

State of Oregon
Department of Geology and Mineral Industries
Vicki S. McConnell, State Geologist

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Open-File Report O-08-10

**OREGON PUBLIC UTILITIES COMMISSION –
OREGON DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
LEADERSHIP FORUM AND
SEISMIC CRITICAL ENERGY INFRASTRUCTURES WORKSHOP, APRIL 2, 2008**

Compiled by
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2008

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Figure 1. Leadership Forum and Seismic Critical Energy Infrastructures Workshop speakers and moderators (left to right): John Eiding; Oregon Governor's spokesperson Mark Ellsworth; Alex Tang; Stu Nishenko; Oregon Public Utilities Commissioner Ray Baum; Oregon State Senate President Peter Courtney; Yumei Wang; Leon Kempner; Anshel Schiff; Pete McDonough; Ivan Wong; and J. R. Gonzalez.

1.0. OVERVIEW

The goals of the Leadership Forum and Seismic Critical Energy Infrastructures Workshop, held April 2, 2008, in Salem, Oregon, were to bring together executives and senior engineers from critical energy and telecommunication infrastructure organizations to:

- Share evidence that earthquake preparedness is needed
- Encourage seismic vulnerability assessments of utility systems
- Encourage development of mitigation plans and implementation of mitigation plans

Oregon Public Utilities Commission (OPUC) Commissioner Ray Baum welcomed participants. Baum emphasized that OPUC is concerned about the state's earthquake preparedness, specifically utilities that are part of the critical infrastructure. The December 2007 wind and rain storm on the northwest Oregon coast demonstrated that the state is not fully prepared. Understanding how vulnerable our utilities critical infrastructures are in relation to a major seismic event is very important for our Oregon's emergency preparedness and response. Equally important is the proactive impact mitigation of such a catastrophic event.

Oregon State Senate President Peter Courtney emphasized that the Legislature is concerned about the state's earthquake preparedness. He has championed 10 successful bills focusing on preparing schools and emergency facilities for "Q9" — a magnitude 9 earthquake on the Cascadia subduction zone. These bills have led to work that has identified high-risk buildings and that promotes mitigation. Courtney outlined four components needed to assure preparedness: 1) The Force, 2) Political Will, 3) Public Demand, and 4) Finish, the Close. He is concerned about community and family safety and lifelines between the coast and the rest of the state.

Mark Ellsworth, the Governor's spokesperson, expressed the Governor's concern about the state's disaster readiness, including business continuity that relies on critical infrastructure. He recommended a higher level of preparedness for individuals (i.e., expect no outside help for 3–7 days), businesses, communities, and utilities. Ellsworth provided examples learned from the December 2007 severe storm with regard to response and recovery hampered by downed electricity and telecommunication systems.

Seven nationally recognized experts (Figure 1) presented overviews of 1) Cascadia earthquake hazards and risk, 2) infrastructure vulnerability to earthquake damage, 3) state-of-practice lifeline seismic vulnerability studies and application, and 4) case studies of vulnerability studies by the Bonneville Power Administration (BPA) and the Pacific Gas and Electric Company (PG&E). Their presentations were followed by a discussion session that included active audience participation (see agenda, Figure 2). Participants expressed an interest in conducting seismic vulnerability assessments and in collaborating to reach the common goal of improved earthquake readiness in Oregon.

Acknowledgements. Sponsors included Oregon Public Utilities Commission (OPUC contract 2007-900), Oregon Department of Geology and Mineral Industries (DOGAMI), Oregon Seismic Safety Policy Advisory Commission (OSSPAC) American Society of Civil Engineers: Technical Council on Lifeline Earthquake Engineering (ASCE TCLEE), and Oregon Seismic Safety Policy Advisory Commission (OSSPAC). Corporate sponsors included NW Natural, PacifiCorp, and Portland General Electric.

