



Senate Energy, Utilities, and Communications Committee

Informational Hearing: After Japan: Nuclear Power Plant Safety in California

April 14, 2011
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Rate Regulation, Analysis and Policy Branch

Energy Division

California Public Utilities Commission (CPUC)





Authority of the CPUC and NRC

- The CPUC has jurisdiction over utility cost recovery related to existing nuclear power plants owned by the investor-owned utilities (IOUs).
- Nuclear power plant safety and operational issues are primarily and directly under NRC jurisdiction.





CPUC jurisdictional issues

CPUC has direct and primary jurisdiction in the following areas:

- Approving Certificate of Public Convenience and Necessity (CPCN) if a CPUC-jurisdictional utility seeks to build a nuclear power plant.
- Reviewing and approving major capital additions to a nuclear plant for cost recovery.
- Reviewing costs of the plant and setting cost recovery rules after the plant goes into operation.
- Staying on top of the safety issues as they arise.
- Ensuring that there are sufficient funds to decommission the plant after its operating life.





Nuclear power plants owned by California IOUs became operational in the 1960s and 1980s.

Facility Name	Operating Agent	California IOU Ownership	Location	Unit	Capacity	Operational Date	Decommission or License Expiration Date
Humbolt Bay Power Plant	PG&E	PG&E (100%)	Humbolt County, CA	No. 3	65 MW	1963	1976
[1] Diablo Canyon Power Plant	PG&E	PG&E (100%)	San Luis Obispo County, CA	No. 1	1120 MW	1985	2024
				No. 2	1120 MW	1986	2025
[2] [3] San Onofre Nuclear Generating Station	SCE	SCE (78.21%) SDG&E (20%)	San Diego County, CA	No. 1	410 MW	1968	1992
				No. 2	1170 MW	1983	2022
				No. 3	1170 MW	1984	2022
Palo Verde Nuclear Generating Station	APS	SCE (15.8%)	Maricopa County, AZ	No. 1	1300 MW	1988	2027
				No. 2	1300 MW		
				No. 3	1300 MW		

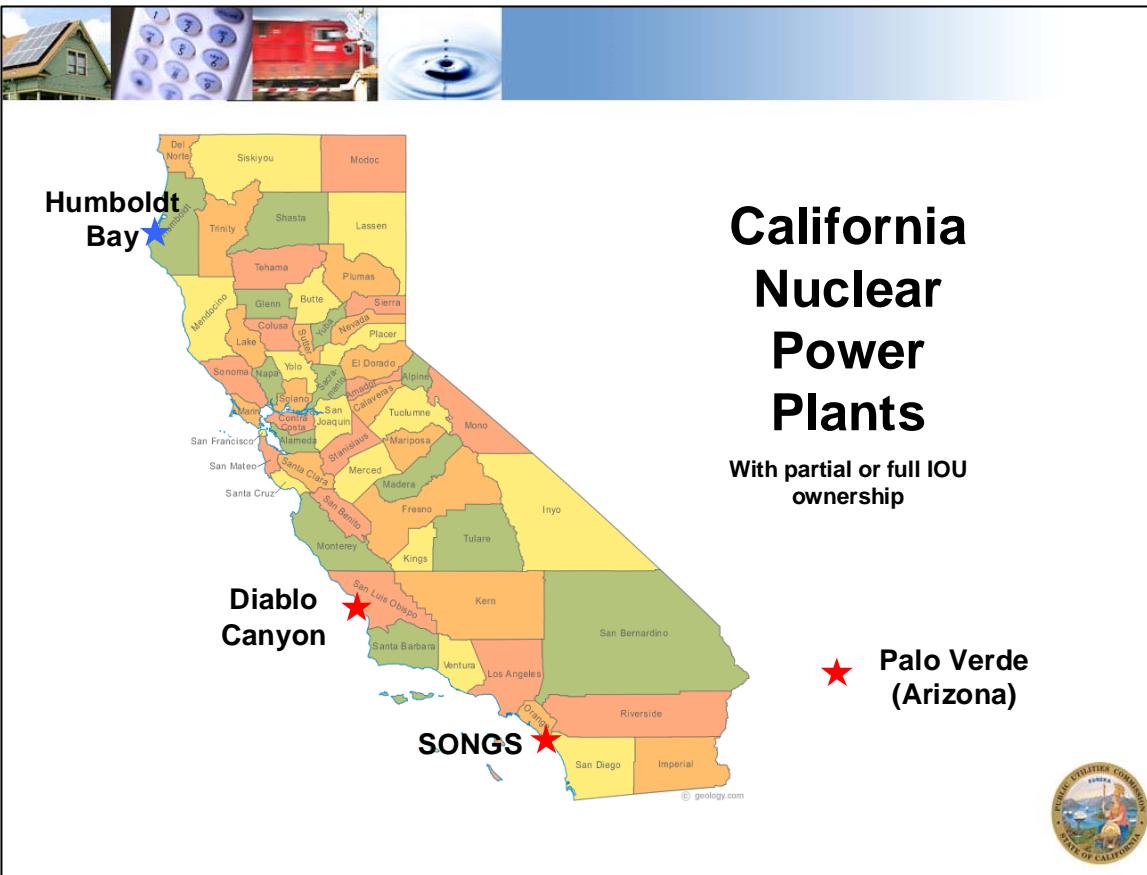
[1] PG&E replaced the DCPP steam generators in 2007-2008 at \$326 million for Unit 1 and \$380 million for Unit 2.

