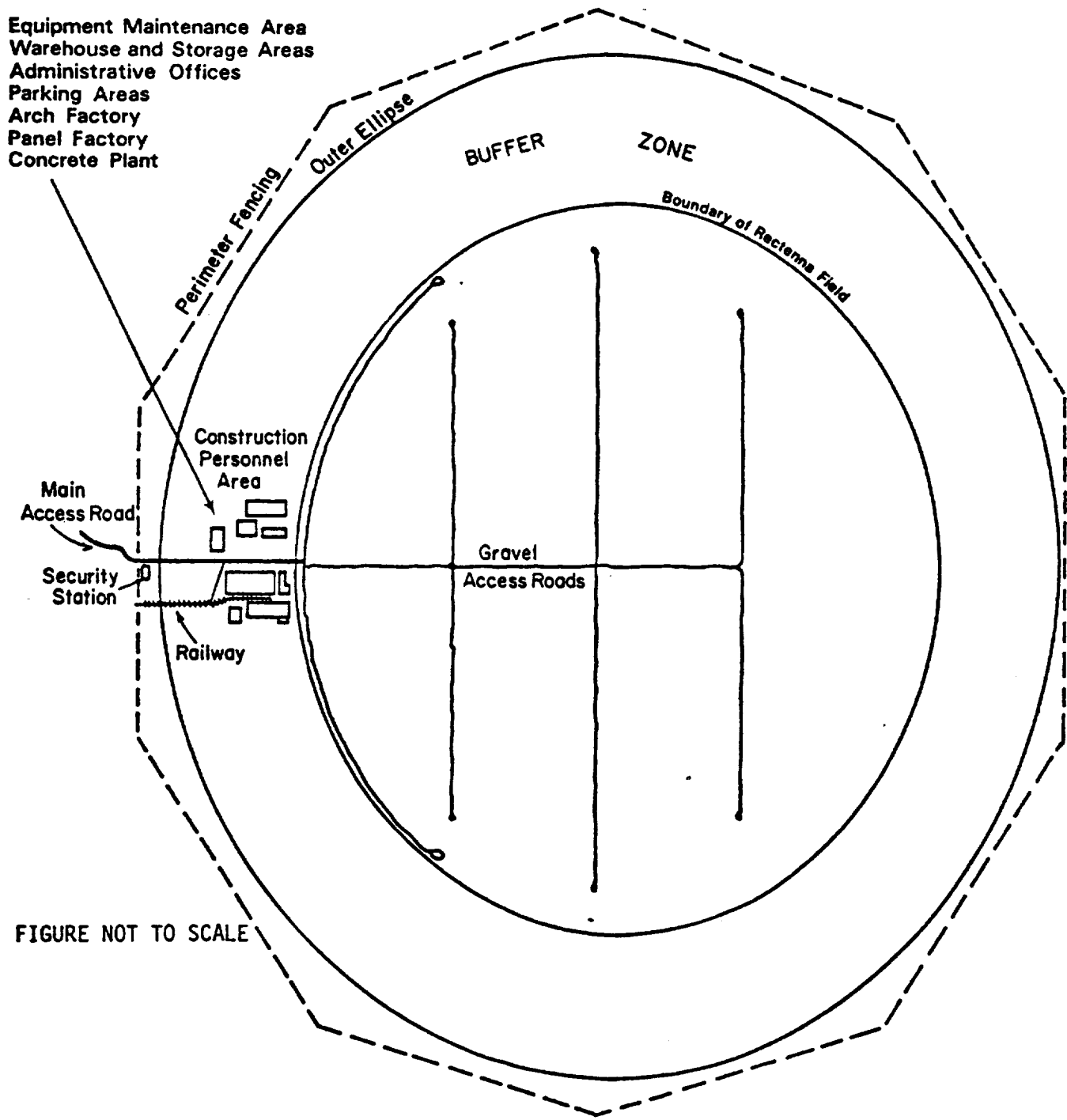


Figure 1 LOCATION OF GRS STUDY AREA



**Figure 2** GRS CONSTRUCTION PHASE: SCHEMATIC LAYOUT  
 (BASED ON FIGURES PRESENTED IN GENERAL ELECTRIC, 1979 AND ROCKWELL, 1979)