



Indago Energy Limited

Hydrocarbon Dynamics 

ASX: INK

Annual General Meeting Presentation

May 2017





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Corporate Summary

ASX listed - Energy focused

Board & Management

Stephen Mitchell	Chairman
Don Beard	Non-Executive Director
Ray Shorrocks	Non-Executive Director
Nick Castellano	Executive Director
Allan Ritchie	Executive Director
Doug Hamilton	Business Development Manager

Capital Structure

Cash:	\$3.2m (31 Mar 17)
Share Price:	\$0.08
Issued Cap:	130.7m Shares
Market Cap:	\$10.5 Million
Debt:	\$0
Performance & Conditional Shares (not yet issued):	100m

Shareholder Summary – Pre HCD acquisition

Geoff Barnes	7.3%
Lowell Resources Fund	5.7%
Morgan Stanley Australia	5.2%
Nick Castellano	4.1%
Wheelbarrow Investments	3.8%
Stephen Mitchell	3.4%
Total	29.5%
Top 20 Holders	51%

Rebuilding Initiatives

New Board & Management
Name Change (formerly Pryme Energy)
Capital Reconstruction (1:10)
Sale of Low Impact Projects
Acquisition of Hydrocarbon Dynamics



Indago's HCD Technology

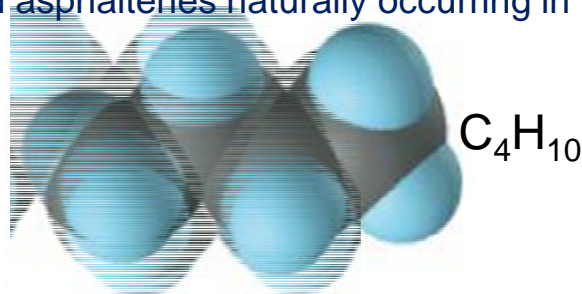
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Hydrocarbon Dynamics

HCD Multi-Flow™, is a small, specially engineered carbon-based molecule that disaggregates & relieves the large agglomerations of waxes and asphaltenes naturally occurring in waxy and heavy crude oils.

