Invitation for Public Comment on

Dr. Robert Budnitz, Dr. Najmedin Meshkati, and Dr. Michael Quinn

As Candidates for Appointment to the Diablo Canyon Independent Safety Committee
Term: July 1, 2022 through June 30, 2025

On December 16, 2021, the California Public Utilities Commission (CPUC) announced it was seeking applications from qualified persons to become nominees to fill a vacancy on the Diablo Canyon Independent Safety Committee (Committee) for a three-year term beginning July 1, 2022.

The Committee consists of three members, one each appointed by the Governor, the California Attorney General, and the Chair of the California Energy Commission (CEC). The Committee assesses the safety of the operations of Pacific Gas and Electric Company's Diablo Canyon nuclear power plant and has authority to review quarterly reports and conduct on-site inspections. The Committee reports its observations and recommendations to PG&E annually; the Committee then transmits its report, along with PG&E's response, to the Governor, the California Attorney General, the CEC, and the CPUC.

According to the procedures adopted by the Commission in Decision 07-01-028 and reaffirmed in PG&E Advice Letter 6361-E,[1] the President of the CPUC selects no more than three qualified candidates responding to the request for applications, plus the incumbent member whose term is expiring if the incumbent consents to reappointment. The CPUC will issue a resolution ratifying the President's selection of candidates for appointment. The Attorney General shall appoint the Committee member for the term beginning on July 1, 2022 from the list of candidates selected by the President of the CPUC and ratified by the Commission.

Applications were received from Dr. Najmedin Meshkati and Dr. Michael Quinn in response to the CPUC's December 16, 2021 announcement. The incumbent member whose term is expiring, Dr. Robert Budnitz, informed the CPUC's Energy Division that he consents to reappointment for a new three-year term beginning July 1, 2022. Their qualifications are summarized below.

The CPUC welcomes public comments on the qualifications of Dr. Budnitz, Dr. Meshkati, and Dr. Quinn. Please e-mail comments to david.zizmor@cpuc.ca.gov. We are not accepting comments via U.S. mail this year due the pandemic and work-from-home policies in place at the CPUC.

Comments must be received via e-mail by March 24, 2022.

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[1] PG&E Advice Letter 6361-E approving the second restatement of the DCISC Charter as authorized in D.21-09-003 is available at https://www.pge.com/tariffs/assets/pdf/adviceletter/ELEC_6361-E.pdf.

Dr. Robert J. Budnitz (Incumbent)

Dr. Robert J. Budnitz is currently an incumbent member of the Diablo Canyon Independent Safety Committee (DCISC), serving a term that began July 1, 2019 and will end June 30, 2022, as appointed by then Attorney General Xavier Becerra. Dr. Budnitz was originally appointed to the DCISC by then Attorney General Edmund G. Brown Jr. in 2007 for a term that ran through mid-2010. He is currently the chair of he DICSC.

In addition to his role on the DCISC, Dr. Budnitz retired in 2017 from the scientific staff at the University of California's Lawrence Berkeley National Laboratory (LBNL), where he worked on nuclear power safety and security. He currently works as a consultant, advising on reactor safety both domestically and internationally. He is a member of the National Academy of Engineering. He has also been honored by being named a Fellow of the American Nuclear Society, the American Physical Society, the Society for Risk Analysis, and the American Association for the Advancement of Science. His current research is largely in the area of the seismic safety of nuclear reactors, most of which is supported by the U.S. Nuclear Regulatory Commission (NRC) and the U.S. Department of Energy (DOE). From 2002 to 2007, he was employed at UC's Lawrence Livermore National Laboratory; during part of that period, he also worked on a two-year special assignment in Washington D.C. assisting the Director of DOE's Office of Civilian Radioactive Waste Management to develop a new Science & Technology Program for the Yucca Mountain Project. Dr. Budnitz additionally serves on advisory and standards-development committees for organizations such as the American Nuclear Society and the American Society of Mechanical Engineers.

From 1967 to 1978, Dr. Budnitz was on the staff of the Lawrence Berkeley National Laboratory, serving in 1975-1978 as Associate Director and Head of LBNL's Energy & Environment Division. The programs under his direction included energy-efficiency, deep-geologic radioactive waste disposal, solar energy, geothermal energy, fusion energy, transportation technology, chemical-engineering for alternate fuels, environmental instrumentation, air-pollution phenomena, and energy policy analysis.

