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enfinium Parc Adfer Operations Ltd - Carbon Capture Facility

Carbon Dioxide Venting Strategy

1 Introduction

enfinium Parc Adfer Operations Ltd (enfinium) is applying for a variation to the EP (Ref: EPR/AB3092CV) for the Parc Adfer Energy Recovery Facility (ERF) to incorporate the proposed carbon capture facility (CC facility).

During normal operation the captured CO_2 will be exported from the site via pipeline for offshore sequestration. However, there will be operational scenarios where the captured CO_2 cannot be exported. In such scenarios the captured CO_2 will be vented to atmosphere. It is anticipated that enfinium will be required to provide Natural Resources Wales (NRW) with a Venting Management Plan as a pre-operational condition. Full details of the CO_2 venting process and venting scenarios to inform the Venting Management Plan will be developed during detailed design of the CC facility. This document has been prepared to outline the scenarios under which CO_2 venting may or will occur and the proposed design and management techniques for CO_2 venting and identify any potential for significant environmental impacts as a result of CO_2 venting.

2 CO_2 vent design

The proposed design of the CC facility includes a CO_2 vent header system. In all scenarios which will require venting of CO_2, all CO_2 within the CC facility will be directed to the header and then to the CO_2 vent stack. It is proposed that the CO_2 vent release point will be at the top of the 85 m stack for the CC facility. High-pressure CO_2 vent pipework may require heating to compensate for the temperature drop on expansion as CO_2 pressure reduces. The requirement for heating will be determined during detailed design.

3 CO_2 venting scenarios

Initially, it has been identified that there are five scenarios that would require CO_2 venting:

1. Venting of out of specification CO_2, i.e. the CO_2 does not meet the specification of the pipeline and storage network;
2. Venting of CO_2 due to operational upset of the CC facility;
3. Depressurisation of equipment to perform maintenance or inspections;
4. Plant commissioning; and
5. Start-up and shutdown of the CC facility.

The Venting Management Plan will include details of CO_2 process conditions, release rates, total mass of CO_2 to be vented, and venting duration for all of the above scenarios. At this stage it is

anticipated that the maximum potential duration of any of the venting scenarios will be approximately six hours, which would occur during start-up and shut-down of the CC facility.

4 Potential impacts

It is proposed that the CO_2 vent will be at the top of the stack for the CC facility, which is the same height as the existing ERF stack. At present, all CO_2 produced by the combustion of waste in the ERF is released in the flue gas from the ERF. For the CC facility design it is proposed that CO_2 would be vented from the CC facility stack so the plumes will combine. As such, during CO_2 venting the plume will be very similar to that during normal operation of the ERF, except at a lower release temperature. The design temperature for treated flue gas from the CC facility is 80°C, although this would likely be reduced during CO_2 venting, depending on the temperature of the CO_2 release.

There is the potential for CO_2 to be vented when there is no treated flue gas being released from the CC facility stack, for example during depressurisation of equipment to perform maintenance or inspections. In such scenarios, as CO_2 capture will not be ongoing, the total mass of CO_2 vented will be limited to the capacity of the CC facility pipework. In such scenarios the short duration and minimal mass of the release would mean that there is no potential for a significant impact when the CO_2 is released from a height of 85 m.

As such, it is anticipated that there is no risk of a significant impact due to CO_2 venting. This will be confirmed as part of the Venting Management Plan prior to operation of the CC facility.

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