



Indago Energy Limited

Hydrocarbon Dynamics 

ASX: INK

Annual General Meeting Presentation

May 2018





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ASX listed - Energy focused

Board & Management

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

Capital Structure

Cash:	\$2.1m (31 Mar 18)
Share Price:	\$0.085
Issued Cap:	174.3m Shares
Market Cap:	\$14.8 Million
Debt:	\$0
Performance Shares (not yet earned or issued):	50m

Shareholder Summary

S McGregor Super Fund	6.9%
Lowell Resources Fund	5.9%
G Barnes	5.7%
S Mitchell	4.7%
A Khan	4.6%
Wheelbarrow Investments	3.8%
Top 20 Holders	51.7%

Summary - 2017

Acquisition of Hydrocarbon Dynamics
Built New Management and Sales Team
Appointed New Distributors for Middle East, China & parts of Europe
Purchased Oil projects in Kentucky & Utah Received initial Resource Certification for Kentucky
Conducted Numerous Lab and Field Tests



Indago's HCD Technology

Multi-Flow® has the following impacts:

- Lowers the pour point of paraffinic crudes by reliquefying paraffin, thereby improving production and recovery rates and reducing transport costs
- Lowers viscosity of heavy oils by increasing API⁰ gravity and reliquefying any asphaltenes, thereby improving production and recovery rates and cutting costs by reducing need for heat & diluent
- Breaks oil and water emulsions reducing BS&W levels, thereby improving crude oil quality (and price), reducing operating costs as well as pipeline and production equipment corrosion rates
- Liquefies oil sludge allowing effective cleaning and high oil recovery from refineries, storage tanks and vessels with HCD's TankClean product
- It provides a clean, green, cost-effective solution to the production, transport, storage and refining of heavy oils.



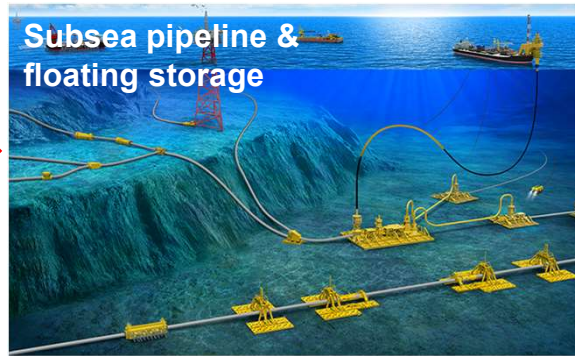


Application from Well bore to Refinery

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Hydrocarbon Dynamics

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



... and its environmentally friendly

Multi-Flow
green tech molecular disaggregation



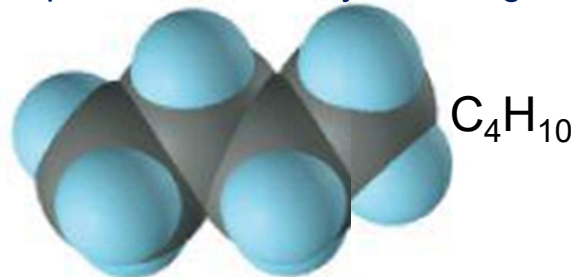


Indago's HCD Technology

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.

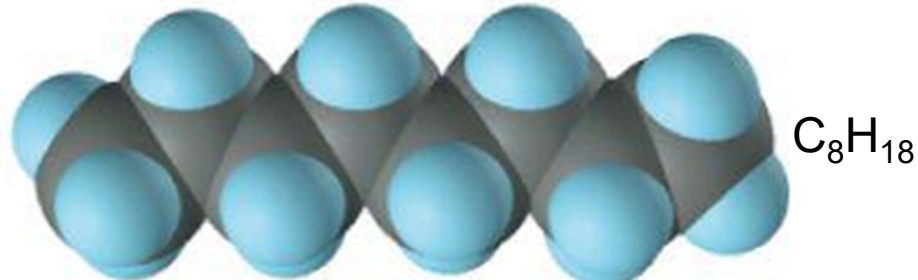
Fewer than 5 carbon atoms

Gaseous at room temperature



5-15 carbon atoms

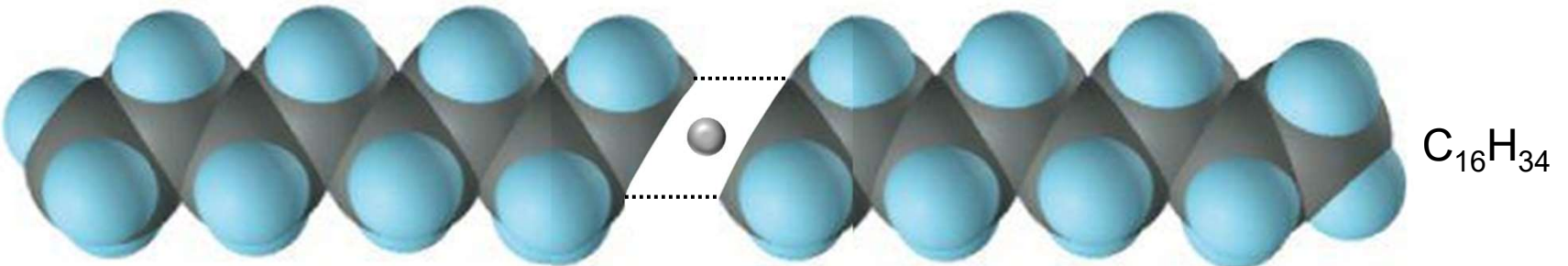
Liquid at room temperature



 **HCD Multi-Flow® molecule**

>15 carbon atoms

Solid at room temperature

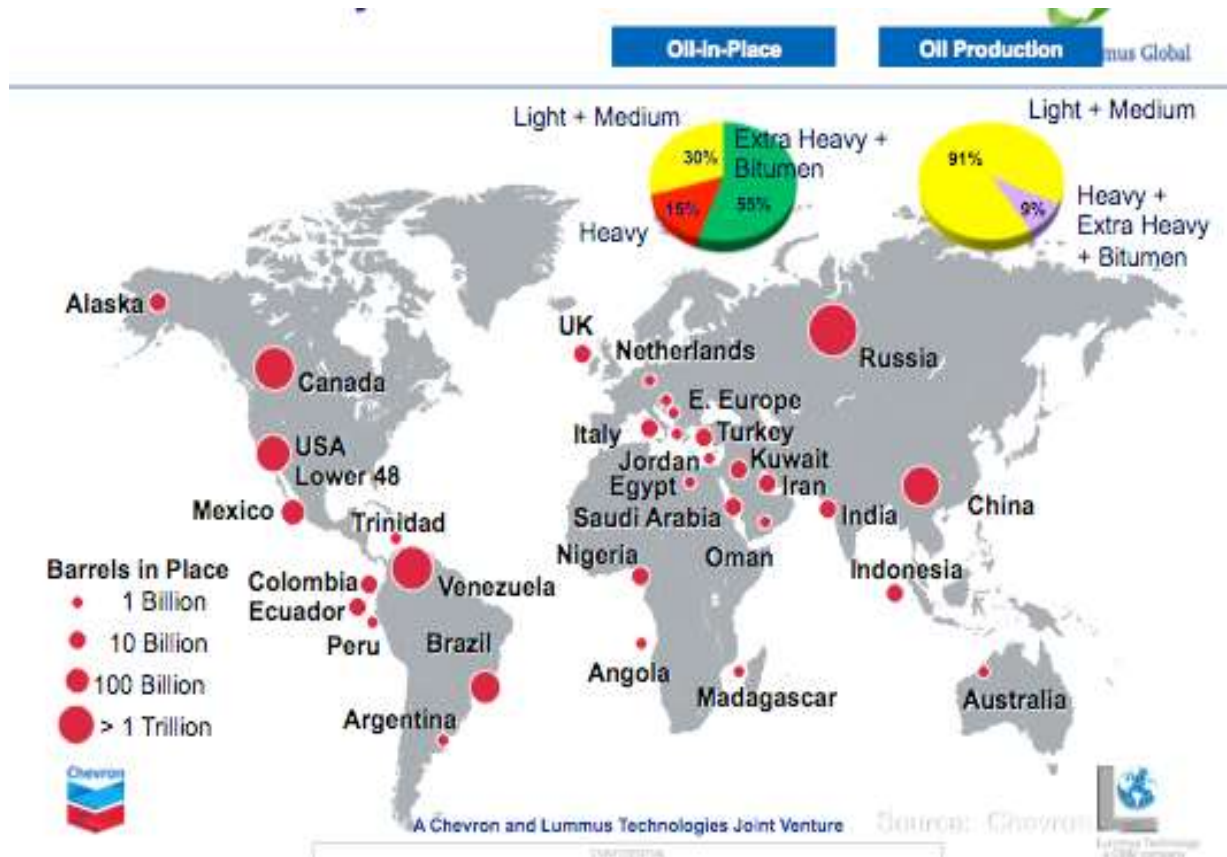


The paraffin now passes into the liquid phase at room temperature



Opportunities in Heavy Oil Fields

According to the US Geological Survey, the world's current heavy oil reserves total approximately 1.1 trillion barrels of oil of which the Western Hemisphere has ~70%



Since acquiring HCD, Indago has been active in the following countries:

- U.S.A
- Canada
- China
- Colombia
- U.K.
- Norway
- Russia
- Belarus
- Kazakhstan
- Oman
- Iraq
- India
- Kuwait
- Brunei
- Brazil



Pipeline & Downhole Success

Petronas Platform



- Pour point reduced from 41°C to 32°C that enabled the platform to resume production at ~9,000 BOPD after a 2 year shut-in.
- HCD Multi-Flow® solution cost ~80% less than the competitor's less effective products and reduced maintenance costs on platform heat exchangers.
- Oil discount of 15% associated with BS&W eliminated – estimated to generate extra revenue of ~\$40m/year .

