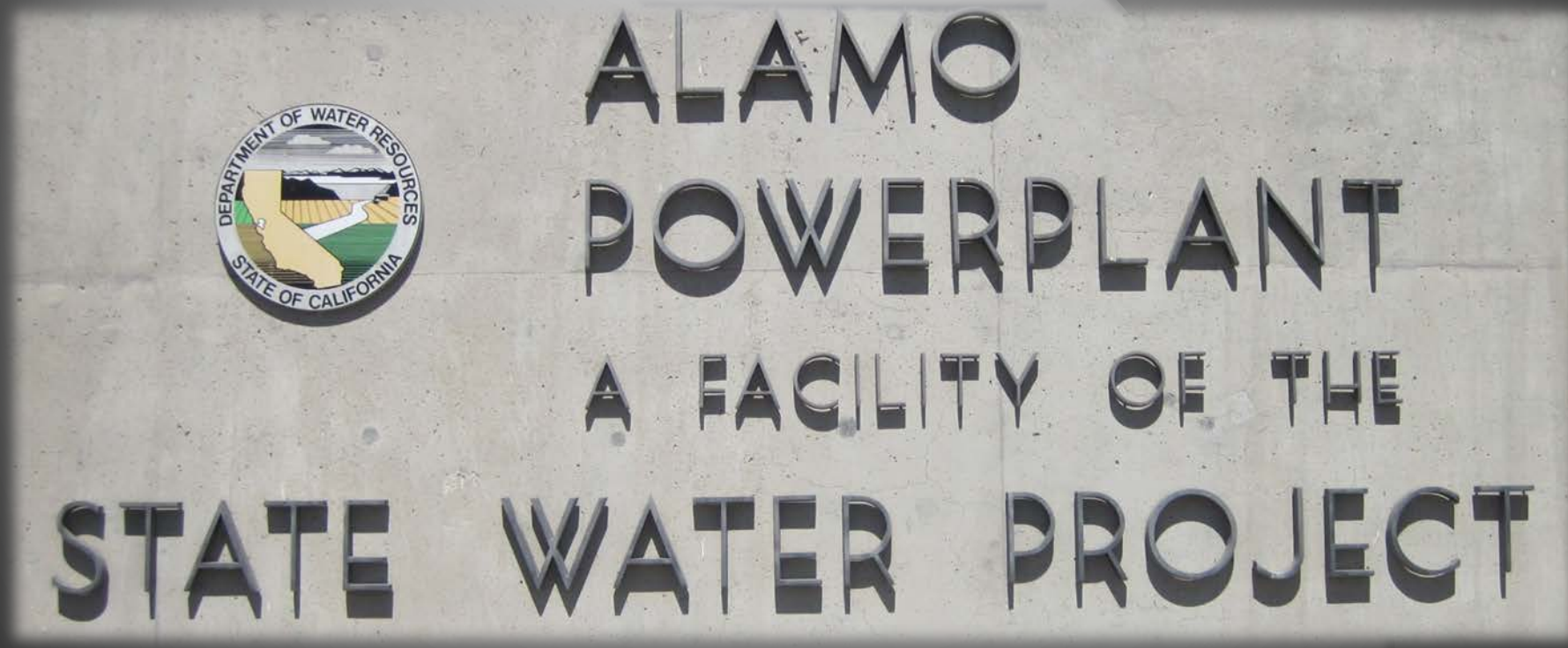


ALAMO POWER PLANT – UNIT 2

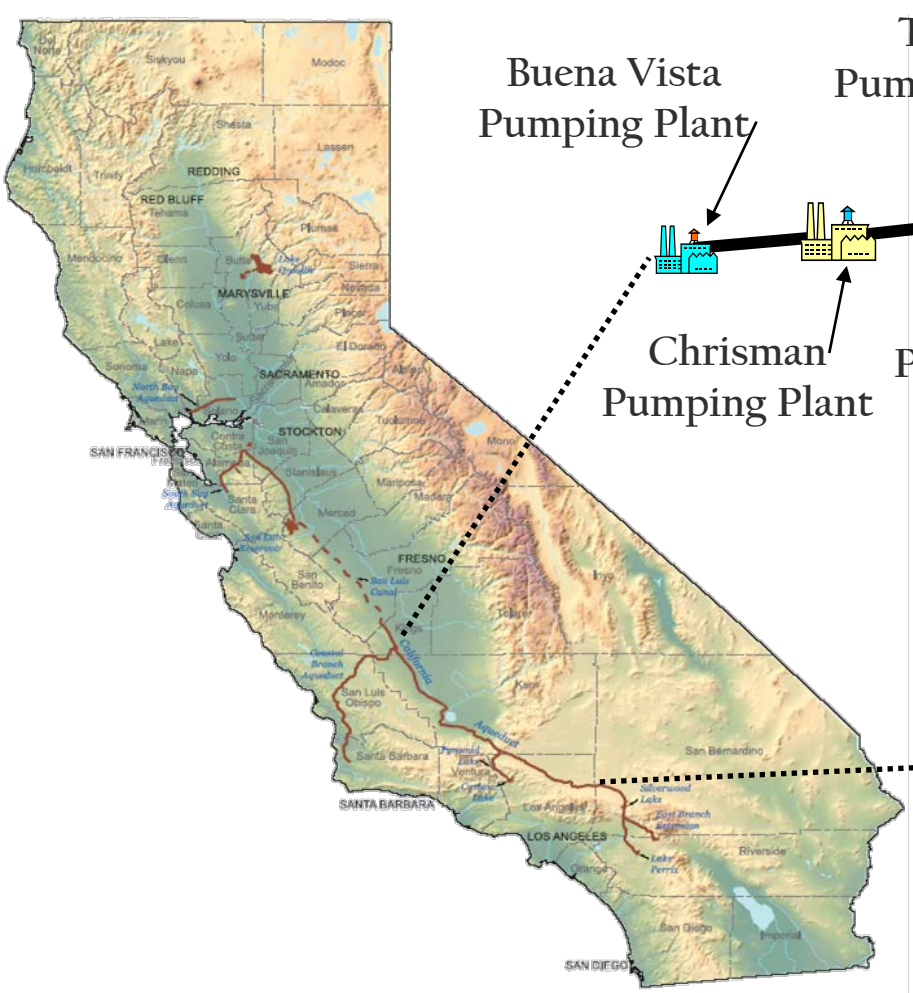
Division of Engineering
December 12, 2012

Presented By: Terry Becker
Chief, Civil Engineering Branch

Introduction

- Background
  - Purpose: Install Second Generating Unit at Alamo Power Plant to maximize the generation capacity of water that is delivered through the East Branch of the California Aqueduct
- Alamo Power Plant
  - Located on the upstream end of the East Branch of the California Aqueduct
  - Construction began in 1982; operational in 1986
  - 133 foot elevation drop
  - Canal capacity: original = 1,850 cfs; current = 2,010 cfs; future = 3,150 cfs
  - Turbines:
    - Unit 1 (operational in 1986): 16 MW; 1,740 cfs
    - Unit 2 (future unit): 13 MW; 1,410 cfs

