APPENDIX III

DETAILED INFORMATION PROVIDED BY NORTH KOREA ON THE CHONGIN-RAJIN-TUMEN RIVER AREA

The free economic and trade zone is located south of the mouth of the Tumen River at the northeastern end of Korea bordering Hunchun, China, and Khassan, Russia. The Tumen River is the northern boundary and the East Sea is the eastern boundary. The zone extends along about 156 km of coastline—from Sosura to Rajin Bay and Biso Cape (latitude 42°05′ to 43° North and longitude 130°7′ to 130°45′ East).

The free economic and trade zone includes Huchang-ri, Uhyon-dong, Anju-dong, Sinhae-dong, Gwangok-dong, Changpyong-dong, Yokjon-dong, Hamsan-dong, Sinan-dong, Chigyong-dong, Dongmyong-dong, Anhwa-dong, Sinhung-dong, and Chonge-dong of Rajin City and Paekhak-ri, Sombong Seat, Ungsang workers' district, Culpo-ri, Uam-ri, Rosan-ri, Pupo-ri, Tumangang workers' district, Sahe-ri, and Hongui-ri of Sombong County. Rajin and Sombong Ports are in the free economic and trade zone, and Chongjin Port is in its adjacent area. These three ports were declared free trade ports by the same Decision no. 74 of the Administrative Council.

The 621 km^2 of the Rajin-Sombong Free Economic Trade Zone is distributed as follows:

Farm land:	146 km^2, 24 percent
Forest:	353 km^2, 57 percent
Water area:	84 km^2, 13 percent
Industrial land:	19 km^2, 3 percent
Population area:	13 km^2, 1 percent

Agricultural land and forest thus represent more than 80 percent of the total land area. The area suitable for construction is about 190 km^2. The rest of the forest and wetlands will be conserved or protected.

The climate is fairly severe. Temperature has an annual mean of 6.3°C, a monthly mean of -8.8°C in January and +20.8°C in August. The annual rainfall is 770 mm; the sun shines 53 percent of the time and the mean humidity is 70 percent. Mild earthquakes were recorded about 1400 and 1200 years ago but the zone has been free of earthquakes since. The soil is mostly sandy clay.

The current population in the free economic and trade zone is 131,000; 90,000 are urban inhabitants. The zone contains several big factories and enterprises including the Sungri Chemical Plant which refines crude oil, a thermal power station, a ship repair factory, fishery stations, and over 50 local industrial factories for foodstuffs, daily necessities, building

materials, garments, paper, and chemicals in the zone. The zone is equipped with a water supply and sewerage network and transport, postal service, education, health care, and commercial networks. The oil refinery has a capacity of 2 million tons/year and the ship repair base can repair 40 to 50 ships of up to 10,000 tons per year.

In the Chongjin area adjacent to the free economic trade zone, there is a basis for a ferrous metallurgical industry, a chemical industry, a ship-building industry, an engineering industry, and light industry. Existing plants include the Kimchaek Iron Complex, the Chongjin Steel Works, the Chongjin Synthetic Fiber Complex, the North Hamgyong Province Shipbuilding Complex, and a bus factory. Unggi Thermal Power Station (200,000 kw) and its contiguous Chongjin Thermal Power Station (150,000 kw) and Sodusu Hydroelectric Power Station (420,000 kw) are connected through Susong substation to form a power supply network.

Total urban area is 11 km^2. In the long term, Rajin City and Sombong City will be integrated into a commercial port city with 750,000 inhabitants. A new urban district with 250,000 population will be formed when a new port is constructed in the Sombong area. Thus the free economic and trade zone will become a modern city with over one million inhabitants. Iron ore, coal, porcelain, timber, and fish are abundant in the free economic and trade zone and its contiguous areas. Available water resources are 4.2 billion m^3 in the Tumen River and 0.2 billion m^3 in small and medium-sized streams.