Reservoir in Western Canada

- HCD treatment increased daily oil production in 4 wells by an average of 150%.
- The production increase was largely sustained for 240 days
- 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 Facilities - Phoenix



Production & storage facilities in Phoenix Arizona. Also storage facilities in Malaysia

Current capacity is 10,000 drums/year. Could be lifted to 20,000 with additional staff

Simple automation of facility could swiftly bring capacity to 130,000 drums/year (24 hours/day)



Middle East partner has the option to manufacture in the Middle East (with exclusive distribution rights) upon US\$20m payment

TankClean product has recently been upgraded and is undergoing trials prior to replacing existing product



Indago's technology is directly applicable and beneficial to the production, handling, storage, transport and refining of waxy, asphaltenic and heavy crude oils. The value creation strategy for Indago's use of **HCD Multi-Flow®** is twofold:

1. **Build a portfolio of Upstream Projects**

Invest in known oil accumulations where the application of HCD technology may lead to commercial extraction, reserves growth and cash flow. Two projects acquired to date:

- Kentucky
- Utah

2. **Sell HCD Multi-Flow® and Tank Clean to Industry**

Targeting oil producers, pipeline operators, tank cleaners and refiners:

- Developed marketing team in North America with representatives in Texas, California and Alberta.
- Established sales & marketing agreements with groups in South America, Europe and Russia.
- Appointed distributors in the Middle East & China.



Upstream Activities



States Containing Significant Heavy Crude Oil and Tar Sands Accumulations



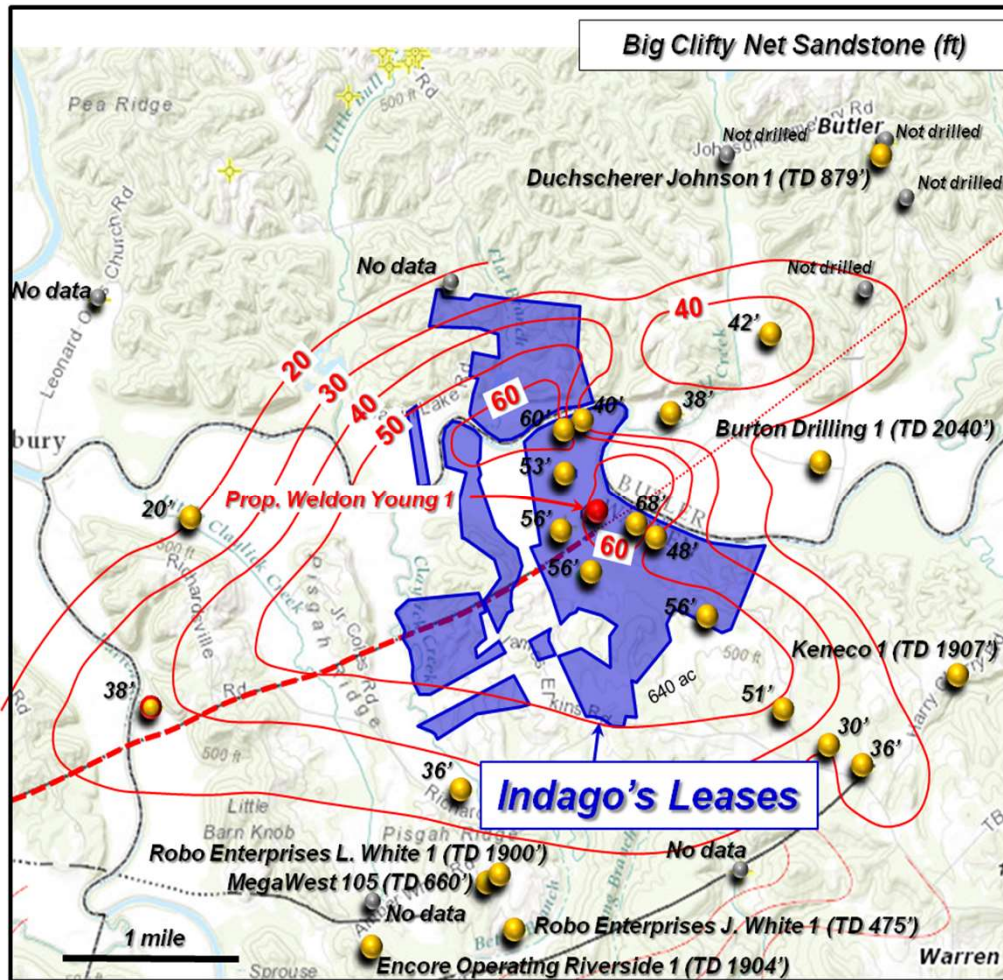
- Areas with significant Heavy Oil accumulations
- Areas with significant Tar Sand accumulations

www.norwestcorp.com





Upstream Projects - Kentucky



Western Kentucky Oil Sands are estimated to have 3.4 billion barrels of original oil-in-place (OOIP).

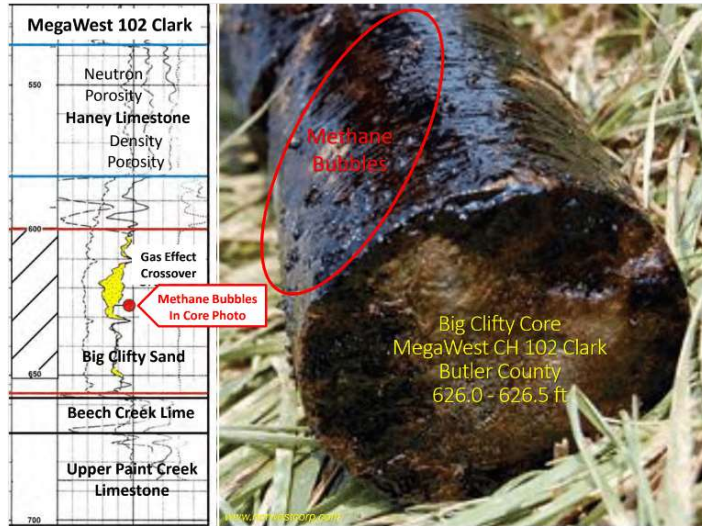
Indago has leased 1,786 acres, over which independent certifiers, Netherland Sewell & Associates, have estimated an OOIP of 42.3 million barrels (mmbbl). Of this OOIP, NSAI estimates that 7.5 mmbbl is 3C, 3.7 mmbbl is 2C and 1.9 mmbbl is 1C.

More than 10 wells previously drilled in INK's acreage demonstrates oil-saturated reservoir 12-20 metres thick at a depth of 125-215 metres.



Upstream Projects – Kentucky

2016 Eastern Section AAPG Annual Meeting
Lexington, Kentucky, September 25 - 27, 2016



Results from over 2,000 cores suggest the play has average attributes of 15.5% porosity, 192 mD permeability, oil saturation between 32 & 45% and 10⁰API oil.

Drilling of the first well commenced on May 18th targeting the Big Clifty Sandstone at a depth down to 215 metres.

