

**From:** [Rob Smith](#)  
**To:** [Planning](#)  
**Subject:** FW: Sirius Minerals Response to EA Letter of 03.05.2018  
**Date:** 11 May 2018 17:01:05  
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**From:** Angela Samuels  
**Sent:** 11 May 2018 16:58  
**To:** Rob Smith  
**Cc:** Victoria Hill; Pedder, Nick H  
**Subject:** Sirius Minerals Response to EA Letter of 03.05.2018

Hi Rob

Please find attached letter from Sirius Minerals in response to the Environment Agency letter RA/2018/138472-01-L01 dated 3 May 2018.

Best regards

Angela

**Angela Samuels**

Project Administrator – Health, Safety & Environment

**Sirius Minerals Plc**

A: Resolution House | Lake View | Scarborough | YO11 3ZB

BY EMAIL [rob.smith@northyorkmoors.org.uk](mailto:rob.smith@northyorkmoors.org.uk)

Our Ref: 40-SMP-AUT-LE-0086

Mr. Rob Smith  
North York Moors National Park Authority  
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North Yorkshire  
YO62 5BP

11 May 2018

Dear Rob

**ENVIRONMENT AGENCY LETTER RA/2018/138472/01-L01 DATED 03 MAY 2018 (ref NYM/2018/0212/CVC) – SIRIUS MINERALS' RESPONSE**

This letter sets out the response of Sirius Minerals to a request for clarification from the Environment Agency, as referenced above. For each issue, the Environment Agency's request is presented in blue text with the Sirius Minerals response following in black text.

With regard to section 4.3.1 of the HRA, please explain how the 'ambient water level' within each aquifer unit encountered during Stage 4a will be controlled? In particular, what is the risk from potentially polluting water contained within excavation entering the surrounding aquifer units as the excavation is progressed? How will this risk be managed? Could there be a driving head created within the excavation?

During liner installation, groundwater is to be maintained between a minimum and maximum level of 10m and 85m respectively above the cutting head. Within the upper 55m below shaft Platform Level (bspl), the water level within the excavation is to be maintained at or around the ambient water level in the relevant aquifer. As such, the water level in the chamber excavation will be maintained at a maximum level of around 196m AOD in the Moor Grit, 191m AOD in the Scarborough, 180m AOD in the Cloughton and 140m AOD in the Saltwick. By maintaining the water level in the chamber excavation at or below the ambient water level in the adjacent aquifer, no driving head will be created within the excavation, which will minimise the risk from potentially polluting construction waters entering the surrounding aquifers.

With regard to section 6.2.2 and following on from question 1 above, how will the hydraulic fluid and lubricant required for the Vertical Shaft Machine be contained so that it doesn't enter the surrounding aquifer formations?

The VSM is specially designed to work below the groundwater table and, as such, is manufactured with appropriate seals and gaskets to minimise hydraulic fluid and lubricant losses. The VSM has a structured maintenance regime in line with the manufacturer's guidance that includes checking and replacement, where necessary, of all gaskets and seals on a regular basis together with monitoring hydraulic fluid and lubricant volumes in the plant. Regular monitoring and maintenance of fluid levels in the plant during its operation ensures that appropriate action can be taken in accordance with the plant's maintenance plan, should an unlikely and unforeseen leak or loss occur. As the

hydraulic oils are less dense than water, should trace amounts enter the construction waters within the excavation chamber, they will float on the surface and would not egress into the surrounding aquifer through the base at the cutting head.

Some flow from the aquifer units will take place into the excavation as it is progressed. How will this affect groundwater levels and flows and for how long?

The VSM cutting head is expected to advance excavation of the chamber and installation of the segmental liner at a rate of around 2m per day. As such, excavation and installation of the segmental liner through the Moor Grit and Scarborough aquifers is expected to be completed within a period of a few weeks and the subsequent progression of the chamber through the Cloughton and the Saltwick over a period of a few months. As the chamber incorporates insertion of a segmental liner behind the cutting head, groundwater flow into the excavation from surrounding aquifers will be limited by this liner. Consequently, once the liner has passed below the most sensitive upper aquifers (Moor Grit and Scarborough) within the first few weeks of excavation, groundwater flow into the excavation from these units will be minimised. In a similar manner, the progressive segmental liner installation through the Cloughton and Saltwick aquifers will limit groundwater inflow from these multi-layered aquifers over the following months. As such, although groundwater levels may locally drop in the aquifers, immediately adjacent to the excavation, the VSM system will have only a short duration and limited lateral impact on water levels within the surrounding aquifers.

Given the above points, is there any contingency in place to deal with any unanticipated excessive volumes of water flowing either into and/or out of the aquifer units, the risks to groundwater associated with this and any considerations for this in terms of the remedial action plan?

As construction water levels within the excavation are to be maintained by pumping, where necessary, at or below the ambient water level within the surrounding aquifer and as the occurrence of this condition will be minimised by the progression of the segmental liner, no additional contingency plans are considered necessary to prevent a driving head of water developing within the chamber excavation that could cause excessive volumes of construction waters to egress into the surrounding aquifers. As such, no amendment to the remedial action plan is warranted.

In the event that groundwater levels in the excavation chamber are below the ambient water level in the adjacent aquifer, or that the segmental liner and bottom cutting shoe side gasket does not restrict the development of vertical hydraulic continuity with the overlying aquifers, then water flows could enter the excavation. This condition will only cause a risk to operation of the cutting head, where excavation water levels exceed 85m above the cutter and, as such, can only cause an operational risk in the lower section of the Saltwick Formation. In the event of such conditions arising, this would cause a localised and short duration impact on groundwater levels for which no remedial actions would be warranted. Under such conditions, additional temporary pumping would be undertaken to lower the head within the excavation to less than 85m. As over pumping of the excavation would not have an adverse impact on the groundwater system, it is not considered warranted to include this within the remedial action plan.

Is there a possibility that abstraction of water from the excavation could be required prior to the final dewatering operation as part of the 'ambient water level' controls? If so, would the volumes required for abstraction fall under the requirement of an abstraction licence?

There is a small possibility that abstraction of the construction waters may be necessary in the chamber during the process of excavation and prior to the final dewatering operation. This may be necessary to maintain the water level above the cutter below a maximum head of 85m and to maintain the head in the excavation below the ambient water level within the aquifer unit adjacent to the cutting head. The volumes of such temporary pumping, in the unlikely event of it being necessary, would not be expected to exceed 20m<sup>3</sup>/day and would not occur over an extended duration that would require an abstraction licence.

We trust that this response addresses the points of clarification raised by the Environment Agency and that Planning Condition 46 can now be partially discharged for the Phase 4a scope. If you have any further questions, please contact the undersigned.

Yours sincerely,

Robert Staniland  
Environment Manager

Distribution:

Nick Pedder – Environment Agency