

30 April 2021

Ada Zaffina

Reference: 20210331P1

By Email: Ada Zaffina ada.zaffina@gmail.com

Dear Ada,

**REVIEW OF ANGUS ENERGY WEALD BASIN NO.3 LIMITED, EPR/BL9763IN/V005
PERMIT VARIATION APPLICATION**

Further to my proposal dated 31 March 2021 (20210331P1) I am pleased to provide you with my review of the following document:

Supplementary Hydrogeological Risk Assessment in Support of Permit Variation Application for a Groundwater Activity for the Injection of Process Waters, Ref: 422.07154.00002, Rev 6, SLR, August 2020

For ease of reference specific comments have been tabulated using the nomenclature from the above document and are presented in Table 1.

General Comments

It is important to read the supplementary document alongside the original Hydrogeological Risk Assessment (HRA) produced in September 2018.

Previous comments on the original HRA were that it was generic and did not quantify the potential risks and/or hazards associated with the proposed groundwater activity. The supplementary report has gone some way to delivering a quantitative approach however still includes some generic evidence, monitoring requirements and reporting. Furthermore it has not investigated all the potential risks associated with the surrounding geology and hydrogeology.

In response to your first question: *Does the revised HRA provide sufficient information to make an assessment of risk?*

It is the opinion of H2Ogeo that additional works should have been carried out to investigate and understand ground conditions in the vicinity of the site, therefore the desk-based approach, used to prepare this document, does not provide sufficient information to make an **adequate** assessment of risk.

In response to the second question: *Does the proposed Angus plan show that an unacceptable impact on the water environment can be minimised, and or mitigated, to an acceptable level?*

Without site-specific details on geology and hydrogeology, particularly shallow interconnected sand lenses, dips and strikes of more permeable strata the full risk profile has not been presented. It is unknown at this stage if an unacceptable impact on the water environment can be minimised and/or mitigated to an acceptable level.

Specific Comments

Table 1 Specific Comments

Report Reference	Report Page No'	Comment
3.1	5	The British Geological Survey's lithological description used to describe the Weald Clay has omitted the 'Calcareous Sandstone' and should be updated to accurately reflect the definition.
Figure 2-1	6	<p>The graph presented in Figure 2-1 is replicated in Appendix 03 however the chart in the document only presents data from either 'Other Wells' or 'BRX4Z' (Legend not clear).</p> <p>The salinity data used in Appendix 3 presents a range of results including:</p> <ul style="list-style-type: none"> • Other Wells; • BA2Z prd wat; • BRX4Z prd wat; • Brockham-1 DST 2; • Brockham-1 DST 3; • Brockham 2Y prd wat; • Brockham BRX2; • Brockham Surface Water BROW05; and • Brockham Surface Water BROW06. <p>The Brockham salinity data is believed to range from approximately 55,000ppm to 95,000ppm. There are no details in relation to when these samples were taken and how they were analysed. The additional data in the Appendix 03 chart also does not provide any further information other than Weald Basin salinity at depth can range from 55,000 to 200,000ppm. To understand the relevance of these samples it is important to know where all the samples came from with regards to strata and location.</p> <p>Based on the wide range of salinity measured in the Weald and presented in the HRA it appears 50% of the Other Wells would exceed the salinity standards set out in the HRA and therefore could not be introduced at the site.</p> <p>There has been no scheduling or time constraints put on independent checks and/or monitoring of compatibility/salinity, therefore the adequacy of the proposed measures cannot be assessed.</p>
2.2	7	<p>Angus Energy do not propose any incremental groundwater quality monitoring activities due to the protection offered by:</p> <ul style="list-style-type: none"> • Geological Stratigraphy and Structure; • Sub-hydrostatic reservoir pressure; and • Well Construction – packers, casing and cement. <p>With regards to the geology, whilst predominantly defined as Unproductive Strata, the Weald Clay does have fine to medium grained sandstones, calcareous sandstone and shelly limestones within it that are classified as Secondary A Aquifers.</p> <p>There is a large bed of Sandstone approximately 6km south east of the site classified as a Secondary A Aquifer. Due to the absence of any intrusive investigations in proximity to the site the presence of any Sandstone and/or Limestone is not known.</p> <p>There are groundwater wells in the vicinity of the site terminating in the Weald Clay and sandstones have been observed in the drainage ditches running along Old School Lane.</p> <p>In the absence of any intrusive investigations it is not known, based purely on the Desk Study information and the BGS mapping, what the surrounding Weald Clay Formation consists of and therefore it is not feasible to rule out groundwater monitoring based on the geology.</p>
Figure 2-5 & 2-6	14 and 15	The figure quality is poor with missing axes on the logs.
2.5	7	There is a gap in the conceptual understanding where the surrounding shallow geology has not been investigated to identify the

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		presence/absence of sand lenses in the Weald Clay. Without this knowledge the proposed approach of confirming well integrity and monitoring is not protective of the nearby environment. The presence of sandstones/Limestones in the Weald Clay could potentially alter the emergency response plans and procedures as an additional sensitive receptor would be identified.
Appendix 03	No page numbers	
Brockham Water Injection Procedure – 1.0 Scope	4	The scope suggests water quality will be tested prior to re-injection? Details of testing prior to reinjection should also be presented in the HRA/Appendix.
Brockham – Water Acceptance and Unloading Procedure – 2.1 Establish Brine Compatibility	4	Only brines from approved sources will be received on site with laboratory testing being conducted every six months. It is unclear what analytes will be tested and what the criteria is to attain an 'approved' classification? This should be laid out in the HRA for assessment.

Should you have any queries please do not hesitate to contact me.

Yours Sincerely



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