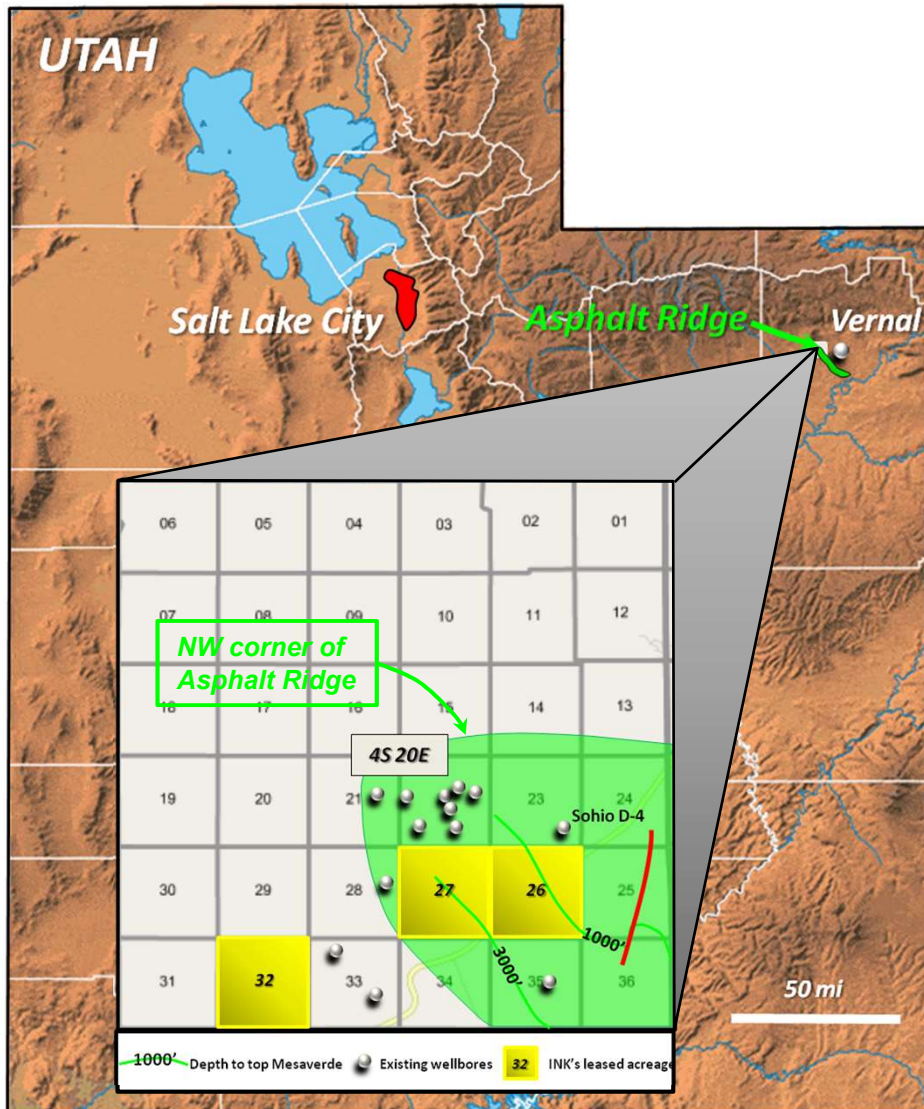
The Big Clifty Sandstone will be cored with the objective to confirm the oil saturation and investigate the interaction between the HCD Multi-Flow®, the oil and the reservoir.

Core analysis will assist in the design of a production test, expected to commence next quarter, which may be followed by a production pilot.

Drilling and coring operations are inexpensive - <US\$100k. Testing procedures will be costed after core analysed.



Upstream Projects – Utah



Utah Oil Sands are well documented and estimated by the Utah Geological Survey (UGS) to contain 14-15 billion barrels of oil.

Indago has leased 1,920 acres over the NW part of Asphalt Ridge in the Uinta Basin.

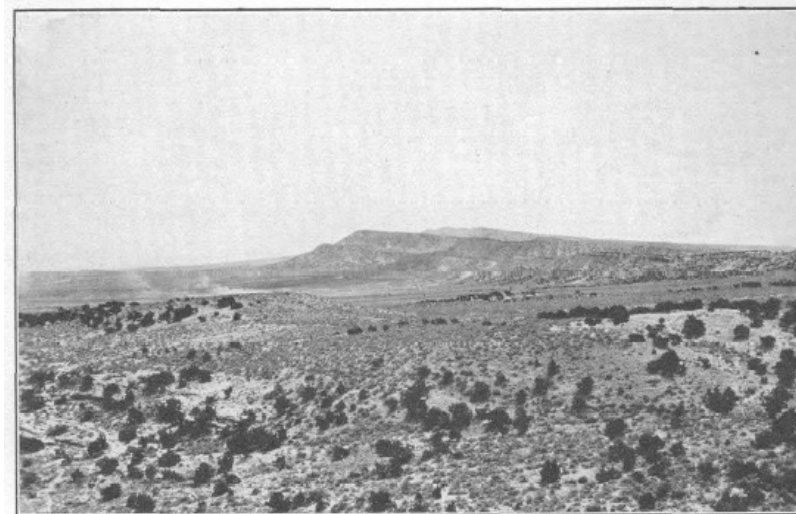
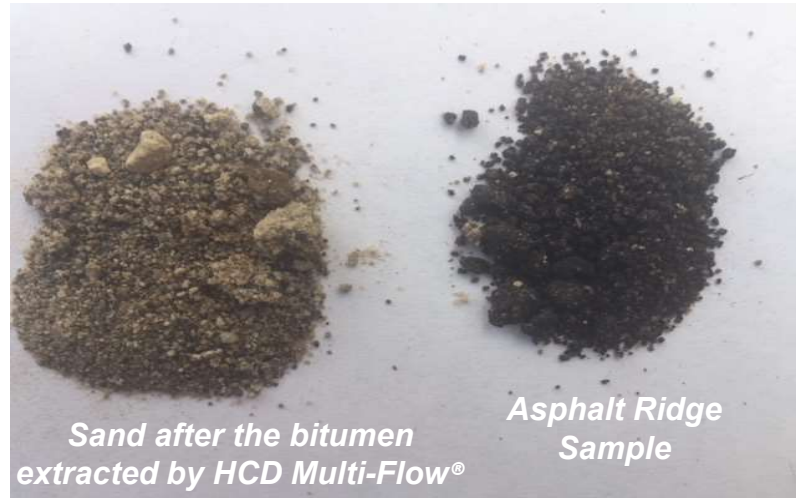
Previous operators have drilled around INK's acreage indicating an oil saturated reservoir 27-53 metres thick at depths from 60-914m

Published results (UGS) from 6 wells drilled adjacent to INK's acreage, report oil saturation of 65.6% of 10-14⁰ API oil in sandstones with porosity of 30.3% & permeability of 524 mD.

Determining the extent to which these hydrocarbon saturated sandstones extend into Indago's acreage, and how they respond to the HCD Multi-Flow® technology will be the objective of Indago's future work programme.



Upstream Projects – UTAH



A. ASPHALT RIDGE, UTAH, AS SEEN FROM THE NORTHWEST

- INK will initially test samples from the Rimrock Sandstone with HCD Multi-flow® for API gravity uplift and viscosity reduction to stimulate oil flow.
- Test results will be submitted (along with core & well bore data adjacent to INK's lease) to independent assessors for resource certification.
- HCD Multi-Flow® may also be offered to a nearby operator to assist in oil production and/or liberation of hydrocarbon from oil sand.
- Six core holes drilled in the adjacent section to the north indicate that the Rimrock Sandstone in their block has an average net pay of 120m, average oil saturation of 63.5% and average of 178,450 barrels of oil/acre, or approximately 114 million barrels of oil/section.



Legacy Newkirk Project Oklahoma

Low cost, repeatable, stacked pay environment

Project information	
Primary Target Location	Mississippi Lime Kay County, OK
Acreage	3,149 net acres
Lease expiry	Ongoing
Well locations	50+



Source: SandRidge Energy, 2012

- Vertical wells expected to cost US\$400k with possible EUR's of ~40,000 boe.
- Indago has no short-term drilling plans and will continue farm-out efforts to concentrate efforts on upstream projects where MultiFlow may be effective
- Complex geology with 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.



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Hydrocarbon Dynamics 

Testing and Sales Initiatives

Doug Hamilton
Business Development Manager



Testing and Sales Initiatives

Since acquiring HCD in April 2017, Indago has concentrated its efforts on building its own sales team in key markets, appointing distributors in other important regions and entering into sales and marketing agreements with specialist groups.

Indago Sales Team

Appointed by Doug Hamilton as Business Development Manager in April 2017. Established an office in Calgary led by Garth Sloan, in Dallas led by John Zetzman and in California by Roger Hamson.

