HOOVER DAM, SOUTHERN CALIFORNIA EDISON 230-KV SWITCHYARD
(Boulder Dam)
(Boulder Canyon Dam)
U.S. Highway 93
Boulder City vicinity
Clark County
Nevada

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

HISTORIC AMERICAN ENGINEERING RECORD
PACIFIC GREAT BASIN SUPPORT OFFICE
National Park Service
U.S. Department of the Interior
1111 Jackson Street
Oakland, CA 94607
Location: U.S. Highway 93
Vicinity of Boulder City
Clark County
Nevada

USGS Hoover Dam, Nevada-Arizona 7.5 Minute Provisional 1997
UTM Coordinates: 11.0703455.3987875

Date of Construction: 1937-1939

Engineer: Southern California Edison Company
Builder: Southern California Edison Company
Present Owner: Western Area Power Administration
Present Occupant: Not Applicable

Significance:
The Southern California Edison (SCE) 230-kV Switchyard was an integral element of the Hoover Dam electrical generation and transmission system. This switchyard provided much-needed electricity during World War II to power Douglas, Vultee, and Northrup aircraft plants, the Long Beach Naval Shipyard, military bases, and major steel and aluminum production plants. Electricity provided by this switchyard and the SCE North and South Transmission Lines was also very important in the post-war agricultural and municipal development of California.

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Date: April 2004
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The SCE 230-kv Switchyard is located south of U.S. Highway 93, to the south of the Metropolitan Water District Switchyard. The SCE switchyard was built into a steep north-facing rock slope, and the north façade of the facility includes stone slope curbing and a high concrete wall. The switchyard receives current by means of two transformer circuits that cross the canyon from the Arizona wing of the power plant, and the SCE North and South Transmission Lines exit the west end of the switchyard.

To help accommodate the slope, the equipment deck of the switchyard has two levels. The main bus system, oil circuit breakers, selector switches, a capacitor tower, and five take-off structures are located on the main level. A narrower level along the south side of the switchyard houses two receiving bus towers, three disconnect switches, a 12,000-gallon oil storage tank, and the foundation for a second capacitor tower. And 82' 6" x 25' 10" lower service building also has two levels that house a battery and battery charger room, an oil storage tank, a pump room, a relay control room, a storage room, and a stairwell to the main equipment deck.

The Southern California Edison Company contracted to begin taking Hoover Dam electricity on June 1, 1940, but the company expedited its construction schedule in response to growing power demands in southern California. Initial plans for the 158' x 225' switchyard on the south side of the highway were prepared in 1937. Excavation began in November 1937 for the control and power conduits extending from the site of the Metropolitan Water District to the north. Excavation for retaining walls, oil circuit breaker foundations, tower footings and other features began in January 1938. Due to the extreme slope of the site, retaining walls up to 36' 3" high were required, and high concrete footings were needed for equipment in the lower, or northern, part of the switchyard. Limited heavy construction equipment was available at that time, and all excavation work for the switchyard was done with manpower using, shovels, and jackhammers.

Installation of power and control conduits from the MWD Switchyard to the SCE Switchyard site began on June 15, 1938, and was completed on July 21, 1938. As part of this construction, conduits were also run to the 150-ton crane. Erection of the capacitor tower in the switchyard was accomplished on July 5, and the northeast bus tower was built on July 13, 1938. Concrete pouring in the switchyard began in March 1938, and construction of the steel bus works was completed by February 15, 1939. Erection of three 230-kv, 600-ampere oil circuit breakers began on October 4, 1938, and was completed on November 18-1938. Construction of the switchyard was virtually completed by April 1939. After tests, the switchyard began receiving electricity from generating unit A-7 on June 19, and from unit A-6 on September 12, 1939.
Expansion of equipment within the switchyard was started in late 1940 to accommodate a second 230-kV transmission line then under construction. Equipment in this expansion was similar to the original installation, and by the end of the year concrete footings had been poured and steel erection had begun. This expansion was completed in 1941, and power was provided to the second transmission line by the end of that year. A second expansion of equipment began almost immediately to accommodate reception of power from generating unit A-5. Assembly and erection of steel structures in the second expansion began in March 1942. Erection of oil circuit breakers for the expansion was completed by August 31, 1942, except for filling with oil. The second switchyard expansion and the corresponding Transformer Circuit No. 10 were ready for service by December 31, 1942.

The two 230-kV tie circuits between the SCE and MWD switchyards have been discussed above; construction of these tie circuits apparently did not substantially alter the SCE switchyard. SCE had adopted a 50-cycle operating system long before Hoover Dam was built, and the company continued to use this system after most other utilities and agencies, including the Metropolitan Water District, had adopted 60-cycle generation and transmission. SCE's 50-cycle system substantially complicated power plant circuitry and the interconnection with the MWD Switchyard, and by 1945, MWD had excess power that SCE needed. On April 8, 1948, SCE converted generating units A-5, A-6, and A-7 to 60-cycle operation.

Alterations were made to the SCE 230-kV Switchyard in 1969-1970, in preparation for transfer of control functions to Mead Substation. The changes included installation of current transformers, coupling capacitor potential devices, line traps, and control equipment in the switchyard and the battery oil houses, and installation of an air conditioner in the battery oil house. The large oil circuit breakers were replaced in 1959 or 1960, and batteries and the battery charger were removed from the battery and oil house beneath the northern part of the switchyard.

