

## Marine Scotland Licence application

### **Section 5 a.**

As part of a cruise in May of 2019, on the RRS James Cook, we are hoping to drill a hole and insert a pipe 2m below the seabed and use this pipe to introduce gaseous CO<sub>2</sub> over a period of 2 weeks, with the intention to cause bubbles to break through the seabed into the overlying water column, and also some CO<sub>2</sub> to dissolve into the pore waters of the overlying sediment. The maximum CO<sub>2</sub> added will be 3-4 tonnes at a slow release rate. We are trying to simulate a leakage from a marine CCS site, and test existing and new technologies to detect and quantify the test release. We are doing the work above the Goldeneye reservoir owned by Shell, who are partners on the project (location approx. 57°59.696N/0°22.413W). The leak simulation will involve CO<sub>2</sub> and some small quantities of tracer gas, at the end of the experiment all equipment will be removed from the seabed.

### **Section 5g.**

We will use a bespoke drill system to push a pipe 2-3 m below the seabed and link this to a cage of CO<sub>2</sub> cylinders through which we will introduce carbon dioxide under the surface. We will discharge approximately 3 4 tonnes of CO<sub>2</sub> over a period of 2 weeks. We will be using a range of detection and measurement technologies to track the release of the CO<sub>2</sub> through the sediments and into the overlying water column. The experiment is aimed at the detection and quantification of CO<sub>2</sub> released from a carbon capture and storage reservoir. Shell are one of our partners in the project and the area of the experiment is within 1000m, but outside of the 500m exclusion zone of the Goldeneye platform. The experimental release will be over a two-week period and will involve tow ships on site, the UK vessel RRS James Cook and the German vessel the Merien. At the end of the experiment all equipment will be removed from the site using an ROV.

### **Section 5h**

No impacts foreseen. A similar experiment was performed last summer of the coast of Bridlington as part of an Energy Technologies Institute funded experiment releasing CO<sub>2</sub> at the seabed. The experiment produced no impact on the environment as we will do here, the amount of CO<sub>2</sub> added is minimal.

### **Section 6 box.**

A lander that is down at the site already and has previously received permissions from Marine Scotland. We will deploy a series of hydrophones, an AUV (Autosub) and a range of sediment and water column profiling equipment all on a temporary basis.

### **Section 6. Deposits**

The pipe that will be deployed will have a diameter of 2.5 cm, and a total length of 4-6m. The plan will be to deploy the drill system tethered to the vessel, the emplacement of the pipe will take approximately 3 hours, the pipe will then be connected to a hose to be attached to the gas release system. Following the experimental equipment will be removed.

## **Section 8**

The project is aimed at the development of methods and techniques for the detection and quantification of leaks associated with offshore CCS operations. In the project is a large effort directed to the preparation of baselines using novel AUV and ROV technology, these developments will inform habitat mapping in the immediate and wider area of the experiment. We will be deploying a number of acoustic systems to measure and monitor marine noise, and aim to determine the general noise field of the North Sea. The project thus plays into the policies around sustainable economy for Scotland, CCS could play an important role in the Scottish economy (Sector 10), the mitigation of climate change is a key policy (GEN 5), marine noise (GEN 13) and the project will provide a body of scientific data to be used as part of providing sound advice in the future (GEN 19).