

1A4. Environment-friendly Resource Development Technology

Technology Overview

1. Background

Through on-site demonstrations of carbon dioxide fixation in coal seams, the reservoir characteristics of coal seams in Japan were identified in order to collect basic data on carbon dioxide. In addition to conventional coal preparation and reforming, and CMM collection and utilization, efforts were made to study energy

recovery through the underground gasification of coal resources, which may offer significant environmental benefits. The development and commercialization of CDM projects were also addressed.

2. Technologies to be developed

(1) Coal preparation and reforming technology

[1] Coal preparation technology is used in Indonesia to efficiently sort raw coal with different properties in order to ensure stable product quality and reduce the environmental burden. Japan manufactured part of the equipment necessary for improving existing coal preparation plants in Indonesia. To introduce jiggling feedback control using on-line ash monitors to the coal preparation process in Indonesia, Japan formulated a control rule on a trial basis from the results of a feedback control applicability test.

[2] To promote the effective use of low-rank coal, a reforming plant using the upgrading brown coal (UBC) process (raw coal processing capacity: 5 tons/day) was subjected to test operations in Indonesia, where, compared to other countries, a relatively higher percentage of brown coal reserves exist. In the UBC process, low-rank coal is dehydrated in an oil slurry to stabilize it and make it water-repellent under moderate conditions. In the test plant, various types of Indonesian coal with different properties were tested. The data obtained was used for evaluation tests on spontaneous combustion, combustibility and other properties. It was ultimately confirmed that the reformed coal had handling properties and combustibility equal to or greater than those of bituminous coal.



Flotation machine



Heavy media cyclone



Effluent thickener

(2) Global environmental technology

[1] To suppress the release of carbon dioxide (CO₂) to the atmosphere, a preliminary test on a new technology to sequester CO₂ in deep coal seams has been conducted in the southern part of Yubari City in Hokkaido. The site injection test will be conducted through FY2006, aiming to successfully sequester CO₂ in PW-1, a methane gas observation well. Since the injection well IW-1, drilled in FY2003, is expected to have lower permeability due to CO₂ absorption and swelling, N₂ gas is injected to reduce CO₂ absorption and subsequently improve the permeability. N₂ gas is also used as a preliminary gas for CO₂ sequestration.

CO₂ is injected at the maximum allowable pressure that will not induce the crushing of the coal seam. More than 900 tons of CO₂ are planned to be injected. Hydraulic fracturing tests of the coal seams are due to be conducted to improve gas injections and coal productivity.

[2] A site test of a technique for the stable collection and utilization of methane gas escaping from coal mines was carried out at an abandoned domestic mine in Hokkaido.