[2] SCE replaced the SONGS steam generators in 2009 at \$680 million for Units 2 and 3.

[3] City of Riverside holds 1.8% ownership interest in SONGS.

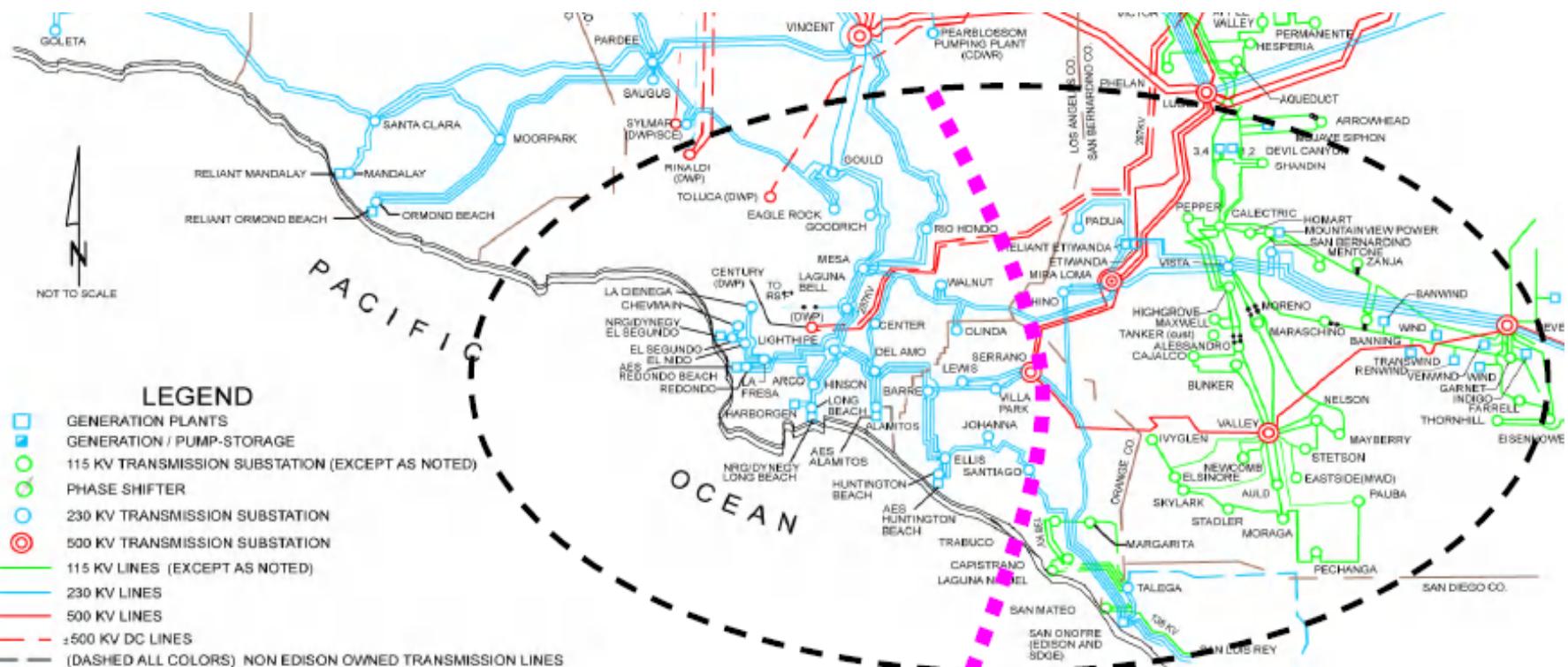
[4] Decommissioning of SONGS Unit No. 1 is currently in progress.







