

# STP NUCLEAR OPERATING COMPANY

presentation to:

Colorado and Lavaca Rivers and  
Matagorda and Lavaca Bays  
Basin and Bay Area Stakeholder  
Committee (BBASC)

12/1/10

# Desired Outcome

- Provide information to the Colorado and Lavaca Rivers and Matagorda and Lavaca Bays Basin and Bay Area Stakeholder Committee relative to the water use and future needs of the South Texas Project Electric Generating Station

# STP Involvement in Water Planning

- Joe King – Colorado and Lavaca Rivers and Matagorda and Lavaca Bays Basin and Bay Area Stakeholder Committee
- Rick Gangluff – LCRA Water Management Plan Advisory Committee
- Sandy Dannhardt – Lower Colorado Regional Water Planning Group



# Importance of Water

- A long-term, reliable, reasonably priced water supply is vital, given the strategic location of the facility and its future generation potential to sustain continued growth in areas already supported by the associated transmission and distribution system.

# Importance of Steam Electric Generation in Texas

- Texas produces and consumes more electricity than any other State.
- Texas per capita residential use of electricity is significantly higher than the national average, due to high demand for electric air-conditioning during the hot summer months and the widespread use of electricity as the primary energy source for home heating during the typically mild winter months.
- Two of the top ten largest electric generation facilities in Texas are in the Colorado River Basin (STP and the FPP)