Distributors

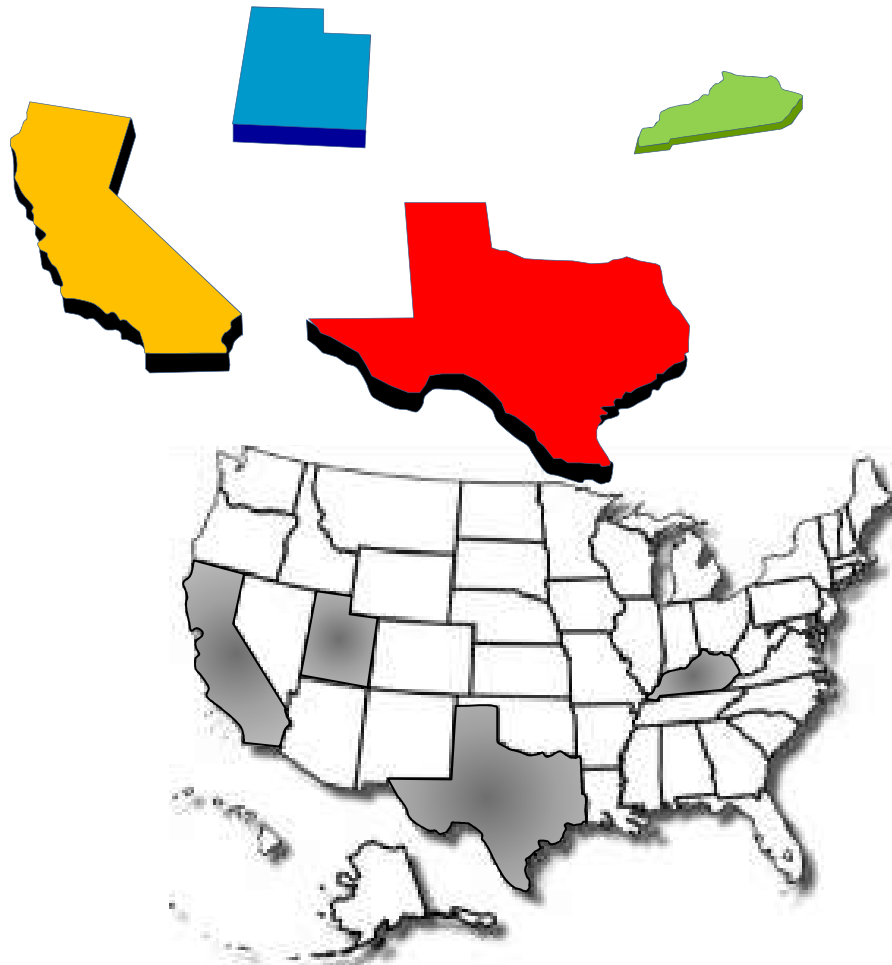
Indago has appointed three key distributors that include NESL in Europe, Gulf Green Crude Dynamics in the Middle East and Qinghua Energy in China.

Sales and Marketing

Many legacy sales and marketing agreements expired and were not renewed. This allowed Indago to appoint new agents covering key markets in South America, California and parts of Asia.



Multi-Flow® Testing – USA



California

- Indago is testing Multi-Flow® in extra heavy (5-6°API) crudes to reduce diluent costs. Tests with independent operators indicate diluents can be significantly cut with Multi-Flow® at ~2,000 ppm.

Utah

- Down-hole testing in 4 wells with two major operators is underway with the objective of reducing the pour point of the very waxy Utah crudes and thereby reduce production and transportation costs
- Testing to date has demonstrated pour point reductions to 80°F (from 120°F) which is the first benchmark set by the operators to reduce heating of their storage tanks.

Texas

- Trials underway with Independent operators in Texas aimed at substantially reducing Basic Sediment & Water levels to increase crude oil sales price. Results to date positive & moving to wells.

Kentucky

- Indago has spudded its first well in Kentucky targeting the heavy oils of the Big Clifty Sandstone. Bench top tests indicate that the heavy oils respond well to Multi-Flow®.



Diluent vs Diluent + Multi-Flow[®] Explained California Heavy Oil

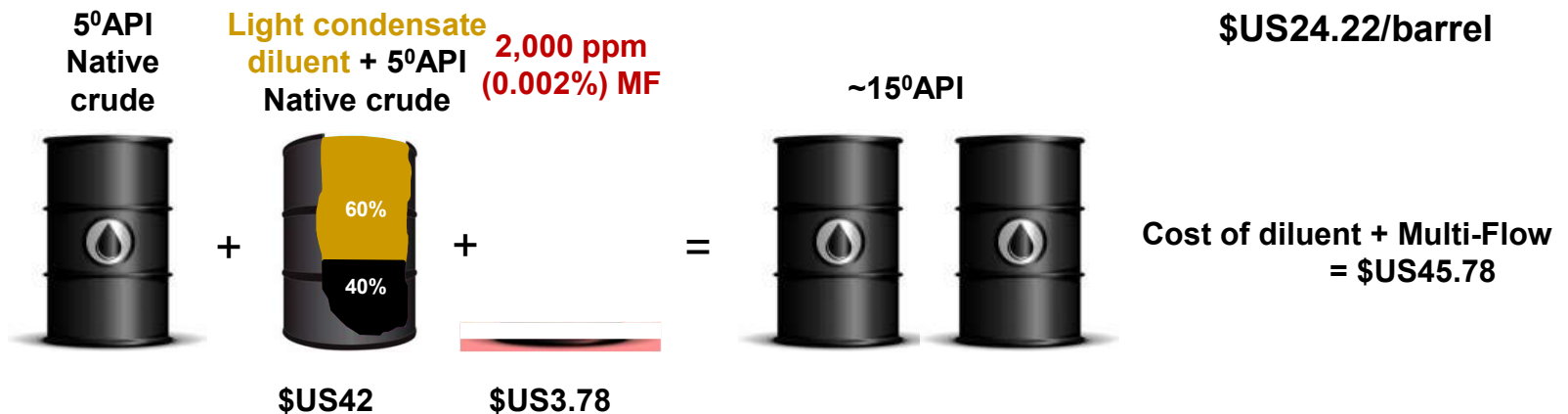
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50:50 crude-diluent blend



70:30 crude-diluent blend + HCD Multi-Flow

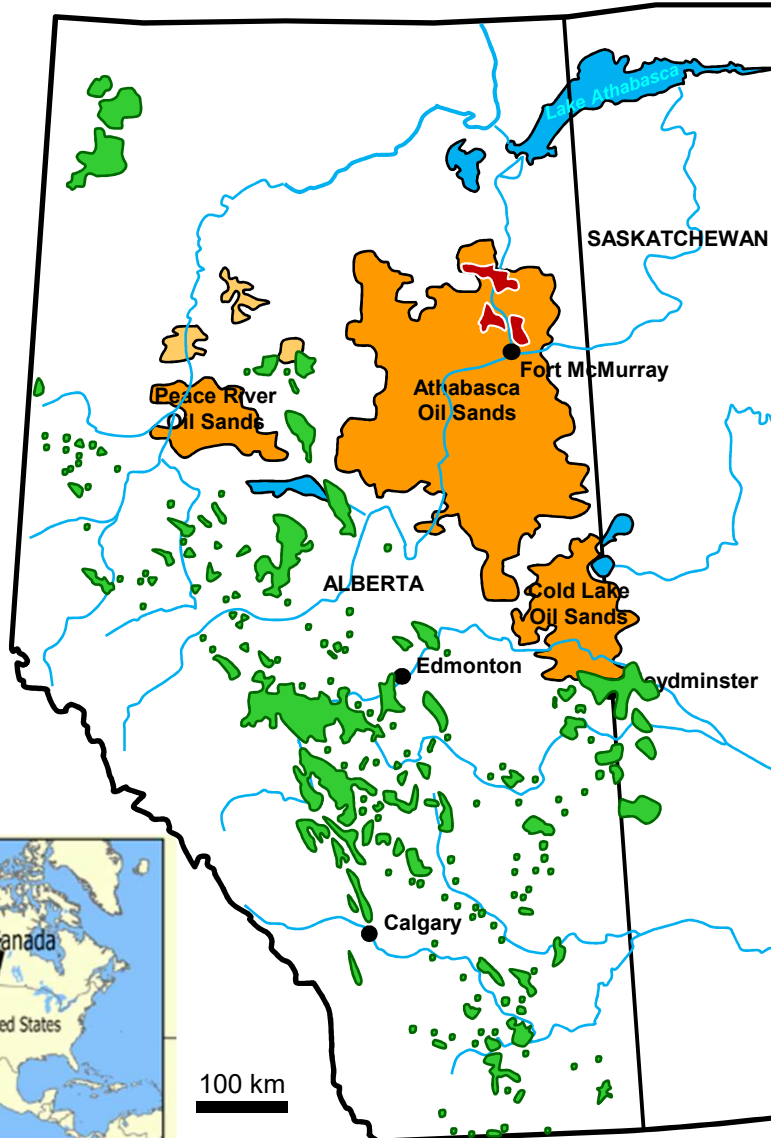




Opportunities for HCD Multi-Flow® in Western Canada

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Canadian Oil Sands

- the Canadian oil sands contain an estimated 1.6 trillion barrels of oil in place.
- the crude oil produced is extra heavy & viscous, and is mixed with 30-50% diluent (naphtha or light crude) in order to handle, store & transport.
- ~1.6 million barrels per day of diluted crude is exported by pipeline.