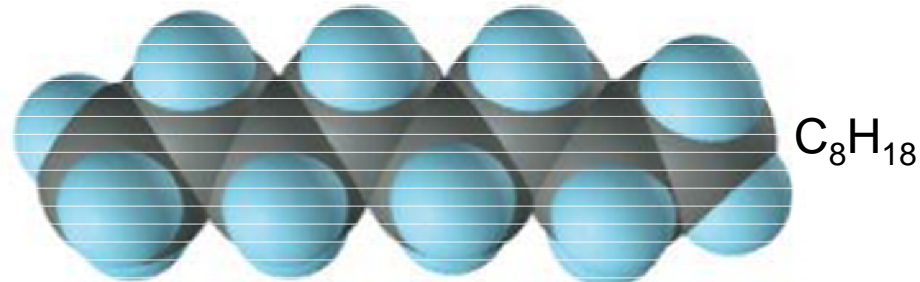
Fewer than 5 carbon atoms

Gaseous at room temperature



5-15 carbon atoms

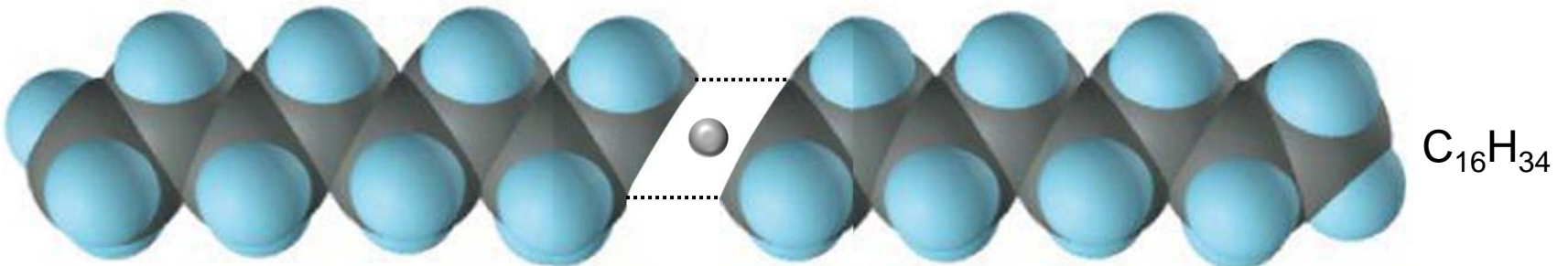
Liquid at room temperature



 **HCD Multi-Flow molecule**

>15 carbon atoms

Solid at room temperature



The paraffin now passes into the liquid phase at room temperature



Multi-Flow has the following impacts:

- Lowers the pour point of paraffinic crudes
- Lowers the viscosity of heavy crude oils, allowing reduced cost transportation
- Lowers the amount of heat required to mobilise heavy oils thereby reducing costs
- Lowers pipeline and production equipment corrosion rates
- Breaks oil and water emulsions, reducing BS&W levels, lowering costs
- Increases production rates by reliquefying paraffin & asphaltenes in the reservoir
- It provides a clean, green, cost-effective solution to the production, transport, storage and refining of heavy oils





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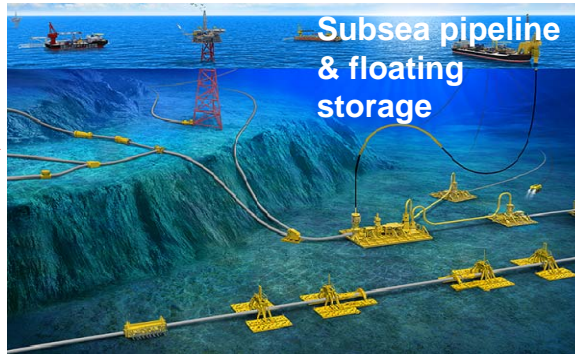
Application from Well bore to Refinery

Hydrocarbon Dynamics

HCD Multi-Flow™ has application through the entire hydrocarbon production stream



Offshore well-bore



Subsea pipeline & floating storage



Tanker storage & transport



Multi-Flow
green tech molecular disaggregation



Oilfield storage



Refinery feedstock & storage



... and its environmentally friendly



Onshore well-bore



Onshore pipeline



Refinery



Key product applications and their benefits:

- Ensures successful and economic flow in onshore/offshore pipeline and oil gathering lines that transport heavy or paraffinic crudes
- Increases oil production and recovery rates and thus economics in both onshore and offshore wells in fields producing heavy or paraffinic crudes
- **HCD Multi-Flow™** reduces the need for costly workovers and chemical or heat treatments to remove paraffin or asphaltene deposition on production tubulars & oil flowlines
- Enables efficient clean-up, oil recovery and water & sediment separation of tank bottom sludge in oil tank batteries offshore/onshore. **HCD Tank Clean** separates oil, water & sediment without the need for human intervention in tank cleaning
- **HCD Multi-Flow™** also improves crude quality in all applications by lifting the API Specific Gravity and separating water by breaking water-in-oil emulsions, resulting in a higher price for the crude at the point of sale



HCD Multi-Flow™, is a more efficient product based on superior technology. It is clean, green, non-toxic and significantly cheaper than rival products:

- It is less harmful to people and the environment than toxic solvents (Benzene-Toluene-Xylene) for clearing blockages in pipelines & well bores caused by paraffin/asphaltene
- It is more efficient than polymer chemistries for significantly reducing wax crystallization of the crude oil by interrupting the molecular attraction that causes wax to crystallise - whereas polymers only slow down this process
- It is much more cost effective than using heat treatments to keep the crude oil in a liquid (flowable) phase in cold environment conditions
- It replaces six traditional additives to treat paraffin and asphaltene with only one versatile product, making it operationally very simple and significantly less expensive for overall system treatments as well as being environmentally safe



The safety rating of **HCD Multi-Flow™** in the HMIS is exceptional. No personal protection is necessary when handling the product and there are no health hazards.