Source: Energy Information Administration

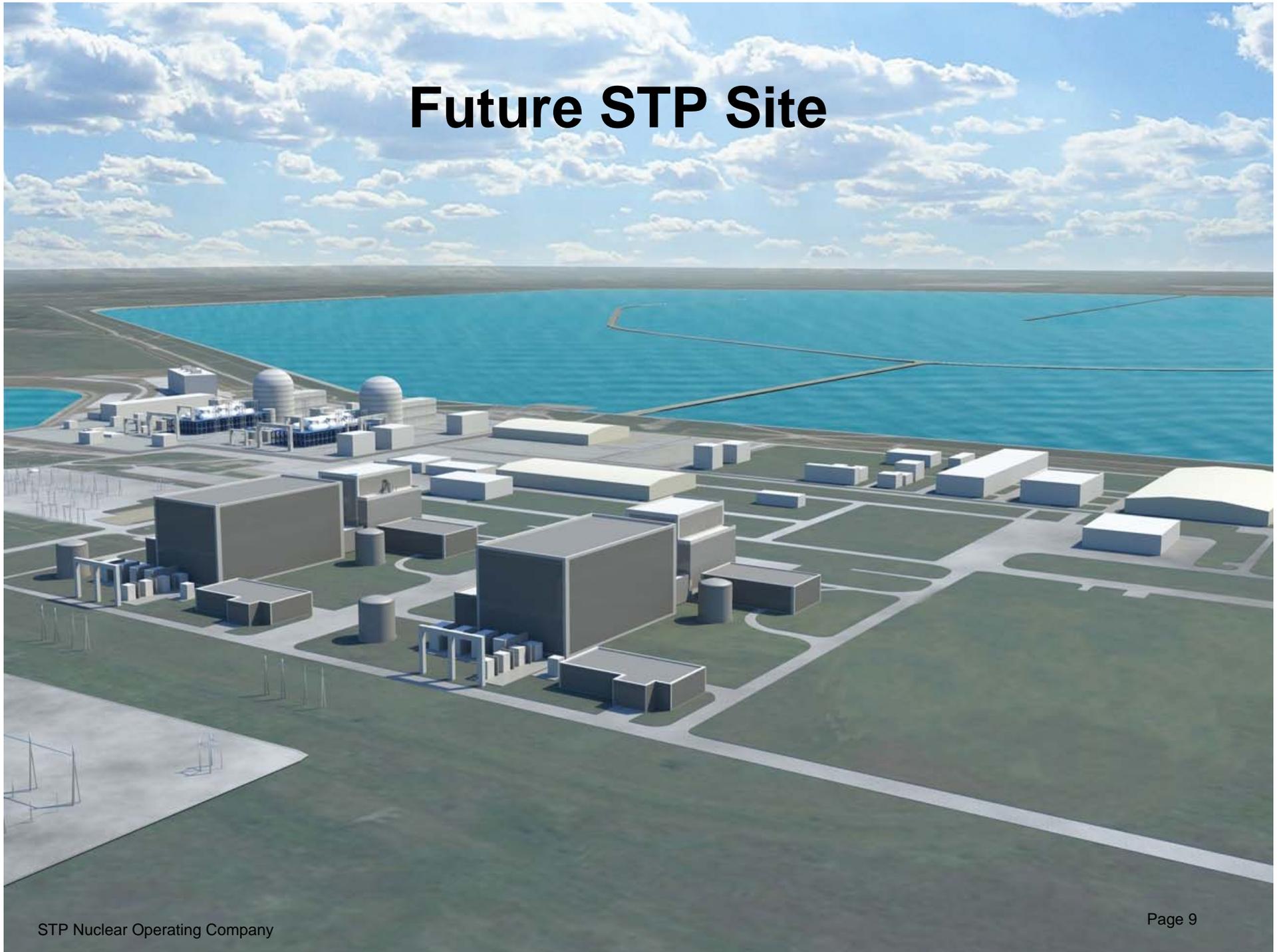
# South Texas Project Information

- Sited to accommodate up to four generating units on property encompassing about 12,220 acres.
- Current facility is a two-unit nuclear generating station with enough combined electric generation capacity to serve more than two million homes (2700 megawatts)
- Largest employer and the largest source of revenue for Matagorda County

# South Texas Project Information

- Units 1&2 owned by Austin Energy; CPS Energy of San Antonio; and NRG Energy, Inc.
- Valuable asset to the state of Texas, providing reliable power to the customers of the two municipalities and to the Electric Reliability Council of Texas (ERCOT)
- Two additional units currently being licensed – no change to water rights.

# Future STP Site



# South Texas Project Electric Generating Station



# Importance of Water

- Water is essential for electricity production.
- Most of the water used is needed to condense steam and provide cooling for plant generating systems
- The majority of this water is drawn from and returned to the station's Main Cooling Reservoir

# Water Use

- The Main Cooling Reservoir is a 7,000-acre, above grade, off-channel reservoir capable of impounding 202,600 acre-feet of water at its maximum design level of 49' MSL
- Authorized to divert up to 102,000 acre-feet of water per year from the Colorado River

## Water Use

- The Essential Cooling Pond is a 47-acre, below grade, off-channel reservoir that supplies water to directly cool crucial plant components.
- STP applies conjunctive use of groundwater for the makeup to this pond as well as the supply to the water treatment plant for the high purity water needed to operate the steam cycle of the plant. (1200-1300 acre-ft./yr.)

# South Texas Project Water Use

## South Texas Project Electric Generating Station 6 – Year Water Usage with 5 Year Averages

	2004	2005	2006	2007	2008	2009	2004-2008 5 year	2005-2009 5 year	Permitted Amount
Surface Water (Acre-ft) ROR	62374	5694	50012	58740	10303	72464	37425	39443	102,000*
Consumptive Use (Acre-ft)	37963	35383	37912	39403	38186	38008	37769	37778	80,125*
Ground Water (Acre-ft)	1223	1296	1301	1255	1185	1132	1252	1234	3000**