There are eight capes and several islands along the coast and a 44 km^2 natural lake. Mt. Chilbo, a second Mt. Kumgang, is situated about 80 miles from Rajin Port. There are several hot mineral springs, and swimming beaches. Thus the area is also promising for tourism development.

Chongjin Port

Chongjin Port is located in Chongjin City, North Hamgyong Province (see Figures III.1, III.2, Table III.2). It is divided into East and West ports 2.9 miles apart. It is sheltered by an artificial breakwater and thus the average annual wave in the port is only 0.4 m. It is ice-free year round. In spring, autumn, and winter, the wind mainly blows toward the northwest and in summer toward the northeast. The average annual wind velocity s 2.8 m/s. The annual temperature and precipitation in Chongjin Port is shown in Table III.1.

The distance from the pilot station to the East Port is 4.9 miles and to the West Port is 4.3 miles. The distance from the open anchorage to the East Port is 1.8 miles and to the West Port is 1-2 miles. The Port has seven terminals with a total length of 2,138 m. Its quay can accommodate eleven 5,000 to 10,000 ton vessels at one time. The railway and road in Chongjin Port is linked with China and Russia through the northern area beltline and a common track combined with the Russian broad-gauge railway has reached the port. The approach railway is 2.16 km long. The transshipment capacity of Chongjin Port is 8 million tons a year—0.87 million tons in the East Port and 7.13 million tons in the West Port. Its

Table III.1

Mean temperature	+7.4°C
Mean high temperature	+12.4°C
Mean low temperature	-8.9°C
Maximum temperature	+32.6°C
Minimum temperature	-22.3°C
Mean precipitation	671.8 mm
Maximum precipitation	972.4 mm
Minimum precipitation	303.4 mm

present throughput is about 3 million tons of coke, ore, and metal products and 100–150 thousand tons of transit cargoes like maize.

Area for Cargo Storage

Total:	126,000 m^2
Warehouse:	27,000 m^2
Open storage yard:	99,000 m^2

Major Equipment

Equipment	Capacity	Quantity
Harbor crane	5 tons	16
	10-22 tons	5
Waggon tipper	20 waggons/h	1
Concentrated ore loader	385 t/h	2
Grain loader	150 t/h	1

Rajin Port

Rajin Port is located in Changpyong dong, Rajin City, North Hamgyong Province at the northern extremity of the Korean East Sea (42°13′4″ N, 130°17′3″E) (Figures III.3 and III.4). It is surrounded by the Rajin Peninsula (Anju-ri) on the coast and protected by Daecho and Socho Island in its mouth (Figure 1). At Daecho Island, the highest wave reaches 6 m

and averages 2.1 m, but waves within the port are negligible. The main winds are northwest in spring, autumn, and winter and southeast in summer. The average annual wind velocity is

Table III.2
Chongjin Port: Capacity by Terminals

Terminals	Length (m)	Accommodation		Annual volume of transit (million tons)	Cargo	Area (m^2)
		5,000 ton-ship	10,000 ton-ship			
Total	2,138	5	8	8		1,013,750
East Port	754	3	2	0.87		192,500
No. 1	210	2		0.2	Sundries	
No. 2	392	1	1	0.37	Sundries	
No. 3	152		1	0.3	Grain	
West Port	1,384	2	6	7.13		821,250
No. 1	176	1		1	Grain and sand	
No. 2	308		2	1.5	Ores and steel	
No. 3	413	1	2	3	Magnetic iron	
No. 4	487		2	1.63	Coking coal	
Total				8		

4.9 m/s. Rajin is not icebound in winter due to the warm current. The tidal range is 20 to 30 cm. The annual temperature and precipitation at Rajin is shown in Table III.3.

Rajin Port is two miles away from the pilot station and one mile from the open anchorage. It has three projecting quays with ten wharves (2,515 m long) and a revetment of 640 m. The quays have a reinforced concrete caisson structure capable of accommodating thirteen 10,000 ton-class ships at one time.

