HOOVER DAM

ANDY DETSCH

- Was the largest Dam of Its time
- Helped usher in several decades of major water projects funded by the U.S. government

Main Purposes for Construction

- Water Storage
- Hydroelectric power
- Flood control
- Irrigation

Overview

- Authorized by Congress in 1928.
  - Called the Boulder Canyon Project
  - Later known as Hoover Dam
- Located on the border between Arizona and Nevada along the Colorado River
- Construction began in 1931
- Construction completed in 1936

Contractor

- The contract was awarded to Six Companies, Inc. in 1931
  - Lowest qualified bidder at $48,890,955
- Frank Crowe was the chief executive

Engineer

- Bureau of Reclamation

Statistics

Hoover Dam

- 726 feet high
- 1,244 feet Long
- 660 feet thick at base
- 25 feet thick at top
- 4.36 million yd^3 of concrete
- Capacity of 1.24 million cubic feet
- Created Lake Mead

Lake Mead

- 233 square mile area

Hydroelectric Generation

- 4 billion kWh a year
  - Enough to serve 1.3 million people
  - Electricity for Arizona, Southern California, and Nevada.

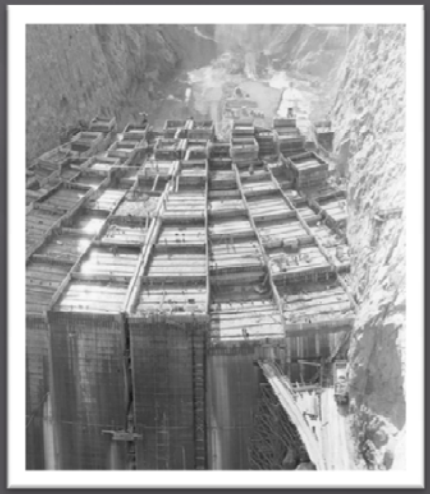
Other Statistics

- Cost $165 million
- Gravity type dam
- Spans 2 time zones
  - Mountain and Pacific