San Onofre Generation Station for Local Area Reliability



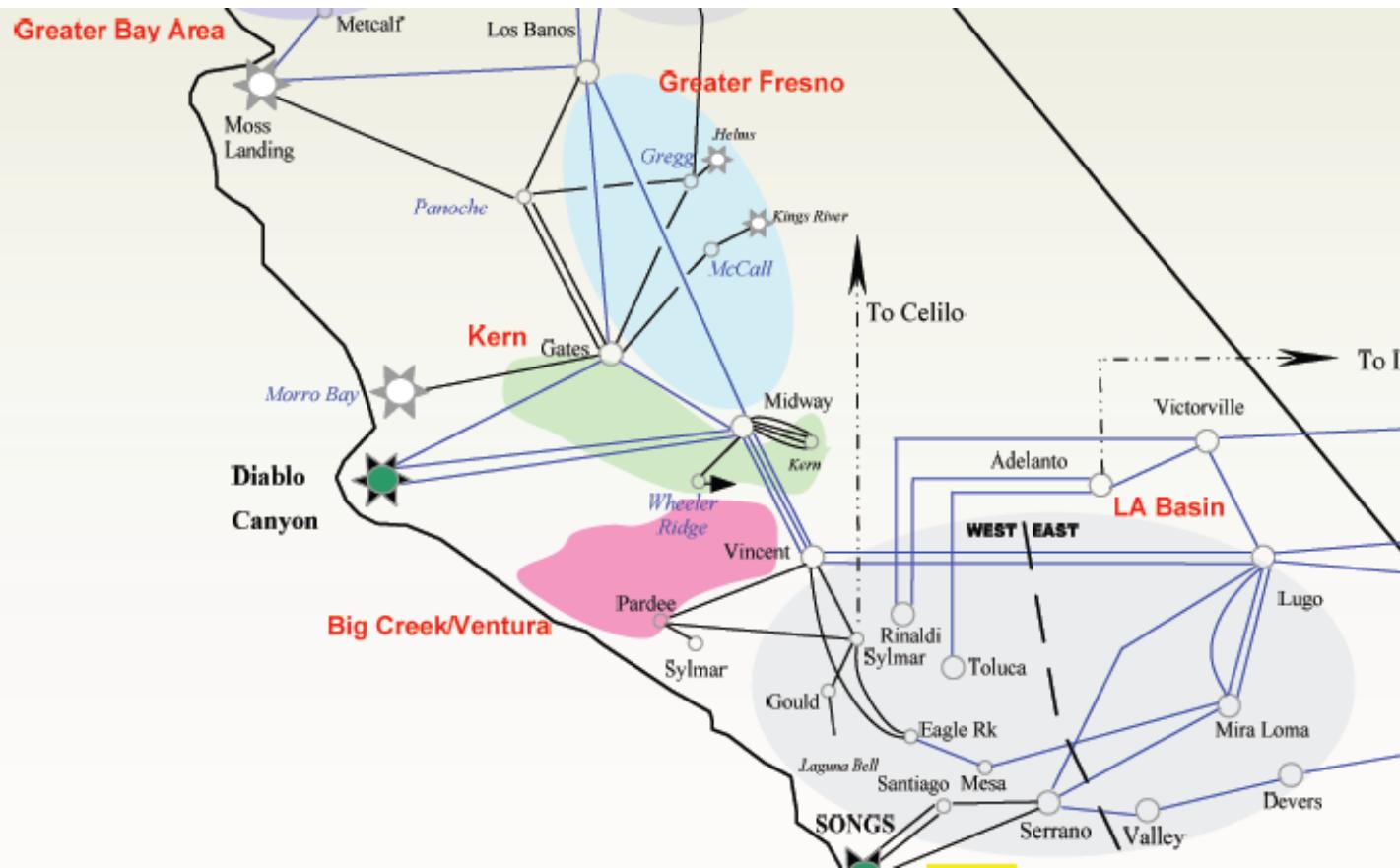
- SONGS is in the LA Basin “Local Capacity Requirement Area” defined by CAISO
- The LA Basin Local Area has 12,309 MW of capacity. It requires 10,600 MW to maintain reliability. SONGS, at 2,340 MW, is critically located in the southern part of this Local Area. It provides grid operational stability in addition to its capacity.