OPUC-DOGAMI Leadership Forum and Seismic Critical Energy Infrastructures Workshop

When	Wednesday, April 2, 2008, 9:00 – 4:15
Where	Oregon Public Utility Commission Hearing Room 550 Capitol St. NE, Salem
Goal	Promote seismic vulnerability studies and mitigation of Critical Energy and Communication Infrastructures to utilities
Description	<p><u>Leadership Forum</u> State leaders will discuss the importance of preparedness for Cascadia earthquakes</p> <p><i>Peter Courtney, Senate President</i> <i>Lee Beyer, Oregon PUC Commission Chair</i> <i>Mark Ellsworth, Governor's office</i></p> <p><u>Seismic Critical Energy Infrastructures Workshop</u> Overview of: Cascadia earthquake hazards and risk Vulnerability of critical energy and telecommunication infrastructure to earthquake damage State-of-practice seismic vulnerability studies and applications Case studies of vulnerability studies by BPA and PG&E</p>
Target Audience	Executives, senior engineers and decision makers from utilities that operate in Oregon including electrical, gas and telecommunications

PROGRAM

9:00 – 10:00	<p>Leadership Forum</p> <p>Opening Comments, JR Gonzalez Introduction of Senate President Peter Courtney, Yumei Wang Senate President Peter Courtney Introduction of PUC Commissioner Lee Beyer, JR Gonzalez OPUC Commission Chair, Lee Beyer Introduction of Mark Ellsworth, Yumei Wang Mark Ellsworth, Governor's office</p>
10:00 – 10:15	Break
10:15 – 4:15	Seismic Critical Infrastructure Workshop



Figure 2. Leadership Forum and Seismic Critical Energy Infrastructures Workshop agenda [agenda continues on next page].

10:15 – 4:15 Seismic Critical Infrastructure Workshop, continued

Moderators: J.R. Gonzalez and Yumei Wang

10:15 – 10:45 Cascadia earthquake hazards and risk, Ivan Wong, URS VP

10:45 – 11:15 Electric Vulnerability, Anshel Schiff, Precision Measurement Instruments

11:15 – 11:45 Gas Infrastructure Vulnerability, Pete McDonough, QueStar

11:45 – 12:15 Telecommunication Vulnerability, Alex Tang, L & T Consulting

12:15 – 1:30 Lunch

1:30 – 2:20 Infrastructure Seismic Vulnerability Assessments, John Eiding, G&E

2:20 – 3:10 Electrical Infrastructure, a BPA Case Study, Leon Kempner, BPA

3:10 – 3:20 Break

3:20 – 3:50 Electric and Gas Infrastructure, PG&E Case Study, Stu Nishenko, PG&E

3:50 – 4:15 Panel Discussion and Adjourn

Sponsors

- Oregon Public Utilities Commission (OPUC)
- Oregon Department of Geology and Mineral Industries (DOGAMI)
- Oregon Seismic Safety Policy Advisory Commission (OSSPAC)
- American Society of Civil Engineers: Technical Council on Lifeline Earthquake Engineering (ASCE TCLEE)
- PGE
- NW Natural
- PacifiCorp

Workshop Contacts

OPUC: J.R. Gonzalez, P.E., Program Manager Safety & Reliability
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DOGAMI: Yumei Wang, P.E., Geohazards Section Supervisor
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RSVP by March 26 to Geneva Beck at Geneva.Beck@state.or.us or 971-673-1554
with attendee's name, company, title and phone. Seating is limited.



2.0. WORKSHOP PRESENTATIONS

2.1. Cascadia Earthquake hazards and risk

IVAN G. WONG
Vice-President URS Corporation
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Ivan Wong is a Principal Seismologist, Vice President, and Manager of the Seismic Hazards Group of URS Corporation. He has a broad and extensive experience in the fields of seismology and seismic geology and is recognized for his work in seismic hazards in the Pacific Northwest. Two research areas that Mr. Wong has focused on have been the estimation of ground shaking from Cascadia subduction zone earthquakes and the potential for large intraslab earthquakes beneath western Oregon. At URS, Mr. Wong has directed and participated in the seismic hazard evaluations of more than 300 critical and important facilities worldwide including numerous dams and lifeline systems in the Pacific Northwest. He is a consultant to FEMA and is currently leading a Working Group to establish a near-real time ShakeMap/HAZUS capability in the Puget Sound to be used for emergency response. Funded by the U.S. Geological Survey through the NEHRP program, Mr. Wong has developed earthquake ground shaking maps at a microzonation scale for several urban areas in the U.S. including the Portland metropolitan area. In addition to his work at URS, he has also been particularly active in serving the U.S. Geological Survey on several review and advisory panels including the review panel for the 1996 National Hazard Maps. Mr. Wong has been actively involved in the activities of several professional organizations. He has been an invited speaker and lecturer at more than 100 conferences, workshops, and meetings. He is currently President of the Northern California Chapter of the Earthquake Engineering Research Institute (EERI). Mr. Wong has authored or co-authored more than 250 professional publications. He is a graduate of Oregon State University, Portland State University, and the University of Utah.