From 1978 to 1980, he was a senior officer on the staff of the NRC. In 1978-1979, he was the Deputy Director, NRC Office of Nuclear Regulatory Research, and in 1979-1980 he became the Director of that same Office. In that position, Dr. Budnitz was responsible for formulating and guiding the large NRC research program that constituted over $200 million/year at the time. His responsibilities included assuring that all major areas of reactor-safety research, waste-management research, and fuel-cycle-safety research necessary to serve the mission of the NRC were adequately supported. Additionally, following the Three Mile Island reactor accident, Dr. Budnitz served the last 7 months of 1979 as the "technical coordinator" of the important NRC internal inquiry examining the accident, known as the "Special Inquiry Group."

After leaving the NRC in 1980 and until late 2002, Dr. Budnitz worked as a private consultant on reactor safety, radioactive waste, and related subjects, as president of Future Resources Associates, Inc., a small firm he founded in Berkeley in 1981. His

clients included both industrial and governmental organizations. A majority of his research support in the post-1981 period came from governmental sources, including NRC, DOE, and the U.S. Environmental Protection Agency, as well as international and intergovernmental organizations such as the International Atomic Energy Agency in Vienna, the OECD Nuclear Energy Agency in Paris, and the European Bank for Reconstruction and Development in London. After the downfall of the Soviet Union in 1991, an international program was assembled by several western nations to assist the operators of Soviet-designed reactors in Russia and several other countries to evaluate and then to upgrade their safety. Dr. Budnitz played a leading role in that multi-national effort for about 15 years. One of those projects, advising the government of Armenia on the safety of their old Soviet-designed reactor, remains an active project for Dr. Budnitz today, nearly 30 years later.

After the serious Japanese reactor accident at Fukushima in March 2011, caused by an earthquake-triggered tsunami that flooded the site and damaged 4 of the 6 reactors on-site, the U.S. Secretary of Energy and President Obama's Science Adviser appointed a special "science panel" to advise them about the best way early-on to interpret the incomplete technical information that was available from Japan, and about how best the U.S. might assist the Japanese in responding. Dr. Budnitz served on that high-level panel for the duration of 2011.

Some of Dr. Budnitz's other assignments include serving as chairman of an OECD/NEA international Specialist Meeting that evaluated the adequacy of our current understanding of possible terrorist attacks on nuclear facilities, a few months after the terrorist attacks on New York and Washington on 9/11/2001; he chaired the "Senior Seismic Hazards Analysis Committee" (the "SSHAC committee") supported by DOE, NRC, and the Electric Power Research Institute, that developed an advanced probabilistic seismic hazard methodology, published in 1997, which has now become the commonly accepted way to do this type of hazard analysis and was used recently in the most advanced studies of the seismic hazards at the Diablo Canyon site; he chaired both the NRC's "Expert Panel on Seismic Margins" that developed the widely-used seismic-margin methodology for assessing the seismic capabilities of existing nuclear facilities, and the DOE's "Senior External Events Review Group" that advised DOE on seismic and wind design criteria for their proposed new production reactor design; and he chaired the "Committee on Remediation of Buried and Tank Wastes" for several years for the National Research Council/National Academy of Sciences under the Board on Radioactive Waste Management. Dr. Budnitz has also performed research in and worked extensively in the fields of nuclear-reactor safety, high-level-waste safety, and nuclear-facility safety assessment, including probabilistic risk assessment.

Dr. Budnitz earned a Ph.D. in physics from Harvard University in 1968, an M.A. in physics from Harvard in 1962, and a B.A. in physics from Yale University in 1961.

Dr. Michael Quinn

Michael Quinn has invested 40-plus years into the public health and safety of the nuclear power industry, entailing 25 years in power block operations at a nuclear power station, and during the past 22 years as an executive operations assessor and consultant to the commercial nuclear industry in the U.S. and Canada.

Dr. Quinn's expertise entails but is not limited to nuclear safety; nuclear operations; significant operational event assessments; nuclear program inspection and performance evaluation; technical program rigor; high reliability and corrective action program/human performance/safety culture program implementation.

Throughout his career, Michael has brought the tenets of Compliance, Integrity, Transparency, and Competency to nuclear power facilities and high-reliability organizations with whom he has been engaged.