Source: CAISO 2012 Draft LCR Study Results at <http://www.caiso.com/2b34/2b34c81773cd0.pdf>





Diablo Canyon Power Plant for System Reliability



- DCPP is not located in a transmission constrained area; it does not fall into a Local Capacity Area defined by CAISO.
- DCPP is strategically located but is not critical for grid stability.

Source: CAISO Once-Through-Cooling Scenario Analysis at <http://www.caiso.com/208b/208b8ac831b00.pdf>





Cost Recovery for Nuclear Generation at CPUC

- Non-fuel operating costs are typically recovered in general rate cases.
- Major capital additions such as steam generator replacements for SONGS and DCPP were addressed in separate proceedings.
- Fuel costs recovered through Energy Resource Recovery Account (ERRA) proceedings.
- Decommissioning costs recovered in the Nuclear Decommissioning Cost Triennial Proceeding.
- Other proceedings are addressing cost recovery for seismic studies and relicensing DCPP and SONGS.





Enhanced Seismic Safety Studies at Diablo Canyon

- Enhanced 2-D and 3-D seismic studies are being undertaken by PG&E at DCPP pursuant to recommendations made by the CEC in its report pursuant to AB 1632 (2006) to assess the Shoreline Fault. SCE is considering similar seismic studies at SONGS.
- CPUC approved \$16.7 million for Diablo Canyon enhanced studies in D. 10-08-003.
- PG&E's preliminary assessment is that the Shoreline Fault would not exceed an earthquake of magnitude 6.5. DCPP is currently designed to withstand a 7.5 magnitude earthquake based on the Hosgri Fault. The recent northeastern Japan earthquake was magnitude 9.0.
- In the same decision, the CPUC created an Independent Peer Review Panel (IPRP) with participation of other state agencies such as the CEC, CA Seismic Safety Commission, CA Coastal Commission, and the CA Geological Survey, to review PG&E's plans and analyses of its enhanced seismic studies.





DCPP License Extension Related Activities

- PG&E filed application at NRC in November 2009 requesting to extend operating licenses for DCPP Units 1 &2 to 2044 and 2045 respectively (20-year extension). Decision expected in 2013.
- PG&E filed application at CPUC (A 10-01-022) requesting recovery of \$85 million to obtain State and Federal approvals related to license renewal.
- PG&E, TURN, and DRA filed a settlement which would allow PG&E to recover up to \$80 million for license renewal activities, and to seek separate recovery of additional amounts incurred, subject to reasonableness review, in its next GRC.
- The settlement is opposed by the Alliance for Nuclear Responsibility.
- A hearing scheduled for April 13th to address whether the settlement should be adopted and whether funding should be authorized before seismic studies at Diablo Canyon are completed, has been removed from the CPUC calendar by assigned ALJ ruling to be reset later.
- According to PG&E's application, relicensing will have substantial benefits for ratepayers (NPV \$3.8 billion --\$16.3 billion in various scenarios).
- On April 10, 2011, PG&E informed the NRC and the CPUC that it believes it is prudent to complete seismic studies at DCPP prior to issuance of the coastal consistency certification and the renewed NRC license, if approved.





