

HISTORIC AMERICAN ENGINEERING RECORD

INDEX TO PHOTOGRAPHS

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Battle Creek Hydroelectric System
Battle Creek and its tributaries
[Shasta and] Tehama Counties
California

HAER No. CA-2

Red Bluff vicinity

Documentation:

- 20 sheets (1979, 1980, including site plans, plans, elevations, sections)
- 33 exterior photos (1979)
- 31 interior photos (1979)
- 31 photocopies and historical photographs (early 1900s)-exterior
- 79 photocopies and historical photographs (early 1900s)-interior
- 181 data pages (1979)
- 1 set of field records (5 folders, numerous loose pages, approximately 151 field photos)

See MASTER CAPTION PHOTO LIST for identification and credit for each photograph

HISTORIC AMERICAN ENGINEERING RECORD

MASTER PHOTO CAPTION LIST

Battle Creek Hydroelectric System
(Shasta and Tehama Counties, CA)
Includes Volta, South, Inskip and Coleman power houses

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VOLTA POWERHOUSE AND RELATED OUTBUILDINGS

Exterior views:

- CA-2-1. Credit TCL.
South elevation. Note water discharging from all five tailraces.
The portion of the powerhouse erected in 1900-01 is on the right.
The 1906 and 1908 additions are on the left.
- CA-2-2. Credit PG&E.
South elevation. Photo 10 November 1927.
- CA-2-3. Credit FM.
East elevation of powerhouse and switch house. Photo c. 1920.
- CA-2-4. Credit TCL.
East elevation of powerhouse and switch house. Photo c. 1920.
- CA-2-5. Credit FM.
View from along penstock of powerhouse discharging water. Photo c. 1920.
- CA-2-6. Credit PG&E.
South and east view of powerhouse, switch house, and outbuilding.
Photo 10 November 1927.
- CA-2-7. Credit JE.
South elevation of original 1901 structure (JE, v. 12 [1902] p. 232).
- CA-2-8. Credit SHS.
View of east elevation of powerhouse and water discharging from
tailrace. Note the absence of upper level windows on facade.
Photo c. October 1901.
- CA-2-9. Credit JTL.
East elevation of powerhouse, switch house and outbuilding.
- CA-2-10. Credit JTL.
East elevation of powerhouse.
- CA-2-11. Credit JTL.
North elevation of powerhouse showing sliding wood doors used for
easy installation and removal of equipment. Note painted surface
indicating location of transformer annex (now removed).
- CA-2-12. Credit JTL.
South elevation of powerhouse.
- CA-2-13. Credit JTL.
South elevation of powerhouse showing tailraces for units 4 and 5.
- CA-2-14. Credit JTL.
View of north and west elevations of powerhouse and switch house.
Note water-cooled transformers.

- CA-2-15. Credit JTL.
East elevation of switch house.
- CA-2-16. Credit JTL.
View of north and west elevations of switch house. Note water-cooled transformers.
- CA-2-17. Credit JTL.
Detail of water-cooled transformers.

Interior Views:

- CA-2-18. Credit Pelton Water Wheel Company.
View from the older portion of the powerhouse with the 750 kW 1901 generating units in the left foreground. An exciter unit and the switchboard are in the right foreground. (Pelton Water Wheel Company, Pelton Impulse & Reaction Turbine Installations, 1920, p. 33).
- CA-2-19. Credit Pelton Water Wheel Company.
Photocopy of drawing (perspective) showing layout of powerhouse in 1901. (Pelton Water Wheel Company, Catalog, 11th ed., 1909, p. 75).
- CA-2-20. Credit JE.
Volta interior c. 1910; the 1901 equipment is in the foreground. (JE, v. 25 [1910] p. 115).
- CA-2-21. Credit EW.
Volta interior c. 1904 with original 1901 equipment. (EW, v. 44 [1904] p. 407).
- CA-2-22. Credit PG&E.
View of the Doble water wheel housing and the 3000 kVA generator installed in 1926 to replace (original) units 1,2 and 3. Photo 10 November 1927.
- CA-2-23. Credit JE.
Switchboard for original 3 generators. (JE, v. 12 [1902] p. 239).
- CA-2-24. Credit EW.
Rear of switchboard of 3 original generators. (EW, v. 44 [1904] p. 410).
- CA-2-25. Credit JTL.
Detail of unit 4 (installed 1906-07) showing single overhurd Doble water wheel, with air duct and 2000 kVA Westinghouse generator in background.
- CA-2-26. Credit JTL.
Overview of unit 4 showing exciter, generator, air duct, water wheel housing, gate valve control and bypass, needle valve control, deflector motor, and bearing in background.