2.2. Identifying and addressing vulnerabilities of power systems

ANSHEL J. SCHIFF
Precision Measurement Instruments
email schiff@stanford.edu

Education and Employment History

B.S.M.E., 1958; M.S., 1961; Ph.D. (Engr. Sci.), 1967 Purdue University

1959–1986: Purdue University Professor of Mechanical Engineering

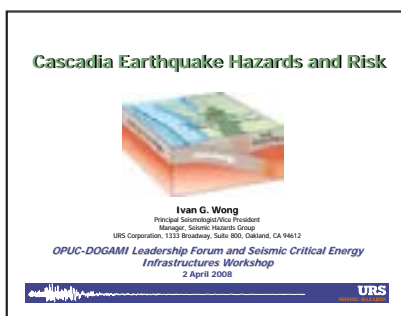
1975–present: Founder and principal of Precision Measurement Instruments

1986–2001: Consulting Professor, Dept. of Civil Engineering, Stanford University

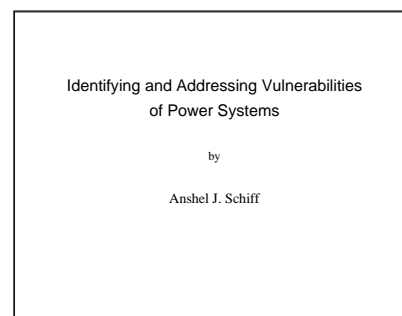
Professional Experience

Dr. Schiff is well recognized for his contributions to establishing industry practices for seismic design of electrical power equipment. He is actively involved with numerous professional organizations, including: Member, Committee on Electrical Power and Communications, Technical Council on Lifeline Earthquake Engineering (TCLEE), ASCE, 1976-present, Chairman 1983-1989, Vice-Chair 1989 1993, Chairman 1993 – present; Member, Earthquake Investigations Committee, Technical Council on Lifeline Earthquake Engineering (TCLEE), ASCE, 1983-present, Chairman 1986-1993 Chairman, Strong Motion Instrumentation Committee, Earthquake Engineering Research Institute, 1983-1995. Member, Senior Seismic Review Advisory Panel, Seismic Qualification Users Group – Nuclear Regulatory Commission, June 1983-1992. Member, Technical Council on Lifeline Earthquake Engineering (TCLEE), ASCE, 1976 - 1993, member Executive Committee, 1988 - present, Chairman of Executive Committee, 1991- 1992. Member, American Society of Mechanical Engineers; Member, American Society of Civil Engineers; Member, Earthquake Engineering Research Institute; Fellow, Seismological Society of America.

2.3. Seismic vulnerabilities of natural gas systems



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2.3. Seismic vulnerabilities of natural gas systems

PETER MCDONOUGH
Questar Corporation
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Chairman- Utah Seismic Safety Commission
 Chairman- American Society of Civil Eng., Technical Council of Lifeline Earthquake
 Engineering, Gas & Liquid Fuels Committee

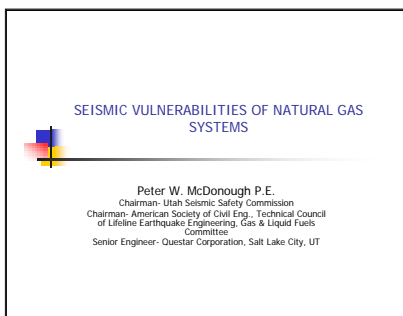
Education

Clarkson College of Technology, Potsdam, NY:
 B.S. Civil and Environmental Engineering, 1972
 Polytechnic Institute of New York, Brooklyn, New York: M.S.
 Civil Engineering, 1977

