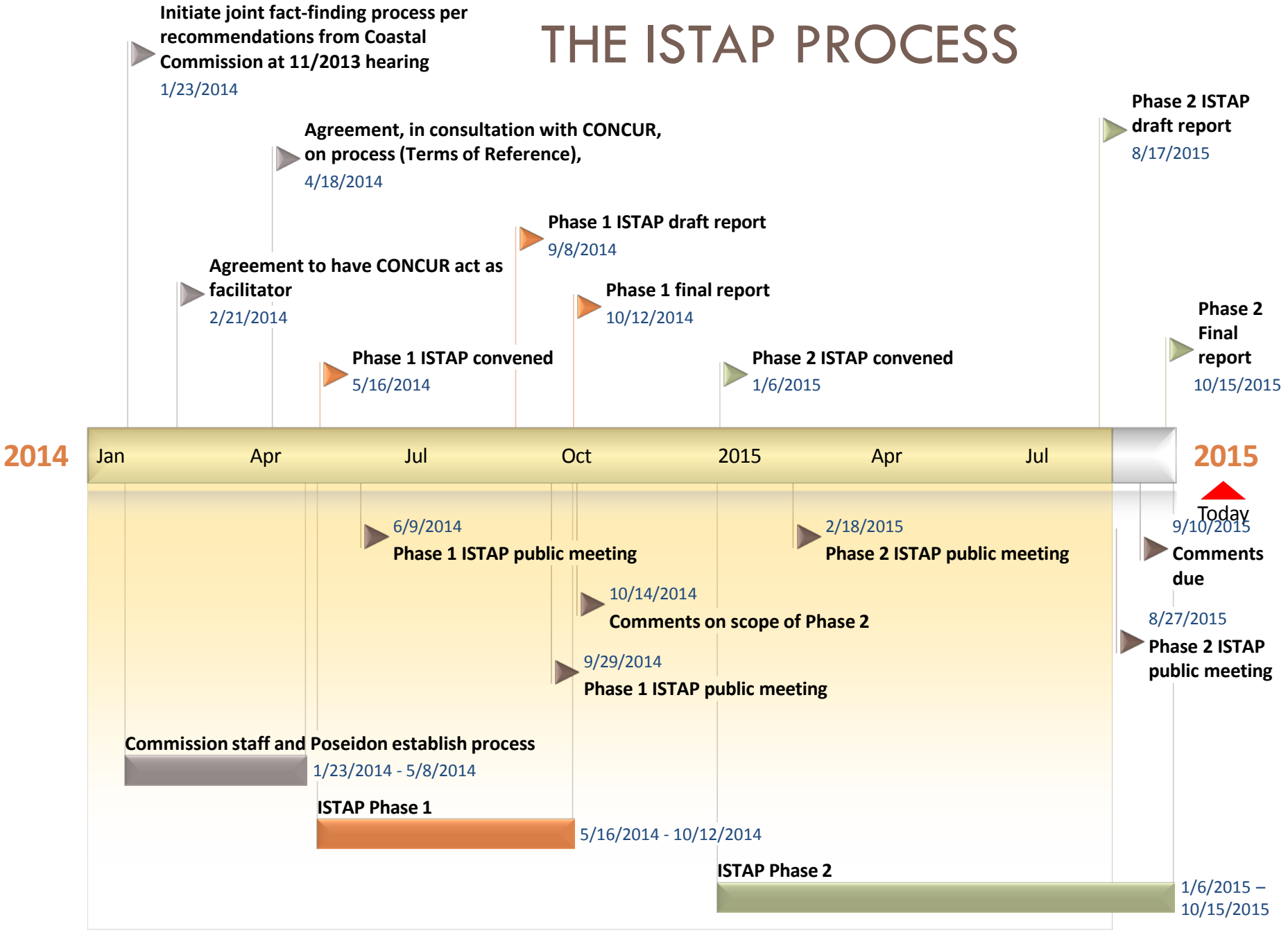
POSEIDON WATER

Huntington Beach Desalination Project

Coastal Commission's Independent Scientific & Technical Advisory Committee (ISTAP) Findings and Conclusions

THE ISTAP PROCESS



Phase 1 ISTAP Conclusion

The panel evaluated nine different subsurface intake methods, including several types of wells and two types of infiltration galleries. The different well methods did not survive the Panel's "fatal flaw" analysis due primarily to their effect at full scale production on the nearby Orange County groundwater basin or due to the Panel's concerns about technical components of some well systems. Only the seabed infiltration gallery and the surf zone (beach) gallery survived the fatal flaw analysis, and both were deemed technically feasible (able to be built and operated using currently available methods).