- CA-2-27. Credit JTL.
Detail of unit 4 showing 45 kW General Electric exciter and 2000 kVA Westinghouse generator.
- CA-2-28. Credit JTL.
Overview of unit 5 (installed 1908) showing exciter, generator, deflector motor, needle valve control, impulse wheel housing, and gate valve controls.
- CA-2-29. Credit JTL.
Overall perspective of new unit (1926) plus units 4 and 5 looking west.
- CA-2-30. Credit JTL.
Detail of generator and hearing of new unit.
- CA-2-31. Credit JTL.
Detail of main switchboard with powerhous operator in foreground.
- CA-2-32. Credit JTL.
Overall view looking east.
- CA-2-33. Credit JTL.
Overall view looking east featuring several components of unit 4.
- CA-2-34. Credit JTL.
Overview of switch house looking west.
- CA-2-35. Credit JTL.
view of switch house interior looking southwest.

SOUTH POWERHOUSE

Exterior Views:

- CA-2-36. Credit FM.
Aerial view of powerhouse and settlement.
- CA-2-37. Credit TCL.
South elevation.
- CA-2-38. Credit FM.
West elevation with shed on north side.
- CA-2-39. Credit PG&E.
Photocopy of east (front) elevation. Photo taken 10 November 1927.
- CA-2-40. Credit PG&E.
Photocopy of south elevation. Photo taken 10 November 1927.
- CA-2-41. Credit FM.
East (front) elevation.

- CA-2-42. Credit PG&E.
West elevation, showing switchyard. Photo taken 10 November 1927.
- CA-2-43. Credit PG&E.
West elevation. Photo taken 10 November 1927.
- CA-2-44. Credit JE.
East (front) elevation; penstock on right; tailraces on left.
(JE, v. 25 [1910] p. 120).
- CA-2-45. Credit JTL.
View of south and east elevations.

Interior Views:

- CA-2-46. Credit TCL.
Detail of Lombard Type "Q" governor, gate valve control, needle valve control, and transformers in their bays in background.
- CA-2-47. Credit JE.
Housing of one of the Doble rotors, cooling ducts, governor, and gate valve. (JE, v. 25 [1910] p. 121).
- CA-2-48. Credit JE.
Doble wheel housing, generator and cooling ducts. (JE, v. 25 [1910] p. 121).
- CA-2-49. Credit FM.
Governor, generator, tachometer, and air ducts.
- CA-2-50. Credit JTL.
View of water-driven exciter unit and exciter control panel.
- CA-2-51. Credit JTL.
View of Doble wheel housing, exciter, generator, switchboard with overhead field rheostat (above).
- CA-2-52. Credit JTL.
Detail of generator bearing, collector rings, air duct, and gate valve control.
- CA-2-53. Credit JTL.
Detail of gate valve control and needle valve control.
- CA-2-54. Credit JTL.
Overview of South powerhouse interior taken from gallery.

INSKIP POWERHOUSE

Exterior Views:

CA-2-55. Credit PG&E.

West (front) and south elevations as seen from downstream, across South Battle Creek. Note penstock descending hill in background and switchyard. Photo taken 10 November 1927.

CA-2-56. Credit FM.

East elevation taken from along penstock. Note additions to the east side and the north side of the building.

CA-2-57. Credit LRC.

West elevation during construction. Note narrow-gauge railroad entering main door of powerhouse. Photo c. 1910.

CA-2-58. Credit FM.

West and south elevations. Photo c. 1910.

CA-2-59. Credit FM.

Flood waters on South Battle Creek next to powerhouse. Note height of water in relation to tailraces.

CA-2-60. Credit LRC.

East elevation from along penstock.

CA-2-61. Credit PG&E.

South elevation from across South Battle Creek. Note two exciter water discharge pipes and also the transformer cooling water discharge pipes (6). Photo taken 10 November 1927.

CA-2-62. Credit TCL.

West and south elevations. Note absence of "Inskip" sign above main door.

CA-2-63. Credit JTL.

West elevation.

CA-2-64. Credit JTL.

West and south elevations from across South Battle Creek. Note penstock descending hill in background and new powerhouse construction in foreground.