Multi-Flow 
green tech molecular disaggregation

HEALTH	0
FLAMMIBILTY	1
REACTIVITY	0
PERSONAL PROTECTION	

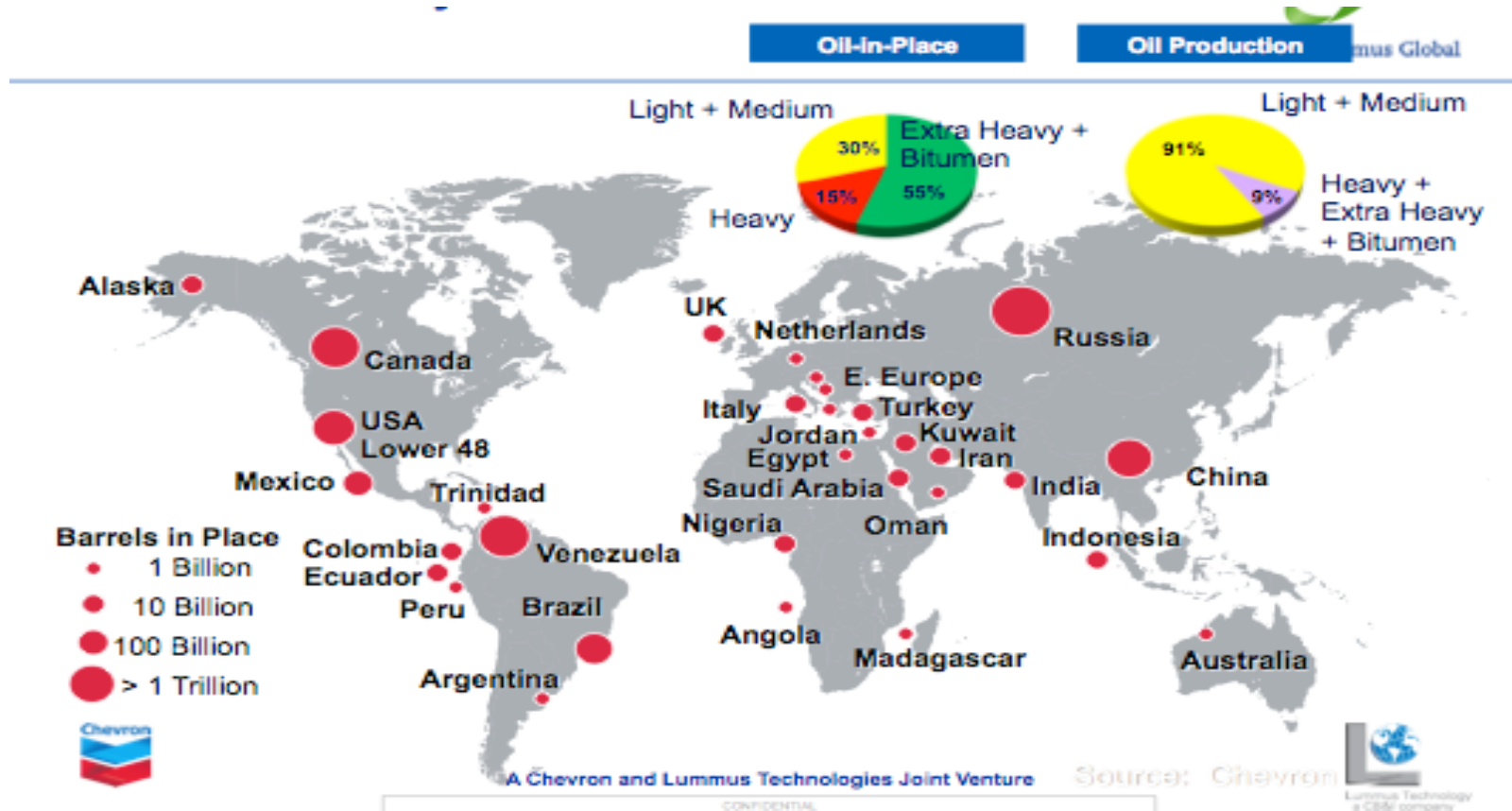
- 0 = Minimal Hazard
- 1 = Slight Hazard
- 2 = Moderate Hazard
- 3= Serious Hazard
- 4= Severe hazard





Opportunities in Heavy Oil Fields

According to the US Geological Survey, the world's current heavy oil reserve estimates total approximately 1.1 trillion barrels of oil. The Western Hemisphere has about 70% of this resource's technically recoverable reserves.