General Map - East Branch Aqueduct



Buena Vista Pumping Plant

Teerink Pumping Plant

Tehachapi Mountains

Tehachapi East Afterbay

Chrisman Pumping Plant

Edmonston Pumping Plant

Oso Pumping Plant

Alamo Power Plant

Pearblossom Pumping Plant

West Branch

East Branch

TEA, Cottonwood Bypass, and Alamo Power Plant

Alamo Powerplant

Alamo Powerplant

Existing Kaplan Turbine Unit No.1

- Void left for future Francis Turbine Unit No. 2

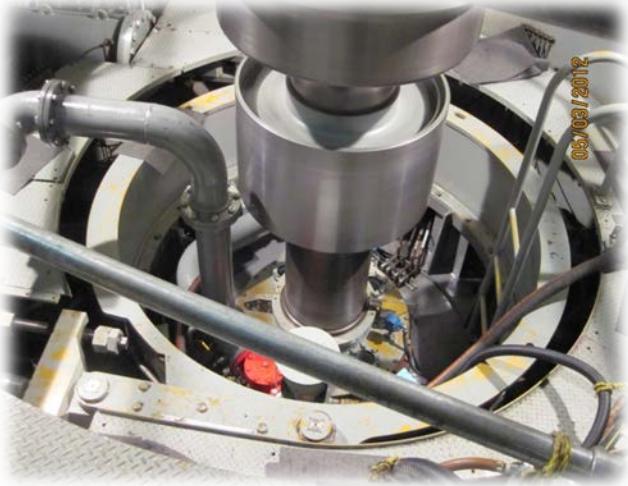
Alamo Powerplant

EL. 2952.0

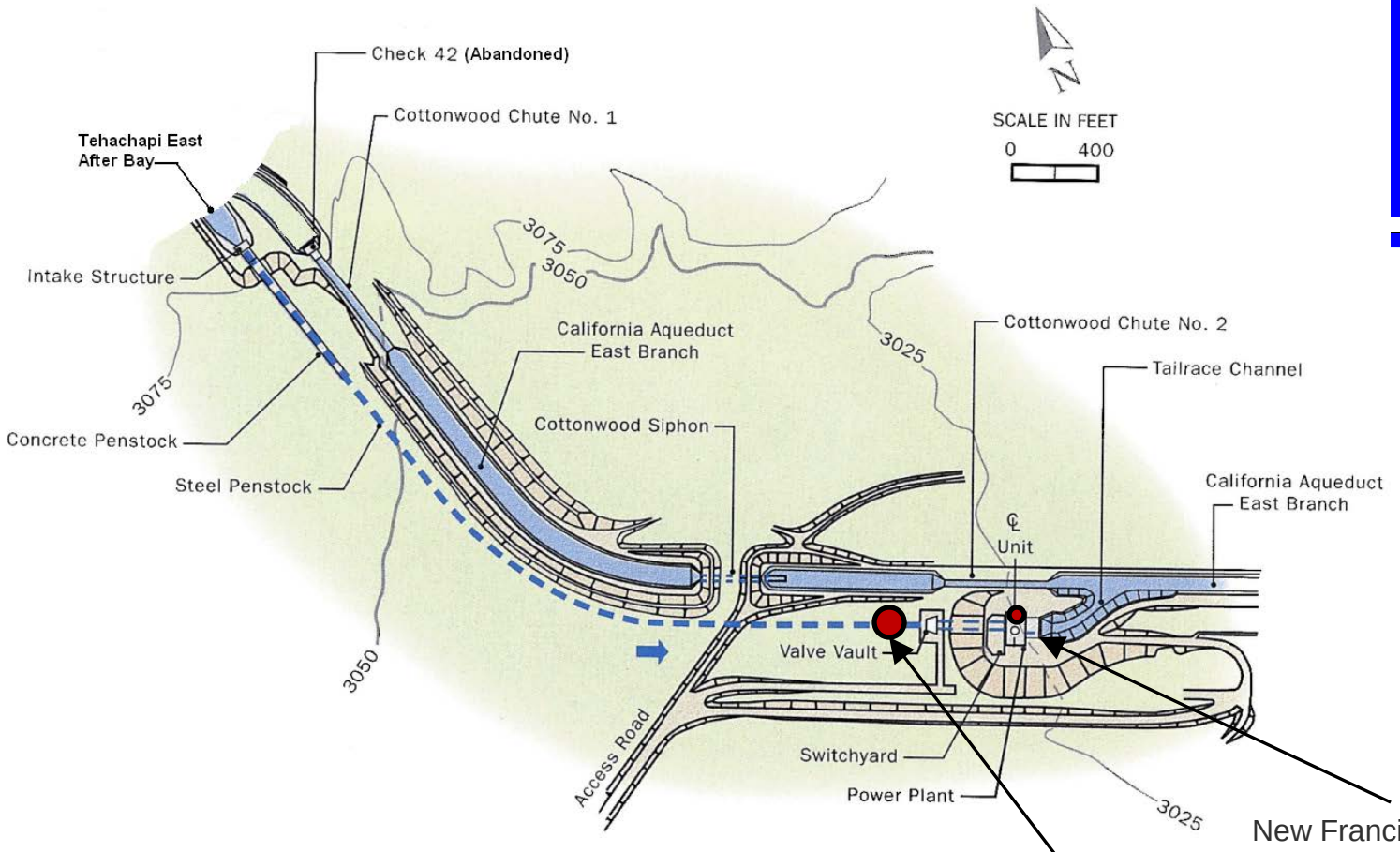
& EL. 2948

Existing Kaplan Turbine Unit 1

