

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
GENERAL ELECTRIC CO.	)	
(Vallecitos Nuclear Center -	)	Docket No. 50-70
General Electric Test Reactor,	)	(Show Cause)
Operating License No. TR-1)	)	

NRC STAFF TESTIMONY OF WILLIAM E. VESELY

Q.1. Please state your name and present position.

A.1. My name is William E. Vesely. I am Acting Chief, Meteorology and Data Branch, Division of Systems and Reliability Research, U.S. Nuclear Regulatory Commission, Washington, DC 20555.

Q.2. Please summarize your educational background and relevant work experience.

A.2. I graduated from Case Institute of Technology with a B.S. in Physics. I received an M.S. and Ph.D. in Nuclear Engineering from the University of Illinois. I have been previously employed as a Senior Technical Analyst and Statistical Group Leader for Aerojet Nuclear Company, as a Senior Scientist for JRB Associates, Inc. and as Section Leader and Special Assistant for Methodology Development for the Nuclear Regulatory Commission. A copy of my qualifications is attached to this testimony.

Q.3. Describe the scope of our participation in the review of the GETR for this proceeding.

A.3. I reviewed the probability analyses and models developed by GE's consultant, Jack Benjamin and Associates (JBA), and Lawrence Livermore Laboratory (LLL) and its consultants, TERA, which were prepared for use in predicting the probability of surface rupture at the GETR. As part of this review, I specifically evaluated the various sensitivity studies that were performed by GE and myself and the critiques that were made to determine those credible results that could be obtained from the probabilistic modelling.

Q.4. Please summarize the results of your review.

A.4. Based on my review, I concluded that the probability models could be used to predict gross probabilities of surface rupture. I also concluded that upper bounds on the probability of surface rupture could be obtained which accounted for various data and modelling uncertainties. The results of my review are contained in Section B of the Staff's May 23, 1980 SER.

The probabilistic analyses presented in the JBA reports are methodologically sound. The TERA model presents an alternative probabilistic model which is not as empirical and is more traditional; the TEP' model does require more data and more assumptions to be made on rupture parameter relationships. As pointed out in the reviews, available data are sparse requiring sensitivity studies to be performed to gain any confidence in the rupture offset probabilities which are estimated. A wide range of sensitivity studies on variation of parameters were performed for the JBA probabilistic models, which included a variety of sensitivity evaluations performed in the reviews

of the models. The TERA model extends the parametric sensitivity analyses by developing a different alternate probabilistic model to compare with the JBA models.

Based on the sensitivity analyses and the alternative model, the probability of a surface rupture offset occurring beneath the reactor building has been shown to lie between  $1 \times 10^{-6}$  per year and  $1 \times 10^{-5}$  per year (to order of magnitude precision), with  $1 \times 10^{-4}$  per year being a conservative upper bound. The probability results for the GETR are credible and should be used to supplement the deterministic evaluations in making a final decision.

PROFESSIONAL QUALIFICATIONS  
OF  
DR. WILLIAM E. VESELY

Acting Chief, Methodology and Data Branch, Division of Systems and Reliability Research (PAS), U.S. Nuclear Regulatory Commission, Washington, DC 20555.

Responsibilities

Personally responsible for the planning, initiation, and direction of research programs for the U.S. Nuclear Regulatory Commission in the fields of risk analyses, reliability analyses, data analyses, and statistical analyses. Performs risk assessments, analyzes risk implications of data collected at power plants, and develops new techniques for risk and reliability assessments. Directs and coordinates activities of the members of the Methodology Section. Manages contracts issued by the Methodology Section involving several million dollars; directs and coordinates activities of the approximately 50 technical individuals engaged in the contract work. Presents research programs and risk evaluations to congressional committees, governmental agencies and other bodies as required. Serves as a representative of the Commission in international activities involving risk analyses and reliability analyses. Serves as a Commission consultant on risk and reliability matters.

Employment History

Period: March 1974 - September 1980

Organization: U.S. Nuclear Regulatory Commission  
Washington, DC 20555

Title: Section Leader and Special Assistant for Methodology  
Development  
Probabilistic Analysis Staff

Period: February 1973 - March 1974

Organization: JRB Associates, Inc.  
1600 Anderson Road  
McLean, Virginia

Title: Senior Scientist

Responsibilities:

Initiated projects and conducted analyses in the areas of reactor physics, statistical analyses, and risk analyses. Directed individuals involved in the projects. Recommended technical areas for company involvement. Served as consultant for the company on reliability and risk matters.

Dr. William E. Vesely  
Professional  
Qualifications

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Period: July 1968 - February 1973

Organization: Aerojet Nuclear Company  
P.O. Box 1845  
Idaho Falls, Idaho

Title: Senior Technical Analyst and Statistical Group Leader

Responsibilities:

Developed techniques and computer codes for reactor physics analyses, reliability analyses and statistical analyses. Performed reliability analyses on nuclear systems. Developed theoretical and computer models for fluid flow and heat transport. Managed the statistical group consisting of approximately ten technical members. Served as company consultant for reliability problems.

PRESENT COMMITTEE MEMBERSHIPS

IEEE Committee on Reliability

IEEE Nuclear Systems Reliability and Safety Committee

Centralized Reliability Data Organization Steering Committee, DOE

International Task Force on the Risk Evaluation of Rare Events in Nuclear Power Plants, OECD-CSNI

International Working Group on Common Mode Failure Analysts, OECD-CSNI

International Working Group on Human Error Analysis, OECD-CSNI

Research Review Group on Probability and Statistics for Risk Evaluations  
(Chairman)

Research Review Group on Risk Evaluations of Limiting Conditions for Reactor Operations (Chairman)

Seismic Safety Margins Research Review Group

Research Review Group on Flooding Analyses for Nuclear Power Plants

Research Review Group on Human Error Modeling in Risk Analyses

Research Review Group on Risk Assessments of Light Water Reactors

Research Review Group on Risk Assessments of the Nuclear Fuel Cycle

PRESENT UNIVERSITY ASSOCIATED ACTIVITIES

Research Affiliate and Thesis Coordinator, Massachusetts Institute of Technology

Thesis Committee Member, Rensselaer Polytechnic Institute

Lecturer, Reliability and Risk Analyses, George Washington University

Lecturer, Reliability and Systems Analyses, University of Washington, Seattle

Lecturer, Navy Safety School, University of Indiana

Lecturer, Reactor Safety School, Massachusetts Institute of Technology

PRESENT SOCIETY MEMBERSHIPS

Americal Statistical Association

Tau Beta Pi (Honorary)

Sigma Xi (Honorary)

Phi Kappa Phi (Honorary)

Reviewer, IEEE Transactions on Reliability

Reviewer, Nuclear Science and Engineering (ANS)

EDUCATION

Massachusetts Institute of Technology, BS Physics 1974  
(Timken Scholarship, Graduated Summa Cum Laude)

University of Illinois, MS Nuclear Engineering 1966,  
PHD Nuclear Engineering 1968 (AEC Fellowship, 4.0 average)