

**ESSE Peer Reviewer Remarks
(Tectonics)**

**by Walter J. Arabasz
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Requested presentation:

"Provide candid views on the tectonics portion of the (ESSE)," including views on

- the validity of the conclusions reached**
- the underlying basis for these conclusions**

Relevant Background—Walter J. Arabasz

- **Ph.D. Geology, 1971, California Institute of Technology**
- **Research Professor of Geology and Geophysics and Director, University of Utah Seismograph Stations**
- **24 yrs professional experience in studies of seismicity and tectonics, earthquake seismology, active faulting, and earthquake hazard evaluation—in California, Chile, New Zealand, and Utah**
- **18 yrs experience in observational seismology in eastern Basin and Range province**
- **Member, Peer Review Group for ESSE, 1991**
- **Member, expert panel, GEOMATRIX/EPRI project to assess earthquake and tectonic issues for Yucca Mountain repository, 1991-92**

Formal Charge to the ESSE Peer Review Panel

- **Documented, in-depth critique of the ESSE Report**
- **Evaluate adequacy of information presented**
- **Review methodology used in the analyses**
- **Determine whether ESSE Report presents "an objective and technically defensible view of the suitability of the Yucca Mountain site with regard to the 10 CFR Part 960 siting guidelines"**

My Own Perspective About Peer Review Responsibility

**Not responsible for finding "truth" amid
competing tectonic hypotheses,**

**Nor to provide a solution for any of the
complex problems involved.**

**Rather, focus of my review was to question
whether "the weight of evidence so far indi-
cates that Yucca Mountain is suitable for
development of a geologic repository."**

My Conclusions from ESSE Review

"From the viewpoint of seismic hazards as they relate to the preclosure and postclosure tectonics guidelines, I agree with the authors of the ESSE Report that 'the available evidence supports a conclusion that the site is suitable, although additional information is needed in specific areas to strengthen this conclusion.'"

Postclosure Guidelines (Tectonics)

Qualifying Condition (lower-level suitability finding)

- **Remarkable degree of devil's advocacy explicit in ESSE Report**
- **Well-reasoned logic**
- **Available geoscience information presented in a thorough and objective way**
- **Conservative evaluations**
- **Authors use carefully-measured arguments and stay within defensible bounds**

Postclosure Guidelines (Tectonics)

Disqualifying Condition (higher-level suitability finding)

I was initially skeptical because of apparent dilemma in simultaneously accepting (1) a lower-level suitability finding for the disqualifying condition for postclosure geohydrology and (2) a lower-level suitability finding for the qualifying condition for postclosure tectonics.

I resolved quandry by accepting that linkage with hydrology wasn't intended. Importantly, the disqualifying condition for tectonics focuses on the geologic record rather than on the geologic setting, it restricts consideration to "fault movement or other ground motion," and it uses the key word "expected."

Preclosure Guidelines (Tectonics)

Qualifying Condition (lower-level suitability finding)

Core Team: "Additional site-specific seismic data are needed to reach an adequate level of confidence that the surface facilities can be designed to accommodate seismic hazards on the basis of RAT."

Disqualifying Condition (higher-level suitability finding)

Core Team: "Tectonic hazards can generally be accommodated using RAT, and new information is unlikely to change this conclusion."

A Personal Perspective
(from observing the ESSE process)

**"Checks & balances" between scientific,
engineering, and regulatory aspects
of the siting process**

Earth Scientists — abundant complexity to be dealt with; much of available information tends equivocally to support multiple interpretations.

Engineers — as "problem solvers," have the ability to define bounds of "relevance" of particular earth-science information and bring to closure the seemingly open-ended deliberations and multiple-working hypotheses of earth scientists.

Regulators — on behalf of society, use best judgment to legally define the level of acceptable risk, bringing to closure the decision-making of both engineers and earth scientists.