CA-2-65. Credit JTL.

West elevation featuring penstock.

Interior Views:

CA-2-66. Credit JE.

Buckets and deflector hoods of triple-rotor Pelton impulse wheel. (JE, v. 25 [1910] p. 123).

CA-2-67. Credit PG&E.

Shot along length of powerhouse; exciters in the left foreground, 2000 kVA generator on right. Photo taken 10 November 1927.

CA-2-68. Credit FM.

Detail showing operators. Note cooling duct (now removed), governor (now removed), hand-operated needle valve controls (now removed).

CA-2-69. Credit TCL.

Housing of Pelton exciter impulse wheel and attached General Electric 60 kW exciter generator.

CA-2-70. Credit TCL.

Generator detail, looking east. Note lack of guard rails around pit.

CA-2-71. Credit LRC.

Inskip interior looking east showing generators and needle valve control.

CA-2-72. Credit FM.

Overview of powerhouse from gallery. Notice cooling duct on generator (now removed) and spare gate valve in far corner.

CA-2-73. Credit TCL.

Detail of switchboard, with governors in foreground.

CA-2-74. Credit TCL.

General overview of interior from gallery looking east. Note air duct on generator (now removed).

CA-2-75. Credit FM.

General overview of interior from gallery looking east.

CA-2-76. Credit FM.

Detail showing belts running from water wheel to governor and from water wheel to tachometer (foreground).

CA-2-77. Credit JTL.

General overview from gallery looking east.

CA-2-78. Credit JTL.

General view of wheel housings, exciter units, and generators looking southeast.

CA-2-79. Credit JTL.

Detail of 2000 kVA generator (unit 2) looking southwest. Note the elevated neutral on upper part of generator (added later).

CA-2-80. Credit JTL.

Detail of switchboard and overhead field rheostats.

- CA-2-81. Credit JTL.
Detail of gate valves and needle valve controls, view looking south-east.
- CA-2-82. Credit JTL.
Detail of collector ring of generator unit 2, view looking southwest.

COLEMAN POWERHOUSE

Exterior Views:

- CA-2-83. Credit PG&E.
Front (east) elevation and south (tailrace) elevation. Note cornice on facade and new roof. Photo taken 10 November 1927.
- CA-2-84. Credit JE.
General view looking down on Coleman site. View looking north. Note two penstocks descending hill in background. (JE, v. 27 [1911] p. 411).
- CA-2-85. Credit TCL.
East (front) and south elevations. Note original roof.
- CA-2-86. Credit JE.
South elevation showing tailrace . (JE, v. 27 [1911] p. 416).
- CA-2-87. Credit JE.
West and south elevations. Notice draft tube openings, relief valve outlets above them, and exciter water discharge opening (with scaffolding in front). (JE, v. 27 [1911] p. 417).
- CA-2-88. Credit JE.
Discharge canal (shown under construction). (JE, v. 27 [1911] p. 418).
- CA-2-89. Credit PG&E.
West (rear) and south elevations. Photo taken 10 November 1927.
- CA-2-90. Credit PG&E.
West (rear) and south elevations. Photo taken 10 November 1927.
- CA-2-91. Credit SHS.
Detail of water discharging from relief valve outlet. Photo c. 1930.
- CA-2-92. Credit JE.
Insulators and gate valves (north elevation). (JE, v. 27 [1911] p. 421).
- CA-2-93. Credit JTL.
West and south elevations; note new powerhouse in background.
- CA-2-94. Credit JTL.
South elevation.

- CA-2-95. Credit JTL.
Detail of north elevation and gate valves.
- CA-2-96. Credit JTL.
New powerhouse. General overview looking southwest. Note old powerhouse on right.
- CA-2-97. Credit JTL.
New powerhouse, south elevation. Note old powerhouse on left.
- CA-2-98. Credit JTL.
New powerhouse, upper level.

