The JUOTC Project (DCPP/SONGS)
Phase 2 Study

November 26, 2012
Bechtel's Commitment

- We are committed to work in a partnership with PG&E and SCE to perform nuclear services with the following objectives:
  - Achieving the highest level of safety and quality
  - Meeting and exceeding customer’s project goals
  - Providing engineering certainty
  - Providing cost and schedule certainty

- Keys to success
  - Single point of contact and accountability
  - Experienced personnel
    - Recognized technical expertise
    - Strong project management
    - Proven project controls processes
  - Sound execution approach (predictability and certainty)
  - Corporate commitment
Based on Bechtel’s Phase 1 Interim Reports, the Review Committee and the Utilities (PG&E / SCE) have selected the following technologies for Phase 2 evaluation:

- Closed-Cycle Cooling Systems – five cooling variations, including hybrids
  - Make-up source
- Desalination
- Fresh / grey water from outside of plant boundaries (up to 20 miles from each plant site)
- Inshore Mechanical (active) Intake Fine Mesh Screening
- Offshore Modular WedgeWire or Similar Exclusion Screening Systems
Phase 2 Scope (cont’d.)

- Complete further technical evaluation of the selected technologies (see flow chart, page 10)

- Complete Criterion #10 evaluation – Nuclear Specific Assessment
  - Licensing (50.59), seismic, operability, transient analysis, nuclear fuel (accident), single failure, hydraulic design, PRA, and I&C

- Develop interim reports, if any, of technologies that “screen out” as a result of Criterion # 10 evaluation

- Complete Criterion # 11 – Detailed Cost and Schedule of technologies that “screen in” Criterion # 10 evaluation
  - Provide separate costs for:
    - (a) Planning, construction, and installation (i.e. EPC costs)
    - (b) Downtime (i.e. lost generation and replacement costs)
      
      [Note – The Utilities have advised Bechtel that they will provide downtime costs for their respective plants]

  - Provide Level II EPC schedules

- Submit Final Phase 2 Report for each plant site
## Phase 2 Approach

- Per agreement with the Utilities, Bechtel will prepare Preliminary Estimates (AACE Class 3) for all technologies that pass Criterion # 10 evaluation.

- Bechtel will prepare preliminary designs to the extent necessary to support development of quantities, estimates, and schedules.

- Bechtel will use its Estimating Process and Integration Control (EPIC) system to develop the Class 3 estimates (see flow chart, page 11):
  - Direct costs – materials, equipment, labor hours and dollars, subcontracts and freight
  - Distributable costs – labor and material, subcontracts, construction equipment
  - Indirect costs – field non-manual, startup, and material
  - Engineering/Other Home Office costs – engineering and other home office labor and material
  - Other costs – taxes, duties, insurance, escalation, contingency, etc.
Typical sources of input for estimate components:

- Direct material and equipments – quantified by engineering; costed via bid, quote, and/or database information
- Direct labor – quantified via installation unit rates and crew-ups; costed using current labor bulletins and other information (crew mix, task mix, overtime percentage)
- Subcontracts – significant subcontracts are specified by engineering and construction; costed via budget quotes with appropriate allowances
- Distributable material – quantities built up; costed by item/category
- Distributable labor – quantified by crew-ups per task; costed per “direct labor” above
- Indirect material – quantified by position and per hour; costed based on expected expenses (business travels, relocation, etc)
- Personnel costs (FNM, Eng/OHO labor) – quantified by staffing plans; costed on billing rates
- Other costs – various methodologies
Typical engineering deliverables (preliminary) for estimate development:

- **Common to all Disciplines**
  - Demolition scope or Removal / Relocation of Equipment
  - Safety related, Non-safety related, Augmented quality
  - Tie-ins to existing SSCs

- **Architectural**
  - Coatings
  - Waterproofing
  - Siding and Roofing
  - Personnel / Equipment Hatches
  - Interior finishes

- **Civil**
  - Earthwork
  - Foundations
  - Building Size Volume
  - Concrete
  - Formwork
  - Tunnel
<table>
<thead>
<tr>
<th>Category</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underground Large Piping and Ducts</td>
<td></td>
</tr>
<tr>
<td>Rebar</td>
<td></td>
</tr>
<tr>
<td>Embeds</td>
<td></td>
</tr>
<tr>
<td>Metal Deck</td>
<td></td>
</tr>
<tr>
<td>Structural Steel</td>
<td></td>
</tr>
<tr>
<td>Miscellaneous Steel</td>
<td></td>
</tr>
<tr>
<td>Electrical</td>
<td></td>
</tr>
<tr>
<td>Single Lines</td>
<td></td>
</tr>
<tr>
<td>Electrical Equipment</td>
<td></td>
</tr>
<tr>
<td>Circuit Counts</td>
<td></td>
</tr>
<tr>
<td>Average Conduit Length / Circuit</td>
<td></td>
</tr>
<tr>
<td>Average Circuit Length</td>
<td></td>
</tr>
<tr>
<td>Average Terminations / Circuit</td>
<td></td>
</tr>
<tr>
<td>Cable Tray Length by size, type, and material specifications</td>
<td></td>
</tr>
<tr>
<td>Duct bank Length, Size, and Configurations</td>
<td></td>
</tr>
<tr>
<td>Motor Control Centers count and number of stacks</td>
<td></td>
</tr>
<tr>
<td>Layout of switchyard / substation</td>
<td></td>
</tr>
<tr>
<td>Unscheduled Commodities (lighting, communication, heat tracing, etc)</td>
<td></td>
</tr>
</tbody>
</table>
Phase 2 Approach (cont’d.)

- I&C
  - Control Logics
  - List of Control Valves (if any) by type, size, and duty
  - I/O Count
  - Type of control system with list of equipment

- Mechanical
  - P&IDs
  - Component sizing calculations (e.g., pumps, cooling towers, screens, desalination units, etc)
  - Hydraulic Analysis / Design
  - Equipment List (including capacities, HP, sizes, etc)
  - Water Source confirmation

- Plant Design / Piping
  - General Arrangements
  - Pipe List of Quantities (L/B and S/B)
  - Valve List (size, MOV or other, pipe class)
  - Specialty List (strainers, other inline components)
Phase 2 Review Process for Each Technology

1. Update the review checklist if required.
2. Review technology against the nuclear-specific criteria.
3. Could the technology work for a single unit?
   - Yes: Proceed.
   - No: End.
5. Conduct chief’s independent review.
6. Send to SCE and PGE for review and comments.
7. Incorporate comments and issue to nuclear review committee.
8. Develop conceptual design details.
9. Develop estimating quantities (Figure 3).
10. Coordinate with key equipment & service suppliers.
11. Develop schedule.
12. Develop final report for each plant site.
13. Incorporate comments and issue to nuclear review committee.
14. Support SCE and PGE with presentation to regulatory agencies as requested.
15. Effort complete.

Phase 1 output:
- Technologies evaluated in Phase 2.
Phase 2 Approach (cont’d.)

EPIC PROCESS

- Quantity Based
- Apply estimating historical nuclear unit rates
- Local wage survey from construction
- Construction equipment
- Procurement quotes
- Vendor quotes
- Major equipment
- Subcontract scope
- Direct cost estimate
- Indirect cost estimate
- Non-manual staffing cost
- Contingency and escalation

Input from engineering

Review and approve estimate
Phase 2 Level 1 Schedule
Phase 2 STWP (typical)
Phase 2 Scope / Approach

QUESTIONS / COMMENTS?