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Solution mining of deep potash deposits in the Michigan Basin

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Solution Mining of Deep Potash Deposits in the Michigan Basin

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About IMC Potash

History of IMC's Michigan Operation

Michigan Geology

Solution Mining of Deep Deposits

Brine Processing

Summary

IMC POTASH

Business Unit of IMC Global (IGL)

Largest producer of potash worldwide

Capacity of 11 million tons / year

Two main products: MOP & K-Mag

Supply most of industrial grade MOP market

Lowest cost producer





Deepest potash mine in the world

Located in Osceola County, Michigan

> Close to major potash & salt markets

Unique solution mining & refining processes



HISTORY OF MICHIGAN PROJECT

1980 Borgen bed discovery

- **1980-1985** Potash exploration program > 50 holes drilled
- 1986-1987 Solution mining test work 2 caverns developed near village of Hersey
 - 1989 Construction & start-up of pilot plant -40,000 tpy potash only
 - 1995 Construction of full scale potash & salt plant begins - production caverns developed
 - **1997** Start-up of plant in April

1998-1999 Additional salt processing facilities built

IMC Potash

THE I

Hersey Michigan Operations



Production Capacities:

Potash 160,000 tons/year Salt 265,000 tons/year Bags & Blocks 220,000 tons/year

Number of Employees:

100

Annual Sales Revenue:

\$35 million

Capital Investment:

\$95 million since 1995



NORTH AMERICAN SALT BASINS









Silurian Age Evaporite

> 400 million years old

MICHIGAN ORE ZONE





<u>Borgen Bed</u> 5 m thick > 50% KCI

<u>BC Beds</u> 11 m thick 25% KCI

Natural gas production from Niagaran

IMC POTASH – LOCAL MINERALIZATION

BORGEN BED GRADE THICKNESS meters x % KCI











Well drilling costs

Workover time & costs

Brine disposal



KCI & NaCI PHASE DIAGRAM





GAS TURBINE / COMPRESSOR & EVAPORATOR



H₂S ABATEMENT SYSTEM





IMC has been able to successfully:

- develop large diameter caverns in sylvinite at depths of over 2,300m
- recover design potash & salt reserves per cavern developed
- control H₂S related corrosion & safety issues