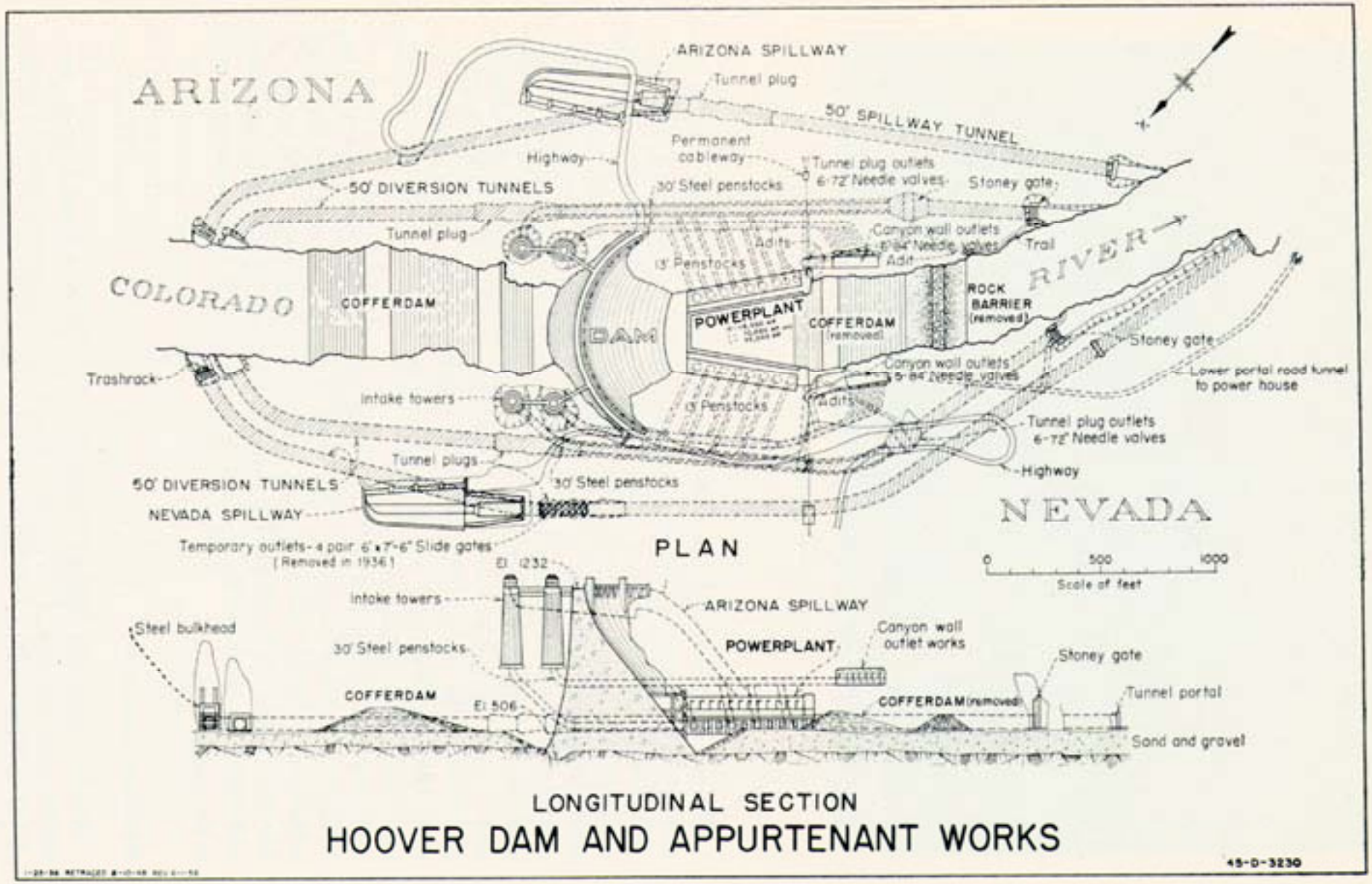
Construction

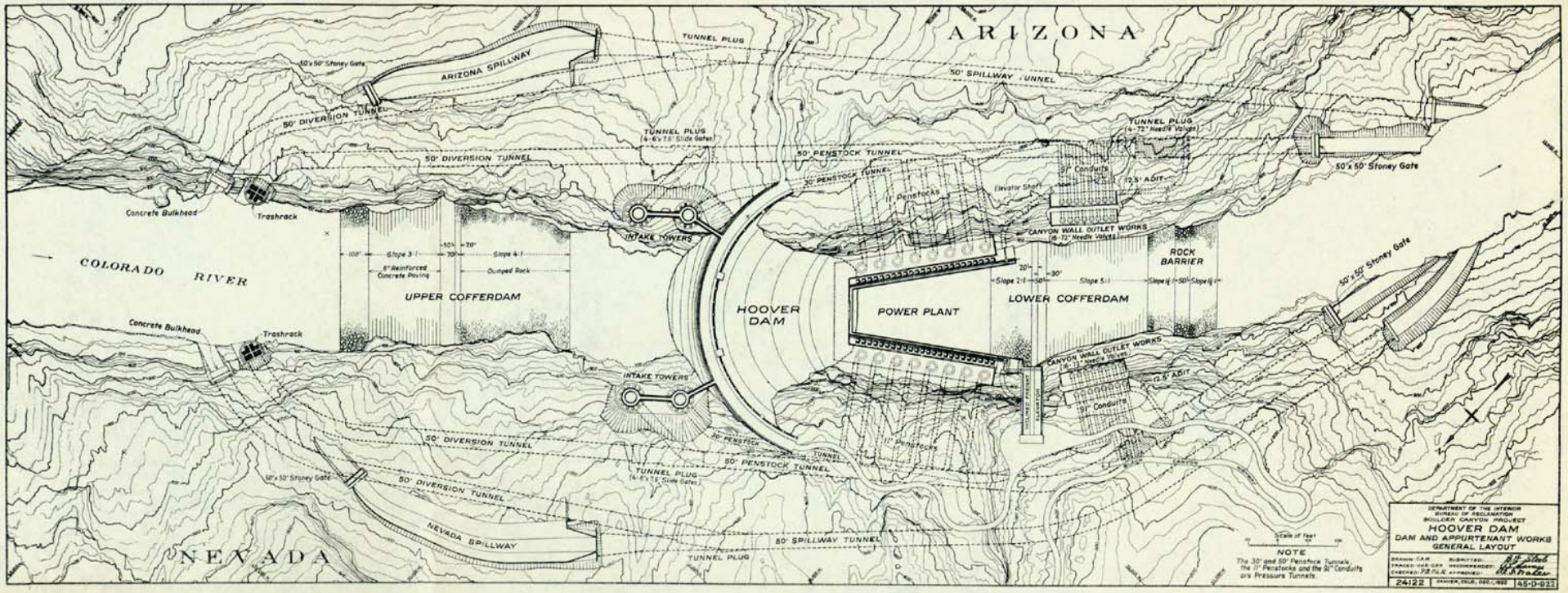
- Started with the building of cofferdams
  - To prevent flooding