\* Certificate of Adjudication 14-5437A and Contractual Permit No. CP-327

\*\*Coastal Plains Groundwater Conservation District Permit No. OP-04122805

ROR = Run-of-River Note: No firm water used by STP during this period

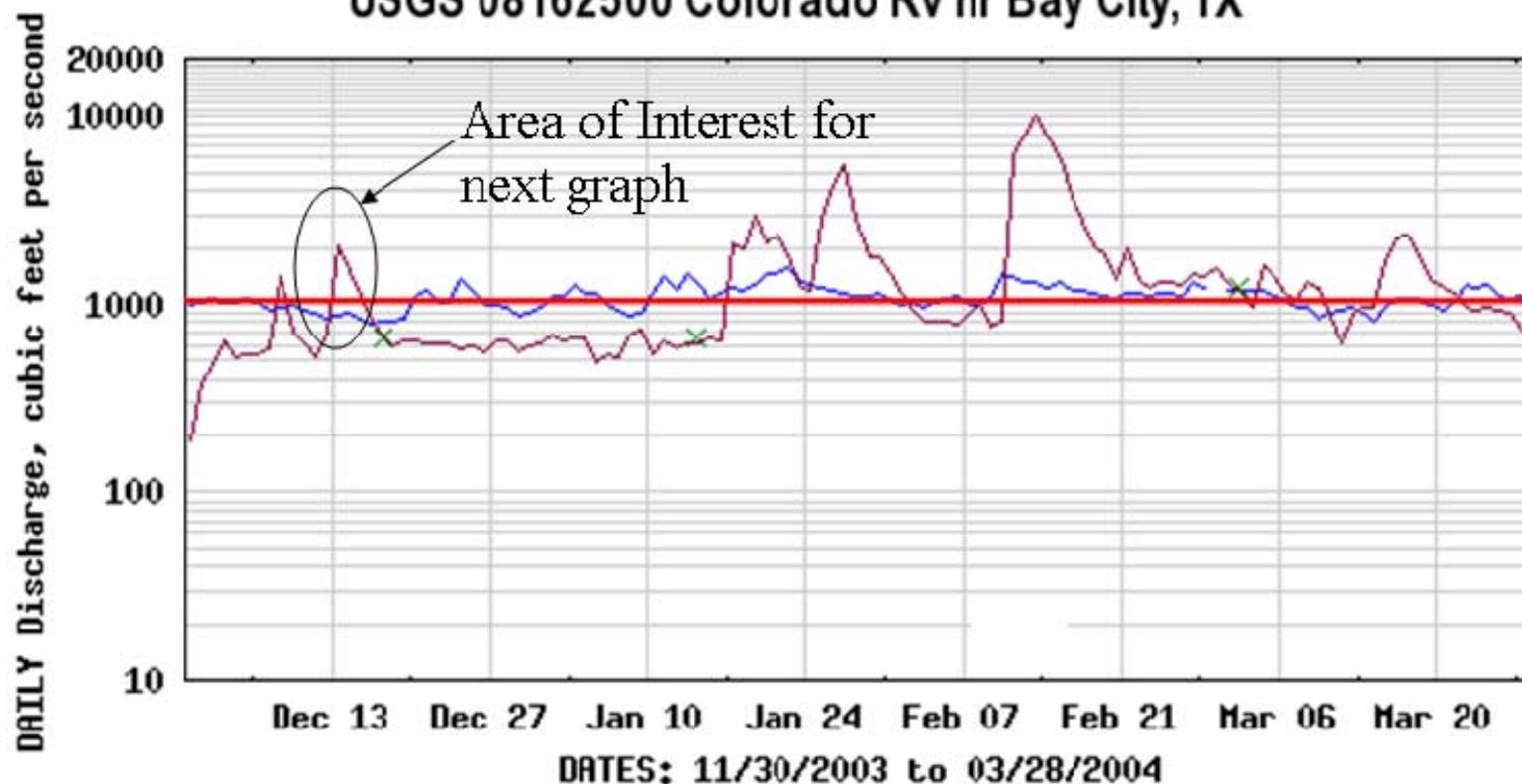
# Bay & Estuary Fresh Water Flow Protection

- The water right for the South Texas Project, granted with a 1974 priority date, includes a special provision to limit diversion from the Colorado River to 55% of the flow over 300 cubic feet per second, which assures that we do not reduce low river flows
- 4000 acre-ft/year of design leakage from the Main Cooling Reservoir also provides benefit to bays and estuaries

# Water Use

- STP has historically utilized run of river diversion and selective pumping to maintain the operating level and water quality of the reservoir
- STP has never used firm water from the Highland Lakes but relies on a firm water backup supply to operate through the drought of record
- Firm water contract provides 20,000 acre-ft/year for 2 units & 40,000 acre-ft/year for additional generating capacity based on a rolling five year average

