



**7) Confirm metrics for the stimulation activity, include supporting models, assumptions and documentation. Provide justification for the stimulation pressure.**

**Reason: A large range (40-80m) is presented for the height/zone of the stimulation activity and similarly a large range (100-200m) is presented for the radius/diameter of penetration. The situation described in the previous sentence lends to differing sizes calculated for the mining waste facility. Greater confidence is needed to support the stimulation pressure outlined, than is provided in the application.**

The variation in ranges of fracture height (40-80m) and fracture length (100-200m) as presented are not a function of uncertainty in the data or modelling. Each fracture's dimensions will be dependent on the specific porosity/permeability, thickness and mechanical characteristics of the individual sands encountered and their surrounding lithologies. The range presented simply reflects the expected range of fracture dimensions across multiple sands based on analogue data and should only be considered as indicative.

For this indicative, initial design, four separate fracture stages were modelled on different Namurian sand packages identified in the Cloughton-1 well. For each of these stages the expected fracture geometry is generated by the simulation modelling, including the pressure required to achieve it. The exact half lengths, heights of the fractures generated and stimulation pressures generated by the modelling can be found in the attached document (Ref. "Clean Cloughton 1 Initial Stimulation modelling & design"). The Cloughton-2 well is prognosed to have very similar lithology and rock properties to Cloughton-1 and as such the simulations give good confidence in the dimensions and pressures of the fracture treatments that will be generated across a range of sands in the Cloughton-2 well.

As explained in *Question 5* above it will only be after the drilling and logging of the Cloughton-2 well that the exact sand packages will be identified for the proppant squeeze. Whilst Cloughton-2 will look very similar and have very similar sand packages (size and dimension) to Cloughton-1 they will not be exactly the same.

The EA permit being applied for and the associated mining waste facilities allows for the accommodation of the maximum expected size of any stimulation operation on site, whether by stage or in total, not the exact final detail of each specific fracture or fracture stage.