- River diversion
  - Four diversion tunnels
    - 50 feet in diameter
    - Combined length of 16,000 feet
- Excavation
  - About 5.5 million yd^3 of material was removed



- Concrete
  - Poured in vertical columns and locked together
  - Enough concrete was used to pave a 16-foot wide highway from San Francisco to New York City


ARIZONA
ARIZONA SPILLWAY
Tunnel plug
50' SPILLWAY TUNNEL
Permanent cableway
Highway
Tunnel plug outlets 6-72" Needle valves
Stoney gate
50' DIVERSION TUNNELS
30' Steel penstocks
Tunnel plug
Adits
Canyon wall outlets 5-84" Needle valves
Trail
13' Penstocks
Adit
COLORADO
COFFERDAM
DAM
POWERPLANT
COFFERDAM (removed)
ROCK BARRIER (removed)
RIVER
Stoney gate
Trashrack
Intake towers
Canyon wall outlets 5-84" Needle valves
Lower portal road tunnel to power house
13' Penstocks
Adits
Tunnel plug outlets 6-72" Needle valves
Tunnel plugs
Highway
50' DIVERSION TUNNELS
30' Steel penstocks
NEVADA SPILLWAY
NEVADA
Temporary outlets-4 pair 6'x7'-6" Slide gates (Removed in 1936)
PLAN
0 500 1000
Scale of feet
El 1232
Intake towers
ARIZONA SPILLWAY
Steel bulkhead
Canyon wall outlet works
30' Steel penstocks
POWERPLANT
Stoney gate
COFFERDAM
El 506
COFFERDAM (removed)
Tunnel portal
Sand and gravel
LONGITUDINAL SECTION
HOOVER DAM AND APPURTENANT WORKS
49-D-3230


ARIZONA
NEVADA
COLORADO RIVER
ARIZONA SPILLWAY
NEVADA SPILLWAY
50' SPILLWAY TUNNEL
80' SPILLWAY TUNNEL
50' DIVERSION TUNNEL
50' PENSTOCK TUNNEL
30' PENSTOCK TUNNEL
TUNNEL PLUG
50'x50' Stoney Gate
Concrete Bulkhead
Trashrack
INTAKE TOWERS
UPPER COFFERDAM
LOWER COFFERDAM
HOOVER DAM
POWER PLANT
ROCK BARRIER
CANYON WALL OUTLET WORKS
Penstocks
Elevator Shaft
12.5' ADIT
Slope 3:1
Slope 4:1
Slope 2:1
Slope 5:1
6" Reinforced Concrete Paving
Dumped Rock
Scale of Feet
NOTE
The 30' and 50' Penstock Tunnels, the 11' Penstocks and the 31' Conduits are Pressure Tunnels.
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
BOULDER CANYON PROJECT
HOOVER DAM
DAM AND APPURTENANT WORKS
GENERAL LAYOUT
24122
45-D-622

Energy generated by Hoover Dam is allocated as follows

Area	Percentage
Metropolitan Water District of Southern California	28.5393%
State of Nevada	23.3706%
State of Arizona	18.9527%
Los Angeles, California	15.4229%
Southern California Edison Company	5.5377%
Boulder City, Nevada	1.7672%
Glendale, California	1.5874%
Pasadena, California	1.3629%
Anaheim, California	1.1487%
Riverside, California	0.8615%
Vernon, California	0.6185%
Burbank, California	0.5876%
Azusa, California	0.1104%
Colton, California	0.0884%
Banning, California	0.0442%

Benefits

- Population growth
- Industrial development
- Water sports

Impacts

- Significant changes to chemical, physical, and biological processes
- The Colorado River once carried 125 million tons of suspended sediment to the Gulf of California
  - Now it doesn't discharge sediment or water to the Gulf

Drawbacks

- Security concerns after 9/11
  - Traffic across Hoover Dam restricted
    - Over 20,000 vehicles a day cross Hoover Dam
  - Some vehicles are inspected prior to crossing
  - Semi trucks and box trucks are not allowed to cross
- Hoover Dam Bypass
  - Spurred by traffic concerns
  - Bypass will divert U.S.-93 traffic
  - Completion in 2010


Any Questions?