

Statoil's response to Bellona's "Preparatory note for meeting with the Norwegian Minister of Environment, Erik Solheim, on 28. Feb. 2011", dated 27th February 2011

Statoil finds the allegations towards Statoil from Bellona regarding the development of CO₂ Capture Mongstad (CCM) worrying and feel such allegations need to be addressed. Specifically, Bellona has claimed that Statoil has used "an erroneous scientific basis" and "misguided the Ministry of Petroleum and Energy" in its decisions.

First and foremost, Statoil would like to reiterate that it is the firm intention of the company to construct a CO₂ capture plant at the Mongstad CHP without compromising the HSE performance, including the health and safety of our employees and those in the nearby communities.

Statoil would like to take this opportunity to respond to various statements in the note from Bellona which Statoil considers to be incorrect in order to ensure the risk picture is properly understood.

1. HSE concerns are grounded in scientific basis
2. The atmospheric dispersion modelling
3. NOx reducing technology

HSE concerns are grounded in scientific basis

CO₂ Masterplan Mongstad (the Masterplan) submitted in February 2009, disclosed that significant knowledge gaps exist with respect to potential health and environmental effects from emission of absorption chemicals, and/or their reaction and degradation products, to the atmosphere.

After submitting the Masterplan a number of R&D projects were initiated with the aim of increasing knowledge about the health and environmental risk. The R&D work has mainly been based on the absorption chemical MEA (Mono-Ethanol-Amine).

In a memo to the Ministry of Petroleum and Energy dated 27th of September 2010, an update of risks related to health effects from amine based CO₂ capture was presented. The update was based on knowledge from R&D projects, work with the discharge permit application for the CO₂ Technology Centre Mongstad (TCM) and ongoing work in the full scale CO₂ Capture Mongstad Project (CCM). A new update was provided 10th of February 2011 (enclosed) including the latest R&D results from the project Atmospheric Degradation of Amines (ADA) published in January 2011 and the recent information from Aker Clean Carbon regarding new estimates for the emission of dimethylamine.

These results are the basis for Statoil's conclusions regarding the risk of using amine-based CO₂ capture technology. The ADA project will continue and provide even more information during 2011/early 2012. Statoil will continue to follow this project very closely, as well as any other R&D projects related to the issue. Additionally we have established an extensive ongoing program to monitor developments within the CCM project and will update the risk picture accordingly. On this basis, Statoil firmly rejects the allegation from Bellona regarding erroneous scientific basis for Statoil's conclusion.

The atmospheric dispersion modelling

The second main objection in Bellona's note is related to the atmospheric dispersion modelling. The amount of flue gas from CCM is approximately 40 times larger than

the amine-facility on TCM. Statoil has used this factor as a worst case scenario for CCM. Bellona refers to a dispersion study commissioned by ACC giving a ground level concentration of 5 times TCM levels. To obtain realistic ground level concentrations plant specific input data is required related to:

- emission levels, which will be process/vendor and aminosolvent specific, and
- physical layout of the plant e.g. height of flue gas stack, outlet flue gas temperature, flue gas velocity at stack outlet.

More realistic ground level concentration will be estimated when the concept for CCM is more clearly defined. In addition, studies on further development of atmospheric dispersion models in order to include formation and degradation processes will be initiated with several suppliers.

NOx reducing technology

Bellona believes that the Ministry of Environment must consider NOx reduction measures on the turbines e.g. Selective Catalytic Reduction (SCR) technology. This is based upon incorrect information. The Combined Heat and Power plant operated by DONG is equipped with SCR reducing the NOx concentration to 5 ppmv or less.

Concluding remarks

The latest experiments at Euphore by the ADA project have yielded positive results for nitrosamines formed in the atmospheric gas phase; uncertainty still persists about the health and environmental effects of emissions from a full-scale plant related to:

- Health and environmental effects for nitramines – lack of knowledge related to health effects and time for degradation in the environment
- Information on the quantities of nitramines, methylamine, dimethylamine and trimethylamine released
- Formation mechanisms and speeds with chlorine, at night and in wet atmospheres, for both nitrosamines and nitramines
- Decomposition of nitrosamines and nitramines in water
- Analysis and measurement methods.

These issues are the base objectives of several research and development studies ongoing/planned by independent scientific institutions such as NILU, UiO and other ADA partners, Tel-Tek, SINTEF, Rambøll, Yale University and CSIRO.

Statoil continues to take the view that the uncertainty related to the health effects of emissions from a full-scale plant, and thereby the risk that amine technology will not be applicable is greater today than it was in 2009 when the Masterplan was submitted.

Statoil emphasises that at this stage one cannot conclude that amine based capture technology is not viable for Mongstad, but rather that there are issues to be solved which require more time. To further reduce the risk for establish a full scale CO₂ capture plant alternative technologies will also be included prior to concept selection.