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**Economic Commission for Europe****Inland Transport Committee**

9 July 2014

**Working Party on the Transport of Dangerous Goods****Joint Meeting of Experts on the Regulations annexed to the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN) (ADN Safety Committee)**

Twenty-fifth session  
Geneva, 25-29 August 2014  
Agenda item 3 (c)

**Interpretation of the Regulations annexed to ADN**

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**Concawe study on “HFO Emissions and Exposure Assessment”:****Project update****Transmitted by EUROPIA****Background**

Reference is made to INF paper 33 of the 22<sup>nd</sup> session of the Joint Meeting of Experts on ADN (Safety Committee) which provided the outline of the CONCAWE study of emissions of vapours emitted during barge loading with Heavy Fuel Oils classified under UN 3082 and associated worker exposures. Reference is further made to the presentation by a CONCAWE representative during the 23<sup>rd</sup> session of the ADN Safety Committee where a further detailed study outline and some initial findings were discussed (item V-B-10.64 in the report of the Joint Meeting of Experts on its twenty-third session). As indicated, a progress update will be provided to the twenty-fourth Joint Meeting of Experts on ADN (Safety Committee) meeting on 27-31 January 2014. The original timeline of the project foresaw project completion by end of 2013, however due to operational reasons some delay did incur in carrying out the field work during loading of HFO at CONCAWE member company jetties. Additional data will be gathered at different loading temperatures ranging from 70 to 90°C on laboratory generated fumes. The current estimated completion date is early fourth quarter, 2014.

**Objective**

To better understand the potential risk of airborne emissions, CONCAWE is implementing a project to assess the nature and likelihood of airborne emissions during tank vessel loading operations with heavy fuel oil in parallel with exposure measurements in the field. The outcome of this evaluation will be used to identify whether or not there are potential health risks for personnel from emissions during loading and, if so, allow the development of appropriate measures to reduce or minimize airborne emissions.

## **Completed research**

### **1. Identify and obtain set of representative samples of HFOs transported via European inland waterways**

A total of 8 samples of HFOs meeting the project definitions has been obtained from CONCAWE Member companies and has been fully characterised by an independent contract research organisation. Five (5) samples are related to barge loading operations and three (3) others were used to define the methodology.

### **2. Potential for emissions during barge loading operations**

Using measured vapour pressure data and other relevant physical-chemical properties of HFOs at normal handling and loading temperature a first estimate of vapour exposure ranges has been made based on a suitable modelling approach.

### **3. Exposure measurements during HFOs loading operations**

Comprehensive sets of static and personal air samples were obtained from 5 barge loading operations between August and December 2013. Exposure sampling covered the entire duration of the loading operations and included deck crew and jetty operators. The samples have been analysed. Available results are currently being assessed in a risk assessment analysis.

### **4. Preparation of vapour samples**

Using HFO bulk samples of 20 litres each, obtained during the 5 loading operations described above, the independent contract research organization generated vapour at 90°C and subsequently collected these vapour samples via cooling as condensate. It was decided to collect samples at different loading temperatures from 70 to 90° C in order to understand the influence of the loading temperature on the potential risk effects. The additional condensate samples are currently undergoing the agreed set of chemical and biological analyses.

## **Planned final steps**

### **5. Assess the biological relevance of emissions of HFOs**

The short-term predictive assay for the carcinogenic potential of petroleum streams (the Modified Ames test – with the result expressed as Mutagenicity Index (MI)) will be applied to the condensates obtained at the range of temperatures.

Timing: September 2014

Task performed by: contract laboratory/facility

### **6. Prepare and approve Occupational Health Risk Assessment Report on HFO Emissions**

Using the field assessment data and the laboratory temperature range data, compare and confirm potential worker exposures are within appropriate limits for safe operations of barge loading of HFO.

Timing: End September 2014

Task performed by: HFO Working Group, and consultant

**7. Define if necessary appropriate protection measures during loading operations**

Timing: End October 2014

Task performed by: HFO working group, CONCAWE and EUROPIA

**Revised Timeline:**

Q4, 2014

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