Frequently Asked Questions – Peterhead Carbon Capture and Storage Project, March 2015

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1. What is the Peterhead Carbon Capture and Storage Project?

The carbon capture and storage (CCS) project being developed by Shell and SSE for the existing gas-fired Peterhead Power Station is one of two demonstration projects to progress to the next stage of the UK Government's CCS commercialisation competition funding.

The Peterhead project is based on post-combustion carbon capture, where flue gas is collected from the existing power station, routed through an absorber where an amine solvent removes the carbon dioxide (CO_2) stream, and the CO_2 removed is compressed, transported and stored in suitable offshore geological formations.

The Peterhead project would be the first commercial-scale full-chain gas post combustion CCS project in the UK and is expected to capture and store 1 million tonnes of CO_2 per annum, over an operational lifespan of 10 years.

2. What is SEPA's role?

SEPA supports the government programme for demonstrating CCS to test and assess the potential contribution of this technology at a commercial scale. SEPA believes it is essential that the planned UK CCS demonstration projects are designed to provide data and scientific outputs that will further the development of the technology and improve public understanding (SEPA's Energy position statement, position statement 5).

We have been consulted by the Department of Energy and Climate Change on the offshore environmental statement under The Offshore Petroleum and Pipelines (Assessment of Environmental Effects) Regulations 1999 (As Amended).

We will be consulted by Aberdeenshire Council, as Planning Authority under the Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 (as amended), on the onshore planning application and supporting environmental statement.

We have prepared guidance on our interaction with the planning process and on specific environmental issues, including our Interim position statement on planning, energy and climate change, as well as Planning guidance in relation to SEPA-regulated sites and processes.

In accordance with our guidance, SEPA has engaged in pre-application discussions with the developer of the Peterhead CCS project. Early engagement provides an opportunity to set out to applicants the level and type of information we require, and to resolve potential issues, relating to the development proposal and whether it is potentially capable of being consented under environmental regulation, prior to an application being submitted.

3. What issues does SEPA consider at the planning stage?

The issues that SEPA considers on development proposals include:

- Flood Risk
- Surface water drainage
- Waste water drainage
- Waste management
- Avoidance of pollution
- Environmental acceptability in a land use planning context
- Potential consentability under areas regulated by us

With regards to the potential consentability of a proposal, at the planning stage SEPA will consider whether the proposed techniques are capable of meeting relevant thresholds for the protection of the environment and human health, and make an initial assessment on whether the proposed development could be potentially consentable under the Pollution Prevention and Control (Scotland) Regulations 2012 (PPC Regulations). The key issues which SEPA will consider at this stage will be emissions to air, emissions to water, flue gas treatment, energy efficiency and cooling water systems.

Emissions to air*:* The technology proposed for the Peterhead CCS Project uses an amine solvent to remove the CO_2. Amine compounds can react to create new compounds both within the process itself and once emitted to the environment and some amine compounds can have potentially significant environmental and health impacts. SEPA will consider the potential for emissions of amines and unwanted amine reaction products (such as nitrosamines) from the scrubber systems. Additional abatement systems to control such emissions into the air may be required.

Emissions to water: SEPA will consider the proposals for provision of adequate waste and waste water disposal and treatment systems for additional wastes produced by the carbon capture system. Additional abatement systems to control such emissions into the water environment may be required.

Flue gas treatment: SEPA will consider the proposals for provision of adequate flue gas treatment systems. This may require additional abatement systems to further pre-treat flue gases entering the carbon capture system.

Energy efficiency: SEPA will consider the proposals for provision of suitable energy supplies to the carbon capture system and quantification of the energy penalty associated with use of the system. The additional steam requirements for the solvent re-generation and re-claimer systems can represent a significant proportion of total low pressure steam generation by a plant. The requirement for steam extraction has implications for the design and operation of the turbine and the condenser systems and careful consideration of alternative design options can reduce the efficiency penalties by a significant amount.

Cooling water systems: SEPA will consider the proposals for the provision of suitable cooling water supplies to the carbon capture system. The cooling requirements of a capture system can have impacts on other areas of the plant design such as the main condenser and condensate systems and in relation to the CO_2 compression system cooling requirements.

Our view at the planning stage relates only to whether the development could be potentially consentable and does not guarantee the granting of a PPC permit if an application is submitted.

4. If the planning application is approved, what happens next?

If the planning application is approved, the proposed plant will require a number of other licences before it can operate. One of the most important of these is a permit under the PPC Regulations. In order to obtain a permit, the Operator must make a separate and more detailed application to SEPA before the plant is operated. A new installation cannot be brought into operation until a PPC Part A permit has been granted.

5. What are the PPC Regulations?

The PPC regulations apply an integrated environmental approach to the regulation of certain industrial activities, including carbon capture. This means that emissions to air, water and land, plus a range of other environmental effects, must be considered together. SEPA must set permit conditions which ensure that installations are operated in such a way that all the appropriate preventative measures are taken against pollution, in particular through the application of best available techniques (BAT), and that no significant pollution is caused. Pollution includes emissions as a result of human activity which may be harmful to human health or the quality of the environment, cause offence to human senses, result in damage to material property or impair or interfere with amenities and other legitimate uses of the environment.

6. What should be in a PPC application?

The PPC application must include sufficient information to allow SEPA to determine whether the installation will be operated in a way which meets all the environmental requirements of the PPC Regulations. SEPA then considers this application and can either grant or refuse a permit.

Further information on the PPC permitting process can be found on the SEPA Website.

7. What happens if SEPA grants a permit?

In general terms, PPC permits set conditions on how facilities may be operated, including a requirement for operators of PPC facilities to carry out monitoring of emissions and supply information to SEPA. SEPA may also carry out its own monitoring and inspections and has a range of powers to enforce compliance with permit conditions.

8. Has SEPA received an application yet?

SEPA has not received an application for a permit to operate this installation yet however pre-application discussions have taken place with the developer of the Peterhead CCS Plant.

9. Where can I get further information on the predicted emissions from a post-combustion carbon capture project?

The SEPA technical paper[1] 'Amine Emissions from Carbon Capture Systems' is available here Amine Emissions from Carbon Capture Systems (528kb).

This technical paper is relevant to post-combustion carbon capture systems, like the Peterhead CCS project, utilising amine post-combustion capture technologies. We are in the process of updating this technical paper as new data and information becomes available from studies which are ongoing in the sector.

Further information on amine scrubbing carbon capture systems can be obtained from the document 'TWG 18 Annex 1 - Draft Text for Inclusion in BREF on Large Combustion Plants, EMERGING TECHNIQUES, Amine Scrubbing Carbon Capture Systems'. This paper discusses the other types of environmental issues associated with carbon capture technologies.

10. Where can I find more information on carbon capture and storage?

- The Scottish Government
- The Department of Energy and Climate Change (DECC)
- The EU Zero Emissions Platform
- The UK Carbon Capture and Storage Research Centre (UKCCSRC)
- Planning Guidance in relation to SEPA-regulated sites and processes (LUPS-GU15)
- Scottish Planning Policy
- Department of Energy and Climate Change CCS Roadmap

11. Where can I find more information on the Peterhead CCS Project?

- Peterhead CCS Project website

[1] The SEPA technical paper 'Amine Emissions from Carbon Capture Systems' is a technical paper and is not a SEPA policy or position statement.