January 5, 2004

MEMORANDUM TO: Eugene V. Imbro, Chief
Mechanical and Civil Engineering Branch
Division of Engineering
Office of Nuclear Reactor Regulation

FROM: Goutam Bagchi, Senior Level Advisor ***/RA/***
Mechanical and Civil Engineering Branch
Division of Engineering
Office of Nuclear Reactor Regulation

SUBJECT: SEMINAR ON DENALI FAULT EARTHQUAKE

DATE & TIME: Friday, January 23, 2004
9:00 a.m. to 11:30 a.m.

LOCATION: U.S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike,
Conference Room O-9B4
Rockville, Maryland 20852

PURPOSE: To discuss the performance of the Trans Alaska Pipeline during the 2002 Magnitude 7.9 Earthquake on the Denali Fault and near fault ground motion characteristics for design.

CATEGORY 3:* Public participation is encouraged at designated points in the agenda.

PARTICIPANTS: Participants from the NRC include staff members interested in seismic design issues. External participants are attending members of the public.

AGENDA: The agenda is attached.

cc: See next page

CONTACT: Goutam Bagchi, NRR
301-415-3305, gxb1@nrc.gov

Accession Number: ML040070217

*Commission's Policy Statement on "Enhancing Public Participation in NRC Meetings," 67 Federal Register 36920, May 28, 2002

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DATE	12/ 24 /2003	12/ 29 /2003	1/ 05 /2004	1/ 05 /2004

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SEMINAR ON DENALI FAULT EARTHQUAKE

Lloyd Cluff and Norm Abrahamson
Pacific Gas and Electric Company

Date: January 23, 2004

Place: One White Flint North Building, 11555 Rockville Pike, Rockville, MD 20852
Conference Room O-9B4

Time: 9:00 to 11:30 AM

AGENDA

9:00	Introduction	NRC
9:10	Performance of the Trans Alaska Pipeline during the 2002** Magnitude 7.9 Earthquake on the Denali Fault	L. Cluff
10:10	Discussion and Public Comments	
10:30	Break	
10:45	Near-Fault Ground Motions Characteristics for Design**	N. Abrahamson
11:45	Discussion and Public Comments	
12:00	Adjourn	

NOTE: Specific topics and associated discussion times may change without notice

Contact:
Goutam Bagchi, E-Mail: gxb1@nrc.gov

ATTACHMENT

** Detailed Topics:

PERFORMANCE OF THE TRANS ALASKA PIPELINE DURING THE 2002 MAGNITUDE 7.9 EARTHQUAKE ON THE DENALI FAULT
Presented by: Lloyd Cluff

Stimulated by the stringent stipulations that resulted from the National Environmental Policy Act of 1969 and the San Fernando earthquake of 1971, in 1972, Cluff and his team of earthquake geologists developed fault displacement design criteria for the Trans-Alaska Pipeline. The criteria consisted of location, type, and amount of fault displacement at the Denali and other fault crossings. The pipeline design team, led by Nathan M. Newmark, developed an innovative design that accommodated the expected surface fault displacements. The above-ground pipeline is articulated in a zigzag fashion, and rests on Teflon-coated support beams that allow the ground to move freely, horizontally and vertically, without disrupting the integrity of the pipeline. The magnitude 7.9 earthquake on the Denali fault in November 2002 was consistent with the design earthquake and fault crossing criteria postulated for the pipeline crossing of the Denali fault. The pipeline maintained its integrity, and disaster was averted.

NEAR-FAULT GROUND MOTIONS CHARACTERISTICS FOR DESIGN
Presented by: Norman Abrahamson

The ground motions from the 1999 Kocaeli, Turkey, the 1999 Chi-Chi, Taiwan, and the 2002 Denali, Alaska, earthquakes are leading to significant changes in the characterization of long-period, near-fault ground motions from large-magnitude earthquakes. The terms "fling" and "directivity" have often been used interchangeably to refer to near-fault effects; however, these terms have very different meanings and result in different types of ground motions, as seen in these recent earthquakes. Directivity is related to the direction of the fault rupture from extended faults. The directivity pulse is a result of constructive interference of S-waves generated from parts of the rupture located between the site and the hypocenter. In contrast, fling is related to the permanent tectonic deformation at the site. The fling pulse is a result of this permanent tectonic deformation occurring over a time interval of several seconds (for large earthquakes). New models have been developed for quantifying the directivity and fling effects, as well as procedures for incorporating them into design.

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