Table III.3

Mean temperature	+6.3°C
Mean high temperature	+12.2°C
Mean low temperature	-9.2°
Maximum temperature	+31.3°C
Minimum temperature	-21.5°C
Mean precipitation	794.1 mm
Maximum precipitation	1,321.1 mm
Minimum precipitation	406.1 mm

The port has been linked with the northern railway beltline and main highways. The broad-gauge railway of Russia extends to the front of the terminal. The total length of the railway approach is 16 km and of this, 11.7 km is a broad-gauge railway. The cargo traffic capacity of the port is 3 million tons per year (Table III.4).

Table III.4
Capacity of Rajin Port by Terminals

Terminals	Length of quay (m)	Accommodation		Annual volume of transit (million tons)
		5,000 ton-ship	10,000 ton-ship	
No. 1	970	2	3	0.5
No. 2	965	2	3	1.5
No. 3	580	1	2	1
Total	2,515	5	8	3

Total site area: 380,000 m^2
Total storage area: 203.000 m^2 of which
warehouse: 26,000 m^2
open storage yard: 177,000 m^2

At present the main cargo carried in the port are coal, bag-packed fertilizer, cement, scrap iron and timber.

Sombong Oil Terminal

The Sombong Oil Terminal is about 24 nautical miles from Rajin Port. The total area of the terminal is 200,000 m^2 divided between the oil incoming berth and the oil product dispatch berth. The import berth has 3,263 meters of submarine pipe and standard mooring buoys to convey oil under pressure to the oil refinery from up to 250,000 ton tankers. The transit capacity is 2 to 3 million tons annually. The product terminal has been constructed so that two 50,000 ton tankers can anchor simultaneously at a quay 455 m long and refined oil can be pumped directly from the refinery to the tanker. There is also a quay 100 m long for the berthing of service vessels. Another submarine pipe is under construction. When completed, 7 to 8 million tons of oil will be handled annually. Nearby Unsang Port is specially equipped to handle logs. It will require an artificial breakwater.

Plans for Port Expansion

The capacities of Rajin and Sombong Ports will be expanded in stages. In the first stage, the harbor equipment and facilities will be reconstructed and management of the existing terminals improved. The transshipment capacity of Rajin and Chongjin Ports will thus be increased to 10 million tons per year. This will not require major investment.

In the first stage of Rajin Port development, specialized loading and unloading equipment will be set up, and auxiliary arrangements and storage facilities will be established in the existing terminals by cargo type. Quay No. 9 of terminal No. 3 will become a coal berth managing 5 million tons of coal per year. About 1.5 million tons of piled fertilizers will be handled by constructing 8,100 m^2 of storehouses for piled fertilizer in quay No. 1 of terminal No. 1, or quays No. 5 and 6 of terminal No. 2, as well as loading facilities and a 3 km long belt conveyor belt. In addition, 1 million tons of cryolite will be handled by building 8,100 m^2 of silo-type storehouse dedicated to cryolite, and introducing an air-suction type unloader in quay No. 7 of terminal No. 2. One million tons of containers will be handled by rearranging the backside open storage yard in quay No. 8 of terminal No. 2 to form 62,500 m^2 of container storage yard. A container crane and transport facilities will be built before the new container terminal. Cargoes such as bag-packed fertilizer, timber and scrap iron will be handled by installing a heavy-duty cranes and auxiliary equipment in quays No. 1, No. 2, No. 3 and No. 4 of terminal No. 1. To this end, about 3 km of various railway works and about 1,250 m^2 of service establishments will be constructed.

In the first stage of expansion of Chongjin Port, a container terminal will be built with an annual capacity of 1 million tons by building a new quay (535 m long) linking terminal No. 3 to terminal No. 4 in Chongjin West Port. In addition, the equipment and facilities in the existing terminal will be improved to handle 1 million tons more than at present. This will require 535 m of quay construction, 0.3 million m^3 of dredging, 1.1 km of crane-line

works, construction of 120 m of conveyor belt, 60,000 m^3 of open storage yard pavement and 1 km of railway construction.