Definition of Feasibility

- Sources of definitions of "feasibility" considered
  - Coastal Act
  - California Environmental Quality Act (CEQA)
- Relied on definition of economic feasibility in the May 6, 2015 amendment to the Ocean Plan,
  - "*Subsurface intakes may be determined to be economically infeasible if the additional costs or lost profitability associated with subsurface intakes, as compared to surface intakes, would render the desalination facility not economically viable.*"

Both SIG Options Require Onshore Pump Station and Pipe Gallery

- Multiple seawater collector pipes from the SIG would be gathered into a single intake tunnel connecting it to an onshore pumping station.
- Poseidon scenario represents that this facility could be constructed below the State Park parking lot.
  - There is not adequate space for these facilities east of the Coast Highway
- Construction would use 4 acres of the State Park lot for 4.5 years (for Float-In option) to 7 years (for Trestle option)
- After construction, the lot would be returned to parking use
- Pumps and piping would remain below the parking lot

Location of Pump Station for SIG

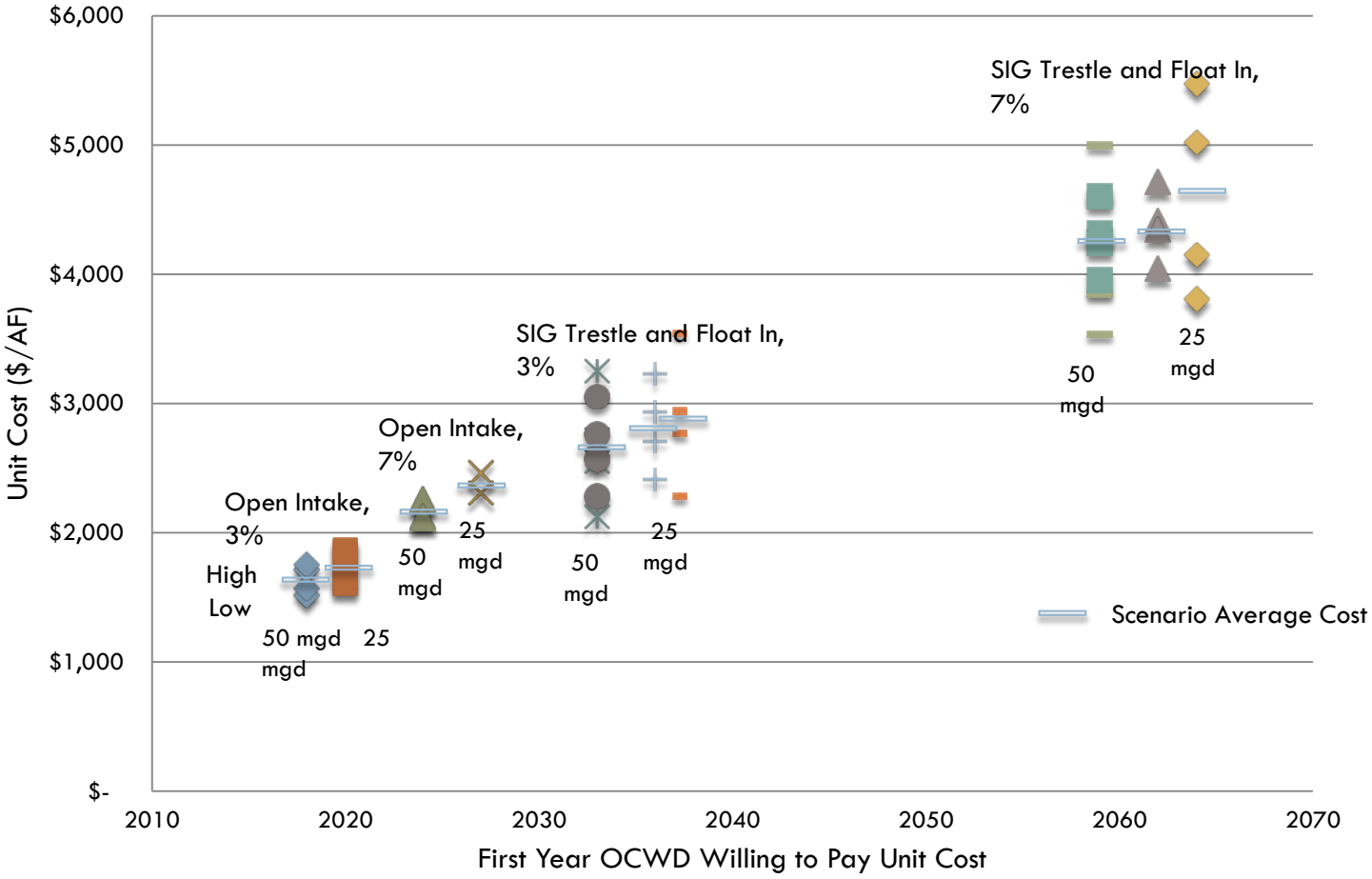
Qualitative Comparison of Impacts for SIG Options

