

REPORT

Phase 4a - Woodsmith Mine Emissions to Atmosphere - NYMNP- 91

Woodsmith Mine Phase 4a – Emissions to Atmosphere

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HASKONINGDHV UK LTD.

Rightwell House
Rightwell East
Bretton
Peterborough
PE3 8DW
Industry & Buildings
VAT registration number: 792428892

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Author(s): Charlotte Goodman

Drafted by: Charlotte Goodman

Checked by: John Drabble

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Approved by: Matthew Hunt

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1 Introduction

1.1.1 In 2014 a planning application (reference NYM/2014/0676/MEIA) was submitted to North York Moors National Park Authority (NYMNPA) for permission to develop a polyhalite mine and underground Mineral Transport System (MTS). Planning consent was subsequently granted in 2015, subject to conditions, as varied in February 2018 by NYM/2017/0505/MEIA.

1.1.2 This document has been prepared on behalf of Sirius Minerals plc (Sirius Minerals) and details the requirements with respect to emissions to atmosphere for amended Phase 4 Works (herein 'Phase 4a') of the development at Woodsmith Mine (see paragraph 1.1.6 below). This document is required to partially discharge Condition 91 of the NYMNPA planning permission NYM/2017/0505/MEIA and has been prepared in accordance with current good practice. The planning condition states that:

“The final specification and configuration of generators to be employed at Doves Nest Farm and Lady Cross Plantation, such to be fitted with Selective Catalytic Reduction (SCR), or other such emissions control measures as are necessary, will be submitted to the MPA for approval prior to commencement of their use. Results of air dispersion modelling will be submitted at the same time to verify that the identified configuration will lead to nutrient nitrogen and acid deposition at levels no greater than those that were demonstrated in the York Potash Environmental Statement (September 2014 as updated by the Supplementary Environmental Statement dated February 2015) as not leading to a significant effect on the integrity of the North York Moors SAC, SPA and SSSI.”

1.1.3 This document also relates to the consideration of Condition 50 of the NYMNPA planning permission NYM/2017/0505/MEIA. The planning condition states that:

“In accordance with the details in the document “York Potash Project: Habitats Regulations Assessment” prepared by Amec Foster Wheeler dated June 2015 with document reference 35190CGos064R, diesel generators installed at the Dove’s Nest Farm site during the construction period

a. shall be fitted with Selective Catalytic Reduction (SCR) abatement technology on their exhausts which shall be shown by the suppliers to achieve a reduction in oxides of nitrogen within the generator exhausts of at least 88% when compared to what would be expected without SCR; and

b. shall at all times demonstrably be operated and maintained in a way to ensure a reduction in oxides of nitrogen within the generator exhausts of at least 88% when compared to what would be expected without SCR.”

1.1.4 The specific requirements of Condition NYMNPA-91 are detailed in **Table 1-1**.

Table 1-1 Condition NYMNPA-91 Emissions to Atmosphere

| Condition NYMNPA-91 | Compliance with Condition NYMNPA-91 |
|--|-------------------------------------|
| The specification and configuration of generators and Selective Catalytic Reduction (SCR) / emission control measures. | Section 2.2 Section 3.2 |
| Confirmation that Phase 4a nutrient nitrogen and acid deposition rates are below those presented in the York Potash Environmental Statement (ES) and Supplementary Environmental Information Report (SEI). | Section 3.1 |

1.1.5 This assessment considers only the Phase 4a Works at Woodsmith Mine and does not include any activities at Lady Cross Plantation, as these works are deferred. Updates to this assessment will be prepared for subsequent construction phases and following any design review or method change.

1.1.6 The scope of Phase 4a described by this document is as per Phase 4 with the exception that no D-Walling will be undertaken at the MTS shaft, and instead the following activities will be implemented:

- Mobilisation to site;
- Use of a Vertical Shaft-sinking Machine (VSM) at the MTS Shaft, in place of the previously planned D-Walling machines;
- Construction of the guide wall and strand jacks for the operation;
- Installation of ancillary equipment;
- Machine setup and installation of VSM;
- Excavation to -55m below platform level (bpl);
- Excavation to -120m bpl;
- Deposition of limited extractive material from within the first 120m of the MTS shaft into earthworks bunds; and,
- Grouting of Annulus.