## USGS 08162500 Colorado Rv nr Bay City, TX



### EXPLANATION

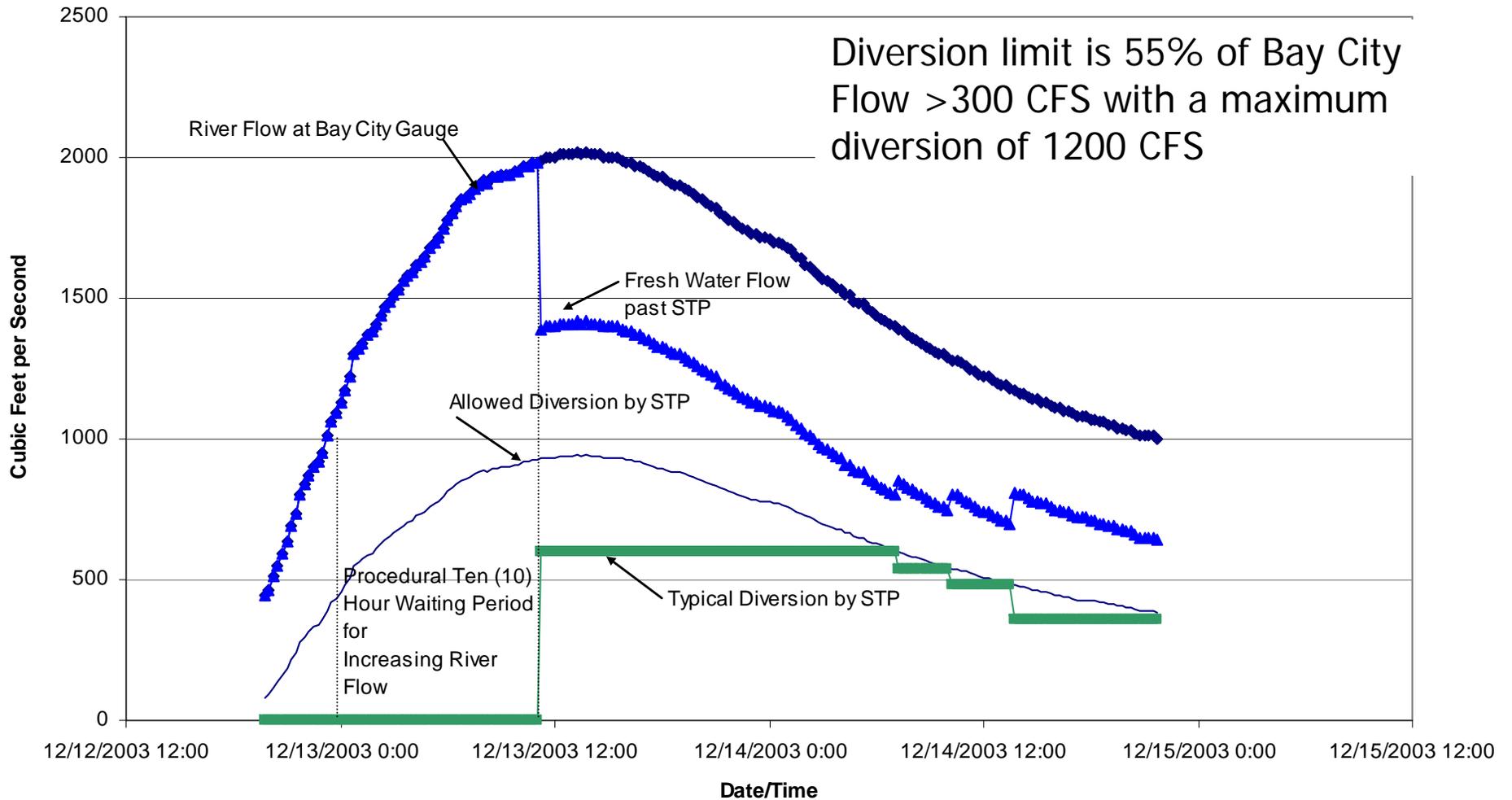
- MEDIAN DAILY STREAMFLOW BASED ON 54 YEARS OF RECORD
- DAILY MEAN DISCHARGE

— Typical Bay City River Flow needed to exclude tidal influence at STP

Note: 410 CFS = minimum required flow to divert by permit

# Fresh Water Flow Protection

## Example of Preservation of Fresh Water Flow During Typical STP Diversion

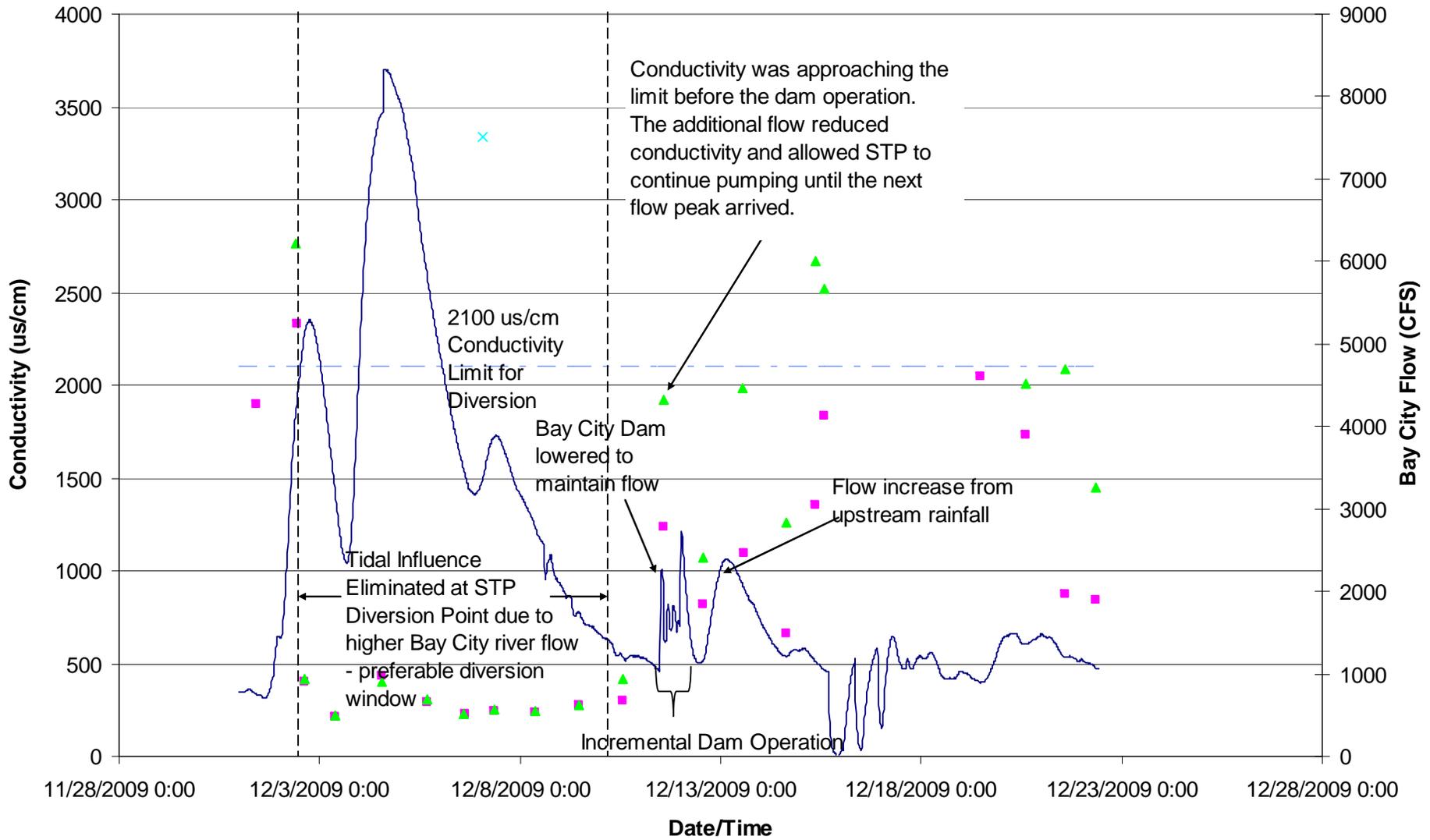


◆ River Flow at Bay City (CFS)   ■ Typical Diversion (CFS)   ▲ Fresh Water Flow Past STP (CFS)   — Allowed Diversion (CFS)

## Flow-dependent water quality

- As the last diversion point on the Colorado River just upstream from Matagorda Bay, we are within the tidal influence of the Gulf of Mexico
- Proximity to the Gulf adds an additional concern about available fresh water flows at our diversion point

