



May 2, 2024

MODEC, Inc.
JGC Holdings Corporation

GHG Emissions quantification project completed at FPSOs in Brazil
– A first by Japanese Companies –

MODEC, Inc. (MODEC) and JGC Corporation, an overseas EPC operating company of JGC Holdings Corporation, are pleased to announce the completion of a project to measure and quantify emissions of methane and other greenhouse gases (GHG) from floating production, storage, and offloading systems (FPSO) off the coast of Brazil, chartered and operated by MODEC¹. This represents a significant milestone for both companies, and this is the first time that Japanese companies gain precise insights into the amount of major GHG emissions from methane, nitrous oxide, and hydrofluorocarbons (HFCs) from active FPSOs.

1. Project background

In its Mid-term Business Plan 2024-2026, MODEC states that one of the initiatives under Vision 2034 is to be the world's best FPSO builder and operator, achieving the smallest carbon footprint alongside safety and high uptime. As a first step in decarbonizing the MODEC's core FPSO business, MODEC is actively involved in measuring and reporting FPSO GHG emissions. In addition to carbon dioxide emissions, this project also addresses methane, nitrous oxide², and HFCs, which have a very high greenhouse effect.

JGC Corporation is engaged in mitigating GHG emissions from oil and gas production facilities in part by leveraging technical engineering expertise and extensive plant construction experience to provide HiHGGuard® GHG emissions measurement service for methane and other GHGs using the MRV³ methodology. In the absence of globally standardized measurement methods, JGC offers highly reliable measurement and quantification in line with plant operations and these conditions, as well as low-carbon/decarbonized solutions based on this knowledge.

Building upon this expertise, MODEC and JGC Corporation have decided to combine their strengths to implement a project aimed at accurately identifying methane, nitrous oxide, and HFCs emissions from FPSOs.

2. Project overview

A quantification of emissions of the three GHGs – methane, nitrous oxide and HFCs – was carried out from July to September 2023 at two MODEC-chartered FPSOs off the coast of Rio de Janeiro.

While the need for emission prevention measures, particularly for methane, has increased in recent years, methane emissions vary widely from facility to facility, and because desktop calculations with common coefficients are not accurate enough; there has been a strong international recommendation that emissions should be determined by actual measurements. Therefore, MODEC and JGC selected two methods of on-site measurement: a bottom-up approach using hand-held sensors and infrared cameras, and a top-down approach using drones (See Figure. 1 below). The bottom-up approach measures approximately 15,000 potential methane emission points in the FPSO, and the latter approach captures the methane potential of plant-wide emissions from flying the drones around the FPSOs.

Some examples of project results are as follows:

- Determination of methane and other GHG emission levels with much greater precision than conventional desktop calculations.
- Establishment of a highly reliable methodology for measuring methane emissions by combining multiple measurement technologies.
- Identification of individual methane emission points on FPSOs, with results leading to specific emission prevention measures.



Figure 1: Measuring methane at an FPSO

Table 1: Characteristics of the two methods

Method	Bottom-up approach	Top-down approach
Measuring devices	Hand-held sensors, infrared cameras, etc.	Drone-mounted sensors
Target of measurement	Individual emission sources	Entire FPSO, specific emission sources

The methodology meets the requirements of levels 4 and 5 (the highest)⁵ in the reporting framework established by the Oil & Gas Methane Partnership 2.0 (OGMP 2.0)⁴, an international methane emission mitigation program.

Verification of the measurement results confirms that the combination of the two approaches enables quantification of GHG emissions with much greater precision than conventional desktop calculations⁶ using common emission factors, and the results are considered to be highly reliable from an international standpoint.

3. Future policies

MODEC, as a leading company in offshore oil and gas development, aims to further improve the precision of GHG emissions calculations and expand the scope of emissions data disclosure. As a part of its charter business, MODEC will also create value for its clients by providing emissions quantification services that are compliant with frameworks such as OGMP 2.0 and requiring minimal effort in the field, as well as additional services such as planning and implementation of emission reduction measures. Improved FPSO design and operation, achieved through the application of new technologies discovered and proven through R&D and other methods, will also reduce the carbon intensity of MODEC's FPSO services and contribute to decarbonization of the global energy supply chain.

JGC Corporation aims to be a leader in the reduction of industrial methane emissions and other GHG emission by quantifying and consulting of the methane and other GHG emissions. In view of growing international demand for measurement instead of conventional desktop calculations to quantify methane emissions in particular, JGC plans to apply project results in providing highly reliable measurement methods, emission control measures, and other services as a packaged solution.

Besides, JGC operates a facility for evaluating methane emission measurement technologies at the R&D center in Ibaraki Prefecture in Japan. JGC aims to leverage this facility and work with sensor manufacturers domestically and internationally to advance partnerships, allowing JGC to quickly utilize cutting-edge measurement technology in the future project.

- 1: Lease of FPSOs to oil exploration and production companies as well as providing crews, undertaking operation, maintenance, and inspection services (O&M).
- 2: According to IPCC estimates, methane and nitrous oxide have global warming potentials about 28 and 273 times higher than CO₂ over 100 years, respectively. The high impact of these gases has drawn attention in recent years. More than 150 countries are now participating in an initiative to reduce methane emissions called the Global Methane Pledge, launched at COP26 in November 2021.

- 3: MRV: Measurement, reporting, and verification.
- 4: OGMP was launched in 2014 and led by the UN Environment Programme (UNEP), in 2020, the OGMP2.0 has become the most comprehensive methane emissions reporting framework in use today. Members include major global oil and gas companies such as Shell, BP, TotalEnergies, Petrobras, Petronas and PTTEP.
- 5: Among the five levels of reporting in OGMP 2.0, levels 4 and 5 require on-site measurement. For the companies that have joined OGMP2.0 to maintain their Gold Standard status, Level 4 or 5 reporting is required within three years for their operated assets and within five years for non-operated assets such as joint ventures.
- 6: Methodologies such as the API Compendium that calculate GHG emissions by integrating the amount of activity and emission factors.

Press Contact

MODEC: Corporate Planning & Strategies Dept. (Phone +81-3-5290-1240)

JGC Holdings: Corporate Planning Unit, Corporate Communications Group

(Phone +81-45-682-8026)