Professional Experience

Peter McDonough has over thirty-seven years of engineering design, project management and supervisory experience, primarily relating to natural gas lifelines and critical infrastructure. Besides having substantial experience in pressure piping design, environmental permitting and right of way reclamation, he has a strong background in earthquake engineering and risk management, extending back to 1979. He has written or contributed to thirteen papers and books on the topic of lifeline earthquake engineering. He has presented papers at seven national and international conferences on earthquake engineering and has served on the organizing committees for five conferences. Mr. McDonough is currently a senior engineer with Questar Corporation, Salt Lake City, responsible for a five year replacement project of high pressure natural gas pipelines within the State of Utah.

Mr. McDonough is a past Executive Committee Chair of the American Society of Civil Engineers’ Technical Council on Lifeline Earthquake Engineering (ASCE/TCLEE). He was Vice-Chair of the ASCE standards committee responsible for the current standard on Earthquake Actuated Automatic Gas Shutoff Devices (ASCE 25-97). He is a Licensed Professional Engineer in Utah and Wyoming.



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2.4. Telecommunications

ALEX TANG
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Mississauga, ON L5C 3G9, Canada
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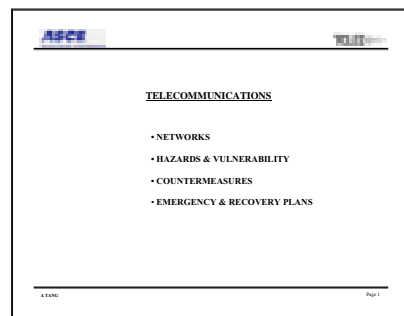
Education

B. A. Sc. (U of Toronto, Engineering Science 1972)
 M. A. Sc. (U of Waterloo, Business Management Science 1984)
 (B. A. Sc. = Bachelor of Applied Science, M. A. Sc. = Master of Applied Science)

Professional Experience

Mr. Tang is well recognized for his contributions to setting industry practices in seismic telecommunications. His professional expertise includes:

- Project Management (Project Implementation and Business Processes Development)
- Electronic Packaging Design and Management (specialized in plastics and sheet metal)
- Product Integrity Management (Product certification to CSA, UL, NEBS and CE on flammability, EMI/EMC, earthquake protection, etc)
- Operations and Customer Services, with 12 years in project management (in Canada and Asia Pacific). PMI certified PMP.
- Security expertise - Site evaluation for military telecommunication equipment installation.
- Budget Management and Capital Appropriation and Deployment (CAD Workstations and Software).
- Multi-countries project management wireless network
- International Project Management Process Involvement – North America, Asia Pacific and Europe.
- Analytical and Problem Solving Skills.
- Technology company evaluation and purchase team.
- Resource Selection and Deployment to countries within AP.
- Training of Project Managers and Designers – North America, Canada, and China JV.
- Three international design patents.
- Knowledge of MS Office suite of applications (including MS Project).
- Technical standards committee member and chair person (CSA, ASCE, NEHRP, and NIBS)



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2.5. Seismic vulnerability analyses for lifelines

JOHN M. EIDINGER
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Education

B.S., Civil Engineering, Massachusetts Institute of Technology, 1975

M.E., Structural Engineering and Structural Mechanics, U.C. Berkeley 1978

M.S., Structural Engineering and Structural Mechanics, U.C. Berkeley 1982

M.B.A., Business Administration, U.C. Berkeley, 1984

Professional Experience

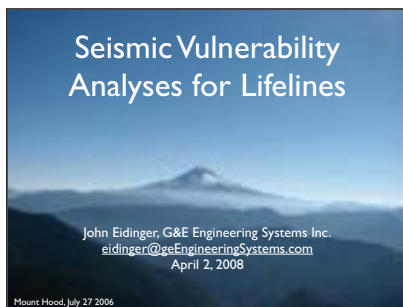
Mr. Eidinger has twenty nine years experience in the water and electric utility industries. He has a detailed background with the analysis, design, risk quantification and economic analysis of water and wastewater treatment plants, pipelines, tunnels, pump stations, canals, bridges, buildings, mechanical and electrical equipment, and electric substations. He is an industry leader in evaluation of water and electric lifelines for natural hazards including earthquakes, fire following earthquake, urban interface fire conflagrations, floods, landslides, and ice storms.