Enhanced Seismic Safety Studies at SONGS

- In its Test Year 2012 General Rate Case (A.10-11-015) SCE requested:
- \$29 million for studies related to SONGS, of which \$21 million is for enhanced 2-D and 3-D seismic studies similar to PG&E's efforts at Diablo Canyon.
- Approximately \$7 million for efforts to continue a feasibility study related to a 20-year license extensions for SONGS Units 2 and 3.
- Commissioner Simon's March 1, 2011, scoping memo in A.10-11-015 directs SCE to seek recovery of the costs identified above through separate applications.
- SCE is expected to file a request at the NRC in 2013 for 20-year license extensions at SONGS. Licenses to operate SONGS Units 2 and 3 would be extended to 2042, if approved by the NRC.
- Assigned commissioner's ruling instructs SCE to make such request in a separate application.



DCPP and SONGS Replacement Power Cost

- DCPP and SONGS are among the lowest cost sources of power at present.
- For 2011, cost of DCPP power is \$502 million. Cost of SONGS power in 2012 is \$322 million.
- Based on preliminary rough estimates, annual replacement cost of energy for DCPP and SONGS would be approx. \$650 million each for the 2011-12 period if the utilities are able to buy replacement power at the current average generation rate. However, market price could go up if supply declines with the closure of DCPP and SONGS.
- If replacement energy is supplied by combined cycle natural gas plant, the annual cost of energy may be over a billion dollars annually for each utility. The cost could be higher still if replaced with RPS sources of power.
- In addition to replacement energy, utilities will need to procure replacement capacity to maintain reliability pursuant to the Resource Adequacy program. Preliminary estimates for annual replacement capacity cost are \$112 million for DCPP and \$425 for SONGS.
- DCPP is strategically located but is not critical for grid stability.
- SONGS is critical for grid stability. It supports power deliveries in Orange County and points north. CAISO is likely to need additional physical generating capacity in that vicinity to replace SONGS.
- Air restrictions in the South Coast Air Quality Management District, and local opposition to building four new power plants in Orange County could significantly delay any replacement to SONGS.





Process for Review and Approval of Replacement Power

- The utilities have approval, under PUC decisions and PU code section 454.5 to enter into contracts for energy and capacity for less than five years without need for a separate PUC approval, if they follow the rules in their procurement plans.
- In order to replace power (energy and capacity) from DCPP and SONGS, the IOUs will need to issue competitive solicitations governed by CPUC power procurement rules. Replacing power from DCPP and SONGS will take one to two years if new generation is not required.
- The procurement process to build new generation resources to replace SONGS will take five to seven years if air and land use permits can be obtained.
- Contracts longer than 5 years require a separate application and approval by the PUC which can take approximately a year. These long term contracts generally involve new generation.





Nuclear Decommissioning Trust Funds

- D.87-05-062 established nuclear decommissioning trusts for funding future decommissioning of the utilities' nuclear units.
- A 5-member committee with a 5-year term is appointed to oversee management of the fund. The committee appoints fund manager.
- 2 officers/directors are nominated and confirmed by the utility; 3 not affiliated with the company nominated by the company but confirmed by the CPUC.
- Decommissioning charges are shown on customer bills as a separate line item.
- For PG&E, the current rate is \$0.00066/kwh.
- For SCE, the current rate is \$0.00064/kwh.
- The charge is set in the Nuclear Decommissioning Cost Triennial Proceeding (NDCTP) every 3 years.





Nuclear Decommissioning Cost Estimates

D.10-07-047 in Phase 1 of the most recent Nuclear Decommissioning Cost Triennial Proceeding (A.09-04-007, et al) adopted:

- \$207 million for SONGS 1 decommissioning work done from 2005 – 2008, \$184 million for remaining decommissioning work at SONGS 1, and \$3.7 billion estimate for decommissioning SONGS 2 and 3;
- \$709 million estimate for SCE's share of PVNGS decommissioning;
- Contributions to SONGS 2 and 3 trusts of \$23 million for SCE and \$8 million for SDG&E;
- Decommissioning cost estimates of \$1.8 billion for DCPP and \$500 million for Humboldt 3; and \$14 million contribution to Humboldt 3 trust, and \$9 million contribution to DCPP trust;
- Established an independent panel to assess parameters for future decommissioning cost studies.





