Al Janoub for Oil Shale (PSC)

شركة الجنوب للصخر الزيتي (ش.م.خ)

AN-NADIYA OIL SHALE PROJECT

EXECUTIVE SUMMARY

Amman-Jordan

2013

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AN-NADIYA OIL SHALE PROJECT

Al Janoub for Oil Shale Co. (*formerly* Aqaba Petroleum for Oil Shale) is private shareholding company (the Company), incorporated in Jordan in 2009 under registration number 688. A Memorandum of Understanding (MOU) was signed on the 16th of April 2009 between the Government of Jordan represented by the Natural Resources Authority (NRA) and the Company. The MOU area (450km^2) is located in Wadi An-Nadiya area, 135km south of Amman. The main aim of the MOU is to carry out different activities having as the purpose the exploration, appraisal and given success the commercial exploitation of oil shale hydrocarbons and associated products via surface retorting process.

The Company is a well-established company owned by two main partners:

- **50%** owned by the Kingdom Investment Group Co. in Jordan (owned by Jordan Armed Forces) and,
- **50%** owned by Aqaba Gulf Capital Co. registered in Jordan.

During the first stage of MOU duration, the Company carried out extensive exploration campaign on the **450km^2**. The exploration study included: -

- Geochemical Remote Sensing investigation has covered the whole area.
- Ground surface geophysical surveys included TDEM and VES at 324 shots.
- In-hole logging investigations in the 32 boreholes.
- Geological survey
- Core drilling of 32 boreholes to penetrate overburden and oil shale layers.
- Analyzing of more than 500 core samples for their organic matter and other chemical analysis.

Based on the positive results revealed, the Company managed to select a potential oil shale deposit in an area of 35km^2. Subsequently, detailed investigation program was conducted on the selected area.

The detailed study included: -

- Further twenty (20) boreholes were drilled in the area

- In-hole geophysical logging investigations were also carried out.
- Around 450 samples from the 20 boreholes drilled in the area were analyzed at NRA and ENIN (Russian Energy Institute) laboratories.
- Digital Topographical and Geological maps (maps at scale of 1:5,000).
- Geological and GIS study.
- Technical evaluation and Ore reserves calculation.
- Hydrological and Hydrogeological studies.
- Mining study

The Company has conducted and prepared all the technical studies as part of the fulfillment requirements of the 35km^2 MOU area. The studies include topography mapping, geological studies and mapping, geophysical surveys and boreholes logging, core drilling and sampling, hydrological and hydrogeological studies, geochemical analyses, reserves estimation and technical evaluation, and mining studies.

The selected area (35km^2) has become the new MOU area for the Company. The results showed that oil shale thicknesses range **20-48m** with an Average of **35.5m** and overburden ranges from **39 to 66m** with an average of **52m** and stripping ratio (overburden/oil shale) is 1.8 . The average oil content of the oil shale ranges between **8.3 to 13**% with a weighted average of **9.7%**. The Selected area comprises a reserve of **1930 million tons** of oil shale. The quantity of Oil content in place of such indicated reserve is calculated at **187** million tons which stands for about **1,235** million barrels of shale Oil.

The shale oil (Syncrude) could be upgraded to meet the normal crude oil which will be able to be refined at the normal refinery. In addition, substantial natural gas is also produced from the process which could be burned to produce electricity.