Mr. Eidinger has conducted post-earthquake reconnaissance efforts for many lifeline systems around the world including California, Alaska, Japan, Turkey, Peru, and India. Mr. Eidinger has worked extensively with nation-wide agencies (FEMA, ALA, NIBS, ASCE, AWWA) to develop cost effective seismic guidelines and standards for water and other lifeline operators

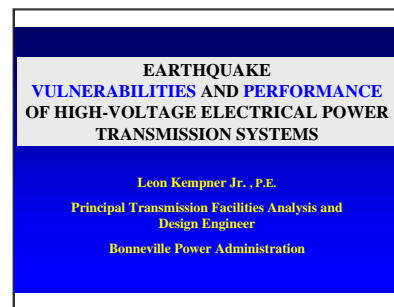
2.6. Earthquake vulnerabilities and performance of high-voltage electrical power transmission systems

LEON KEMPNER, JR.
Principal Transmission Facilities Analysis and Design Engineer, Transmission Engineering (TEL-TTP3) Bonneville Power Administration
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Leon Kempner has over 34 years experience as a structural engineer for the Bonneville Power Administration. Assignments have included structural engineering analysis, design, and research of transmission line facilities (transmission line towers, substation and microwave structures). The last seventeen years he has been performing seismic evaluation, research, qualification, shake-table testing, standards development, and mitigation design of the Bonneville Power Administration transmission line facilities. Leon is active on a number of industry standards and technical committees: American National Standards Institute (ANSI)/ASCE Standard 48 -Design of Transmission Pole Structures, Co-Chair of IEEE Standard 693 - Seismic Design of Substation Structures, National Electrical Safety Code Subcommittee 5 - Overhead Lines (Strength and Loading), US Representative to CIGRE Study Committee B2 (Overhead Line) Working Group 08 (Towers), ASCE Electrical Power and Communications Lifelines Committee of the Technical Council on Lifeline Earthquake Engineering, Interagency Committee on Seismic Safety in Construction (Subcommittee 2, Lifelines), Secretary of ANSI/ASCE 10 Standard - Design of Latticed Steel Transmission Structures, and Chairperson of ASCE Subcommittee for Design of Electrical Substation Structures. He has over fifty technical papers discussing structuralengineering (analysis, design, and research) of transmission line facilities. He is a registered Professional Civil Engineer (P.E.) in the States of Washington and Oregon. He is a graduate of the University of Nebraska, Oregon State University, and Portland State University. **2.7. Mitigation and infrastructure resiliency: a West Coast perspective**



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2.7. Mitigation and infrastructure resiliency: a West Coast perspective

STUART NISHENKO

Department of Geosciences PG&E

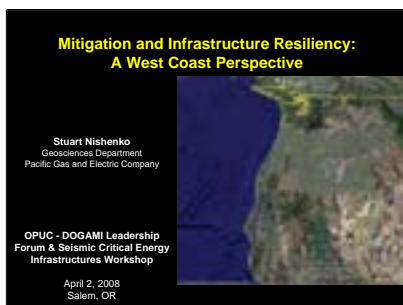
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Stuart Nishenko is the Senior Seismologist in the Geosciences Department of the Pacific Gas and Electric Company in San Francisco, CA. He is chairman of the California Integrated Seismic Network Advisory Committee, a member of the U.S. Geological Survey Scientific Earthquake Studies Advisory Committee, and has served as a member of the National Research Council committee on the "Economic Benefits of Improved Seismic Monitoring". From 1996 to 2001, Stu was the resident Seismologist in the Mitigation Directorate of FEMA in Washington, DC where he managed the American Lifelines Alliance; the FEMA 366 HAZUS99 Estimated Annualized Earthquake Losses for the United States study, and was a contributing author to *Disasters by Design, A Reassessment of Natural Hazards in the United States*. As a Research Scientist with the USGS, Stu served on the 1988 and 1990 Working Groups on California Earthquake Probabilities. He received his PhD in Geophysics from Columbia University, Lamont-Doherty Geological Observatory in 1983 and was a National Research Council Postdoctoral Research Associate from 1983 to 1985.



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