In the second stage, other new terminals will be constructed, equipment reinforced, and facilities built to accommodate large ships to cope with the increase in transit cargo volumes. By then, the two ports will manage a total of 50 million tons of cargo annually—30 million tons in Rajin Port and 20 million tons in Chongjin Port. In the second stage of expansion of Rajin Port, a new terminal will be constructed to accommodate 10,000 to 20,000 ton ships. Thus, the port will be handling 20 million tons of cargo in addition to the 10 million tons scheduled for phase 1—12 million tons of piled cargoes such as ores and coals, and 8 million tons of containers.

This will require construction of about 4 km of quays, 0.5 million m^2 of open storage yard pavement, 14 km of siding railway works, 11 km of various line works, 27,000 m^2 of storehouse, and 700 m of conveyor belts.

In the second stage of expansion of Chongjin Port, another 10 million tons of transit capacity will be created by constructing a new terminal 2.4 km long in the East Port. The newly built terminal will manage 0.5 million tons of coal, 2 million tons of containers, and 2 million tons of ball ores. This will require construction of 2.4 km of terminal, 1,250 m of breakwater, 6 km of railway, 9.8 km of crane line works, and about 0.39 million m^2 of open storage yard pavement.

A new port with 50 million tons of annual transshipment capacity will eventually be built in the Sombong area. It is expected to have 19 km of terminals to handle 80 ships of 20,000 to 50,000 ton-class each berthed simultaneously, carrying mainly piled cargo like coal and containers. The port will have railways and roads connected directly to China and Russia and include a passenger pier for tourists using passenger ships. An airport will be built in the vicinity. The three ports combined will then be able to handle 100 million tons of goods annually.

The Northern Belt-Line Rail Network

About 80 km of Chongjin-Rajin new railway was laid in 1962. The belt-line railway network was subsequently constructed in northern North Hamgyong Province (Figure III.5). Because of a steady growth of trade, the Tumangang Station was expanded in 1967 and a combined transshipment base for cargo was established in the Ungsang Area. In addition, 50 km of Tumangang-Rajin composite line was built and extended to Chongjin in 1989, at the same time as the reconstruction of Chongjin marshaling yard in preparation for further transshipment through Rajin Port.

The northern beltline railway in North Hamgyong Province has a total length of 405 km of which 237 km is electrified. The non-electrified section includes 34 km of double-line (Susong-Komusan) and 134 km of composite line (Tumangang-Chongjin). The vehicle

operating system includes the locomotive engine service stations in Chongjin, Rajin, Tumangang, Sombong, and Hyeryong, passenger-freight train service stations in Chongjin, Rajin, Tumangang, and Namyang, and a wagon repair shop in Chongjin with an annual capacity of 3,000 wagons.

The northern railway beltline network is connected to Chongjin East and West Ports, Rajin Port and Sombong Port. The Namyang Station links to China and the Tumangang Station links to Russia. Since the transit capacity of the railway between Rajin and Tumangang is 12.1 million tons per year, it can handle about 6 million tons more than the existing freight traffic. The transit capacity of freight between Chongjin and Namyang is 12.2 million tons annually and thus can handle about 5.5 million tons more than it does now. In addition, there is considerable reserve in the transit capacity of freight in the railway section between Rajin and Namyang. Thus another 12 million tons of intermediate cargo can be transported from China and Russia per year without much investment using the existing northern railway beltline network.