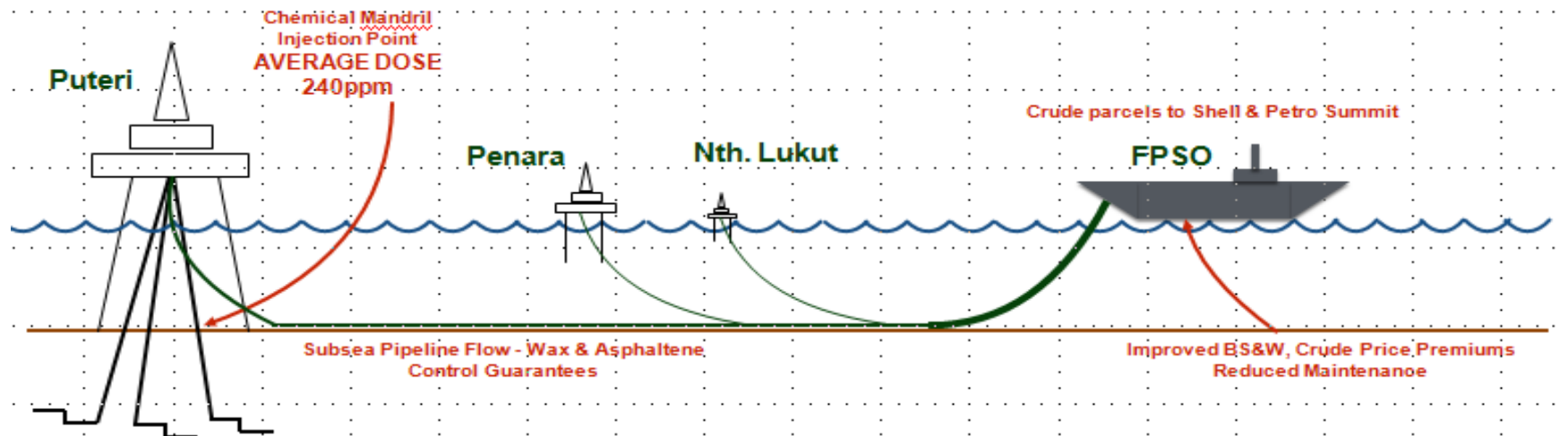
Pipelines Success: Puteri Platform

Puteri platform is part of a \$2bn offshore Malaysian development owned by Petronas that included a \$400m pipeline. The field is estimated to have produced up to 17,000 bod.

Due to Paraffin and asphaltene build-up in both the well bore and the pipeline, production had reduced to ~1,000 bod before the field was then shut-in in 2009.

In 2012 the production re-commenced using HCD Multi-Flow and was returned to production at an estimated rate of ~9,000 bod. HCD product was continuously used for 5 years.

Chemical Costs - Bunga Kertas De-watering & Flow Assurance





Pipeline Success: Puteri Platform



- Pour point reduced from 41°C to 32°C that enabled the platform to resume production and resume flow through the pipeline at ~9,000 BOPD
- HCD Multi-Flow™ solution cost ~80% less than the competitor's less effective products
- Facilitated restart of Puteri and restoration of value to the \$400M pipeline and \$2bn field
- Reduction of maintenance on platform heat exchangers
- Oil discount of 15% associated with BS&W eliminated – estimated to generate extra revenue of ~\$40m/year for Petronas
- Pour point was also reduced in the neighbouring Abu Alpha Field from 36°C to 14°C



