Innovations in Potash Technologies

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Intrepid’s Innovations

- Past
- Present
- Future
Intrepid Potash’s Cane Creek Potash Solution Mine
Moab Mine
Intrepid Potash’s Cane Creek Potash Solution Mine

- Conventional underground mining of Bed 5 initiated in 1964
- Bed 5 mine workings converted to solution mining in 1971
- Approximately 400 acres of Solar Evaporation Ponds
- Facility purchased by Intrepid Potash in 1999
- In 2001, Intrepid initiated Bed 9 horizontal well solution mining to supplement production
- Cane Creek produces both Salt (NaCl) and Potash (KCl)
- Cane Creek currently produces between 100,000 and 110,000 tons of KCl product annually
Site Map
Cane Creek Mine,
Moab, Utah

Bed 9 Horizontal Holes

Evaporation Ponds

Surface Facilities
Intrepid Potash’s Cane Creek Potash Solution Mine

Injection Well

Recovery Well
Intrepid Potash’s Cane Creek Potash Solution Mine

Solar Evaporation Ponds
Intrepid Potash’s Cane Creek Potash Solution Mine

Harvesting a Pond
Introducing ...
Carlsbad Potash Basin Location
World Potash Production and Consumption

- Potash is produced in the U.S. in New Mexico, Utah, and Michigan
- 85% of U.S. potash is produced in the Carlsbad Potash Basin (CPB)
- About 20% of U.S. consumption is produced in the CPB
- Between 70%–80% of U.S. consumption is imported from Canada
Brief History of Carlsbad Potash Basin

- Bedded Potash discovered in 1925
- First Production in 1931 from American Potash Company (presently Intrepid Potash West Mine)
- Potash Company of America formed in 1931 (presently Intrepid Potash HB Mine)
- Five companies merge in 1936 to form IMC (presently Mosaic)
- Duval Sulphur and Potash begins operation in 1951 (presently Mosaic)
- Southwest Potash begins operation in 1952 (Horizon/Amax—presently abandoned)
- National Potash begins operation in 1956 (presently Intrepid Potash North Mine)
- Kerr-McGee begins operation in 1965 (presently Intrepid Potash East Mine)
Overview of the Carlsbad Potash Basin

- Eleven potash beds are within the ~400' thick McNutt Member of the Salado Formation
- Depth to the McNutt potash zone ranges from 700'–1800'
- Sylvite (KCl) and Langbeinite (K$_2$SO$_4$-2MgSO$_4$) are the major economic potassium minerals
- Sylvinite is a mixture of Halite and Sylvite (NaCl + KCl)
- Major Sylvinite ore zones are 1, 10, 7, 5, and 3
- Major Langbeinite ore zones are 4, 3, and 5
- Sylvinite Ore is 20%–40% KCl and 80%–60% NaCl
- Langbeinite Ore is 30%–50% K$_2$SO$_4$-2MgSO$_4$ and 70%–50% NaCl
Mixed Ore
Langbeinite & Sylvinite
5th Ore Zone
TYPICAL TWO-STAGE
"BRINE" - ONLY CYCLONE CIRCUIT

FIRST-_STAGE
BRINE-ONLY
CYCLONES

1ST-STAGE
OVERFLOW

SECOND-STAGE
BRINE-ONLY
CYCLONES

2ND-STAGE
OVERFLOW

FIRST-STAGE
BRINE-ONLY
CYCLONE
SUMP

1ST-STAGE
UNDERFLOW

SECOND-STAGE
BRINE-ONLY
CYCLONE
SUMP

2ND-STAGE
UNDERFLOW

INTREPID POTASH
Section View of a Water-Only Cyclone or “Brine”-Only Cyclone

- Vortex-finder length can be adjusted to increase or decrease density cut point.

- Truncated cone bottom allows “high-density” bed to form which rejects lighter-density particles. These particles are then transported to the vortex finder by the ascending slurry stream in the cyclone.

- Apex Ø can be adjusted to increase or decrease density cut point.
LANG RECOVERY CIRCUIT

LANGBEINITE RECOVERY CIRCUIT

INTREPID POTASH
BRINE ONLY CYCLONES AND HOT SCREENS
1ST AND 2ND STAGE BRINE ONLY CYCLONES
Future for Carlsbad
Intrepid Potash’s Carlsbad Solution Mining Project

The Intrepid Potash Solution Mining Project takes full advantage of previous mining and milling operations to provide the following benefits:

– Re-activation of an existing mineral operation by a well-defined alternative mining method
– Utilization of existing industrial facilities and right of ways
– Stable Intrepid Potash employment
– Recovery of abandoned resource
– Long-term, low-cost potash production
– Strengthens CPB competitive position in the fertilizer marketplace
– Potential for expansion
– Utilization of non-potable water source
– Utilization of energy efficient solar evaporation
1st Ore Zone Leach Lake Development

Water is Injected

Brine is Extracted

INTREPID POTASH
Initial Development of Leach Lake
Initial Development of Leach Lake
THANK YOU