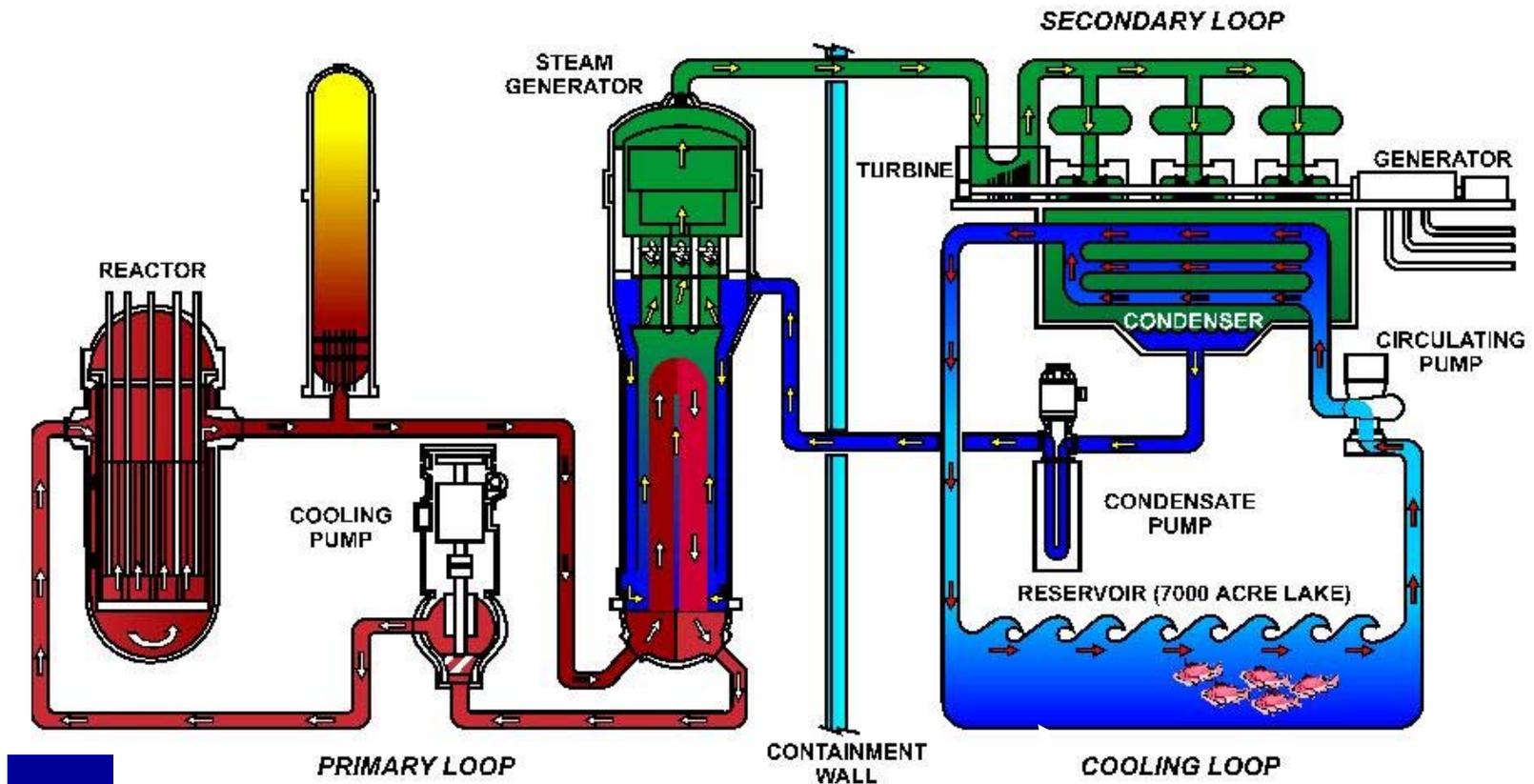
### December 2009 STP Diversion with Bay City Dam Operation



# Steam Cycle

- Fuel is used to produce heat to convert water into high-pressure steam. Steam is directed through a turbine to turn a generator.
- The fuel for a nuclear reactor is uranium. The use of uranium allows us to conserve natural gas, oil and coal and to avoid the production of greenhouse gases. The uranium fuel is used to heat the primary loop.