Interior Views:

- CA-2-99. Credit SHS.
Detail of governor, turbine housing, and generator. Photo c. 1930.
- CA-2-100. Credit SHS.
Detail showing interior of generator. Photo c. 1930.
- CA-2-101. Credit TCL.
General view of turbine room looking east.
- CA-2-102. Credit TCL.
Detail of switchboard balcony looking northeast.
- CA-2-103. Credit TCL.
Detail of low voltage switches.
- CA-2-104. Credit JE.
Detail view of Allis-Chalmers Francis-type turbine housing and generator. (JE, v. 27 [1911] p. 418).
- CA-2-105. Credit JE.
Detail view of Allis-Chalmers Francis-type turbine housing and generator. (JE, v. 27 [1911] p. 418).
- CA-2-106. Credit JE.
General overview looking east showing generating units and switchboard on balcony. (JE, v. 27 [1911] p. 417).
- CA-2-107. Credit PG&E.
General overview looking east. Photo taken 10 November 1927.
- CA-2-108. Credit JTL.
General overview looking east from switchboard balcony.
- CA-2-109. Credit JTL.
Detail of exciter looking east.

- CA-2-110. Credit JTL.
Detail of generator and exciter with connecting belt.
- CA-2-111. Credit JTL.
Detail of generator bearing between turbine and generator.
- CA-2-112. Credit JTL.
General detail of turbine housing, generator, and exciter taken from switchboard gallery.
- CA-2-113. Credit JTL.
Detail of turbine housing and generator looking southwest.
- CA-2-114. Credit JTL.
Detail of turbine housing and generator looking southwest from switchboard gallery.
- CA-2-115. Credit JTL.
General overview of exciter, generator, and switchboard gallery looking east.

CA-2-116. Credit JTL.
New powerhouse, overview of control room.

CA-2-117. Credit JTL.
New powerhouse, detail of control board.

CA-2-118. Credit JTL.
New powerhouse, detail of turbine housing.

WATER SUPPLY SYSTEM: RESERVOIRS, DAMS, PENSTOCKS, DITCHES, ETC.

- CA-2-119. Credit JE.
General view of Manzanita Lake and Lassen Peak. (JE, v. 25 [1910] p. 111).
- CA-2-120. Credit JE.
Lake Nora with forebay in the distance. (JE, v. 12 [1902] p. 231).
- CA-2-121. Credit JE.
Galpin Creek ditch, a feeder leading water to the Keswick ditch, supplying Volta powerhouse. (JE, v. 12 [1902] p. 235).
- CA-2-122. Credit JE.
Millseat Creek above the intake of the ditch leading to the Volta forebay. (JE, v. 12 [1902] p. 233).
- CA-2-123. Credit JE.
Woodstave portion of the Lake Grace penstock at Volta. (JE, v. 25 [1910] p. 113).
- CA-2-124. Credit JTL.
"Saxophone", a pipe carrying water from Volta crossing North Battle Creek and emptying into the Ripley Creek flume.

- CA-2-125. Credit JTL.
"Saxophone", detail showing water emptying out of pipe, crashing into concrete wall and falling into flume.
- CA-2-126. Credit TCL.
Cross County Canal (between Volta and South). Photo c. 1910.
- CA-2-127. Credit JTL.
Detail of structure of Ripley Creek flume.
- CA-2-128. Credit JE.
Outlet of tunnel on South Battle Creek Canal immediately above junction with Cross Country Canal. (JE, v. 25 [1910] p. 118).
- CA-2-129. Credit JE.
Steel penstock on rubble masonry bridge at South powerhouse. (JE, v. 25 [1910] p. 119).
- CA-2-130. Credit FM.
Eagle Canyon flume, looking northeast.
- CA-2-131. Credit LRC.
Wood stave penstock leading to Inskip powerhouse, stand pipe in background.
- CA-2-132. Credit JTL.
Smaller feeder pipes collecting seepage and water from springs for the Eagle Canyon flume.
- CA-2-133. Credit JTL.
View of wood stave portion of Inskip penstock from forebay.
- CA-2-134. Credit JTL.
Eagle Canyon diversion dam. Note water rushing off sheer rocks and into canal.
- CA-2-135. Credit JTL.
Eagle Canyon dam and fish ladder.
- CA-2-136. Credit JTL.
Eagle Canyon flume, looking southwest.
- CA-2-137. Credit JTL.
Eagle Canyon flume, looking southwest.
- CA-2-138. Credit TCL.
Eagle Canyon flume, looking southwest.
- CA-2-139. Credit TCL.
Eagle Canyon flume, looking northeast.
- CA-2-140. Credit JTL.
Detail of header gate at Inskip forebay.