Pipeline Successes: Syria's Souedie Field

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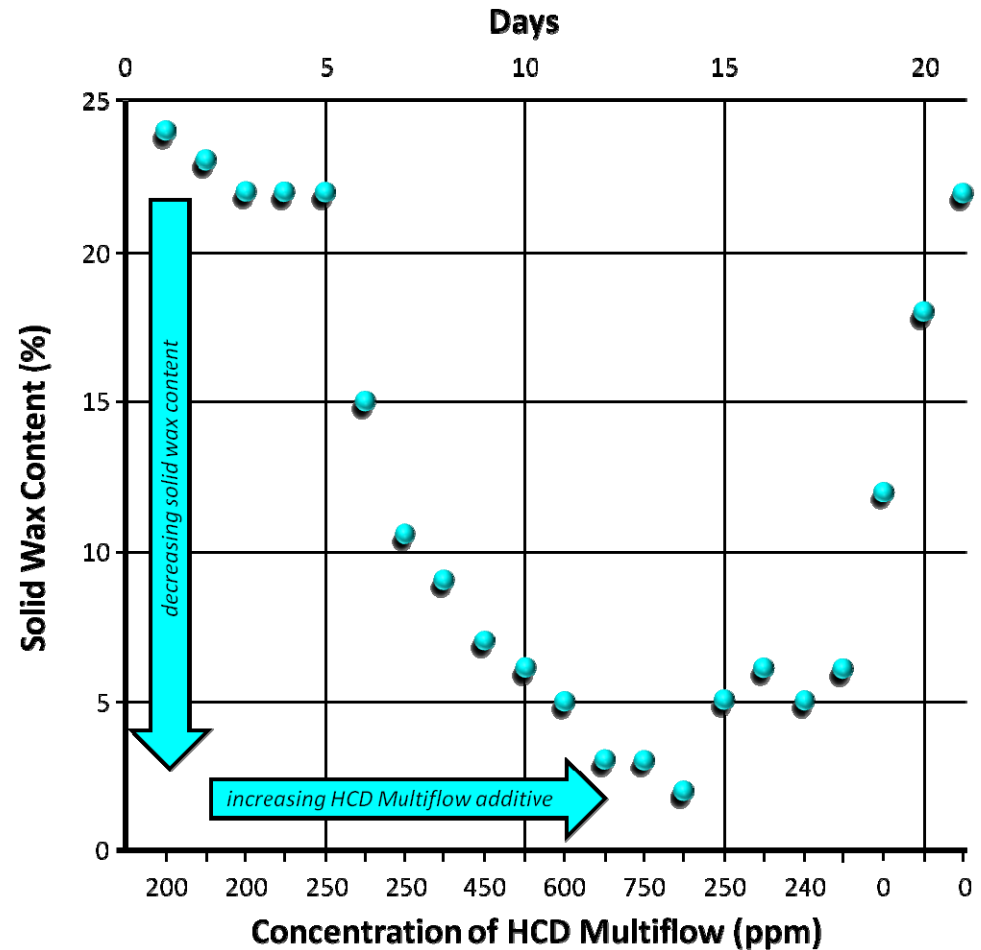
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Problem:

- Cold ambient temperatures at surface and high pour point waxy & asphaltenic crudes caused gathering lines and pipeline failures in Souedie Field, Syria
- Oil production was seriously curtailed because wax/asphaltene blocked the lines in winter. The wells had to be shut-in and damaged sections of gathering lines and pipelines had to be replaced in the Spring each year

Solution & Benefits:

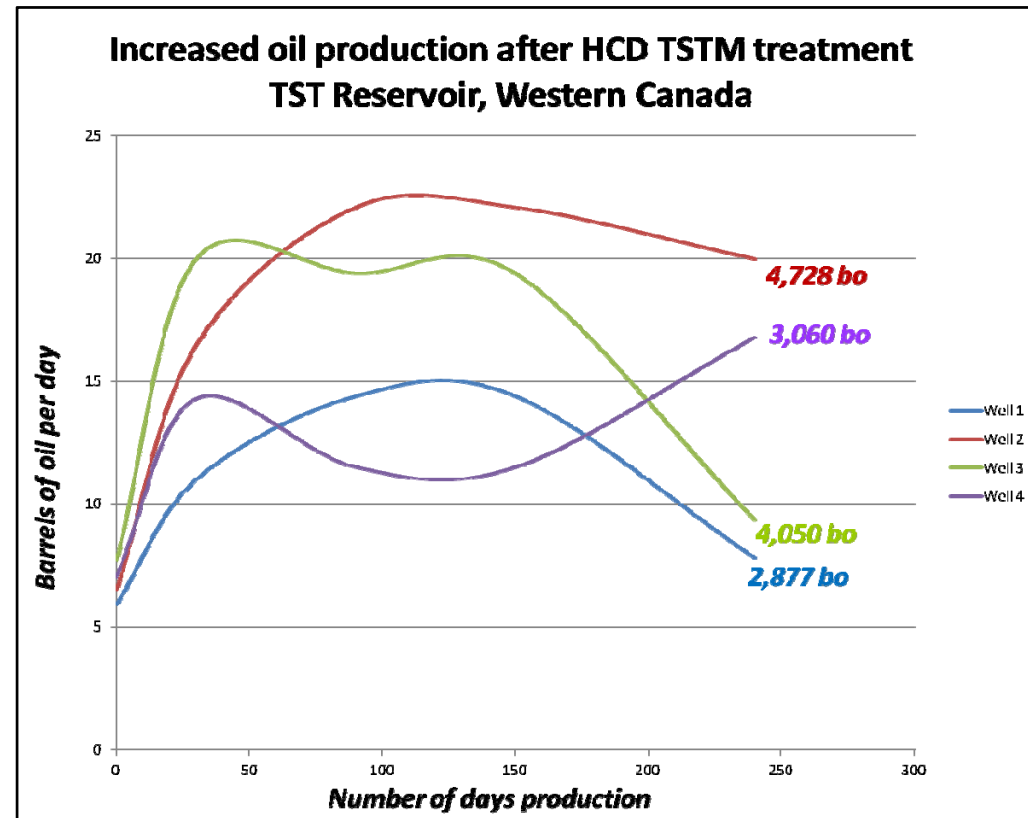
- HCD product was injected into gathering lines, liquefying the wax deposition and PP (by as much as 53°C) ensuring continuous well production & crude flow
- API gravity of treated crude was uplifted from 11⁰ to 15.2⁰





- HCD treatment increased daily oil production in 4 wells, increases varied from 64-240% and increases averaged 150%
- The production increase was largely sustained for 240 days of monitoring after the treatment
- No asphaltene or paraffin built up in the flowlines for at least 6 months after the treatment.

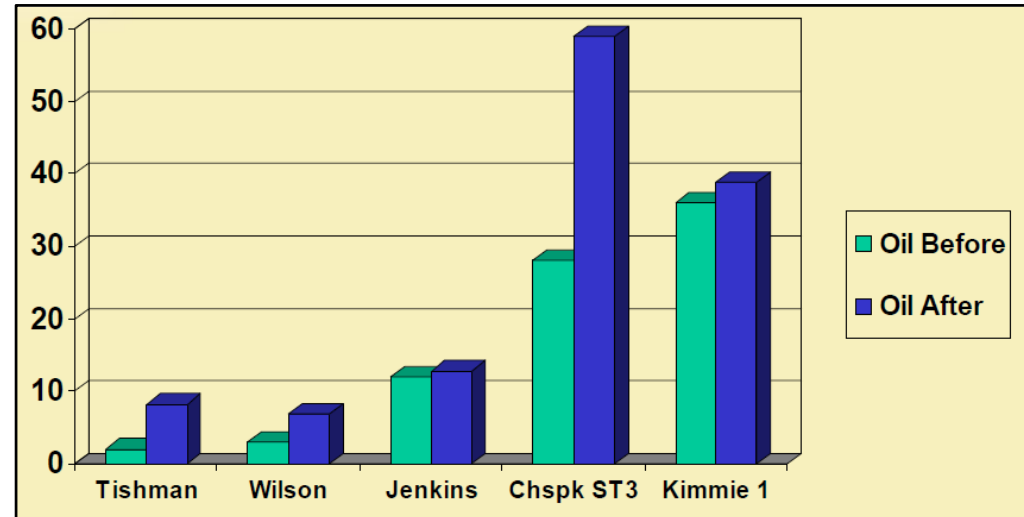
Well	Before (bopd)	After (bopd)	Increase %
1	5.9	14.4	144
2	6.5	22.1	240
3	7.7	19.4	152
4	7	11.5	64