1.1.7 This document is intended to be read in conjunction with the Phase 4 emissions to atmosphere assessment (reference 40-RHD-WS-70-EN-RP-0002), and the information herein supersedes the Phase 4 documentation only where specified.

2 Methodology

2.1 Introduction

2.1.1 This assessment considers the impact of nutrient nitrogen and acid deposition from additional plant installed as part of the Phase 4a Scope of Works. As required by Condition NYMNPA-91, dispersion modelling was conducted to assess emissions from proposed power generation plant used within Phase 4a. The results are compared to the deposition rates presented within the York Potash Environmental Statement (ES) and Supplementary Environmental Information report (SEI) (Royal HaskoningDHV, 2014 and 2015).

2.2 Phase 4a Emission Calculations

2.2.1 The approach to the assessment included the remodelling of the Phase 4 plant with the following additional elements as detailed below.

- 2.2.2 The VSM has a power rating of 850kW. For the purposes of the assessment, it was conservatively assumed that the VSM will be powered using an additional 1MVA generator, of the same specification and configuration as those considered in Phase 4. The NOx emission rate and release parameters used in the dispersion model are detailed in the Phase 4 generator emissions assessment (40-RHD-WS-70-EN-RP-0002).
- 2.2.3 A variable emission file was used to represent the period of time for which the VSM generator is anticipated to be operational.

3 Assessment Results

3.1 Comparison of Dispersion Modelling Results

- 3.1.1 The results of the assessment are presented in Table 3-1, which shows the predicted deposition of nutrient nitrogen and acid associated with the Phase 4a Works, compared to the equivalent value from the ES and SEI.

Table 3-1 Comparison of Nutrient Nitrogen and Acid Deposition

| Receptor Ref | Max Modelled Nutrient Nitrogen Deposition Rate kgN.ha ⁻¹ .y ⁻¹ | | Max Modelled Acid Deposition Rate kEq.ha ⁻¹ .y ⁻¹ | | Result |
|--------------|---|--------|--|--------|---|
| | Phase 4a | ES/SEI | Phase 4a | ES/SEI | |
| U1 | 0.47 | 1.2 | 0.03 | 0.1 | The predicted deposition of nutrient nitrogen and acid associated with the Phase 4a Works is within the acceptable values presented in the ES/SEI |
| U2 | 0.51 | 1.1 | 0.04 | 0.1 | |
| U4 | 0.40 | 0.4 | 0.028 | 0.029* | |

*reported as 0.0 to one decimal place in the ES, but calculated from the Nutrient Nitrogen deposition rate using the calculator on the Air Pollution Information System website

- 3.1.2 The results of the assessment show that the predicted Phase 4a deposition rates for both nutrient nitrogen and acid are no greater than those presented in the ES and SEI.

3.2 Consideration of Phase 4a Emission Controls

- 3.2.1 The maximum power demand considered in the ES and SEI was 20MW_E, which assumed the use of retro-fitted SCR abatement technology and a 40m high stack. The deposition rates using this configuration were considered to be acceptable.
- 3.2.2 The maximum power generation demand for the Phase 4 and 4a Works is significantly lower than this previous assumption, at 4.15MW_E. The results of the Phase 4a generator emissions assessment indicate that there will be no increase in nutrient nitrogen and acid deposition at ecological receptor locations compared to that presented in the ES and SEI. Given this, it is not considered that additional investment in mitigation controls, including retro-fitted SCR abatement technology identified under Condition NYMNPA-50, is necessary.

4 Conclusions/Condition Discharge

- 4.1.1 This emissions to atmosphere assessment shows that emissions from the Phase 4a Works will result in no greater nutrient nitrogen and acid deposition at the assessed ecological receptors than those values presented in the ES and SEI. Additional mitigation controls, including those detailed in Condition NYMNPA-50, are therefore not required for Phase 4a.
- 4.1.2 The assessment thereby demonstrates that the requirements of Condition NYMNPA-91 are met, and that Condition NYMNPA-50 is otherwise met.