- CA-2-141. Credit JTL.
Diversion dam for Coleman Canal, just downstream from Inskip powerhouse.
- CA-2-142. Credit JE.
Typical masonry waste weir (spillway) on Inskip ditch. (JE, v. 25 [1910] p. 122).
- CA-2-143. Credit ER.
Coleman Canal, section cut in rock. (ER, v. 64 [1911] p. 701).
- CA-2-144. Credit JE.
6-foot diameter wood stave section of Inskip penstock on masonry foundation. (JE, v. 25 [1910] p. 122).
- CA-2-145. Credit JE.
Steel section of Coleman Canal inverted siphon #2, crossing Baldwin Creek. (JE, v. 27 [1911] p. 413).
- CA-2-146. Credit ER.
Rubble masonry header box with dual intake pipes at Coleman powerhouse forebay. (ER, v. 64 [1911] p. 701).
- CA-2-147. Credit FM.
Typical section of Coleman Canal. Photo c. 1910.
- CA-2-148. Credit FM.
Coleman Diversion Dam, immediately downstream from Inskip powerhouse.

CONSTRUCTION ACTIVITIES

- CA-2-149. Credit JE.
Using wooden forms and wire reinforcing to construct concrete portion of inverted siphon #2 on Coleman Canal. (JE, v. 27 [1911] p. 413).
- CA-2-150. Credit ER.
Building reinforced concrete portion of Coleman Canal inverted siphon #2. Longitudinal steel reinforcing rods are visible at bottom. (ER, v. 64 [1911] p. 702).
- CA-2-151. Credit JE.
Steel penstock fabrication at the Inskip pipe shop. (JE, v. 25 [1910] p. 123).
- CA-2-152. Credit JE.
Steel penstock between Lake Nora forebay and Volta. (JE, v. 12 [1902] p. 237).
- CA-2-153. Credit JE.
North Battle Creek Dam under construction. (JE, v. 25 [1910] p. 112).

- CA-2-154. Credit JE.
Sections of Lake Nora penstock at Volta ready to go into the trench.
(JE, v. 12 [1902] p. 237).
- CA-2-155. Credit ER.
Hand cleaning and trimming of Coleman canal after excavation by steam
shovel. (ER, v. 64 [1911] p. 701).
- CA-2-156. Credit LRC.
Steel penstock fabricating shop used in Inskip construction.
Photo c. 1909.
- CA-2-157. Credit LRC.
Best Company steam traction engine, one of two used by Northern
California Power Company for hauling heavy freight.
- CA-2-158. Credit LRC.
Sections of riveted penstock for Inskip. Photo c. 1909.
- CA-2-159. Credit PG&E.
Using mules and horses to transport generator base plate from
Anderson, CA, to Northern California's Kilarc powerhouse, c. 1903.

DOMESTIC STRUCTURES AT POWERHOUSE SETTLEMENTS

- CA-2-160. Credit TCL.
Volta Clubhouse.
- CA-2-161. Credit PG&E.
General view of Volta residences. Photo taken 10 November 1927.
- CA-2-162. Credit FM.
Volta clubhouse; transmission lines in foreground.
- CA-2-163. Credit TCL.
Cottages and fountain at South.
- CA-2-164. Credit FM.
Residence at South.
- CA-2-165. Credit FM.
Residence at Inskip.
- CA-2-166. Credit FM.
View of "main street" at Inskip c. 1912.
- CA-2-167. Credit PG&E.
General view of Inskip residences. Photo taken 10 November 1927.
- CA-2-168. Credit PG&E.
Boarding house and foreman's cottage at Coleman. Photo taken 10
November 1927.

CA-2-169. Credit FM.

Remains of H.H. Noble residence, destroyed by fire. "Noble Castle" stood atop the ridge near Lakes Grace and Mora, overlooking Volta.

MISCELLANEOUS

CA-2-170. Credit SHS.

Northern California Power Company substation, Bully Hill Mine area. Note lack of vegetation, caused by nearby copper smelting works.

CA-2-171. Credit PG&E.

Hamden Holmes Noble, founder of the Keswick Electric Power Company. President of Keswick Power and its successor companies -- Northern California Power Company and Northern California Power Company, Consolidated (until 1915).

CA-2-172. Credit PG&E.

Kilarc powerhouse on right; transformers and high voltage switches are in building on the left. Photo taken 10 November 1927.

CA-2-173. Credit PG&E.

Overview of Kilarc powerhouse and settlement. Photo taken 10 November 1927.

CA-2-174. Credit JTL.

Header gate at Inskip forebay.