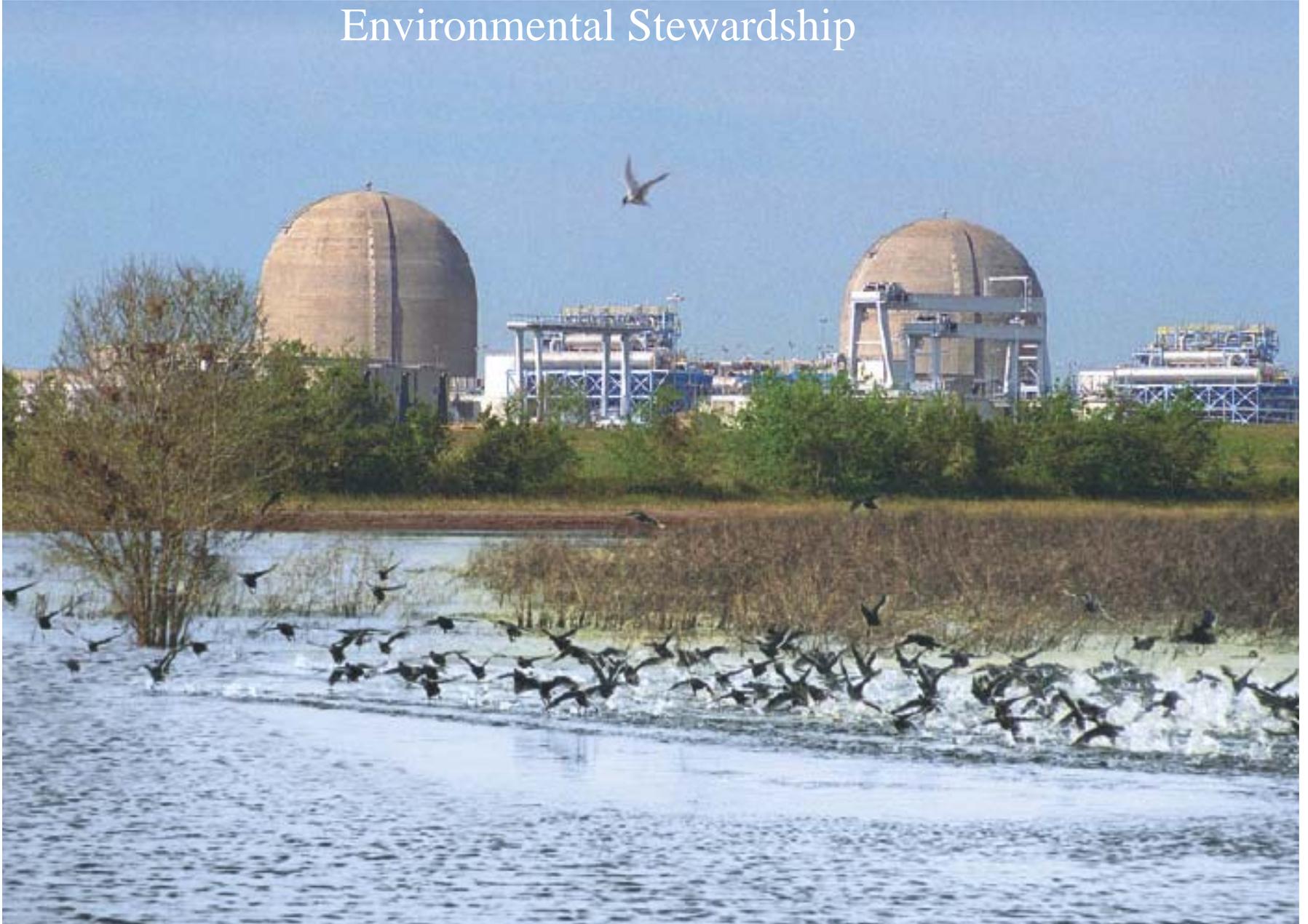
# Typical Nuclear Steam Supply System



# Steam Cycle

- This heat is transferred to the steam generators in the secondary loop to produce steam that is directed through the blades of a turbine generator to produce electricity
- The steam is then fed through a condenser where a separate supply of cooling water from the Main Cooling Reservoir turns it back into water that is then pumped to the steam generator for reuse

## Environmental Stewardship



**Portion of the 110 acre Constructed Wetlands**

# Environmental Stewardship

- Water also provides diverse habitat areas for birds and other wildlife
- Colonial waterbirds (terns, skimmers) nest on the internal dikes of the MCR
- 1700 acres at the site adjacent to the Colorado River are designated as lowland habitat.

# Environmental Stewardship

- In 1996, in cooperation with various state agencies and Ducks Unlimited, STP established a 110-acre wetland habitat for migratory waterfowl.
- The constructed wetlands is on the state-sponsored Great Texas Birding Trail.
- Area that includes STP consistently ranks at the top of the National Audubon Society's Christmas Bird Count for the number of species identified.
- Financial supporter of the Matagorda County Birding Nature Center located in Bay City.

# Environmental Stewardship

- As a partner with the Texas Commission on Environmental Quality in the Clean Texas program, the South Texas Project is committed to meeting established environmental goals, maintaining and improving internal programs and continuing community environmental outreach programs and projects.

# Environmental Stewardship

- STP is classified as a high performer by the Texas Commission on Environmental Quality based on the station's above-average environmental compliance record.

