

# Hydrocarbon Dynamics



*Advancing Crude Oil Mobility*



**AGM Presentation May 2020**

# Disclaimer Page

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# Corporate Summary

## ASX listed - Energy focused

### Board & Management

Stephen Mitchell	Non-Executive Chairman
Bill Tarantino	CEO- Chemical Division
Nick Castellano	Executive Director
Ray Shorrocks	Non-Executive Director
Allan Ritchie	Non-Executive Director
Andrew Seaton	Non-Executive Director
Julie Edwards	Company Secretary & CFO

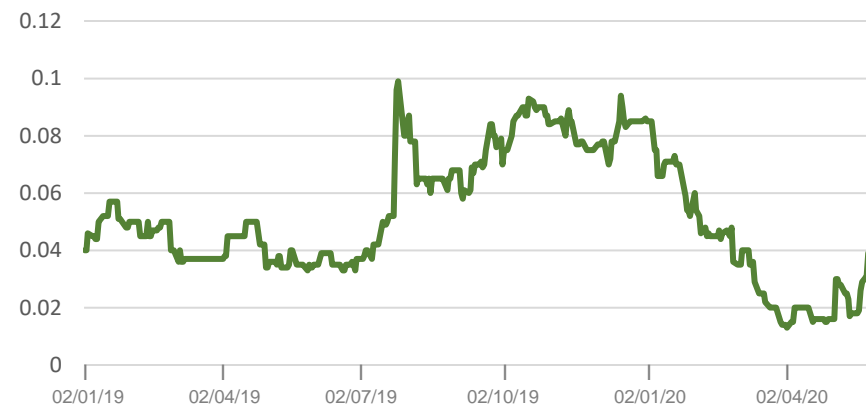
### Capital Structure

Cash:	\$1.4m (25 May 2020)
Share Price:	\$0.04
Issued Cap:	345m Shares
Market Cap:	\$13.8 Million
Incentive Shares	14.05m (expiry 01/09/2021)

### Shareholder Summary

S Mitchell	10.8%
S McGregor Super Fund	9.2%
Lowell Resources Fund	4.2%
G Barnes	3.6%
Wheelbarrow Investments	3.5%
A Khan	2.6%
Top 20 Holders	53.6%

### HCD Share Price



# Year in Review

- Strengthened board and management with the appointment of Bill Tarantino CEO- chemical division (Ex Baker Hughes) and non-executive director, Andrew Seaton (Ex Santos CFO)
- Undertook a strategic review which led to new sales strategy and new product mix and branding
- Modest product sales of \$180,555 - including repeat sales to client in Texas
- Substantial cost cuts in response to industry conditions
- MOU signed with Valkor to farm-out HCD's Utah project. Kentucky relinquished
- Field trials undertaken in India (two) and Kuwait
- Successful testing in Labs on oils from two producers in the Gulf of Mexico, four producers in Canada, three producers in Colombia, as well as for producers in Saudi Arabia, Abu Dhabi, Iraq, Kuwait , Turkmenistan and India
- Several field trials postponed due to oil price collapse and/or COVID-19
- Exciting lab test results for large Canadian oil sand producers where HCD products demonstrated potential to reduce operating cost substantially

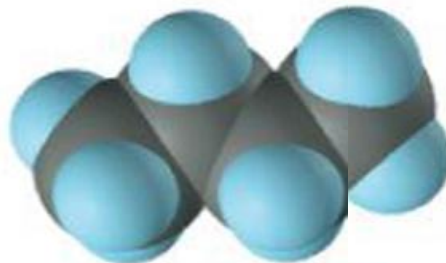


# HCD Technology

**HCD PhaseShift** suite of chemistries utilize small, specially engineered carbon-based molecules that reduce the Van der Waals attractive forces between like molecules in order to reliquefy large agglomerations of wax and asphaltene deposits naturally occurring in heavy crude oils.

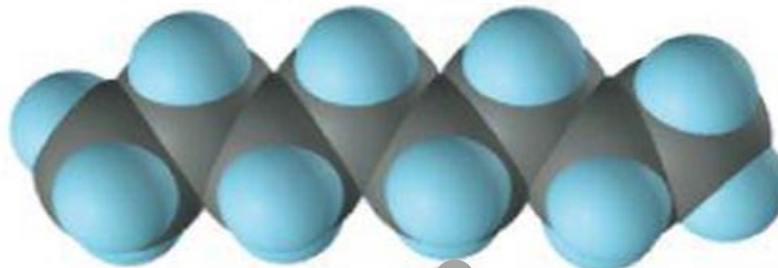
**Fewer than 5 carbon atoms**

Gaseous at room temperature



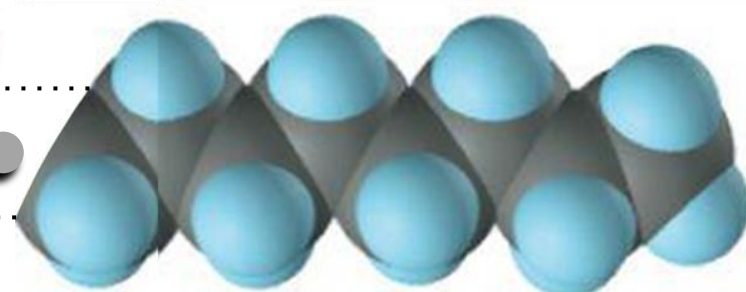
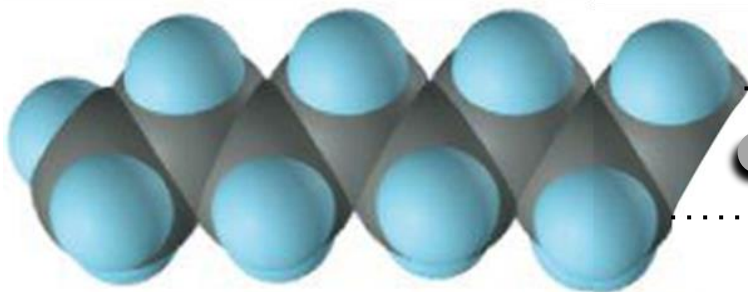
**5-15 carbon atoms**

