Chile rock salt export planning

Introduction

Gold Dragon Resources (GDR) is a privately owned Canadian company, which is planning to ship ASTM specification deicing salt from its permitted mine site located on the Salar Grande in northern Chile. The high purity salt will be exported to USA Gulf Coast and Atlantic NE ports commencing between Q4 2015 - Q1 2016. GDR's wholly owned subsidiary, Potash Dragon Inc. (PDI), is currently progressing its Chilean Marine Concession application within the Puerto Patache area where it intends to construct a deck storage barge loading facility. GDR/PDI intend to outsource all activities in the port area from the point of the truck unloader to the departure of self-loaded geared bulk dry vessels of 30 kt to 50 kt dwt size from the port area.

Approximately 100,000 tonnes per month of deicing salt is planned to be transported over a distance of approximately 40 km from the mine in 28 tonne road trucks to GDR's marine terminal at the port of Patache as shown in Figure 1. The trucks will tip onto a RazerTail® truck off-loader which will feed an inclined gantry conveyor belt to load a 10,000 tonne dwt deck storage barge. The barge will be positioned below the conveyor belt discharge chute using a tug boat and will be manoeuvred with the help of a tug boat and four mooring buoys. When the barge is fully loaded it will be moved by the tug boat and anchored in the protected area of the Patache bay while the second barge is filled. On a periodic basis a geared dry bulk ship will moor alongside the two filled deck storage barges and self-load the salt for export. This design results in the infrastructure requirements being significantly smaller than conventional bulk ship loading terminals and eliminates the need for double handling from large salt stockpiles near the terminal; thereby significantly reducing the environmental impact on the land and ocean floor environment.

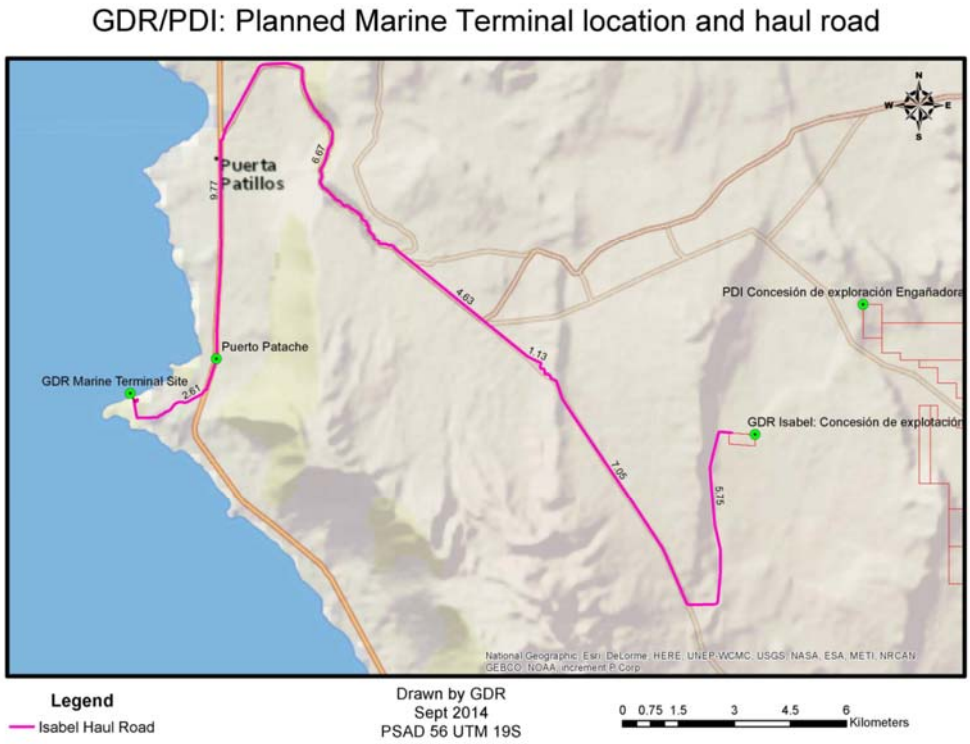

Figure 1: Planned marine terminal location and Isabel mine to Puerto Patache haul road

GDR requires the services of various specialist logistics companies for the following activities:

1. **Mine to Razertail® road transport**: The transportation of salt from the Salar Grande mine to the RazerTail® truck offloading system.
2. **Razertail® truck off-loading system to barge**: The transfer of the deicing salt from the truck off loader to a 10,000 tonne dwt barge.
3. **Barge manoeuvring and dry bulk ship loading**: To manoeuvre two 10,000 tonne dwt deck storage barges between GDR's marine terminal and dry bulk self-loading vessels of up to 50,000 tonne dwt in size. The self-loading will take place within the bay of Patache in the close proximity of the marine terminal.

