

Chinese Oil Shale Activities

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I. History-1

- In China, oil shale retorting for producing shale oil began from 1920's; during the Japanese invasion of China
- Shale oil industry was operated in Fushun, Liaoning Province, for warfare needs.
- After the founding of the People's Republic of China in 1949, 100 oil shale Fushun type retorts and the related shale oil processing units were restored.

I. History-2

- Till nineteen sixties, Fushun retorts increased to 266.
- The maximum annual shale oil production increased to 780,000tons.
- In 1969, in Maoming, Guangdong Province, a new oil shale retorting plant was put into operation.
- With the discovery of Da Qing oil field in 1960's, the shale oil production declined and shut down in 1990's.

II. Oil Shale Reserves in China

- The proven reserves of oil shale in China accounts about 36 billion tons
- Yet extensive geological survey remains to be done.

II. Oil Shale Reserves in China-2

- Major oil shale deposits are:
 - Fushun, Liaoning: 3.6 billion t, Fisher Assay 6%;
 - Maoming, Guangdong: 4.1 b t, Fischer Assay 7%;
 - Huadian, Jilin: 0.3 b t, Fischer Assay 10%;
 - Longkow, Shandong: 0.1 b t, Fischer Assay 14%;
 - Nong An, Jilin; 16 b t, Fisher Assay: 4.5%.

III. Fushun Oil Shale Industry-1

- Fushun West Open Pit Mine has the length 6.6 km and width 2 km; oil shale , with the overburden of clay, sand, and green shale, overlies on the coal bed, is the byproduct of coal mining; oil shale layer has the aver. thickness of 80m;

III. Fushun Oil Shale Industry-2

- Western Mine has been operated for 90 years; now 70 million tons oil shale remain as proven exploitable reserves, with the aver. Fischer Assay shale oil yield 6.5%.
- Fushun East open Pit has huge quantity of oil shale reserves not mined yet.

III. Fushun Oil Shale Industry-3

- Fushun Shale Oil Plant under Fushun Bureau of Mines was built and operated in 1991.
- Till 2005, the plant expanded and was equipped with 120 Fushun retorts, each with the capacity of daily processing 100 t oil shale.

III. Fushun Oil Shale Industry-4

- Every 20 retorts share one condensation and recovery system.
- In 2005, 180,000t shale oil was produced.
- Fushun Retort has the upper oil shale pyrolysis part and lower shale char gasification part.

III. Fushun Oil Shale Industry-5

- Fushun shale oil is sold as fuel oil; part of surplus retort gas with low heating value is used in internal combustion engine for producing steam and power.
- By using shale ash, a cement factory was built with yearly production of cement 90,000t; and a brick factory with yearly production of 60 million bricks.

III. Fushun Oil Shale Industry-6

- Production cost of one t shale oil accounts about 1500 yuan, while selling cost about 3500 yuan, the plant earns much money.
- Fushun Shale Oil Plant is planning to build an ATP retort, with daily processing 6000t particulate oil shale.

IV. Maoming Oil Shale Industry-1

- Maoming oil shale mining area takes the shape of 50km length and 7km width, dividing into 6 districts, with aver. Fiasher Assay 7%, suitable for open pit mining.
- From 1960's to 1990's, Maoming Petrochemical Comp. under SINOPEC built 64 Fushun Type retorts and 48 gas combustion retorts for producing shale oil.

IV. Maoming Oil Shale Industry-2

- In Maoming the max. annual shale oil production was 180,000t.
- But retorting was shut down in 1990's.
- Recently Guandong Province is intended to utilize Maoming oil shale fluidized bed combustion for producing power.

V. Longkou Oil Shale Project-1

- In Longkou Mining area, Shangdong Province, oil shale coexists with brown coal, which has been underground mined for 30 years.
- Longkou oil shale has proven exploitable reserves of 0.1bt, with Fisher Assay 14%.