Production Success: New Mexico

- HCD EOR (Enhanced Oil Recovery) treatment increased average daily oil production in 5 wells from 6-310%
- Total average incremental barrels of oil produced from one treatment was 45 barrels of oil/day
- Increased gas production from 367 mcf/day to 502.6 mcf/day (37%)
- Substantial increase in daily revenue. At current oil (\$US50) and gas (\$3.3/mcf) prices the increased revenue is \$US2,697 per day



Well Name	Before (bopd)	After (bopd)	Increase %	Before (mcf)	After (mcf)	Increase (%)
Tishman	2	8.2	310	0	0	no change
Wilson	3	6.8	126	5	30.8	516
Jenkins	12	12.8	6	50	74.3	48
Cheasapeake ST 3 No. 1	28	59	110	157	191.8	22
Kimmie 1	36	38.8	7	155	205.7	33
Total	81	125.6	55%	367	502.6	37%



The opportunities for future applications of **HCD Multi-Flow™** are enormous because the technology is directly applicable and beneficial to any area or business involved with the production, handling, storage or transport and refining of waxy or heavy crude oil.

In summary, potential applications include:

- Production in heavy and extra heavy crude oil fields
- Production in paraffinic crude oil fields
- Production in oil sands
- Treating pipelines that transport heavy or paraffinic crude oils
- Treating tanks that store heavy or paraffinic oils
- Treating refinery feedstock by reducing corrosive BS&W levels



States Containing Significant Heavy Crude Oil and Tar Sands Accumulations



- Areas with significant Heavy Oil accumulations
- Areas with significant Tar Sand accumulations

www.norwestcorp.com





Additional Opportunities

- **Paraffin Oil Fields** Caspian Sea and Kazakhstan – 85 Billion BO
Western Siberia Basin – 120 Billion BO
Indonsesia – 4 Billion BO
- **Oil Sands** Athabasca Oil Sands, Canada - 1.6 Trillion BO
- **Heavy Oil** Orinoco Heavy, Venezuela - 500 Billion BO
- **Asphaltene Problems** El Furrial, Venezuela - 26 Billion BO +50 TCF





New Business – Potential Impacts

The oil field chemical market is ~\$20 billion/year. HCD is relevant to 50% of this market.

- **Pipeline Applications.** Revenue possibilities are up to \$1/bbl treated. A single 50,000 bbl/day pipeline could therefore generate revenue of \$18m/year
- **Product Sales to Producers.** Similar revenue objectives of \$1/bbl of recoverable oil treated
- **Self Owned Projects.** Seek to own projects that generate significant reserves and production (initially in North America). Target projects with 10mmbbls recoverable
- **Incremental Production.** Contribute product to producers for share of incremental production and profits
- **Tank Cleaning & Refineries.** Large contract could generate up to \$5m in revenue





Existing Newkirk Project Oklahoma

Low cost, repeatable, stacked pay environment

Project information	
Primary Target Location	Mississippi Lime Kay County, OK
Operator JV Partner	Empire Energy
Acreage	4,049 net acres
Lease expiry	Commencing July quarter
Well locations	~100 (based on 40 acre spacing)

- AMI & JV allows for both parties to contribute 50% of costs to each earn 50% WI and 40.6 % NRI in each well drilled
- Vertical wells expected to cost US\$400k with possible EUR's of ~40,000 boe
- Np drilling plans due to low oil price. Scoping economics suggest oil price of US\$60/bbl needed and leases expire from mid 2017 and all lapse by late 2018 if not drilled
- Complex geology with cherts, cherts, dolomites & limestones
- Developed with fraced horizontal & vertical wells
- Mixed success - wide range of initial production rates and EUR's
- Wells produce significant water and low oil cuts – typically 10:1
- Salt water disposal wells required – linked to seismic activity



Source: SandRidge Energy, 2012



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