As the intermediate freight traffic increases, the northern railway beltline network will be constructed in two stages. In the first stage, the 168 km section between Hyeryong and Haksong will be electrified and double line works will be built along 126.5 km of the Myongho-Hunyung section. There are plans to construct 14 km of new railway between Kuryongpyong and Zosan-ri, to build another bridge between Tumangang and Hassan, and to connect the railway bridge between Sombong and Hunyung with China. In the second stage, they plan to construct 169 km of double-line works between Komusan and Hunyung and 71 km of double-line between Panzuk and Myongho, to improve the freight handling capacities of railway stations linked to the ports and border stations, to rebuild and reinforce the wagon facilities, and to modernize railways in this region. Specialized container wagons will be produced and will be constructed at a container factory with a capacity of 10,000 containers per year and a container terminal built in the Chongjin area. The transit capacity of intermediate goods on the northern railways will then be more than 50 million tons per year.

Roads in the Northern Region

The integrated road network is now 431 km long connecting Chongjin-Buryong-Hyeryong-Sombong-Onsong-Saebyol-Undok-Sombong-Rajin-Chongjin (Figure III.6). There is also a road connecting Onsong-Namyang-Unjok-Wonjong Road and the Rajin-Tumengang Road. Roads abutting China and Russia include 194 km of the Chongjin-Namyang Roadway linked with the Ryongjong-Gaisantun-Domun of China through three border bridges at Hyeryong, Sombong, and Nanyang; 125 km of Rajin-Onsong Roadway connecting Sombong-Undok-Saebyol counties and linking with Hunchun of China through Ryuda and Hunyung Bridges; 43 km of Rajin-Sombong-Tumangang Roadway connecting Hassan-Posyet-Vladivostok through the Friendship Bridge on the Tumen River; 22 km of Unjong-Wonjong Roadway connecting Hunchun, China, and Kraskyno and Vladivostok, Russia through the Wonjong Bridge (Kyonghung bridge). This system will eventually form a triangular beltline

network of rail and roads in the lower Tumen River delta connecting Rajin-Sombong with Hunchun-Yenji and Vladivostok-Khasan.

The technical specifications of roads in the northern area are: 44 km or about 10 percent in the inner city and with an average width of 5.5 m; 159 km or about 33 percent of the total is paved with concrete or asphalt and is about 5 to 6 m wide; 78 places have 7 to 10 percent slope and 9 places have 11 percent; there are 128 curves with less than the standard minimum curve radius; and there are 135 bridges.

A new highspeed road will be constructed. The new highway will have 6 inlets and outlets, 16 bridges, and 5 tunnels on the 71 km between Rajin and Saebyol linking Rajin Port with Hunchun, China; 2 inlets and outlets, 4 bridges and 1 tunnel on the 18 km between Rajin and Tumengang connecting Rajin Port with Khassan-Posyet of Russia; and 9 entrances and exits, 24 bridges, and 13 tunnels on the 131 km between Chongjin and Namyang linking Chongjin Port with Ryongjong, Kaisantun and Domen of China. A highway of 61 km will connect Chongjin Port with Rajin Port and 25 km of Saebyol-Jongsong Highway will connect the Rajin-Saebyol Highway and Chongjin-Namyang Highway. This 306 km of highway in the free economic and trade zone and its adjacent area will facilitate transportation of intermediate goods through Chongjin and Rajin Ports.

Communications

Communication will be provided by 480 telephone lines between Pyongyang and the free economic and trade zone by adding equipment to the existing super-high frequency system between Pyongyang and Chongjin, and establishing a new super-high frequency system between Chongjin and Rajin. The existing satellite communication system will be used to communicate between the Pyongyang International Communication Center and foreign countries. Electronic telephone exchange and automatic telex exchange will be installed on an optic fiber communication network in the free economic and trade zone.

The communication circuit number and exchange capacity will be supplied in two stages. In the first stage, the capacity will be increased to 120 circuits for international communication, 50,000 circuits for automatic telephone exchange, and 1,000 circuits for automatic telex exchange. In the second stage, there will be 480 circuits of international communication, 100,000 circuits for automatic telephone exchange, and 5,000 circuits of automatic telex exchange.