V.Longkow Oil Shale Project-2

- Longkou Bureau of Mines has made oil shale project:
yearly mining 2.5Mt oil shale
processing 2 Mt oil shale
with first choice to use 1 Petrosix retort
daily capacity 6000t
producing 200,000 t shale oil
shale char mixed with particulate oil shale is to burn in
fluidized bed combustion for producing power
shale ash for building material.

V.Longkow Oil Shale Project-3

- Investment for shale oil production accounts for 0.65 billion yuan
- Pay back period 5 years.
- The feasibility study was approved by Shandong Provincial Development Committee.
- Longkou is also intended to utilize Fushun Type retorting at first.

VI. Huadian Oil Shale Development-1

- Huadian oil shale reserves account about 0.3 bt, with Fisher Assay oil yield 10.4%;
- Oil shale has been underground mined;
- In 1996, 3 sets of 65t/h oil shale circulated fluidized bed combustion boiler were put into operation, with the capacity of 18000 kw;

VI. Huadian Oil Shale Development-2

- Besides, dozens Fushun Type Retorts were operated by private companies for producing shale oil, with the production cost of 1000 yuan per ton and selling cost 2000 yuan per ton; but with strong environmental impact;

VII. Huadian Oil Shale Project-1

- Huadian oil shale comprehensive utilization project has been put forward in 2005 by main investor-Jilin Energy & Communication Corporation under China Power Investment Corporation, cooperated with Jilin Municipal Government.

VII. Huadian Oil Shale Project-2

- This project includes:
 - yearly mining 2.5Mt oil shale;
 - retorting 2Mt for producing 0.2Mt shale oil, shale char mixed with 0.5 Mt particulate oil shale used for circulated fluidized bed combustion for producing power with the capacity of 2x50,000kw;
 - shale ash for 1.2 Mt cement and other building materials;

VII. Huadian Oil Shale Project-3

- Total investment is expected to be 2.7 billion yuan;
- The retorting part is expected to be 0.8 billion yuan;
- With the pay back period about 7 years;
- For oil shale retorting, it is intended to utilize Petrosix technology as the first choice;

VII. Huadian Oil Shale Project-4

- The prefeasibility study of Huadian oil shale comprehensive project has been approved by China National Development and Reform Commission in Nov.2003;
- Now, this project is in the feasibility study stage.

VIII. Other Potential Items-1

- In Mingxin, Gansu Province, coal and oil shale coexist in Hongshagong district;
- A Mingxin Mining Company is intended to exploit coal for producing methanol, and to mine oil shale for retorting for shale oil;
- Feasibility study for yearly production of 400,000 t shale oil is being made.

VIII. Other Potential Items-2

- In Uromqi Xinjiang, Yongden Gansu, Yilan Heilongjiang, etc., there are plentiful oil shale reserves, with Fisher Assay 6-19%;
- It is believed that these reserves will be utilized in near future.
- Chanpo, Hainan is also actively engaged in utilizing its coal and oil shale reserves

IX. China University of Petroleum-1

- China University of Petroleum has been involved in the research and development of fossil fuel processing for more than 50 years;
- Its Applied Chemistry Department is the main institution dealing with oil shale in China

IX. China University of Petroleum-2

- University's oil shale experts undertake the oil shale evaluation, consulting, and reviewing work for prefeasibility and feasibility study and development projects for domestic and foreign countries;
- Recently, signed contract with a Mongolian Company to make feasibility study for Mongolian Khoot oil shale deposit.

X. Conclusion-1

- Due to high world's crude oil price, China is being paid more attention to oil shale utilization, especailly now China imports large amount of crude oil.
- China has plentiful oil shale; Fushun is expanding its shale oil production; Longkou, Huadian, Maoming are planning to build oil shale retorting, or /and combustion plants.

X. Conclusion-2

- In 2005, China National Oil Shale Association was established.
- China University of Petroleum undertakes oil shale education, evaluation, consulting and reviewing work for feasibility study and development projects for domestic and foreign countries.

Thank you for your attention!