Mature Fines Tailings

- 1.3 trillion litres of toxic fluid tailings have accumulated in tailings ponds since oil sands mining operations commenced in 1967.
- residual bitumen-bearing clays “Mature Fines Tailings” within the fluid tailings causes serious environmental problems.
- extracting the residual bitumen is key to resolving the tailings pond problem.

Heavy Conventional Oil

- ~0.8 million barrels of heavy oil are produced daily.
- high viscosity & low API gravity make handling, storage & transport costly. High asphaltene content causes water-in-oil emulsions and high Basic Sediment & Water levels, reducing crude oil sale price.



Multi-Flow Testing in the Canadian Oil Sands

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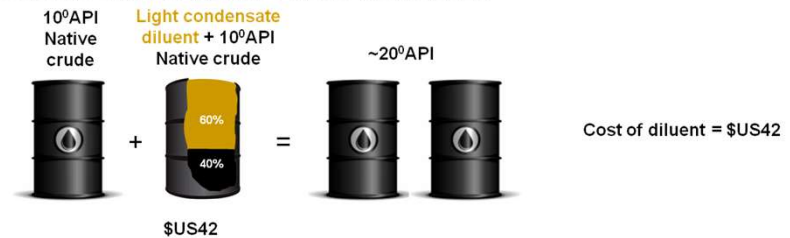
Hydrocarbon Dynamics



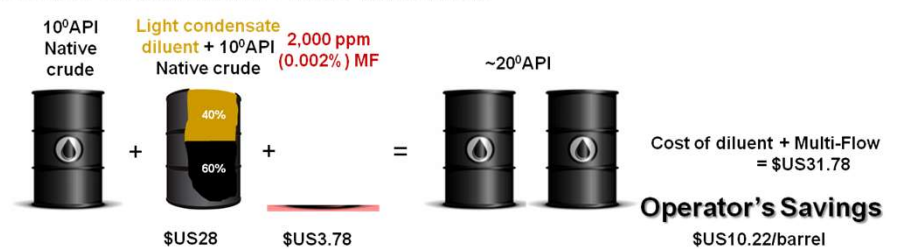
Canadian Oil Sands

- Indago attained samples of native crude from an Oil Sands operation near Fort McMurray. Laboratory analysis from CoreLab, Canada showed that the crude responds well to HCD Multi-Flow®.
- Viscosity required for pipeline transport to the export market in the USA is 350 cSt's, and it is unlikely that HCD Multi-Flow® alone could achieve such a benchmark.
- However, the Oil Sands industry currently dilutes the crude with 30-50% naphtha or light condensates to achieve pipeline specifications, and the opportunity for HCD Multi-Flow® is to reduce the diluent usage in the Oil Sands.

70:30 crude-diluent blend + HCD Multi-Flow



80:20 crude-diluent blend + HCD Multi-Flow

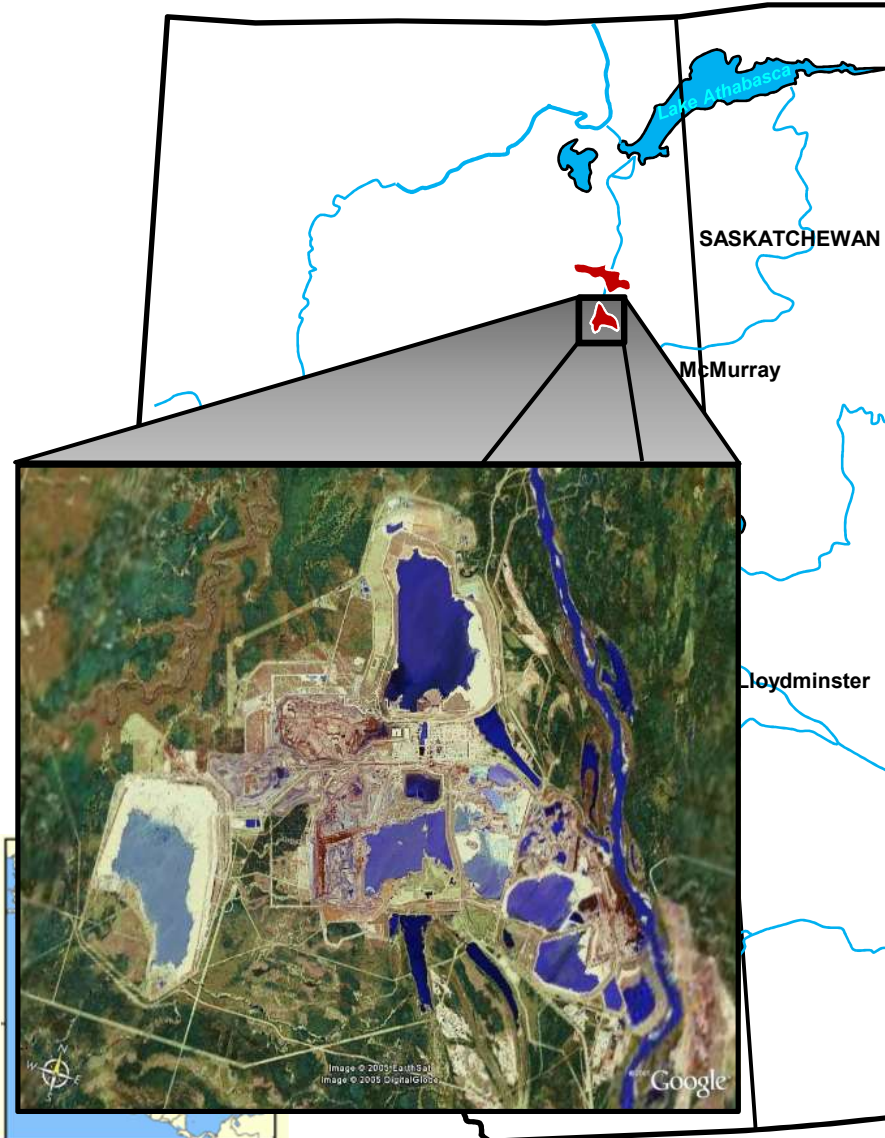




Multi-Flow Testing in the Mature Fines Tailings

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Mature Fines Tailings

- despite billions of investment dollars spent on tailings treatments, no acceptable solution is available and Alberta faces a huge and growing environmental challenge.
- Multi-Flow® is hydrophobic and oleophilic, making it ideal for separating residual bitumen from water. Indago tested HCD Multi-Flow® on MFT samples & readily extracted the residual bitumen from the fines tailings. A companion product flocculated the clays and clarified the water.
- Bitumen extracted from tailings was analysed by Agat Labs and found to be saleable oil. Crude yield to be determined.

