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Progress of the Jang Bogo Station during the first construction season 2012/13

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1. Introduction

The Republic of Korea circulated draft Comprehensive Environmental Evaluation (CEE) for consideration at the CEP in June, 2011. The CEP XIV had concluded that the draft CEE met the requirements of the Article 3 Annex 1 to the Protocol on Environmental Protection to Antarctic Treaty and recommended it to ATCM for endorsement. Final CEE for the Jang Bogo Station was prepared incorporating all the valuable suggestions received from the Parties and assessed at the CEP XV (IP-23) and ATCM XXXV in June 2012.

Considering the national research interest and international collaboration, the site of Jang Bogo Station (74°37.4'S / 164°13.7'E) had been chosen through an evaluation process since 2006. The site is located near Cape Möbius, the coastal area of Terra Nova Bay in Northern Victoria Land along the western Ross Sea.

The station includes the main building, research facilities, and maintenance facilities with a building area of 4,411.46m². The station is planned to be used for no less than 25 years. It will accommodate up to 15 personnel in the winter and up to 60 personnel in the summer.

The construction activity started in December 2012 and continues for two Antarctic summer seasons. The station is planned to start operation from the early 2014.

2. Progress during the season 2012/13

2.1 Probationary fabrication in Korea before shipment

The main building of the Jang Bogo Station was pre-assembled in Korea in order to obtain effective construction and reduce waste in the Antarctic, every step of assemblage was tested from July to August 2012.



Figure 1: Pre-assembling of the main building of the Jang Bogo Station in Incheon, Korea

2.2 Transportation

MV *SUOMIGRACHT*, 1A ice classed cargo ship, was mobilized for transport of construction material, vehicles and equipment from Pyeongtaek Port in Korea to the construction site in Terra Nova Bay, Antarctica. The ship left Pyeongtaek Port with 22,880 m³ of bulk cargo and 291 containers on 15 November 2012. The ship stopped in Wellington for bunker and switched from IFO 380 CST to MGO fuel for the leg to Terra Nova Bay and back, following MARPOL 73/78 Annex 1. The icebreaker RV *ARAON* boarded 112 construction workers left Lyttleton Harbour to the Antarctic on 30 November 2012.

Two ships joined at the heavy sea ice edge near 65° S and *ARAON* assisted the cargo ship to access Terra Nova Bay. Ice breaking operation started on 5 December to break through 2 m thick pack ice. The cargo ship approached Terra Nova Bay and stopped at fast ice 1.2 km offshore from the construction site.

Unloading began after sea ice safety check and operation continued for 21 days in three-shifts around the clock. The heaviest piece to be discharged on the ice surface was the main part of crawler crane without boom, weighing 68 tons.

The cargo ship sometimes moved further offshore due to heavy sea ice pack but she mostly anchored near the construction site until 9 March, 2013. *ARAON* left the site temporarily and got back to Terra Nova Bay to evacuate the cargo ship and construction workers to Christchurch.



Figure 2: Unloading from the cargo ship, MV *SUOMIGRACHT*, using a heavy helicopter and unloading of the heaviest cargo, a 100 ton crawler crane.

2.3 Construction works

Once temporary camp was set up housing altogether 112 persons construction were carried out in a planned manner during January. However due to heavy snow and wind every two days in February construction had to be finished behind the schedule. It was accomplished about 80% of the planned works before evacuation. The maintenance building, power plant and steel frame of the main building were almost completed and a road to the pier and fuel tank site were prepared.

Vehicles, equipment and parts sensible to cold and snow were housed safely in the maintenance building of the Jang Bogo Station before evacuation. No one stays at the site during the winter.

2.4 Waste treatment and Environmental monitoring

Construction and domestic wastes were collected separately for recycling and reuse if possible. Ten 20ft and three 40ft containers with waste and five 20ton liquid tanks filled with contaminated water were removed from the site by the cargo ship.

IC-SBR system was installed and operated for wastewater treatment during the construction period.

To avoid anthropogenic disturbance to the colony of south polar skua located in the eastern hill of the Gondwana Station, unnecessary visiting by either construction workers or other personnel was strictly controlled and restricted. Low altitude flying of helicopters over the colony was also strictly prohibited. Two ornithologists monitored the colony during some period to observe impact.



Figure 3: Aerial view of the Jang Bogo Station after the first construction phase just before evacuation (on 5 March 2013)

2.4 Accident and Incident

Regrettably, there was a loss of life of a construction member who might lose his footing into the sea and died due to hypothermia.

A fuel spill accident was happened due to lack of attention and bad weather condition. Immediately after detecting fuel spill, all necessary measure was taken properly according to the ‘Jang Bogo Station Fuel Spill Prevention and Contingency Plan’. About 1,100 ℓ of diesel fuel was spilled. Initially the fuel on the snowpack was removed with absorbing mats. The spilled fuel stagnated in the snowpack transferred into a 200 ℓ-fuel drum, contaminated snow and soil was kept in three sealed 20ft containers, and contaminated artificial pond water was pumped into five 20 ton fuel tanks. All contaminated materials were loaded on the cargo ship to bring back to Korea except three containers filled with contaminated soil and snow. Those three containers will be taken out from Antarctica after the second construction phase in 2014.

The damaged area will be monitored by KOPRI’s environmental monitoring team every year for further assessment. The training course related with oil spill prevention and emergency response will be strengthened. The oil spill report was uploaded on AINMR at COMNAP website according to Annex of Resolution 6 (ATCM XXII).

3. Outlook in the following season 2013/14

The second phase of construction will be started in the early November, 2013. A part of construction workers will be flown early to the sea ice runway by collaboration with Mario Zucchelli Station. The others will access to Terra Nova Bay on board *ARAON* in the early December, 2013. A cargo ship will transport construction materials and bring empty containers, waste, vehicles and equipment back to Korea. By the early March 2014 all preparations should be finished for the first wintering.

4. Acknowledgement

During the construction period, Russian experts shared their knowledge and experience for the sea ice safety. Italian colleagues provided us their valuable experiences and data in the operation of Mario Zucchelli Station in Terra Nova Bay. The air evacuations of a patient and a body progressed smoothly owing to the support of

McMurdo Station. Australian Antarctic Division offered convenience for chartering an Airbus 319 for the transportation of Korean scientists. We were afforded every facility for our activity from New Zealand. Here we would like to express our sincere thanks to the parties for their assistance.