Sources:
This documentation of features of Hoover Dam and associated structures was accomplished by Associated Cultural Resource Experts (ACRE). ACRE completed documentation of 21 features in October 2002. Documentation on four linear features was extended and an additional 3 features were newly documented in February 2004. Both phases of documentation were conducted as part of the historical/engineering recordation of Hoover Dam—prepared for the Department of Energy, Western Area Power Administration; Bureau of Reclamation; and Federal Highway Administration—that includes a narrative for the Addendum to Hoover Dam and individual documentation of 25 features located at the Hoover Dam facility, photo documentation, and documentation of existing historic photographs and site plans. The recordation conforms to the standards of the Historic American Engineering Record, U.S. Department of the Interior. Other reports in the HAER collection completed for these projects are a narrative for the Addendum to Hoover Dam (NV-27) and 24 short forms for individual structures: Hoover Dam, Los Angeles Switchyard (NV-27-A); Hoover Dam, Southern Sierras/CEP/Southern California Edison 138-kV Switchyard (NV-27-B); Hoover Dam, Metropolitan Water District Switchyard (NV-27-C); Hoover Dam, State of Nevada Switchyard (NV-27-D); Hoover Dam, Southern California Edison 230-kV Switchyard (NV-27-E); Hoover Dam, Arizona-Nevada Switchyard (NV-27-F); Hoover Dam, Static Towers and Lines (NV-27-G); Hoover Dam, Los Angeles Relay Control Building (NV-27-H); Hoover Dam, Switchyard Fire House (NV-27-I); Hoover Dam, Promontory Water Tank (NV-27-J); Hoover Dam, Control Cable Hoist House (NV-27-K); Hoover Dam, Transformer Circuits 1-15 (NV-27-L); Hoover Dam, Los Angeles BPL Lines 1-3 (NV-27-M); Hoover Dam, Southern California Edison North and South Lines (NV-27-N); Hoover Dam, Hoover-Basic Magnesium North and South Lines (NV-27-O); Hoover Dam, Metropolitan Water District Line 1 (NV-27-P); Hoover Dam, United States Construction Railroad (NV-27-Q); Hoover Dam, U.S. Highway 93 Nevada Segment (NV-27-R); Hoover Dam, Lower Portal Access Road (NV-27-S);
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Hoover Dam, Kingman Switchyard (NV-27-T); Hoover Dam, U.S. Highway 93 Arizona Segment (NV-27-U); Hoover Dam, Explosives Magazines (NV-27-V); Hoover Dam, Nevada Downstream Waste Tailings (NV-27-W); and Hoover Dam, Nevada Spoils Tunnel (NV-27-X); Hoover Dam, Henderson-Mead Transmission Line 2 (NV-27-Y).

Project Information:

This documentation was prepared for three federal agencies: U.S. Department of Transportation, Federal Highway Administration (FHWA), Central Federal Lands Highway Division, Lakewood, CO; U.S. Department of Energy, Western Area Power Administration (Western), Desert Southwest Customer Support Region, Phoenix, AZ; and U.S. Department of Interior, Bureau of Reclamation (Reclamation), Lower Colorado Region, Boulder City, NV.

This documentation records certain transportation and electrical features associated with Hoover Dam before planned removal or alteration of some structures. FHWA plans to construct a bridge over the Black Canyon of the Colorado River about 1,500' downstream from Hoover Dam. The Hoover Dam Bypass Project would include realignment of U.S. Highway 93 on the Nevada and Arizona sides of Black Canyon. The project would include demolition, relocation, or substantial visual impact to a segment of U.S. Highway 93 on the Nevada approach to Hoover Dam, a segment of a former alignment of U.S. Highway 93 in Arizona, electrical transformer circuits in Arizona and Nevada, two electrical switchyards, a segment of the grade of the U.S. Construction Railroad, a stone gate structure for a dam construction and operations road, and six historic transmission lines. This documentation also records certain structures not directly affected by FHWA’s Hoover Dam Bypass Project. Electrical transmission facilities at Hoover Dam are administered by Western, but these facilities are within a federal reservation administered by Reclamation. Documentation of electrical structures is intended to partially fulfill responsibilities of Western and Reclamation under Section 110 of the National Historic Preservation Act (Amended). Some electrical structures addressed by Western and Reclamation would be directly affected by FHWA’s Hoover Dam Bypass Project, and all structures addressed by Western and Reclamation are functionally related and geographically near structures addressed by FHWA.

Project Manager and historian for the recordation was Kurt P. Schweigert of Associated Cultural Resource Experts. The photographers were Deborah Dobson-Brown and Douglas M. Edwards of Associated Cultural Resource Experts. This documentation was prepared on the basis of research conducted at Reclamation archives in Denver, CO, and Boulder City, NV; Western archives and files in Denver and Phoenix, AZ; the National Archives and Records Administration in Denver; libraries of the University of Nevada-Las Vegas; and the Western History Collection of the Denver Public Library. This documentation includes information contained in survey reports for the Hoover Dam Bypass Project Environmental Impact Statement, an evaluation of the Western switchyards at Hoover Dam, an evaluation of the Hoover Dam construction railroads, a National Register nomination for Hoover Dam, and other documents.