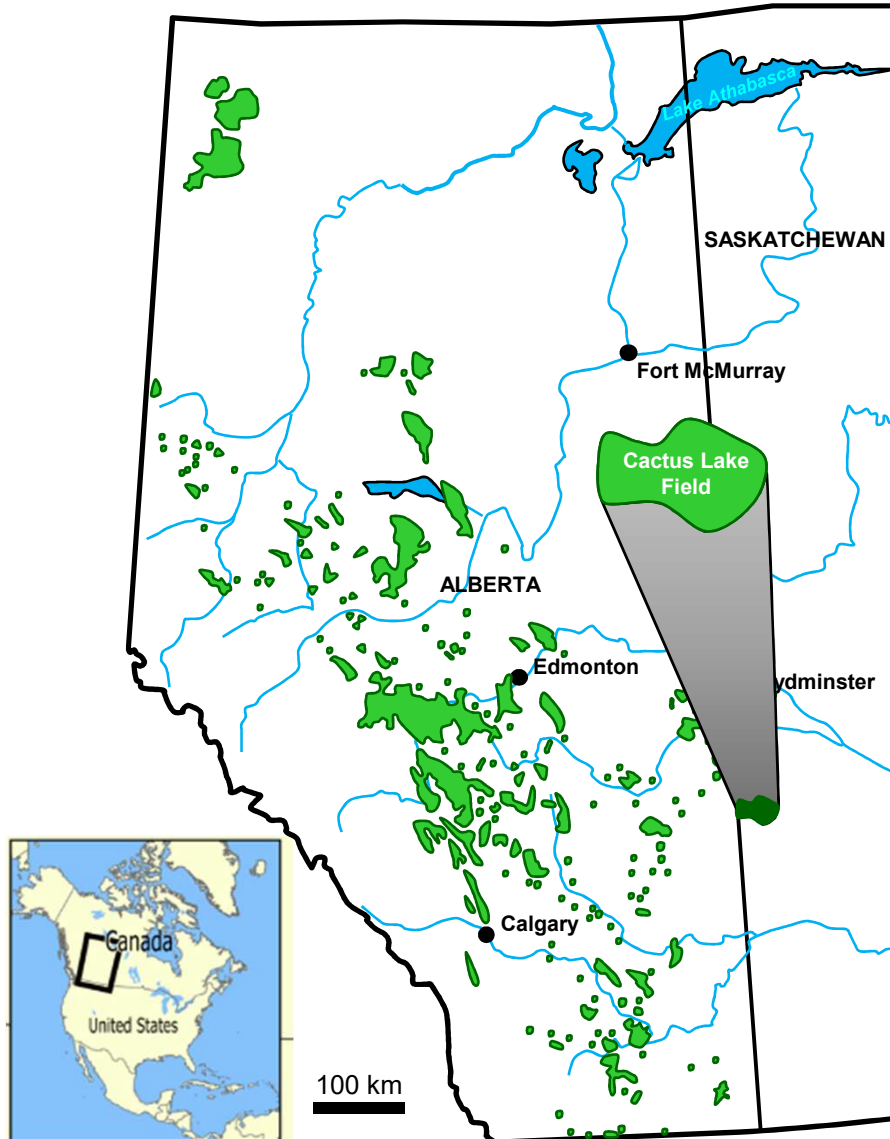




Multi-Flow Testing in the Heavy Conventional Oil

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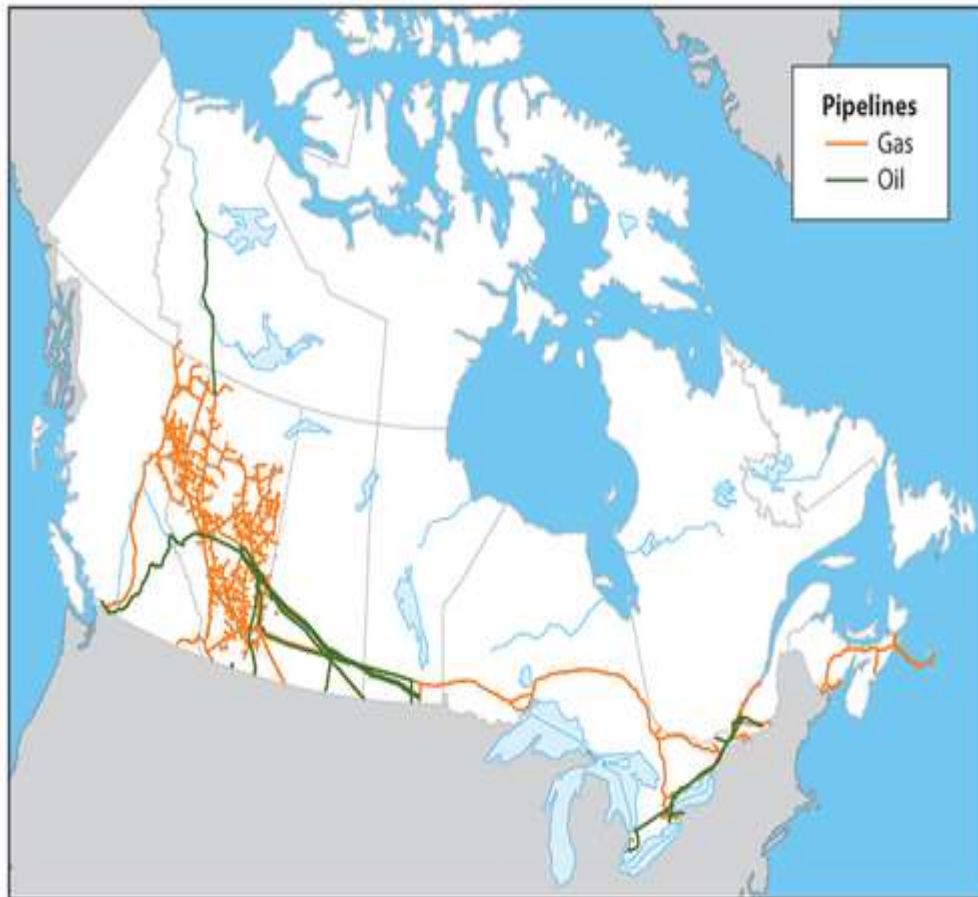


Heavy Conventional Oil

- Indago selected by Canadian producer of 10,000 bopd of 14-15^oAPI gravity crude with the objective to uplift API gravity to allow producer to achieve a higher oil price.
- Testing so far has increased API by 1.2^o at a feed rate of 1000 ppm making the improvement in API (and reduction in density) economical (final testing to be conducted on holding tank).
- Operator has now given INK a well to test to reduce density.
- If successful, company will achieve both higher oil price and reduced condensate usage thereby reducing costs



Multi-Flow Testing in Canadian Pipelines



- *Canada has ~840,000km of pipelines.*
- *Multi-Flow has application in reducing BS&W content, reducing or removing asphaltene and wax build-ups*
- *Ultimately, Multi-Flow could be used to reduce the amount of diluent added to heavy crudes, simply by working at lower concentrations to drop the viscosity of crudes – thereby freeing up significant space in dilbit pipelines*
- *Multi-Flow is currently being tested by one of Canada's largest pipeline operators to greatly reduce BS&W in a large new pipeline.*



Middle East Initiatives with Gulf Green Crude Dynamics

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Oman

- GGCD, Indago's Middle Eastern distributor, has a proposal to the MOG to trial HCD Multi-Flow® in mobilizing heavy oil in the 2.4 billion barrel HabHab heavy oil field.
- GGCD has a proposal with Oxy to trial HCD Multi-Flow® in EOR applications in the multi-billion barrel Mukhaizna & Safah fields.
- GGCD has a proposal with PDO to trial HCD Multi-Flow® in flow assurance applications in their pipeline network.

Iraq

- GGCD has a proposal to the Oil Ministry of Iraq to trial HCD Multi-Flow® in various applications in Rumaila field including EOR, pipeline flow assurance & tank clean. The Rumaila field is the 3rd largest ever discovered and produces 1.3 million bbls of oil per day.

UAE

- GGCD has been short-listed for a Tank Clean pilot with ADNOC
- GGCD conducting a technical evaluation for ADOC to provide a technical solution for pipeline & tank sludge prevention/minimisation.

Turkmenistan

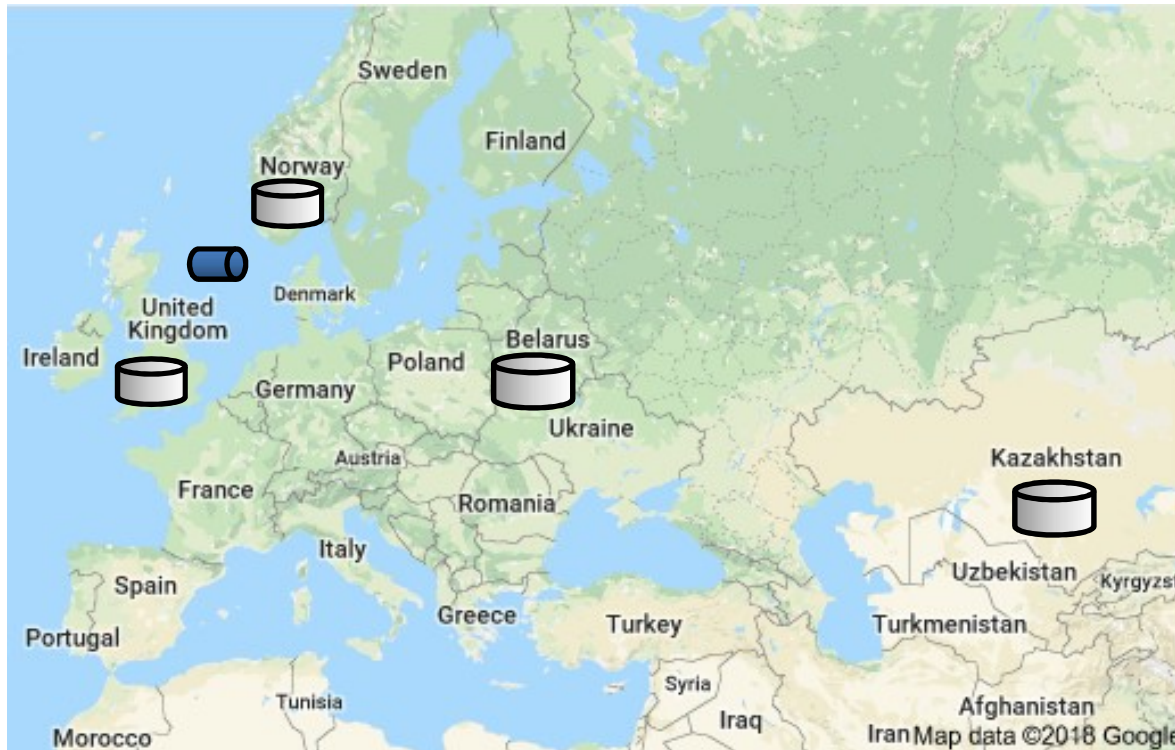
- GGCD has a proposal to Dragon Oil to trial HCD Multi-Flow® for paraffin and scale deposition control in down-hole and pipeline applications, offshore Turkmenistan. Crude oil produced offshore Turkmenistan has 15% wax content and a pour point of 34°C, much higher than year round ambient temperatures in the Caspian Sea.