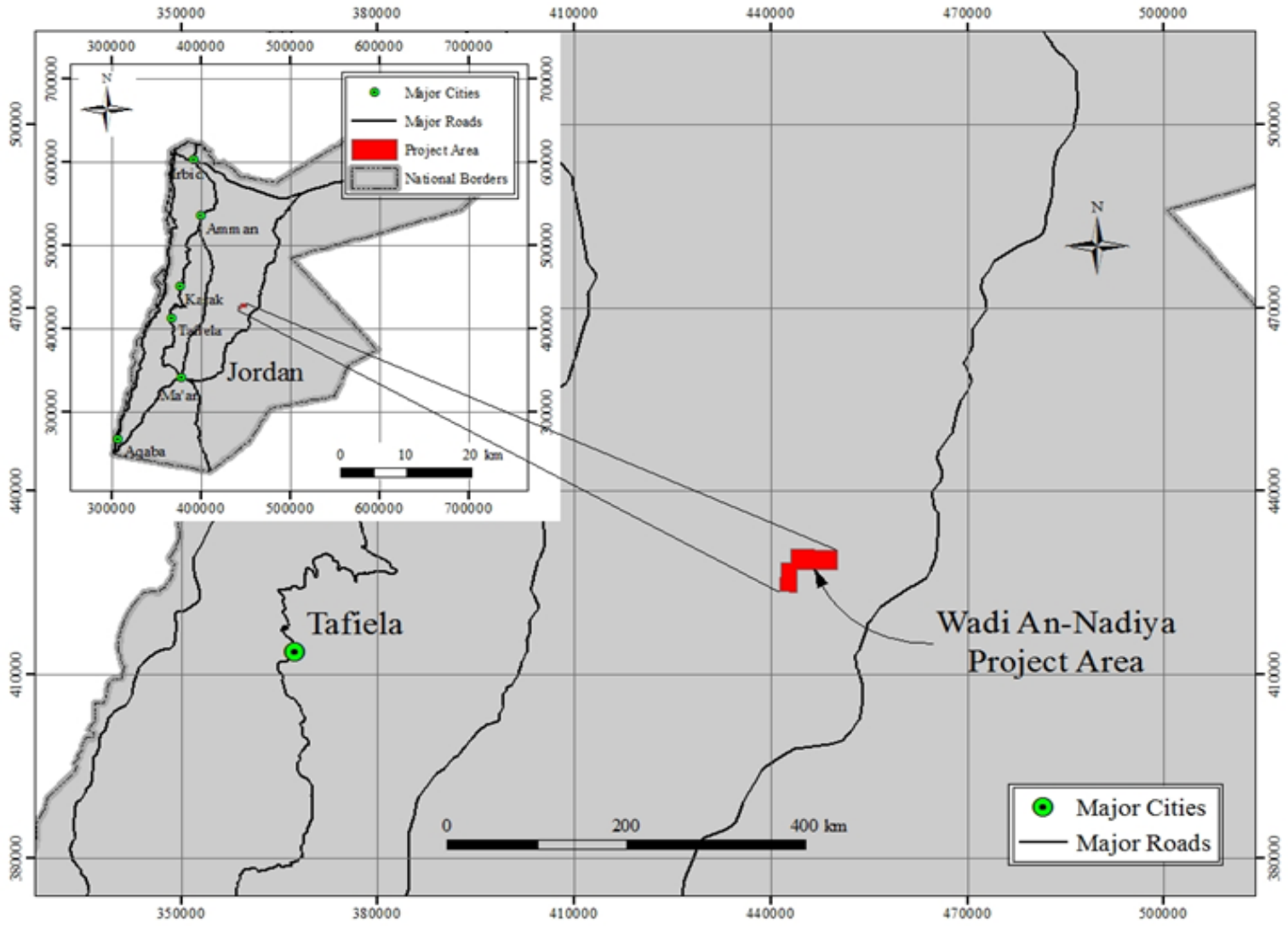
A 3km^2 mining site was selected in the MOU area. In this site, about 158 million tons of oil shale rocks at **10%** oil content with favorable mining conditions are available to start Phase-1 of production using 3 to 6 UTT processing units (Russian Technology). The average thickness of Overburden is **44.6m**, inter-waste layers (poor OS layers) is 14.9m and the average oil shale thickness is **39.1m** at **1.53** stripping ratio.

The MOU was extended till Dec. 16th of 2014 in order to accomplish the feasibility and environmental studies to fulfill its obligations in regard to the MOU requirements. Upon the completion of the full scope of the Feasibility Study, the Company intends to sign the Concession Agreement with the Government of Jordan.