Trust Fund balances as of February 2011

- Humboldt Bay Unit 3 has a balance of \$305 million. This is after PG&E has already withdrawn \$200 million for work in progress.
- DCPP Units 1 and 2 have a balance of \$832 million and \$1,119 million respectively.
- PG&E has a total of \$ 2.256 billion in nuclear decommissioning funds.
- SCE's portion of SONGS Units 1, 2 and 3 have balances of \$ 212 million, \$1,173 million and \$1,368 million which adds up to a total of \$2.753 billion for SCE in nuclear decommissioning funds.
- SONGS 1 decommissioning is in progress and approx. \$800 million has already been withdrawn. Remaining balance determined to be sufficient for SONGS 1. No increase has been sought by SCE in the 2009 NDCTP.
- SDG&E's portion of SONGS Units 1, 2, and 3 have balances of \$108 million, \$314 million, and \$375 million, for a total trust fund market value of \$797 million.





CPUC reviewing and considering additional rules for Nuclear Decommissioning Trust Funds

Phase 2 of the NDCTP (A.09-04-007, et al) is addressing nuclear trust management, selection and investments.

- Trust fund administration, process, prior concerns, segregation of funds for long-term storage and decommissioning, management fees;
- Historic performance of trust funds;
- Trust fund committee selection process, members, roles;
- Investments, asset allocation studies, equity limitations, guidelines;
- Investment strategies, alternative asset classes;
- Advance withdrawal and interim disbursement process.



Geophysical Characteristics of Fukushima March 2011 Event

- The major damage to the nuclear power plants in Japan was caused by the tsunami following the 9.0 earthquake, which flooded the backup generators for the pumps that supply cooling water to the reactors and cooling ponds for spent fuel.
- The March 2011 tsunami in Japan flooded the Fukushima nuclear plant with sea water at about 30 feet above sea level.
- Diablo Canyon Power Plant is about 40 feet above sea level, and its emergency diesel generators are about 85 feet above sea level. This plant was designed for a 7.5 earthquake and a 25 foot tsunami wave.
- The SONGS units have a 30 ft high sea wall and the emergency diesel generators are approximately 30 feet above sea level. This plant was designed for a 7.0 earthquake and a 25 foot tsunami wave.
- The December 2004 Indian Ocean tsunami rose water levels by about 100 feet in Indonesia and 40 feet in Thailand.
- PG&E's seismic studies at DCPP include a tsunami analysis based on the 1964 Alaska tsunami resulting from a 9.2 earthquake.





Diablo Canyon Independent Safety Committee

The CPUC created the Diablo Canyon Independent Safety Committee in D.88-12-083 when resolving ratemaking issues for DCPP - a restated charter for the committee was approved in D.07-01-028.

- The three member Safety Committee assesses safety of DCPP operations and makes recommendations for the plant's safe operation;
- The Safety Committee has no responsibility or authority for plant operations, and does not direct PG&E personnel;
- The Safety Committee conforms to all applicable federal laws, regulations, and NRC policies;
- The CPUC approves candidates for appointment to the Safety Committee; the Governor, Attorney General, and Chair of the CA Energy Commission each appoint one committee member.

The NRC is responsible for assuring the safety and security of all U.S. nuclear power plants including DCPP.

- The Safety Committee reviews NRC reports, monitors NRC inspections, and periodically meets with NRC inspectors at DCPP.





Cooling Systems and State Water Board Policy

- DCPP and SONGS use once-through-cooling systems that the State Water Resources Control Board has stated do not meet Federal law requiring best available technology.
- The Water Board has ordered PG&E and SCE to conduct special studies to investigate alternatives.
 - Studies will consider factors such as engineering, space, and permitting constraints, cost and public safety.





Contracts for Uranium Enrichment Services require CPUC Approval

The CPUC approves utilities' contracts for uranium enrichment services. Examples include:

- PG&E's contract with AREVA, LLC., a U.S. company. Uranium enrichment services for delivery to DCPP from 2015 through 2024. Contract approved by CPUC Resolution E-4322, May 6, 2010;
- PG&E's contract with URENCO Ltd., an international company. For enriched uranium delivery to DCPP from 2014 through 2023. Draft Resolution E-4398 expected to be on CPUC April 14, 2011 agenda;
- Review of AREVA and URENCO contracts done in accordance with PG&E's conformed 2006 Long-Term Procurement Plan approved by Resolution E-4177, June 2008.





Contact Information For Follow Up Questions

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