Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

HRE28-03 会場:105 時間:5 月 25 日 09:45-10:00

火力発電所における炭酸ガス分離回収技術
CO2 Recovery Technology from Power Plants

辻内 達也 [1*] ; 登里 朋来 [1] ; 遠藤 崇彦 [1] ; 大石 剛司 [1]
TSUJIUCHI, Tatsuya[1*] ; NOBORISATO, Tomoki[1] ; ENDO, Takahiko[1] ; OISHI, Tsuyoshi[1]

[1] 三菱重工業株式会社
[1]Mitsubishi Heavy Industries, Ltd.

It is now widely agreed that capturing CO_2 from flue gases and the subsequent injection into geological formations can significantly contribute to reducing CO_2 emissions, the principal greenhouse gas. As well as having benefits in terms of reducing CO_2 emissions into the atmosphere, the deployment of Carbon Capture and Storage (CCS) can also allow nations around the world to continue using important domestic fossil fuels, such as coal, in an economic and environmentally sustainably way. Among the CCS technology, Enhanced Oil Recovery (EOR) utilizing anthropogenic CO_2 is believed to be an effective use of CO_2. For commercialization of CCS and EOR, scale-up of equipment and energy reduction for CO_2 capture and compression are essential considerations.

Mitsubishi Heavy Industries, Ltd. (MHI) has developed a high efficiency chemical solvent process to capture CO_2 from the flue gas, the KM CDR Process, in collaboration with Kansai Electric Power Co., Inc. Since 1990 MHI has continued R&D programs of CO_2 capture technologies using laboratory research and the CO2 recovery pilot plant at Nanko Power Station. As a result, the KM CDR process has been applied to eleven (11) commercial CO_2 capture plants for natural gas-fired boilers or heavy oil-fired boilers and all of these plants are now in commercial operations.

MHI has also focused on carbon capture technologies for coal fired power plants since 1999, performing numerous test programs for plant performance, optimization, and evaluation of flue gas impurities and their impact at the 1 tonne per day pilot test facility at MHI's R&D center in Hiroshima, Japan. MHI also completed several test programs capturing CO_2 utilizing the 10 tonnes per day slip stream test facility from the flue gas of a commercial 500MW coal fired power plant in Matsushima, Japan in 2006. Based on these R&D commercial experiences and scale-up studies, Southern Company Services, Inc. and MHI successfully started the world's first full chain anthropogenic carbon capture and sequestration (CCS) project applied to a coal-fired power plant. The plant, with a CO_2 capture capacity of 500 tonnes per day, began operation in June 2011 at Alabama Power Company's James M. Barry Electric Generating Plant, and 100,000 tonnes of CO_2 has been successfully injected into a geologic structure, the Citronelle Dome, as part of the Department of Energy (DOE) funded Southeast Regional Carbon Sequestration Partnership (SECARB) phase-III "Anthropogenic Test".

In July 2014, MHI received an order for the world's largest post-combustion CO_2 capture plant (with a CO_2 capture capacity of 4,776 tonnes per day) from an enhanced oil recovery (EOR) project mainly promoted by NRG Energy Inc. and JX Nippon Oil & Gas Exploration Corporation. Captured CO2 will be utilized for EOR at mature oil fields in the Gulf Coast region in U.S.. The operation will be started in 4th quarter, 2016 and it is expected that oil production will be enhanced from 500 barrels/day to approx. 15,000 barrels/day. Furthermore, 1.4 million metric tons of greenhouse gas will be used annually or injection into geological formations.

This presentation will introduce MHI's CO_2 capture technologies and the current activities including the results of the CO_2 capture and storage demonstration test.

キーワード: CO2 回収貯留, 炭酸ガス, 分離, KS-1 吸収液, KM CDR Process
Keywords: CCUS, CO2, Capture, KS-1, KM CDR Process

HRE28-03 会場:105 時間:5 月 25 日 09:45-10:00