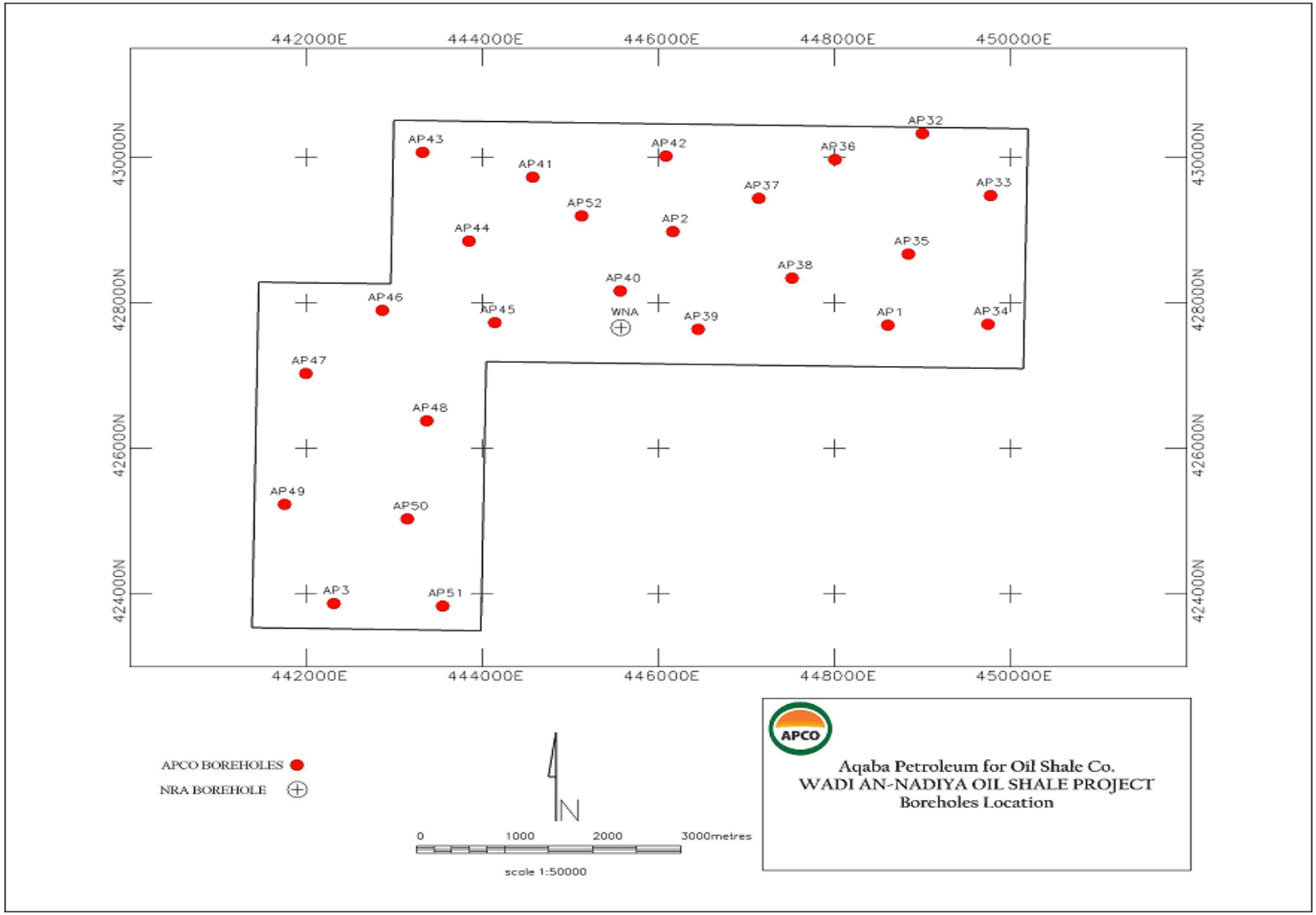
Aim of the project

The aim of the project is to construct in the Hashemite Kingdom of Jordan an enterprise for production of synthetic oil and electric power from Jordanian oil shale utilizing surface retorting technology. The Objectives are:

