

Summary of Canadian Discovery Stakeholder Feedback and Reservoir Containment Team (RCT) Response on Technical Reports				
Section	Stakeholder Feedback - Issue	Possible Solution or Recommendation	Rationale to Support Solution or Recommendation	RCT Response
Limitations with Currently Used Geomechanical Models, Section 3 – Geomechanical Modeling, pages 2-3	“Working with uncertainty and variability in processes, properties, loading conditions and load history, initial and boundary conditions, etc., is unavoidable in rock engineering. Therefore, the reliability and credibility of a geomechanical model are always relative, subjective, and case-dependent (Jing, 2003).” and “The presence of these problems does not mean that one cannot supply rock characterization parameters, but it does mean that the limitations of numerical modelling must be carefully considered.” And from the summary document: “Considering the limitations of geomechanical modelling, the MOP formula provides a more acceptable level of risk with respect to tensile failure by ensuring that the steam injection pressure is 80 per cent of the caprock fracture closure pressure at the shallowest base of the caprock.”	We agree that the models should be carefully considered. We disagree that they are to be dismissed as useful in modeling caprock tensile failure and that the proposed, simplistic MOP formula is a better approach. Rigorous uncertainty analysis and parameter sensitivity analysis should be performed on the currently-used models prior to dismissing them. We do not refer to commonly-applied “one-at-a-time” sensitivity analysis (a.k.a. knob-tweaking), but rather well-established techniques that, while rarely applied in the oil and gas industry, have been successfully used in other fields for decades. Canadian Discovery has vetted this idea with operators, academia and the AER and has found unanimous support	An excellent example from the medical field is “Sensitivity and Uncertainty Analysis of Complex Models of Disease Transmission: an HIV Model, as an Example,” S.M. Blower and H. Dowlatabadi, International Statistical Review, 62(2), 229-243, 1994. In this study, a complex model with 34 ordinary differential equations, 20 input parameters and 10 state variables was examined using well-established statistical approaches. The result was the identification of three key parameters that had the most important effect on the model outcomes. “The results of the sensitivity analysis can be used to focus data collection effort because the analysis identifies which parameters (due to their estimation uncertainty) are important in the prediction precision of adult AIDS cases.” The usefulness and rationale for such an analysis is nicely summarized at the following website: http://dpannell.fnas.uwa.edu.au/dpap971f.htm	At this time the RCT continues to believe that considering the limitations of geomechanical modelling, the MOP formula provides a more acceptable level of risk with respect to tensile failure by ensuring that the steam injection pressure is 80 per cent of the caprock fracture closure pressure at the shallowest base of the caprock.