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Protocol for the estimation of VOC emissions  
from petroleum refineries and gasoline  
marketing operations

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2nd edition



PROTOCOL FOR THE ESTIMATION OF VOC EMISSIONS FROM  
PETROLEUM REFINERIES AND  
GASOLINE MARKETING OPERATIONS

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2nd edition

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# CONTENTS

|   | <b>Page</b> |
|---|-------------|
| <b>Foreword</b> .....   | v           |
| <b>Acknowledgements</b> .....   | vii         |
| <b>1 Refineries</b> .....   | 1           |
| 1.1 Combustion sources .....  | 1           |
| 1.1.1 Combustion of fuels .....   | 1           |
| 1.1.2 Combustion of flare gas streams .....                               | 2           |
| 1.1.3 Catalytic cracking regenerators .....                               | 3           |
| 1.2 Storage tanks .....   | 4           |
| 1.2.1 Above-ground storage tanks .....                                    | 4           |
| 1.2.2 Underground tanks .....   | 5           |
| 1.3 Fugitive emissions from pressurised components .....                  | 5           |
| 1.4 Oily-water collection and treatment systems .....                     | 5           |
| 1.4.1 Process drains .....  | 5           |
| 1.4.2 Oil-water separators .....  | 6           |
| 1.4.3 Biological treatment facilities .....                               | 7           |
| 1.4.4 Ponds and basins .....  | 7           |
| 1.5 Cooling towers .....  | 7           |
| 1.6 Volatile product loading .....  | 7           |
| 1.7 Process venting (including barometric condensers) .....               | 8           |
| 1.8 Bitumen blowing .....   | 8           |
| 1.9 Non-routine sources .....   | 8           |
| 1.9.1 Venting of tanks and vessels before maintenance .....               | 8           |
| 1.9.2 Spills .....  | 8           |
| 1.10 Other emission sources .....   | 9           |
| <b>2 Product loading and distribution facilities</b> .....                | 10          |
| 2.1 Storage .....   | 10          |
| 2.2 Loading .....   | 10          |
| 2.2.1 Road tanker loading – uncontrolled .....                            | 11          |
| 2.2.2 Rail tanker loading – uncontrolled .....                            | 11          |
| 2.2.3 Marine vessel (ship or barge) loading – uncontrolled .....          | 12          |
| 2.2.4 Loading at terminals fitted with a vapour recovery unit (VRU) ..... | 12          |
| 2.3 Fugitive emissions from equipment components .....                    | 13          |
| 2.3.1 Storage and loading facilities .....                                | 13          |
| 2.3.2 Pipeline pumping facilities .....                                   | 13          |
| 2.4 Other sources .....   | 14          |
| 2.4.1 Wastewater treatment .....  | 14          |
| 2.4.2 Maintenance activities .....  | 14          |
| 2.4.3 In-transit emissions during gasoline transportation .....           | 14          |

| <b>Contents Cont...</b>  | <b>Page</b> |
|--|-------------|
| <b>3 Service stations</b> .....                                      | 15          |
| <b>4 References</b> .....  | 17          |
| <b>Annexes</b>   |             |
| <b>Annex A True vapour pressure (TVP)</b> .....                      | 20          |
| <b>Annex B Updates to factors from 1st edition of protocol</b> ..... | 21          |

## FOREWORD

This document updates the Protocol first produced in 2000. It contains some new and updated emission factors; a change log is presented in the Annexes.

The Protocol provides methods for the estimation of annual emissions of non-methane volatile organic compounds (NMVOCs) from potential sources in refineries and gasoline marketing facilities. The aims are to aid industry compliance with existing legislative reporting requirements and to allow consistency in emission estimation methodologies.

The emission factors in this Protocol are consistent with those provided in the 2009 revision of the EMEP/EEA *Air Pollutant Emission Inventory Guidebook* [1] (formerly called CORINAIR) for refinery sources.

Several of the potential sources produce very low VOC emission levels. The average value of NMVOC emissions for eight UK oil refineries in the 2004 EPER database is 3,7 kte/year. For reporting purposes, therefore, sources emitting <10 te/year can be deemed to be de minimus and do not need to be included in the total site NMVOC estimate.

The Protocol is intended for the estimation of annual emissions and the methodologies provided are not generally appropriate for the estimation of emissions over shorter time periods.

### Refineries

The Protocol is intended to be used to satisfy both the requirements of the Refinery Integrated Pollution Control authorisations and mandatory reporting requirements e.g. for the European Pollutant Release and Transfer Register (E-PRTR).

The first edition of the Protocol was a development of the methodology used by UKPIA members to report refinery VOC emissions for inclusion in the UK national emissions inventory. As previously, the methodologies presented in this edition are intended to provide reasonable estimates of annual emissions without resorting to overly lengthy and/or complicated calculation methods.

The vast majority of VOC emissions arise from diffuse sources such as leaks from pressurised equipment components, storage of volatile products, etc. As these sources are not channelled (i.e. not connected to a stack) it is not practical to undertake continuous measurement of VOC emissions of them.

The potential sources listed are those which were originally agreed during discussions between the DETR, UKPIA, UKOOA (now Oil & Gas UK), IP (now Energy Institute) and OCIMF in developing the demarcation of emissions between the up and downstream oil industries.

The emission sources listed are those commonly found in UK refineries. In those cases where specific refinery operations (such as delayed coking) are not covered by this Protocol, the operator should develop suitable factors based upon measurement campaigns.

Sites should review their processes to establish if there are any other potential sources of NMVOC emissions which are not listed in this Protocol.

This Protocol can be used in conjunction with the EI *Protocol for the determination of the speciation of hydrocarbon emissions from oil refineries* [2] to provide speciated annual NMVOC mass emission estimates.

### **Gasoline marketing operations**

Neither gasoline distribution terminals nor service stations are regulated under the IPPC Directive and hence do not need to provide E-PRTR emission reports. Emission estimates, however, may be made by oil companies for their own environmental reporting purposes. This Protocol is intended to provide consistency in the estimating methodologies used to generate those reports.

Although it is believed this Protocol will assist the user in estimating non-methane VOC emissions, the Energy Institute cannot accept responsibility, of whatsoever kind, for any damage arising or otherwise occurring as a result of the application of this Protocol.