California Energy Commission Workshop
Nuclear Power Plant Issues

Contingency Planning for Diablo Canyon

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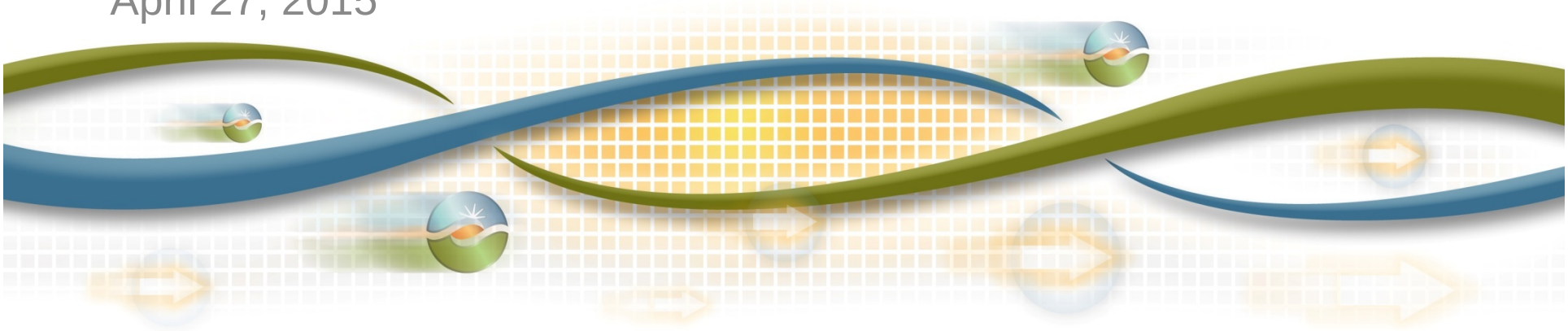
April 27, 2015



2012-2013 Transmission Planning Process

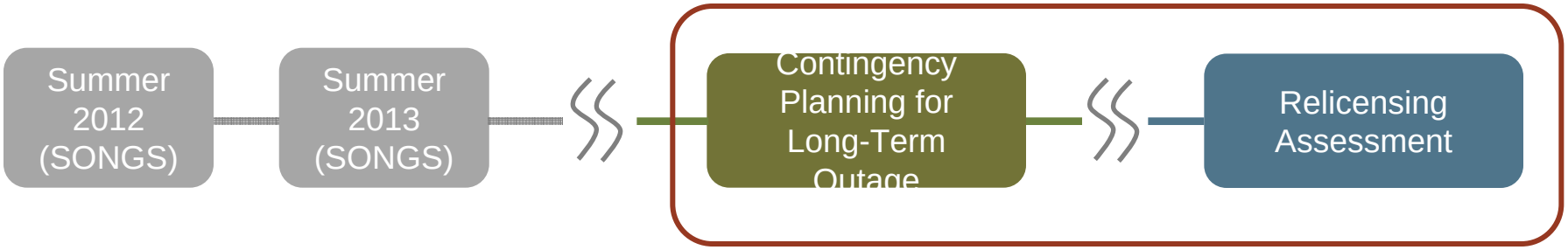
- Studied Grid Reliability Impact In the Absence of Nuclear Generation
  - Study included assessment of the transmission system without the Diablo Canyon Power Plant
  - Studies included the following evaluations:
    - Potential transmission reliability concerns
    - Potential mitigation options
  - The results of the assessment and transmission impact are still valid

2012-2013 Transmission Planning Process

- These studies are not sufficient to base a decision to keep or retire the nuclear generating power plants
- Other studies would be needed to provide a more completed assessment:
  - Asset valuations
  - Environmental impacts of green-house gas emissions and compliance with AB 32
  - Impacts on flexible generation requirements
  - Least-cost best-fit replacement options
  - Generation planning reserve margin
  - Market price impacts
  - Customer electricity rate impacts
  - Impacts to natural gas systems for replacement generation

Studied the impact of absence of the Diablo Canyon and San Onofre nuclear power plants

Study efforts completed in ISO 2012/2013 TPP



- Summer 2012 and 2013 Preparedness
  - Addendum to 2013 LCR studies (without SONGS) was posted
- Mid Term Study – Contingency Planning (2018)
  - –Considers what elements of the long term plan should be initiated immediately to help mitigate future unplanned extended outages
- Long Term Study – Relicensing Assessment (2022)
  - –Studies focus on transmission system implications of loss of SONGS and DCPP
- Study results are documented in the ISO 2012/2013 Transmission

PG&E Bulk System Studies for the Diablo Canyon Power Plant Back-up

- Post-transient and transient stability analysis for the cases with and without Diablo Power Plant
- Peak and off-peak conditions
- All single and double 500 kV outages studied, large generation outages, three-phase faults with normal clearing, single-phase-to-ground faults with delayed clearing
- 2012-2013 Transmission Plan Policy Driven Commercial Interest RPS case used as a starting case
- DCPP generation was replaced by dispatching thermal generation and peakers in PG&E and hydro generation in Northwest

2012-2013 Transmission Planning Process

- Study Conclusions for the Mid and Long Term Studies – Diablo Canyon Power Plant
  - No material mid or long term transmission system impacts associated with DCPP absence in the assumption that renewable generation projects develop according to the CPUC RPS Portfolio
  - Absence of DCPP allowed to avoid several overloads on the PG&E bulk system during off-peak load conditions (Westley-Los Banos 230 kV, Gates-Midway 230 kV)
  - Category D contingencies will require more load tripping if DCPP is absent
  - Additional studies are required to determine if the system has sufficient reactive margin with higher load
  - Additional sensitivity studies with lower level of renewable generation may be required to confirm these conclusions

ISO Current Assessment of Potential Transmission Impacts

- The ISO continues to monitor the system and assumptions related to the 2012-2013 Transmission Planning process assessment
  - The results of the assessment and transmission impact are still valid
  - There are no material transmission impacts without Diablo Canyon Power Plant
    - May be some dynamic reactive requirements to address potential high and low voltage conditions under different operating conditions.