

INSTITUTE OF PETROLEUM

GUIDELINES FOR THE CALCULATION OF
ESTIMATES OF ENERGY USE AND GASEOUS EMISSIONS
IN THE DECOMMISSIONING OF OFFSHORE STRUCTURES

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FOREWORD

These guidelines have been prepared by the Institute of Petroleum to assist in the calculation of energy use and gaseous emissions relating to the decommissioning of offshore oil and gas structures. They are intended to represent an overview of 'best practice' with regard to the assessment of gross energy use and emissions, as well as being a practical help in standardizing the calculation and presentation of data.

Key aspects of these guidelines:

- A **Framework** showing the different stages in the completion of an energy estimate, and providing guidance on deriving and calculating energy use and emissions data.
- A **Checklist** of the major sources of energy use and emissions during decommissioning.
- A **Description** of the boundaries of the energy and emissions calculations, and a checklist of some of the minor sources of energy use and emissions that could be safely ignored in the overall energy estimate.
- **Tables** showing the range and preferred values for energy use and gaseous emissions for key operations and activities contributing to the total use of energy and total emissions.
- A **Worked example** of a complete calculation of energy use and emissions, and an example of how the results of the energy and emissions calculations can be clearly presented.

Intended users of these guidelines

It is hoped that these guidelines will be of use to operators, contractors, consultants, and all other parties seeking to obtain accurate and objective estimates of energy use and gaseous emissions relating to the decommissioning of offshore structures. The recovery or disposal of in-field pipelines, export pipelines, templates and drill cuttings piles and their associated end-points may also be included in the calculations if they are part of the decommissioning programme.

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The study was initiated by the Offshore Decommissioning Communications Project (ODCP) in December 1997. Dr Peter Prasthofer was the client representative and became the Chairman of the Task Group formed in order to review and agree the technical content and methodology proposed in this Guideline document.

These Guidelines were developed as a result of studies commissioned and funded by the Institute of Petroleum. The project was carried out by an alliance of three contractors (CORDAH, DNV and ERT) working together and managed by the Institute of Petroleum. The Institute acknowledges the contributions made by all those involved with developing or reviewing these Guidelines and in particular, the members of the Task Group who provided the ongoing technical direction for the project. The Task Group included the following industry and international representation: (Alphabetic)

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INTRODUCTION

1.1 BACKGROUND

Several generic and structure-specific calculations have been reported for the energy used and emissions produced during the decommissioning of offshore oil and gas installations and infrastructure. A preliminary review of these studies by the Institute of Petroleum (IP 1998) showed that these assessments have been performed in different ways, and that they have varied with respect to:

- the sources of energy consumption and gaseous emissions that have been considered;
- the raw input data that have been used;
- the way results have been calculated and interpreted.

The findings of the IP study highlighted the need for a standardized set of guidelines that could be used by the oil and gas industry to permit an accurate comparison of either:

- the estimates of energy use and emissions for the **different options** for any one structure, or
- the estimates of energy use and emissions for **different structures**.

These issues are addressed in this document, which provides guidance on how to undertake energy and emissions calculations and gives a set of preferred values for use in such assessments. The guidelines:

- set out the important assumptions and considerations to be taken into account in the assessments;
- provide a flow diagram of steps to follow to complete the assessment; and,
- illustrate the method using a case study selected from published literature.

1.2 MAJOR SOURCES OF ENERGY USE AND EMISSIONS IN DECOMMISSIONING

Several studies have quantified the use of energy and the production of gaseous emissions during decommissioning. These studies have indicated that there are several activities or operations, commonly associated with all decommissioning options, that account for the majority of energy used and gaseous emissions. These are listed in Table 1.

Some studies have divided decommissioning options into two broad categories with respect to energy use and gaseous emissions, namely '**operations**' and '**end-points**'. This is a useful distinction, and the categories are defined as follows:

- **Operations:** These are all the offshore and onshore activities of dismantling and transporting the structure, and of recycling or treating any recovered material. Various power sources will be employed, using different types of fuel for varying periods of time.