What Dr. Quinn can bring to the DCISC:

- Current and comprehensive nuclear safety and operations assessment and Evaluation experience in dozens of nuclear facilities since 2000 (refer to the following 'Current' details)
- Prior to 2000, 25 years of actual, in-house, nuclear operations licensee experience at two nuclear power stations through all operational modes, including 13 Refueling and Maintenance Outages
- Experience as a Senior Reactor Operator Licensed Director and Duty Officer (US NRC License No. 10071); SRO licensed for 15 years

Current Nuclear Operations Experience: Nuclear Licensees, Nuclear Regulators, and Nuclear Suppliers

Consistent with the activities the DCISC provides in its independent assessment of Diablo Canyon operations, Dr. Quinn has provided the same, plus additional assessment service initiatives to over 25 nuclear facilities/units and for three regulators in the United States and Canada since 2000. An overview:

- Provided requested assessment to 'unplanned' nuclear events at 16 nuclear power units in the United States and Canada
- Performed program and operational assessments at 13 nuclear licensee units or facilities
- Conducted Organizational Safety Culture assessment, remediation and consulting with 10 nuclear organizations
- Developed Technical Engineering and Operational Rigor shortcoming assessments including 15 nuclear safety-related units/facilities (e.g., a large Department of Energy engineering remediation project for management of 50MM gallons of nuclear mixed waste; and an Independent Spent Fuel Storage Installation [ISFSI])
- Taught Operational and Event Causal Analysis (a 24-hour course) over 40 times to the US Nuclear Regulatory Commission, entailing hundreds of Inspectors and technical staff; contracted into 2023

(in this course teaches NRC staff how to evaluate nuclear station event analysis reports and their associated corrective action implementation effectiveness)
- Taught Operational and Event Causal Analysis (a 24-hour course) to the Japan Nuclear Regulation Authority (JNRA) staff
- Taught Operational and Event Causal Analysis (a 24-hour course) to the Canada Nuclear Safety Commission (CNSC) staff
- Conducted Operational Reliability assessments impacting 16 nuclear facilities
- Provided causal analysis [root cause] training to 17 nuclear units/facilities and nuclear suppliers in the US and Canada

Over the past 22 years Dr. Quinn has been engaged by nuclear organizations in the safe operation of nuclear units, as well as in the operational, new build, refurbishment, decommissioning and spent nuclear fuel storage installation sectors of the nuclear industry in the U.S. and Canada. On the regulatory side, during the 2006-2022 period he has trained U.S. NRC resident inspectors and regional office technical staff on methods to evaluating significant nuclear licensee operational events and processes, with a focus on nuclear safety and the three cross-cutting areas of *Human Performance, Problem Identification and Resolution (PI&R), and Safety Culture.*

During the past 20-plus years, Michael has been, and is presently: advising on performance improvement; conducting program and operational assessments of nuclear licensee organizations; leading/performing root cause evaluations on significant nuclear events; and leading recovery project management for nuclear licensees and suppliers. His primary focus is on nuclear safety and the three cross-cutting areas.

In addition, Dr. Quinn continues to evaluate and to remediate licensee and supplier organizational and corrective action programs; providing PI&R, Human Performance, and Safety Culture consulting, coaching, assessment, and training. He provides related consulting services to several nuclear industry sectors, including: the commercial nuclear power industry in the U.S. and Canada; U.S. Government (e.g., U.S. NRC, U.S. Department of Energy); nuclear supplier organizations - large nuclear steam supply system providers (e.g., Westinghouse and Mitsubishi); as well as smaller nuclear suppliers to the industry.

From a major nuclear industry ‘campaign’ perspective, Dr. Quinn has been/is engaged in many industry issue campaigns and challenges that include/have included:
- Nuclear fuel handling, storage, cask operations
- Safety culture challenges to nuclear operations
- Safeguards at operating and decommissioning nuclear units
- Technical program rigor and quality challenges resulting in non-compliances
- Independent Spent Fuel Storage Installations (ISFSI) operations and events
- Radioactive effluents and radioactive waste treatment; Groundwater tritium
- Radiological/ trans-uranic worker uptake events
- Corrective action program and 10CFR50 Appendix B Criteria challenges
- Post-accident response and subsequent upgrades (NUREG 0737)
- Containment sump screen upgrade (GSI-191)

- And very importantly, the impact that a 'final shutdown decision' (as Diablo Canyon is facing in 2024-2025) has had on nuclear station staffs' performance while attempting to maintain focus on operational excellence. Experience includes maintaining operations 'within the envelope,' key staff retention, addressing increases in event frequency and severity, increased employee concerns, and safety culture/ safety conscious work environment (SCWE) declines, amongst others.

Starting in 2006 and continuing into 2022, Dr. Quinn has trained U.S. NRC inspectors and technical staff in a concentrated three-day workshop to evaluate significant nuclear safety licensee events, training over 600 U.S. NRC inspectors and technical staff during 40+ deliveries. He is contracted into 2023. In 2017, Dr. Quinn was requested to present this training to the first cohort from the Japan Nuclear Regulation Authority, and in later 2017, he was requested to present this training to the first cohort of the Canadian Nuclear Safety Commission.

