

The Arab Potash Company PLC.
Terms of Reference for Request for Information (RFI)
Design of Channels Mobile Dredger
Exploratory Enquiry

SCOPE:

APC (Arab Potash Company) factory is located at the south end of the Dead Sea, near Safi, Jordan. APC is discharging brine pumped from the Dead Sea between evaporation ponds via brine channels, as part of its operation process to produce the Potash product. Salt is accumulated within these brine channels, which creates blockage to the channel, and thus salt needs to be removed to maintain the channels discharge capacity. Accordingly, APC has floated this RFI to attract proposals and offers to design, supply, install, test and commissioning of sufficient size equipment to dredge the salt in the channels.

The tenderers/ bidders to be informed that APC also as part of its operation is dredging salt from the solar ponds using dredgers, which don't fit for the intended purposes of dredging the channels, due to their large sizes and difficulties in mobility.

The scope shall include Design, supply, fabricate, manufacture, transport, install/ assembly, testing, commissioning and warranty of special salt machine dredger, with sufficient size and capacity to dredge brine channels in two locations; along salt pond SP0A and the entrance channel of salt pond no. SP-0B, in addition to the ability to operate this dredger inside the evaporating ponds other than the channels that contain salt and Carnallite, and shall be used for the following purposes:

1. Dredging the salt mushroom inside the evaporation ponds weirs, gates, and other restricted narrow and shallow areas.
2. Design and propose the best alternative of transferring the dredged materials to the assigned reclamation site/ area(s).

The Scope shall include the following:

- 1- Delivery Terms: CPT APC Safi Site.
- 2- Performance Test for 120 hours continuous operation
- 3- Special Warranty (Defects Notification Period) for One full year after successful Performance Test.

Site visit-:

All Bidders shall visit the two locations defined above prior submitting the offers. Bidders shall familiarize themselves with the nature of site, its surrounding, the environment, materials properties that need to be dredged, and any other parameters that will affect the bidders' prices. APC will consider the site visit is conducted once the proposal/ offer is received from the bidder.

APC will arrange the site visit within two weeks from the date of issuing the RFI, to allow flexibility for the bidders.

Salt Dredging/ Process - General Description.

1.1 Introduction of Current Dredging Process

Potash is produced at The Arab Potash Company by a process based on selective precipitation of the non-required minerals in a system of evaporation ponds until the solutions of the desired composition are finally obtained (through natural evaporation).

Dead Sea brine is one of the main sources to produce potash, which is found in the form of potassium chloride salt. Dead Sea is a Terminal Lake at the Southern end of the Jordan River, which for centuries has been receiving the waters of the river and very slowly concentrating the salts into what has become one of the greatest mineral reservoirs known to man.

The process commences at the brine intake pumping station where the intake pumps deliver the Dead Sea brine to salt ponds. The first salt ponds (SP-0B), then to SP0-A, then to SP1 then to SP2 then to PC-2. The brine is transferred by gravity through weirs and canals.

In the system, the brine starts flowing and moves from the salt ponds at the beginning of the system southward towards other salt pans by gravity. As the solution flows, the water begins to evaporate, and the density of the brine gradually increases, leading to the precipitation of salt (NaCl). Huge amounts of salt are deposited in the salt ponds, which may lead to the loss of some areas and create obstacles in the flow of the solution specially at the narrow area such as canals and weirs. However, these problems are addressed through inspection tours and regular monitoring of the differences in the levels and concentrations of the salt pans.

Subsequently, APC is currently removing the deposited salt using a fleet of cutter suction dredgers in addition to dry excavation equipment.

1.2 Salt material description

This section describes the chemical and physical properties of the slurry that need to be dredged.

Salt slurry - Chemical Analysis:

Stream	Phase	Solid	Liquid
	Chemical Analysis	%KCl	0.01 - 5
%NaCl		90 - 10	1.00 – 6.00
%MgCl ₂		0.01 – 2.0	15.0 – 26.0
%MgBr ₂		0.00	0.00
%CaCl ₂		0.01 – 0.60	4.00 – 7.00
%H ₂ O		Balance	Balance
Temp. ^o C			16 - 50

*Process water is usually used for flushing and cleaning purposes.