Companies testing Multi-Flow® – Europe

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United Kingdom

- HCD Tank Clean successfully bench-top tested on tank sludge and emulsions in a Shell-owned refinery in the UK.
- Indago has submitted a proposal to Chrysaor to mitigate paraffin deposition in a subsea pipeline in the North Sea.

Norway

- HCD Tank Clean successfully bench-top tested on tank sludge from a tank farm owned by Statoil.

Belarus

- HCD Tank Clean successfully bench-top tested on tank sludge from a tank operated by LLC Inspe Group.

Kazakhstan

- HCD Tank Clean successfully bench-top tested on tank sludge from a tank owned by Chevron.



Opportunities for HCD Multi-Flow® in Colombia

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Llanos Basin

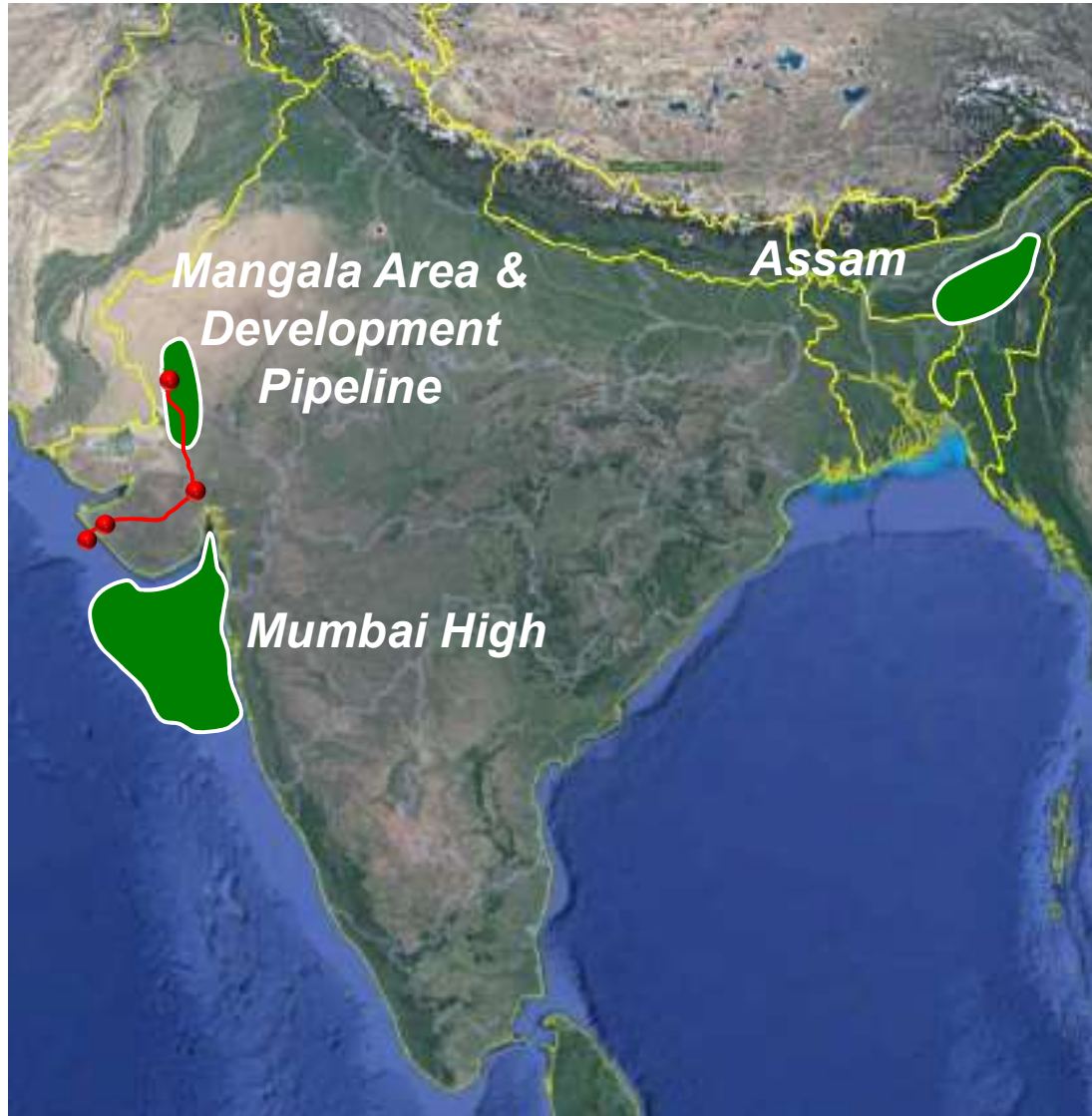
- Includes heavy oil fields such the Rubiales field with proved reserves of 4.38 billion barrels of 11.3-14.5⁰API crude.
- The Llanos basin has many fields and billions of barrels of reserves where crude oil gravity must be uplifted or diluted to meet pipeline specifications (15-16⁰API).
- Indago has met with 3 major independent companies that produce oil in the Llanos to offer the Multi-Flow solution to uplifting crude API to pipeline specifications.

Upper & Middle Magdalena Valley

- characterized by crude oils from 15-20⁰API, but of unusually high viscosity and locally high in wax content with some crudes trucked to the Caribbean because they don't meet pipeline specifications
- Indago has met with 2 major independent companies producing in the Middle Magdalena Valley and offered the Multi-Flow solution to reduce viscosity and paraffin to meet pipeline specs.



Oil Producing Areas in India



Mangala Field Area & Pipeline

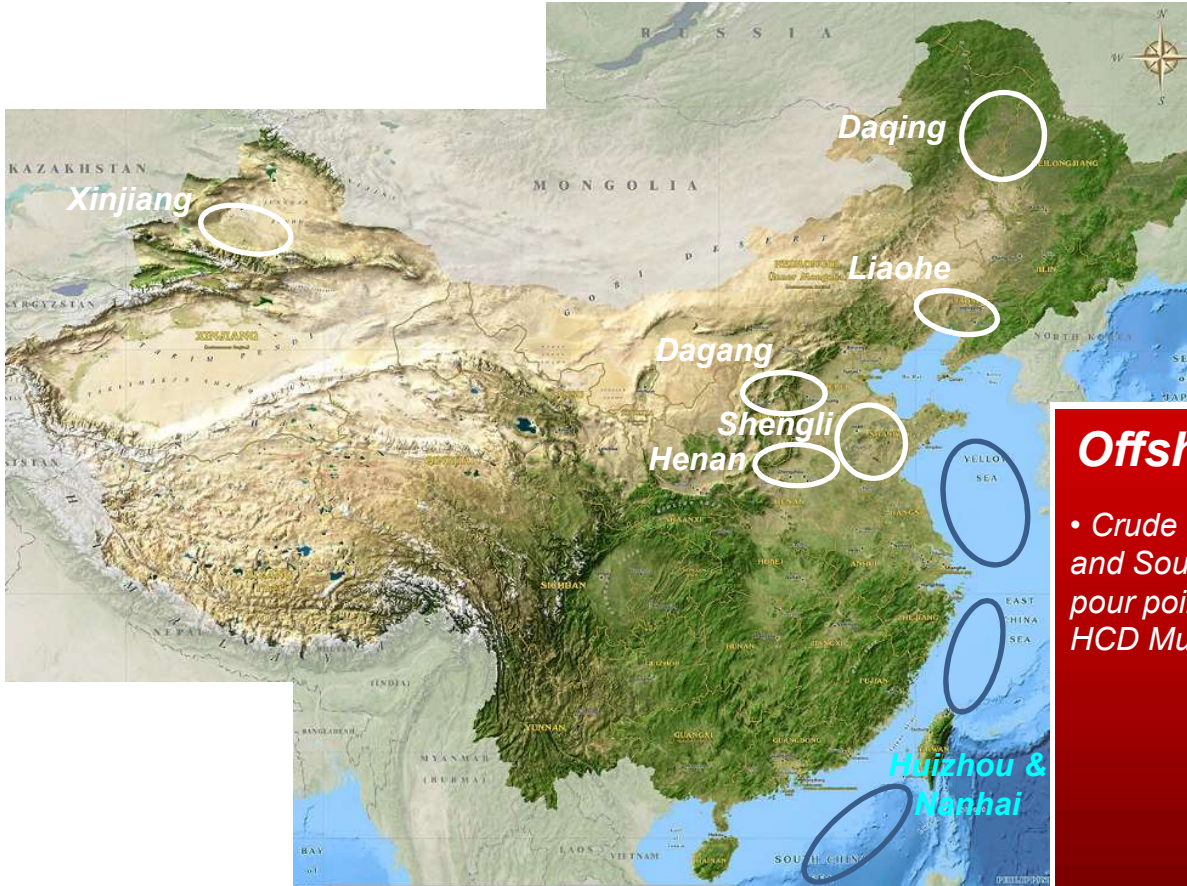
- the Mangala field area contains an OOIP of 3.6 billion barrels & daily production of 200,000 bopd of waxy crude. If applied downhole, HCD Multi-Flow® could resolve severe wax deposition problems.
- the 670 km pipeline transporting the crude is heated to 65°C (the Wax Appearance Temperature) to keep the crude liquid. HCD Multi-Flow® could be applied continuously in the pipeline to lower the WAT.