Company contact details in Chile

GDR's Chile assets are held via wholly owned subsidiaries in Barbados and Chile. The contact details of the engaging company in Chile are as follows:

a. Compañía Minera Gold Dragon Resources Ltda. (Chile)
b. Legal Representative: Gonzalo Grez
c. Legal Firm: Cariola Díez Pérez-Cotapos & Cía. Ltda.
d. Address: Av. Andrés Bello 2711, piso 24, Las Condes
e. Phone: Santiago – Chile T: +5623683591

Project scope

GDR plans to deliver 1.2 Mt per annum of salt from the Salar Grande in northern Chile to destinations in the USA. Industry standards for bulk de-icing rock salt deliveries are as follows:

North American Road Salt (ASTM Designation D 632-12), Grading Analysis

- 0 to 12.5 mm minimum of 100%
- 0.0 to 9.5 mm between 95% and 100%
- 0.0 to 4.75 mm between 20% and 90%
- 0.0 to 2.36 mm between 10% and 60%
- 0.0 to 0.6 mm between maximum of 15%

Soluble chlorides minimum of 95% m/m NaCl

Mine to RazerTail® road transport method statement

The salt will be transported from the mine in the northern part of the Salar Grande to GDR's marine terminal within the Puerto Patache area using 28 tonne tipper trucks. The transport distances and speed restriction details are shown in Table 1 below:

Road and truck cycle segments	Km	Prog	Speed (km/h)	Time Hrs
Isabel to Salar Grande tar road	5.75	5.75	30	0.19
Salar Grande tar road to first mountain pass	7.05	12.81	80	0.09
Salar Grande tar road pass	1.13	13.94	30	0.04
Salar Grande tar road to Coastal cordillera	4.63	18.57	80	0.06
Cordillera de la costa pass	6.67	25.24	30	0.22
Coastal flats road to Patache	9.77	35.01	80	0.12
Patache terminal road	2.61	37.63	30	0.09
Patache offloading loop	0.23	37.86	15	0.02
Cycle time				
One way travel time				0.82
Loading time				0.50
Offloading time				0.50
Return				0.82
Total	37.86			2.65

Table 1: Haul road distances and speeds

The trucking rate of delivery assumption includes a 30 minute period to load and a 30 minute period to unload the trucks, inclusive of time taken for other breaks such as driver rest periods and refuelling, etc.. The round trip is estimated to take 2.65 hours including the load and unload periods. The one way distance between the mine and the port is 37.9 km and the altitude difference is 650 meters. The road transport will require the services of 45 28 tonne trucks for periods of between 3 and 5 days, depending on the anticipated bulk ship size (between 30 and 50 kt dwt) to be loaded at that time. The transport system has been optimised for the rate of road transport, the rate of barge loading and the rate of ship self-loading. The various scenarios related to the optimisation are shown in Figure 2.

