

Name(s): \_\_\_\_\_

Date: \_\_\_\_\_



## ***Examining the Alternatives***

Why was the Hetch Hetchy Valley selected over the alternatives that were considered by San Francisco, by the Army Corp of Engineers, by the Interior Department, and by Congress? There were a variety of factors that were important in selecting the dam and reservoir site including:

- size and regularity of the water source
- need for filtration of the water
- elevation of the source at the dam site
- possibility of power generation
- distance from San Francisco
- extent of the water shed draining into the source
- geology of the dam site as it affected construction costs
- geology of the lake bed as it related to water loss due to seepage

San Francisco engineers and city leaders obviously wanted the combination of factors leading to the lowest construction and operation costs and a source of water that would be adequate for participating Bay Area communities into the 21st century. In the spirit of Progressive era politics they wanted the greatest value for the largest number of Californians served by the resource. In their minds these considerations far outweighed the scenic value of the valley to the few who were able to visit Hetch Hetchy. The fact that the valley was part of a national park carried little weight.

How did the various alternatives measure up? Assume the role of an engineer hired by the city of San Francisco in 1912 and analyze the available data.

- 1) Which of the sites are within 50 miles of San Francisco? 100 miles? 150 miles? 250 miles? Record your results in the table below:

<b>Within</b>	<b>Dam Sites</b>
50 miles	
100 miles	
150 miles	
250 miles	

- 2) Repeat the selection of the water alternatives that met the 400 million gallons per day minimum set by San Francisco. Then eliminate river systems from the list by applying the following criteria:
  - a) There is no need for filtration
  - b) The water intake is at an elevation that gravity will help push water through the pipeline to San Francisco over the California Coast Range minimizing the need for pumping
  - c) The annual rainfall in the watershed is greater than 40 inches per year
  
- 3) Examine the pictures linked to each of the six potential dam sites along the western side of the Sierra Nevada Mountains beginning with Hetch Hetchy in the south and extending north to South Table Mountain. Describe the geology and topography of each site noting features that you think would lend themselves to dam construction and the existence of a lake at the site and those that would not.

Site	Positive Geologic Features	Negative Geologic Features

- 4) Prepare a summary of the results of your analysis including appropriate maps, charts, tables, and pictures making your conclusions to the San Francisco Board of Supervisors.

## San Francisco Water Options Data 1912

Data	Description
NAME	Name of river or lake
DRAINAGE	Number of square miles that the source drains
RAINFALL	Average annual rainfall in the upper reaches of the drainage
MILLIONS OF GALLONS / DAY	Number of millions of gallons of water per day that the source could provide (several values are 400 because the source would meet the minimum amount San Francisco required)
POWER POTENTIAL	Estimate of the annual amount of power in 1000s of horsepower that could be developed along the source
FILTRATION REQUIRED	Yes or No - Is filtration of the source required to assure safe drinking water?
ACRE FEET OF EXISTING IRRIGATION RIGHTS	Number of acre feet of existing irrigation water rights attached to the source
GRAVITY FLOW	Yes or No - Does the source allow for gravity flow of water through pipelines to San Francisco with minimal need for pumping?
TOTAL COST	Estimated total bonded cost of developing the water source in millions of 1914 dollars
EXISTING USES	Description of economic activity in the area of the water source

## Locations of Possible Points of Intake 1912

Field Heading	Description
RIVER	Name of river
POINT OF INTAKE	Location of water intake along the river
ELEVATION	Elevation in feet above sea level of the point of intake
RESERVOIR OR DIVERSION	Is the point of intake at a reservoir or diversion of a river?