Major Concern	Moderate Concern	Minor or No Concern
• Degradation of coastal views	• Construction effects on marine habitat at SIG site	• Impingement, Entrainment
• Air emissions from construction vehicles & equipment	• Greenhouse gas emissions	• Maintenance effects at SIG site
• Noise during beachfront construction	• Onshore vehicle traffic during construction	• Operational energy use
• Disturbance to recreational beach users		• Recreational and commercial fishing
• Potential loss of tourist income		• Seafloor obstructions

Environmental & Social Issues

- **Conclusions on Environmental and Social Issues**
  - Some construction impacts would be severe, but short-term compared with 50-year life of desalination facility
    - Construction would last from 4 to 7 years
  - Standard construction mitigation is available to reduce construction impacts
  - Effects on tourism and tourist income are of particular concern

Unit Cost of Design Alternatives



Conclusions

- **Conclusion 1:** The beach infiltration gallery is infeasible at the Huntington Beach location
- **Conclusion 2:** Two construction methods are feasible for constructing the SIG
- **Conclusion 3:** The environmental impacts of the SIG options would not likely prohibit their implementation

Conclusions

- **Conclusion 4:** The open ocean intake option for a product capacity of 50 MGD may be economically feasible in the near future, depending on outcome of negotiations with OCWD
- **Conclusion 5:** The higher unit costs for the SIG options regardless of construction method significantly extend the period of time before the unit cost could be comparable to costs of other available water supplies
- **Conclusion 6:** The SIG option is not economically viable at the Huntington Beach location within a reasonable time frame, due to high capital costs and only modest reduction in annual operating costs.

TECHNICAL QUESTIONS AT NOVEMBER 2013 COASTAL COMMISSION MEETING – WHAT DID ISTAP FIND

QUESTION	POSITIONS OF PARTIES	ISTAP
Is a subsurface intake technically feasible at or near this site?	Staff - yes, at least a seafloor infiltration gallery ("SIG") Poseidon – no	All subsurface intake technologies have fatal technical flaws except for a SIG. Identified "no change" zone made possible by beach nourishment appropriate for SIG was identified.
How many pipes would SIG require	Staff – 1 Poseidon - 39	30 pipes and pumps

ENVIRONMENTAL QUESTIONS AT NOVEMBER 2013 COASTAL COMMISSION MEETING – WHAT DID ISTAP FIND

QUESTION	POSITIONS OF PARTIES	ISTAP
Significance of proposed intake entrainment impacts	Staff – significant Poseidon – not significant	Commission staff guidance to ISTAP – Panel is not being asked to question whether entrainment is an adverse effect.
Would construction and maintenance of SIG result in loss of habitat	Staff – no, any mitigation for SIG construction would be minimal and impacts of maintenance do not require mitigation unless it impacts higher quality habitats Poseidon - yes	Seafloor disturbance during construction would result in short-term loss of benthic habitat over 26-acre area and maintenance may result in longer-term or periodic disturbance to benthic habitat over 20 to 23 acre area.
Impact of construction and operation of SIG versus environmental effects of operating proposed intake	Staff – SIG less Poseidon – SIG more	Report does not compare the potential environmental impacts of proposed intakes with the potential impacts of the SIG options. That comparison not within the scope of this panel's work.

ECONOMIC QUESTIONS AT NOVEMBER 2013 COASTAL COMMISSION MEETING – WHAT DID ISTAP FIND

QUESTION	POSITIONS OF PARTIES	ISTAP
Capital cost of SIG	Staff- < $200m Poseidon - $200m($280 $2015)	SIG capital costs = $641m to $722m (2.3X to 2.6X) Project capital costs for proposed intake project $852m to $899m. Capital cost for project with SIG intake $1.9b to $2.3b.
Environmental Mitigation cost for proposed intake	Staff – November 2013, $16m to $33m, during ISTAP, $35m to $71m Poseidon - $6m	Marine life mitigation= Range of from $6m to $53m midpoint of Commission staff estimates.
Screens for open intake	Staff – feasible Poseidon – not feasible	No determination of feasibility. Used $8.7m screen retrofit cost for economic analysis

ECONOMIC QUESTIONS AT NOVEMBER 2013 COASTAL COMMISSION MEETING – WHAT DID ISTAP FIND (2)

QUESTION	POSITIONS OF PARTIES	ISTAP
Life cycle cost of SIG vs. proposed intake	Staff – SIG < proposed Poseidon – SIG > proposed	Life cycle analysis of unit costs SIG average $3,452 to $3,471 Proposed intake average $1,914 SIG > 1.8X to proposed
SIG economically infeasible	Staff – no, and determining economic feasibility, even though part of the Panel's charge, is outside their process. Poseidon - yes	SIG not economically viable at the Huntington Beach location within a reasonable time frame.