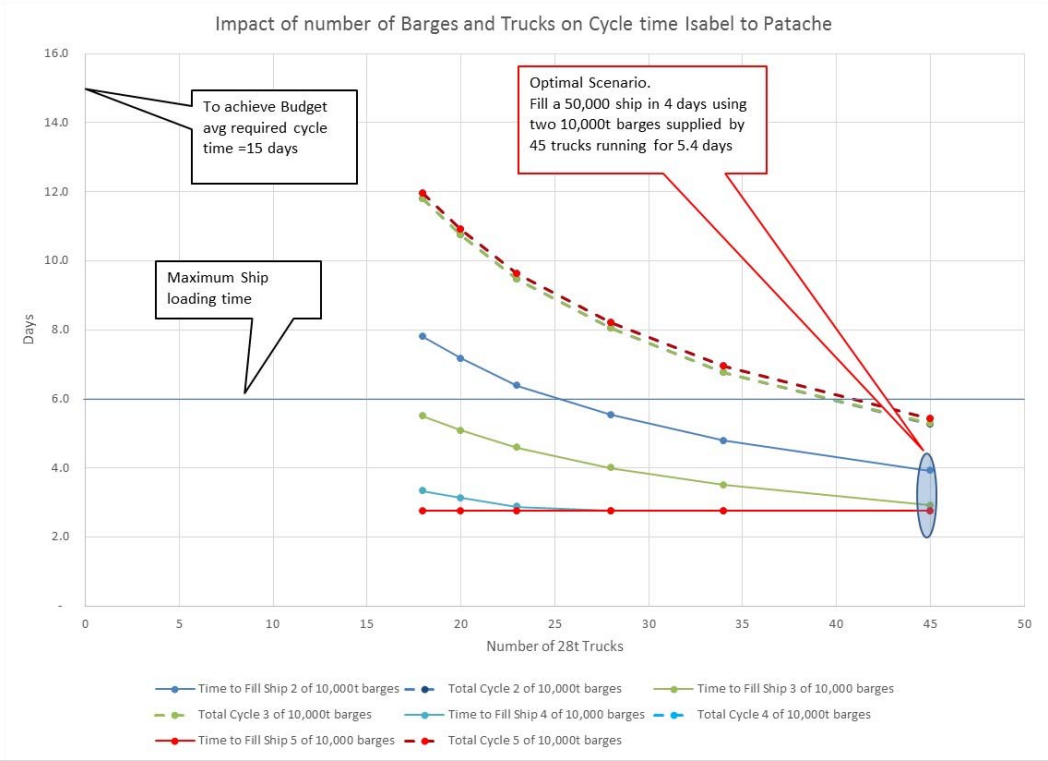

Figure 2: Optimisation of trucking, barge loading and ship self-loading

RazerTail® truck off-loading and barge loading method statement

The RazerTail® truck off-loading system shown in Figure 3 is designed to operate at 648 t/h (with other higher capacity models available) to load the inclined conveyer belt gantry to feed the stockpile on the 10,000 tonne dwt barge. This equipment is available in a variety of "off the shelf" models. The truck off-loading operation usually takes a few minutes per truck and the rate assumed in the simulation is that one truck will take 30 minutes to offload including all other breaks. The inclined gantry conveyor belt system is designed as per Figure 4 and the plan view of the loading and belt arrangements are shown in Figure 8.

Figure 3: RazerTail® truck off-loader configuration

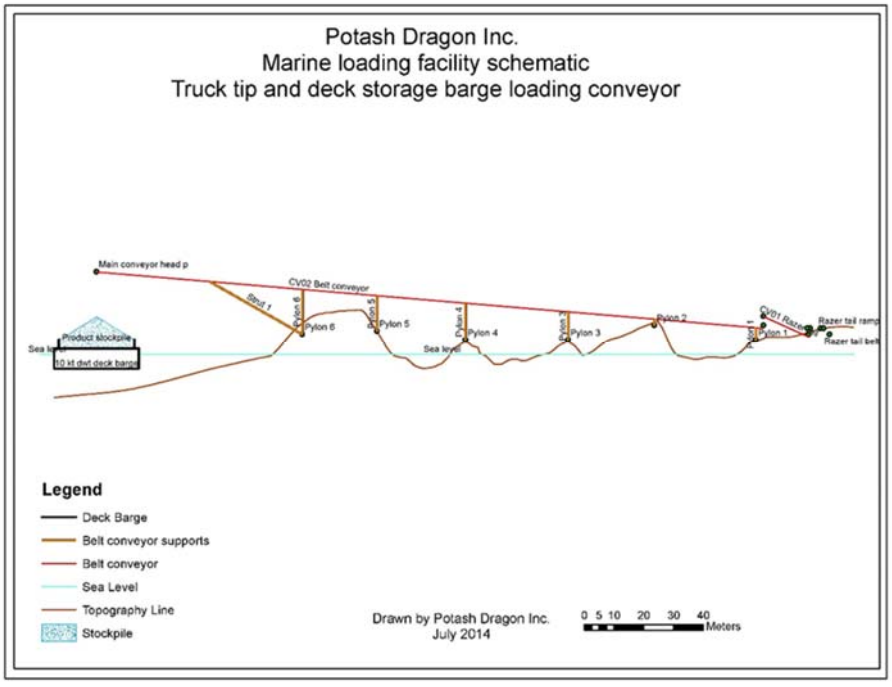

Figure 4: Section of the RazerTail® and inclined gantry conveyor belt system

Barge to ship transportation method statement

This operation will utilise two 10,000 tonne dwt barges, which will be moored within a radius of 1 km of GDR's marine terminal, in the bay area. The planned rate of manoeuvre speed is 5 km/hr for the barges and it is estimated that it will take 120 minutes to move and re-position a barge at the terminal, at a mooring or shipside, including contingency. When filled, the barge is moved to a mooring or the waiting ship and conversely to the terminal if offloaded. It is estimated that the barges will be loaded at a maximum rate of 648 t/h and take approximately 1.4 days to re-fill as per Table 2.

Figure 5: Photograph of 10,000 tonne dwt salt barges at ESSA'a Cedros Island facility