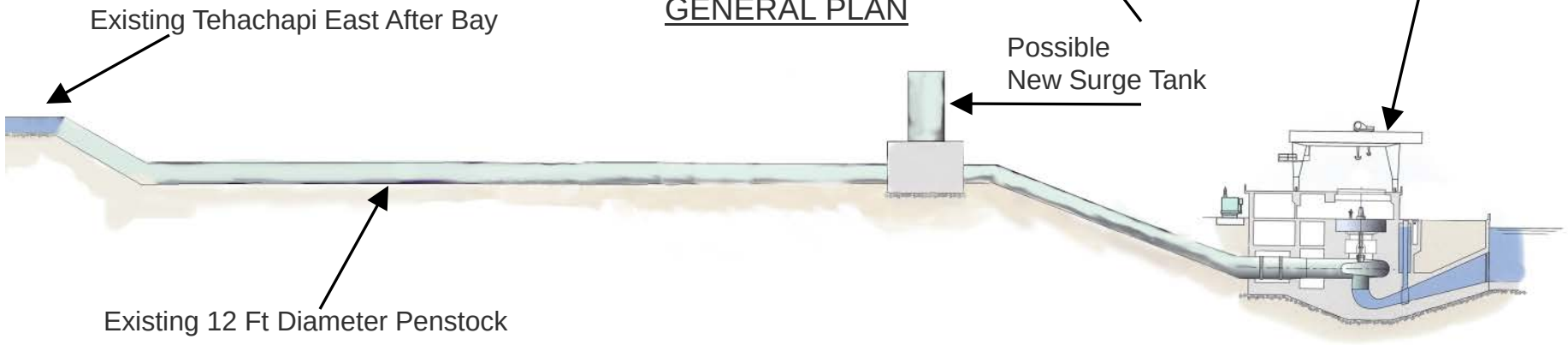
Generator Shaft



Alamo Powerplant – Unit 2

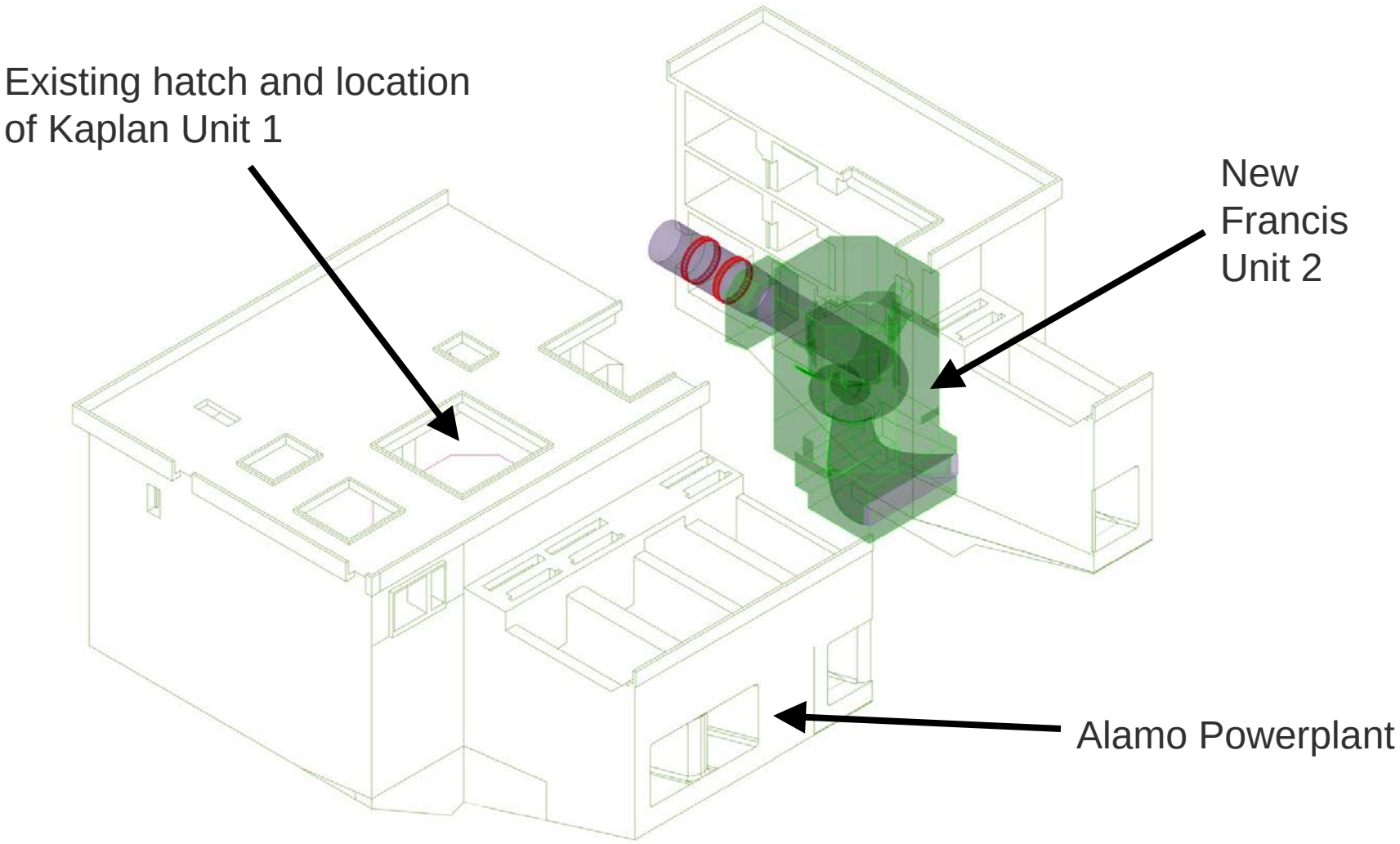


GENERAL PLAN



PROFILE

Alamo Powerplant - Layout



Scope of Work

Civil Engineering

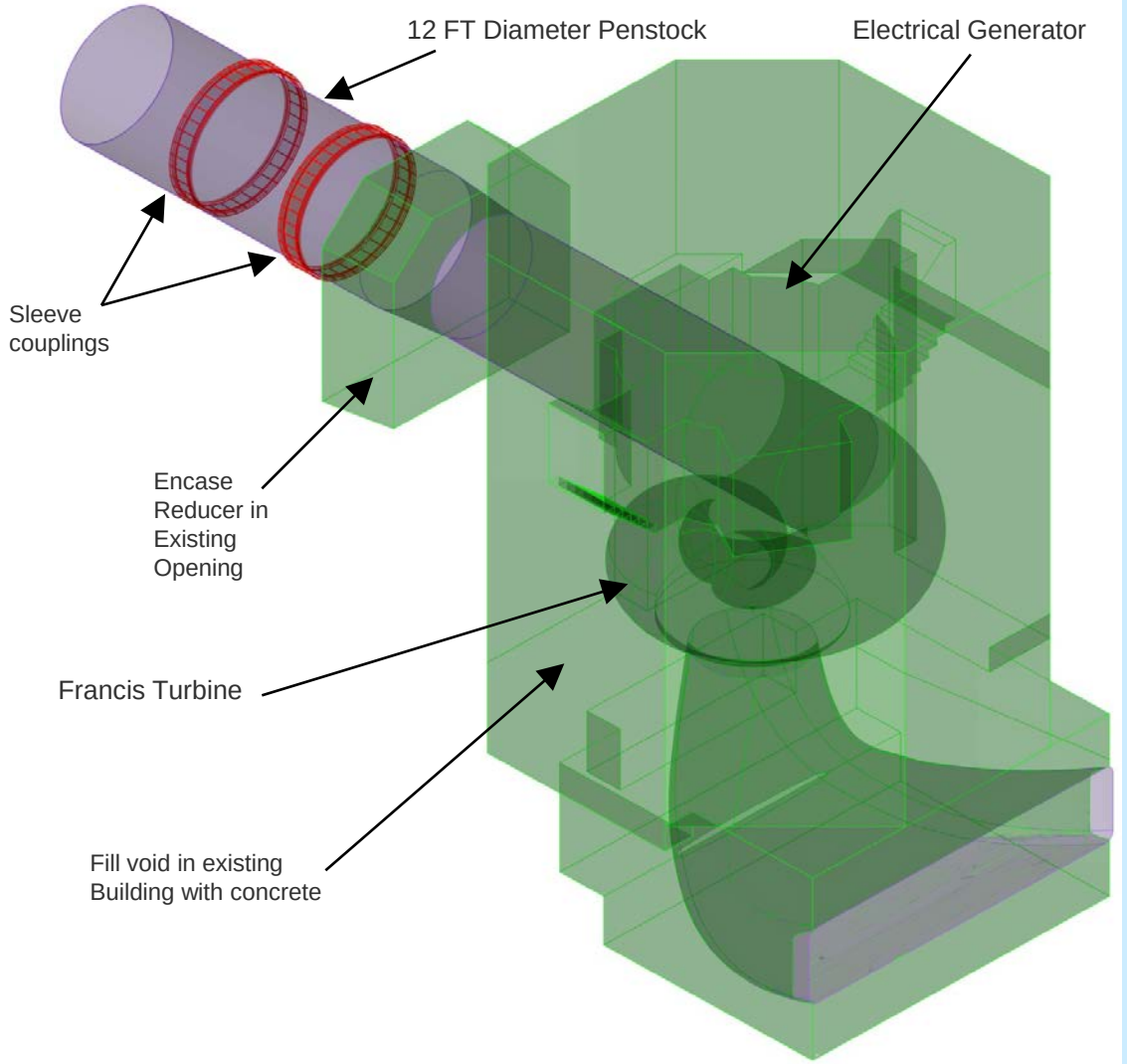
- Connect Existing Penstock to new turbine unit
- Construction of concrete containment of new turbine unit
- Possible construction of new surge tank
- Additional Site Work - Civil

Mechanical Engineering

- Install Francis Turbine Unit and all pertinent features

Electrical Engineering

- Electrical Generator
- Excitation
- Governor
- Control System
- Protection System
