

20. Ron Ballard/Hanford Lefevre
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ANDREA BEATTY RINKER
Director



Ballard/Lefevre
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June 8, 1987

Jim Mecca
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Dear Jim:

This is a follow-through of our conversation June 4 on the structural implications of microearthquake activity at and near the CASZ. I am sending you this package for use as you see fit, but certainly to assist in writing the pertinent sections of the SCP where this topic will be discussed.

Numerous Rockwell reports of the 1970s and early 80s state in effect that no association exists between microearthquake swarms and structure (faulting). I propose here that this position is scientifically untenable today; that is, the evidence for a structural association is much more compelling than the evidence against it.

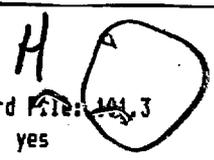
There are three lines of evidence supporting this conclusion (see attachments).

First is the published work of George H. Rothe, S. D. Malone and others in Geophysics, EOS, GSA Abstracts, and in Rothe's dissertation. Rothe developed focal plane solutions for a NW oblique thrust at Wooded Island; there are varying strike slip proposals for E-W, NW and N-S movement. This work studied the swarms in unusual detail and at unusually close range. Contemporary fault movement at Wooded Island, underlying the Hanford Reach, has great significance for transport of radionuclide-contaminated groundwater from the repository horizon upward into the Columbia River, short-circuiting the diffuse pathways proposed by Rockwell and possibly invalidating the stochastic transport model.

Second is our interpretation of the 1978 Weston aeromagnetic survey performed for WPPSS 2 siting and licensing, and reported (uninterpreted) in Appendix 18 of the 1981 FSAR. I interpreted this in 1985, with an independent and confirming interpretation by Shannon & Wilson, then under contract to us. Briefly, the interpretation conforms with a remarkable degree of accuracy to outcrop-mapped geology over a large area, and extends in a logical and consistent way into areas of glaciofluvial cover, including Wooded Island. The interpretation is that the N-S alignment of the Hanford Reach is fault-controlled at depth, and that Wooded Island is at a triple junction with NW and NE structures. It also

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suggests that most other microearthquake swarms occur on structure; that few, if any, are "random" events. It further says that the RRL lies within a trapezoidal fault block, which is in turn within the CASZ.

Finally, the very recent review of drillers' logs of several important holes in the Cold Creek syncline shows that events associated elsewhere with tectonic strain and pervasive faulting or fracturing are common events. These include lost circulation, slickensides in basalt (including post-mineralization slickensides), open fractures, broken and disked core, sloughing and hole distortion, mud loss and "tectonic breccia." It is a matter of deep concern to us that for at least some years there was an apparently systematic effort made to downplay or eliminate these features in the reports summarizing the holes, but the logs are straightforward. CERT geologists took the lead in requesting these data last month and we will support their further analysis and documentation. I note here that this supports our long-standing contention that faulting and fracturing in the CASZ are the expected result of continuing, albeit modest tectonic activity in the Pasco Basin.

Clearly there is more at stake here than scientific interest in the microearthquake swarm activity. If there are active, unmineralized and open groundwater pathways for migration on the vertical component of hydrologic discharge, then the stochastic model is likely to be invalid and discrete modeling is needed. In my professional opinion, the only sound approach is angle drilling of suspect structural trends, until it can be shown beyond reasonable doubt that there are no open pathways between the RRL and the (defined) accessible environment. I will be happy to discuss sites and techniques for such a drilling program.

As to the SCP, obviously our technical positions may differ. Should you decide to maintain the historic Rockwell position, I believe there should be (1) a statement as to why our three pieces of evidence were considered and rejected, and (2) an opportunity for us to place a footnote in the document summarizing our position.

Sincerely,



W. A. Brewer
Office of Nuclear Waste Management

WAB:la

cc: Terry Husseman
Don Provost
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