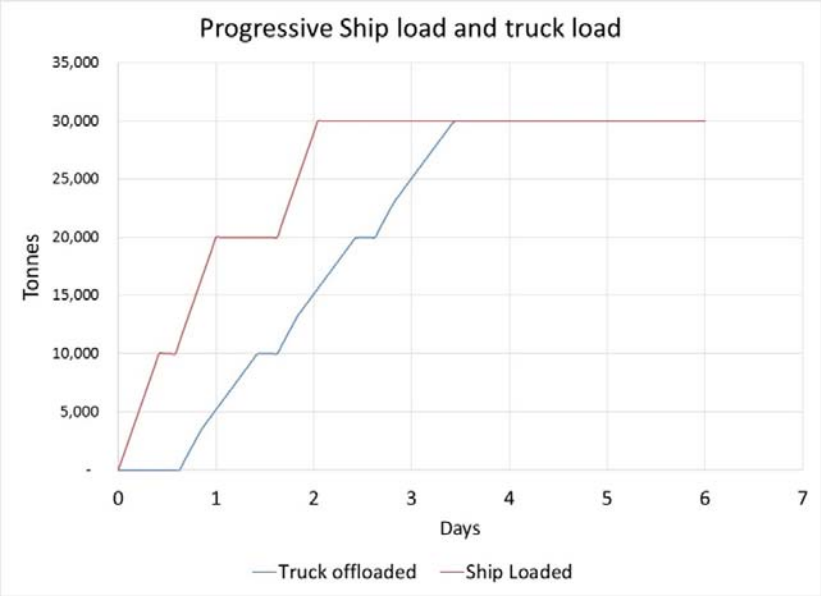

Figure 6 Barge and ship loading cycles

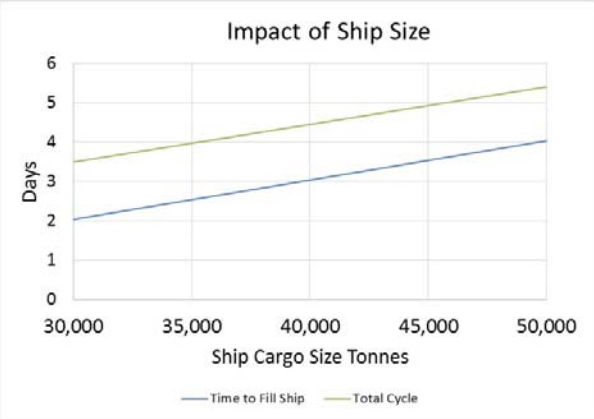

Figure 7 Impact of ship size on cycle times

Ship size (tonnes dwt)	50,000	40,000	30,000
Time to self load ship (days)	4.0	3.0	2.0
Time to re-fill barges (days)	1.4	1.4	1.5
Total cycle time (days)	5.4	4.5	3.5

Table 2: Cycle times

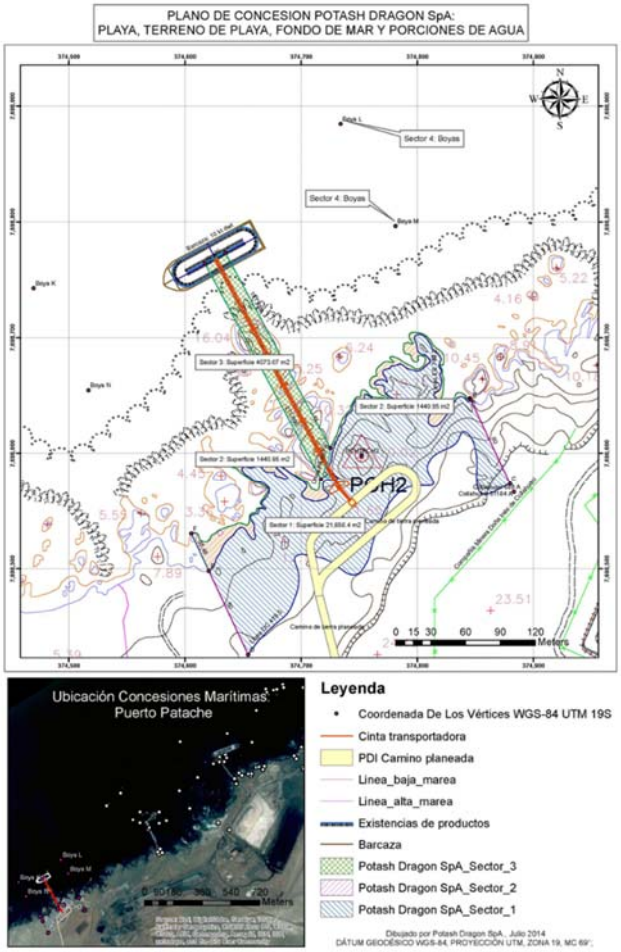

Figure 8: Plan view of the RazerTail®, inclined conveyor belt gantry and barge location

Geared Vessel; self-loading

It is assumed that a geared vessel will moor in the Patache port area and commence self-loading at an assumed rate of ~ 1,000 t/h while having two full deck storage barges available. When the un-loading of a barge is completed it is moved back to the terminal and the refilling cycle commences with trucks operating continually until the cycle is complete. The trucking and barge filling cycle only ceases when the ship has been filled including both empty barges. The point to point barge manoeuvring time is assumed to take 120 minutes. The results of the average cycle times simulated are shown in Table 2.

Figure 9: An example of a geared ship self-loading from deck storage barges.