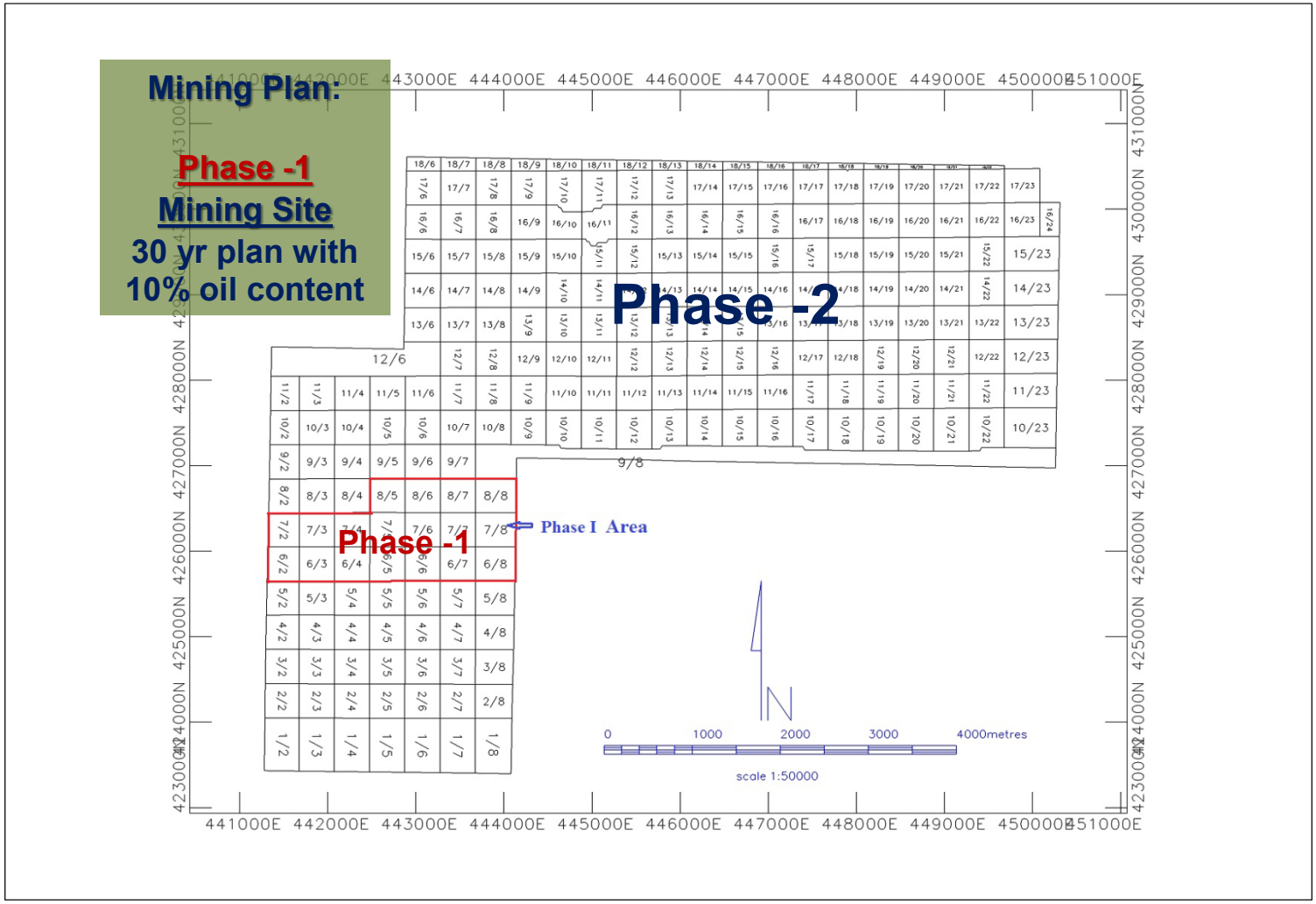
- to produce the high calorific energy resources in the form of shale oil (synthetic oil) and combustible gas,
- to generate power utilizing the oil shale processing by-products obtained,
- Creation of additional jobs for Jordanian nationals, and development of infrastructure in Jordan
- to reduce the degree of Jordan dependence on foreign energy supply.



Location of MOU Area



Boreholes drilled in the area (MOU area)



Mining plan for the MOU area