Salt slurry - Physical Analysis:

1- PSD for Salt after stockpiling & Drying

Granulometry: -

- Sized (d'): 2 – 5 mm.
- Distribution (h): 1.5 – 5.2
- Crystals Size: Particle size distributed from 0.5 mm to 19 mm diameter contains lumps more than 19 mm diameter.:-

Mesh Size (mm)	Passing %wt./wt.
19	85 – 95
4.7	65 – 85
2.8	45 – 65
2.0	25 – 45
0.5	1.0 - 25

To determine the mechanical properties of salt materials, suppliers are requested to collect representative samples and analyses at a representative lab, however only for guidance the following table illustrate the the particulars relevant for the dredging equipment are:

Item	Units	Particulars
Brine Channel depths	meter	1.5 to 2
Brine channel width	meter	20 to 80
Discharge or transport distance	meter	50 to 400
Discharge or transport height	meter above brine level	2 to 10
Material to be dredged		Salt (NaCl), sometimes contaminated with silt or other soils
Strength of salt cohesion	Undrained shear strength in compression	500 to 1000 Kpa
	Tensile strength	66 to 100 kPa
The compressive strength of the salt to be dredged		2MPa up to 15MPa
Required daily production capacity	M ² /day	1000
Mobile Dredging Equipment	Launching	To be lifted by crane
	Transport	on low-bed truck or self-driving

GENERAL REQUIREMENTS

Bidder shall recommend all alternative to dredge the specified canals including but not limited to: -

- Normal cutter suction self-floated dredger if it works at such canals.
- Backhoe Dredgers that equipped with suitable jack hammer and huge bucket in addition to a cutter head with additional hydraulic power and small size pipe, in length and diameter, a low bed trailer to be also designed and manufactured by the same supplier of the backhoe dredger.
- Other type(s) of Dredgers to be recommended by the bidder.

The proposal shall include:

- Equipment offered with due particulars.
- Related or required auxiliary equipment for support, lifting, transporting.
- Expected operating productivity efficiency in production, maintenance requirements.
- List of recommended spare parts for one year operation.
- Expected operation Fuel consumption and lube oil, and other consumables.
- Operation of the equipment will be carried out by APC staff and/or other contractors. ~~In case any~~ specialized operational and maintenance training for APC staff is required.
- The dredging control shall be operated by one operator.
- The dredger shall be diesel dredger.
- The dredger is designed such that it can be easily transported to any location.
- The thickness for bottom & side plates shall be minimum (8-10) mm thickness
- All equipment should be designed and selected to provide high durability and ease of maintenance, considering the aggressive environment.
- Provide us with the Preliminary Risk Assessment and Safety in design review plan.

Conditions and Terms

The bidder shall clearly identify in his offer and select one of the following two options:

- a. Type 1: The proposed dredger is custom made, and needs to be manufactured and supplied specifically for APC.
- b. Type 2: The proposed dredger is being manufactured by the bidder, as continuous production process in his factory, and not a custom made.

The following conditions shall be applied for each type:

- i. Type no. 1: The successful bidder will be considered as "Contractor", and The General Conditions of Contract shall be the Conditions of Contract for EPC/Turnkey Projects, First Edition 1999 Part I, published by the Fédération Internationale Des Ingénieurs-Conseils (FIDIC), World Trade Center II, P.O. Box 311, 1215 Geneva 15, Switzerland. The Contractor is deemed to have full knowledge of the General Conditions. The Particular Conditions under Annex no. 2 shall have precedence over the mentioned General Conditions.

- ii. Type no. 2: The successful bidder will be considered as “Supplier”, and the General & Particular Conditions mentioned in Type no. 1 above, will be customized to consider the supplying agreement, however the outlines in the document under Annex no. 2 will be generally applicable

Address	ARAB POTASH CO. PLC. P.O. BOX 1470, AL-JAHIZ STREET, SHMEISANI, AMMAN 11118, JORDAN.
Copies	One original and one copy.
Format	Bids must be submitted in two closed, sealed, and separate envelopes; the first contains the commercial bid; the second contains the technical bid
Signature	Signature person with authorization letter from the company