Dr. Quinn is the only individual who has taught nuclear safety event causal analysis evaluation to the US Nuclear Regulatory Commission, the Japan Nuclear Regulation Authority, and the Canadian Nuclear Safety Commission.

Since 2001, Dr. Quinn has presented workshops and seminars on current nuclear safety industry issues and challenges at industry conferences and forums in the US and Canada, as well as for the International Atomic Energy Agency (IAEA) and Argonne National Laboratory. He has also taught 20+ courses in Management Systems, Strategy, Organizational Behavior, and Organizational Management at two Connecticut universities.

Nuclear Operations Experience within the Power Block 1975-1999

While in the power block of a pressurized water reactor unit with a large nuclear utility from 1975 to 1999, Michael earned a U.S. NRC Senior Reactor Operator License on a Westinghouse Pressurized Water Reactor unit, and held leadership positions that included Director of Nuclear Station Services; Nuclear Station Duty Officer; Chair-Nuclear Plant Operations Review Committee [operations oversight including 50.59 Reviews]; Corrective Action Review Board (CARB) Chair; Director of Nuclear Station Emergency Operations (DSEO); Refueling and Maintenance Outage Shift Manager; Manager of Chemistry and Radiochemistry; and Project Manager, reporting to the President, on a three-unit, four-year Nuclear Station Recovery Team.

During this time frame Michael was a member of the senior station leadership team at Haddam Neck Station, a nuclear unit that consistently performed at U.S. NRC SALP-1 and INPO-1 performance levels (presently termed U.S. NRC ROP Column 1 and INPO-1 respectively).

LICENSES/ CERTIFICATIONS CONTRIBUTORY TO A POTENTIAL POSITION ON THE DCISC:

- U.S. NRC Senior Reactor Operator License #10071 on a Westinghouse PWR (Diablo Canyon is a Westinghouse PWR NSSS design)
- Certified Root Cause Investigator (Nuclear Safety Review Concepts Event Evaluation and PII)
- Certified Root Cause Training Instructor
- Certified Radiation Safety Officer

Michael earned a Doctorate in Organizational Management Systems (organizational system dynamics), and preceding that effort he had completed an Executive Master of Business Administration degree and had earned a Bachelor of Science degree in Chemistry.

Michael's collective current and past nuclear power experience is congruent with the Diablo Canyon Independent Safety Committee's (DCISC) mission and requirements. He can bring current and comprehensive assessment experience in nuclear operations, decommissioning, and **Independent Spent Fuel Storage Installation** (ISFSI) management to supplement the depth and breadth of the DCISC team.

Dr. Quinn has a demonstrated history of articulating his evaluations in an objective, empirically-based, and plain language manner to a spectrum of stakeholders (e.g., utility commissions, the public, station staff, utility staff, state and federal regulators, interest groups, and the boardroom).

In summary, Michael offers current and comprehensive nuclear industry assessment and evaluation experience that support consideration of his candidacy for a role on the Diablo Canyon Independent Safety Committee.

On a personal note:

- For the most recent nine years, Dr. Quinn has served on the Connecticut Community Care Inc. (CCC) Board of Directors, a non-profit health care service provider of 250 employees who are responsible for over 9,000 medically compromised individuals in need.
- Michael, after serving as Chair of the Board, recently rotated off per the CCC Charter requirement to serve no more than three consecutive three-year terms. During his tenure as Chair of the Board,
  Dr. Quinn helped guide the CCC organization, and the Board, through 2020-2021 with effective response to the Coronavirus impact on the organization's 9000 clients in Connecticut.
- Dr. Quinn is a four-decade American Red Cross blood donor.

LinkedIn: https://www.linkedin.com/in/quinnmd/

Dr. Najmedin Meshkati's

The following is a synopsis of University of Southern California (USC) Professor Najmedin Meshkati's qualifications and experience in nuclear safety. For the past 35 years at USC, he has taught and conducted research on the safety, risk reduction, and reliability enhancement of complex technological systems, including nuclear power plants.

A Short Biography

Dr. Najmedin Meshkati is a (tenured, full) Professor of Civil/Environmental Engineering, Industrial & Systems Engineering; and International Relations at the University of Southern California (USC); an Associate (ex-Research Fellow) with the Project on Managing the Atom at Belfer Center for Science and International Affairs at Harvard Kennedy School; and has been an Associate with the Mossavar-Rahmani Center for Business and Government at Harvard (2018-2020).