Mumbai High

- The offshore Mumbai High Oil field is India's largest containing ~half of India's recoverable reserves. Current production is >200,000 bopd of waxy crude. The crude pour point (30°C) is much higher than sea floor temperature creating flow assurance issues in the subsea pipelines. HCD Multi-Flow® could be applied to lower the crude PP in the pipeline.

Assam

- the Assam region produces ~30 million barrels of oil per year. Assam crude has a PP of 30°C, much higher than average winter temperatures at surface, creating handling, storage & transport problems that could be resolved with HCD Multi-Flow®.



Onshore fields

- Indago research identified heavy asphaltenic and waxy crude oils from the Liaohe, Dagang, Xinjiang and Henan fields as candidates for HCD Multi-Flow® EOR applications.
- CoreLab testing of crude from Liaohe field showed uplift in API gravity and viscosity reduction, justifying field trials.

Offshore fields

- Crude oils produced in the offshore fields in the Bohai and South China Seas are high in wax content and have pour points ranging from 25-35°C problems resolved by HCD Multi-Flow® in Malaysia.

Distribution Agreement

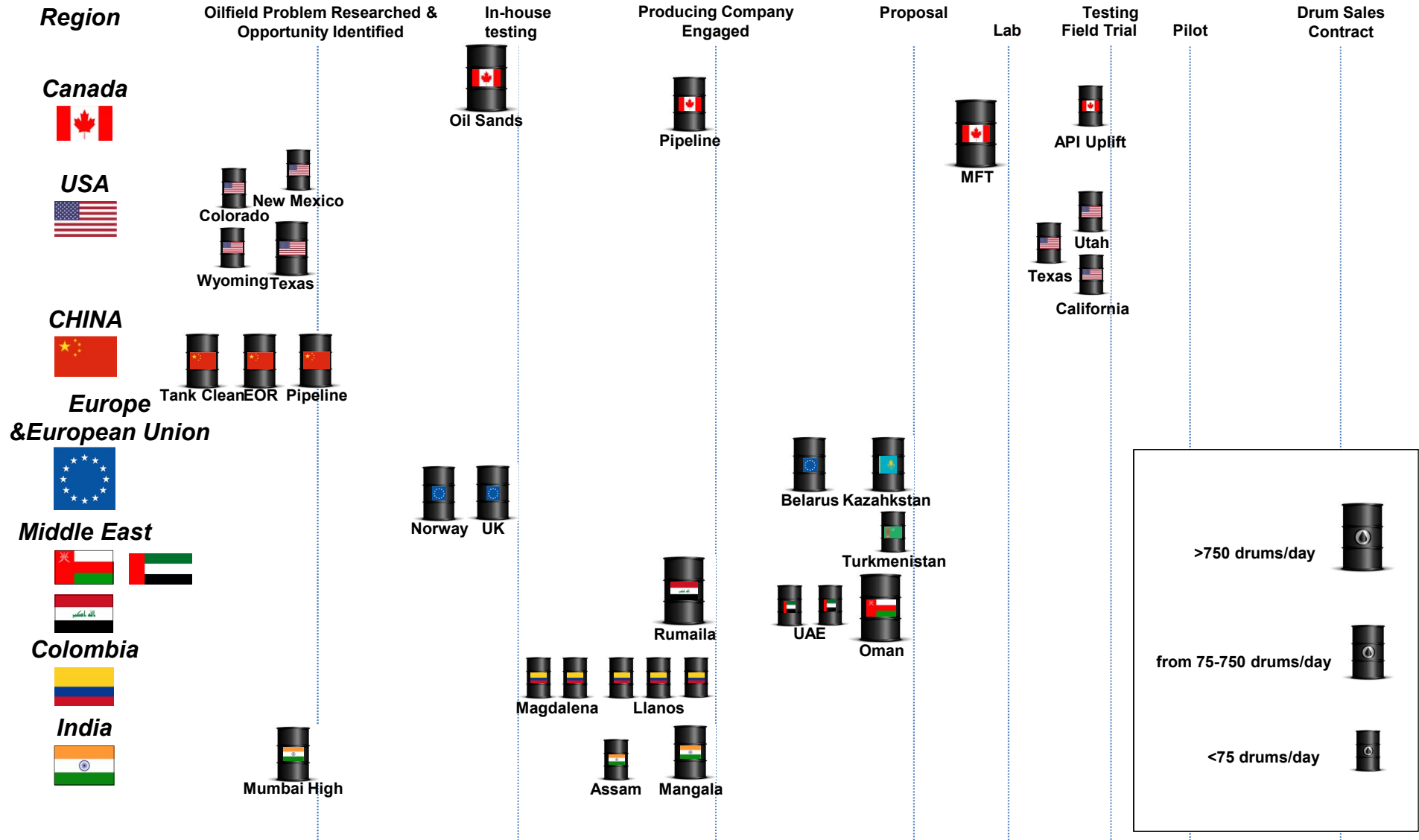
- Qinghua Energy Company (Indago's distributor in China) is pursuing these opportunities, and to date has a number of successful bench-top tests with several crude oils across the country.



Indago Progress

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Indago Kentucky Heavy Oil Project

Best Estimate OOIP (mmbbl)	Net (87.5%) Contingent Oil Resources (mmbbl)*		
	Low Estimate (1C)	Best Estimate (2C)	High Estimate (3C)
42.79	1.87	3.74	7.49

*The resources shown in this report are contingent upon demonstrating the efficiency and economics of HCD Multi-Flow® injection into the Big Clifty Sandstone heavy oil reservoir and Indago Oil and Gas Inc.'s commitment to develop the properties. If these contingencies are successfully addressed, some portion of the contingent resources estimated in this report may be reclassified as reserves. The estimates in this report have been prepared in accordance with the definitions and guidelines set forth in the 2007 Petroleum Resources Management System (PRMS) approved by the Society of Petroleum Engineers (SPE).

The contingent resources shown in this report have been estimated using deterministic methods. No petroleum reserves or prospective resources have been determined at this time. Once all contingencies have been successfully addressed, the approximate probability that the quantities of contingent resources actually recovered will equal or exceed the estimated amounts is generally inferred to be 90 percent for the low estimate, 50 percent for the best estimate, and 10 percent for the high estimate. The estimates of contingent resources included herein have not been adjusted for any risk including for the possibility that the contingencies are not successfully addressed.

Qualification Statement

The contingent resources stated herein are based on and fairly represents information and supporting documentation prepared by or under the supervision of John Hattner of NSAI who is a qualified petroleum reserves and resources evaluator within the meaning of the ASX Listing Rules. Mr Hattner has provided his written consent to the issue of this report in the form and context in which the contingent resources and the supporting information are presented in it. The contingent resources reported continue to apply and have not materially changed.



Voting Summary Report

Indago Energy Limited
Annual General Meeting

Security Class(es):
INK - ORDINARY FULLY PAID SHARES

Meeting Date: 28-May-2018

Resolution	For		Against		Discretionary		Totals		Exclusions		Abstain	
	Votes	Holders	Votes	Holders	Votes	Holders	Votes	Holders	Votes	Holders	Votes	Holders
1 Election of Director – Mr Ray Sharrocks	53,179,648	32	167,979	1	1,956,134	2	55,303,761	35	0	0	90,704	2
	96.16%	91.43%	0.30%	2.86%	3.54%	5.71%						
2 Election of Director – Mr Stephen Mitchell	53,268,637	33	167,979	1	1,956,134	2	55,392,750	36	0	0	1,715	1
	96.17%	91.67%	0.30%	2.78%	3.53%	5.56%						
3 Increase in capacity to issue securities under Listing Rule 7.1A (Special Resolution)	53,175,615	31	262,479	3	1,956,134	2	55,394,228	36	0	0	237	1
	95.99%	86.11%	0.47%	8.33%	3.53%	5.56%						
4 Remuneration Report	34,722,081	18	174,496	5	1,956,134	2	36,852,711	25	18,317,765	10	223,989	2
	94.22%	72.00%	0.47%	20.00%	5.31%	8.00%						

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