## Items to Note about STP by the BBASC

- 1) STP is the last diversion point on the river
- 2) Flow-dependent water quality at the STP diversion point because of the tidal influence.
- 3) The flow restriction limits diversion from the Colorado River to 55% of the flow over 300 cubic feet per second which protects downstream flow



View of the Colorado River  
from the STP Diversion Point

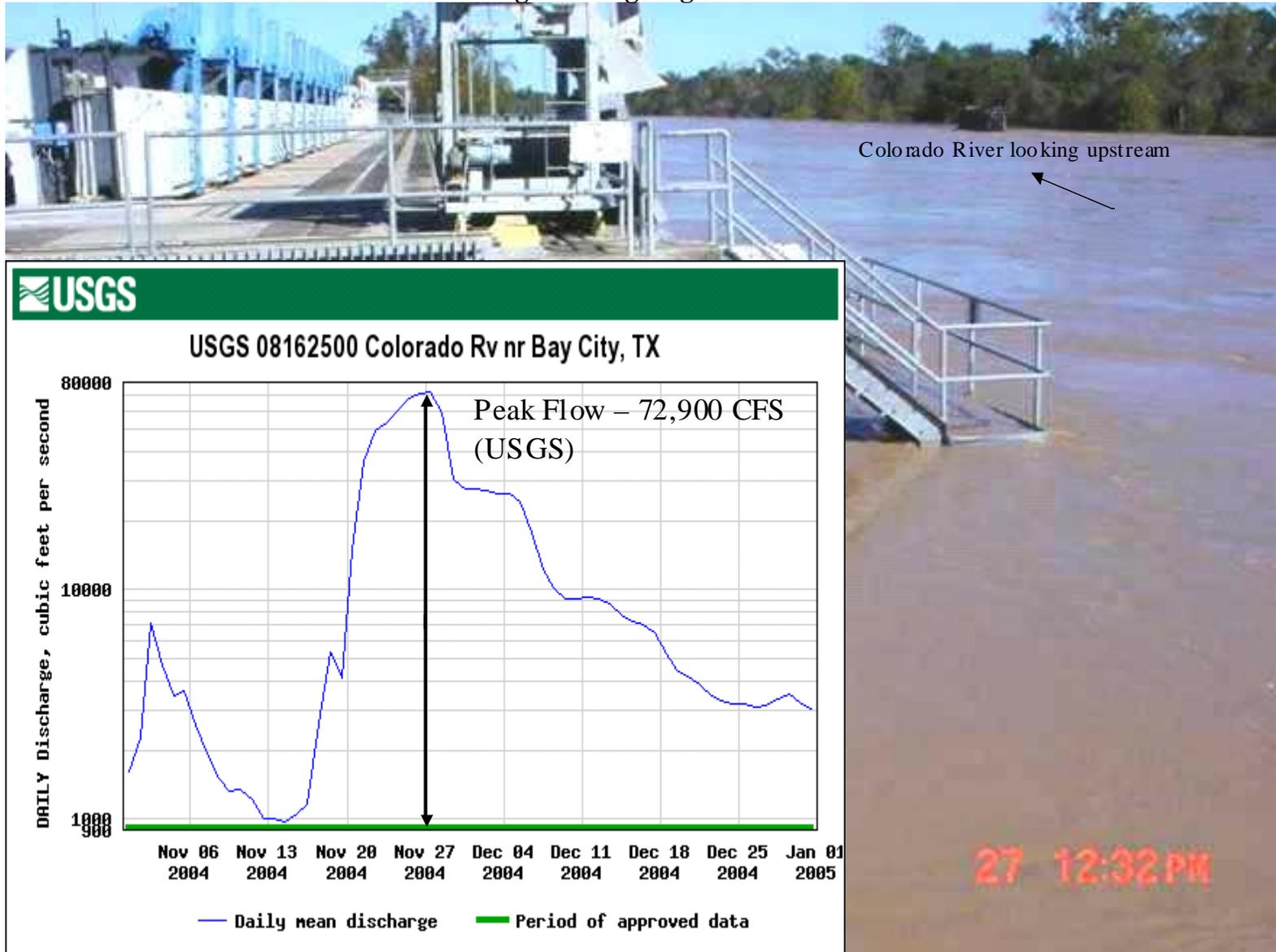


Colorado River looking upstream



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### South Texas Project Reservoir Makeup Pumping Facility During Thanksgiving Flood 11/27/04



# Questions