Meshkati was a Jefferson Science Fellow and a Senior Science and Engineering Advisor, Office of Science and Technology Adviser to the Secretary of State, US State Department, Washington, DC (2009-2010). He is a member of two boards of the National Academies of Sciences, Engineering, and Medicine (NASEM): Board on Human-Systems Integration (BOHSI) and Gulf Offshore Energy Safety (GOES) Board.

The NASEM selected Meshkati for his interdisciplinary expertise concerning human-systems integration, and safety culture, and he served as a member and technical advisor on two national panels in the United States investigating two major recent accidents: The "Committee on Lessons Learned from the Fukushima Nuclear Accident for Improving Safety and Security of U.S. Nuclear Plants" (2012-2014); and "Committee on the Analysis of Causes of the Deepwater Horizon Explosion, Fire, and Oil Spill to Identify Measures to Prevent Similar Accidents in the Future" (2010-2011).

Meshkati has conducted research on sixteen and visited and inspected ten nuclear power plants worldwide, including Chernobyl (1997), Fukushima Daiichi, and Daini (2012). As Principal Investigator (PI), he has had research grants from the US Nuclear Regulatory Commission (NRC); attended and given talks based on his research at many national and International Atomic Energy Agency's (IAEA) conferences on nuclear safety in the last twenty years. The last IAEA conference was in 2016, for the 30th anniversary of the Chernobyl accident. He also wrote extensively and gave testimonies to the US Commission on Improving the Effectiveness of the U.N. on the importance of IAEA for global nuclear safety in 1993.

As a co-PI of an NRC-funded project which created a new Nuclear Energy option in the MS degree Mechanical Engineering at the University of Southern California (USC), Meshkati developed and taught two graduate courses: CEE 571, "Nuclear Safety and Security: Human Performance and Safety Culture"; and CEE 599, "Complex Systems Safety and Resiliency: Safety Culture, Systems Design & Integration."

Meshkati is an elected Fellow of the Human Factors and Ergonomics Society (HFES); one of the eighteen "Titans of HFES"; the 2015 recipient of the HFES highest award, the *Arnold M. Small President's Distinguished Service Award*, for his "career-long contributions that have brought honor to the profession and the Society"; and the 2007 recipient of the HFES *Oliver Keith Hansen Outreach Award* for his "scholarly efforts on human factors of complex, large-scale technological systems." He is an AT&T Faculty Fellow in Industrial Ecology, a NASA Faculty Fellow (Jet Propulsion Laboratory, 2003 and 2004), and a recipient of the *Presidential Young Investigator Award* from the National Science Foundation (NSF) in 1989.

Meshkati simultaneously received a B.S. in Industrial Engineering and a B.A. in Political Science in 1976, from Sharif (Arya-Meher) University of Technology in Iran and Shahid Beheshti University (National University of Iran), respectively; an M.S. in Engineering Management in 1978; and a Ph.D. in Industrial and Systems Engineering in 1983 from USC. He is a Certified Professional Ergonomist (CPE # 650).

The following is a small sample of Dr. Meshkati's nuclear safety-related articles in the last few years which could be relevant to the mission and thrust of the DCISC:

10 Years after Fukushima, Safety is Still Nuclear Power's Greatest Challenge. [Co-authored with Dr. Kiyoshi Kurokawa, March 27, 2011, The Conversation. (Has been translated into Spanish (Diez Años Después de Fukushima la Seguridad Sigue Siendo el Mayor Reto de la Energía Nuclear), Catalan, Italian, and Vietnamese; and reprinted in many newspapers, websites, and blogs around the world (Singapore, Australia, Spain, Italy, New Zealand, Philippines, etc.) and cross-posted by, e.g., American Nuclear Society's Nuclear Newswire, *Popular Science*, Yahoo News, Associated Press.]

Thirty-three Years Since the Catastrophe at Chernobyl: A Universal Lesson for the Global Nuclear Power Industry. [Co-authored with Prof. Serhii Plokhii, April 25, 2019, Belfer Center for Science and International Affairs, Harvard Kennedy School].

How to Deal with Increasingly Complex Safety-Critical Technologies: Public Policy Recommendations from the Control Room of the Three Mile Island Nuclear Reactor to the Cockpit of the Boeing 737 Max. [Co-authored with Dr. Sebastien Philippe, March 28, 2019, March 28; Belfer Center for Science and International Affairs, Harvard Kennedy School].

Onagawa: The Japanese nuclear power plant that didn't meltdown on 3/11, *Bulletin of the Atomic Scientists*, [Co-authored with former industrial engineering undergraduate student, Ms. Airi Rue, March 10, 2014].