- Additional Site Work - Electrical



Project Schedule

Project Phase	Start	Finish
Program Management Plan	May 2012	April 2013
Preliminary Design Phase	April 2013	April 2014
Final Design	April 2014	April 2015
Construction	April 2015	April 2018

Project Budget

Fiscal Year	Budget
2012/2013	$175,000
2013/2014	$3,000,000
2014/2015	$4,000,000
2015/2018	$28,000,000

* Note: Benefit/Cost Ratio without enlargement of the East Branch = 1.28

Project Cost

1	Turbine	$	12,200,000.00
2	Generator		
3	Excitation	$	840,000.00
4	Governor	$	1,500,000.00
5	Control system	$	900,000.00
6	Protection system	$	300,000.00
7	Installation	$	2,850,000.00
8	Total Cost of Turbine Unit including Auxiliary Systems (Sum of rows 1-7)	$	18,590,000.00
9	Additional Site Work - Electrical	$	1,955,000.00
10	Additional Site Work - Civil	$	2,788,500.00
11	Contractor's Payment	$	23,333,500.00
12	Engineering Cost	$	5,833,375.00
13	Contractor's Payment plus 20% Contingency	$	28,000,200.00
14	Engineering Cost plus 20% Contingency	$	7,000,050.00
15	Total Project Cost	$	35,000,250.00

Project Considerations

- **Power Acquisitions**
- **Right of Way**
- **Environmental**
- **FERC**
- **Confined Space**
- **High Voltage Hazards during Testing and Startup**