Liquid at room temperature



 **HCD Multi-Flow<sup>®</sup> molecule**

**>15 carbon atoms**  
Solid at room temperature



 The paraffin now passes into the liquid phase at room temperature

# Technology Used from Well bore to Refinery

- Improves oil production onshore and offshore by reducing viscosity and mitigating paraffin and asphaltene depositions in production equipment
- Reduces reliance on, and costs of, diluents and chemical treatments
- Provides flow assurance for onshore and offshore pipelines by liquefying paraffin and asphaltene depositions. Reduces reliance on traditional solutions of heat, solvents and mechanical pigging
- Liquefies oil sludge in transport and storage facilities, transforms the way cleaning operations are undertaken and recovers saleable hydrocarbons from the sludge



# Value Creation Strategy

The value creation strategy for Hydrocarbon Dynamics is twofold:

## 1 **Sell HCD Products and Technology to the Oil Industry**

Targeting oil producers, pipeline operators, tank cleaners and refiners

- Developed marketing team in North America with representatives in Texas and Alberta
- Established agents & distributors in Canada, China, India, the Middle East, Colombia & parts of Europe

## 2 **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- relinquished
- Utah

# Testing Implications on Dosage Rates

- Tests and trials indicate dosage rates of HCD products for use in pipelines and continuous down-hole applications on viscous crudes are typically between 250 - 750 ppm
- Tests and trials indicate dosage rates of HCD products for use in heavy, extra heavy and viscous crudes are in the 1,000 – 2,000 ppm range
- Dosage rates will always vary considerably depending on individual applications and oil composition
- New product range and pricing to be confirmed before June 30<sup>th</sup> but indicative cost to producers for baseline product follows:

Multi-Flow Dosage Rates (ppm)	250	500	750	1000	2000
End User Cost/bbl of oil treated (US\$)*	\$0.36	\$0.72	\$1.08	\$1.45	\$2.90

\* Based on the North American recommended retail price of HCD standard Multi-Flow. Other MF based products will have different pricing



# Reducing Diluent Needs in Heavy Oils

- In the Canadian oil sands industry, approximately 1.8 million bbls/day of viscous oil production requires significant dilution to produce and transport. “Diluents” are used to do so at ratios of 30% and up to 50% of oil production
- In recent independent tests for several producers HCD Multi-Flow based product has shown it is able to reduce diluent requirements by 42% with potential to reduce usage by 50%
- On average the “Diluent Penalty” for producers is estimated at between \$10 ~\$20 per barrel (mainly Transportation Costs and Market Value Loss)
- The implications of the test work for the Canadian heavy oil industry indicate the use of HCD product may cut operating costs to producers by \$3-\$8/bbl of oil produced
- Replacing diluent use in the Canadian heavy oil sector is a major priority for HCD but test work has also shown substantial effects on oils in California, China and Colombia

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## Trial Successes/Lab Results

# Field Successes

PROJECT	PURPOSE	DOSAGE RATE IN FIELD	RESULTS/STATUS
Petralis(Texas)	Increase Production in 3 wells 10 well potential	5 drums of MF/1 drums SR 7 lbs MicroPhase per Well	5-month avg oil production increase 186% /Gas increase of 316%
Oil India (India)	Increase Well Production Rates (Tri-Phase Squeeze)	10 drums MF/1 drums SR/10lbs MicroPhase per Well	64% Increase in oil production before Pump Failed for 11-week shutdown (retrial requested)
Cairn Energy (India)	Reduce Pour Point of oil in 105,000bopd pipeline	500– 5000 ppm MF	Modest decrease in pour point due to wrong equipment and sludge filled holding tank utilized in trial (retrial requested)
Petronas Platform	Restore production to 9,000 bopd	250 ppm	Pdn resumed for 5 years after 2 yr shut-in with PP reduction and emulsions broken
Kuwait	Viscosity Reduction in 1 well	20 drums used	Results Pending – Greater Burgan Field
China CNPC	Diluent Reduction in 1 well	38,000 bopd field @ 2,000ppm	Diluent may be reduced by 40%, viscosity by 65%, production increased 22%.
California 1 & 2	1. Diluent Reduction 2. Clean-up of waterline	1,000 bopd field @ 2,000ppm	Diluent requirement reduced by 40% and organic deposition successfully removed from water pipe
Canada - Alberta	Improve Production of waxy oil	<200ppm continuous feed	4 wells treated. Pdn increase @ 150% over 6 months
Utah 1 & 2 (Newfield)	Pour Point Reduction	23,000 bopd @ 1,000ppm	Pour Point reduced by 14°C (25F). Company taken over

# Lab & Bench-Top Success- Seeking Field Trials

PROJECT	LAB RESULT	STATUS
Gulf of Mexico USA # 1	Oils showed large reduction in viscosity and API increase	Postponed offshore trial in 3 undersea flowline wells (1300BOPD) at MF feed rate of 250-2000 ppm (40 drum trial)
Gulf of Mexico USA # 2	As above	Trial postponed until field success elsewhere demonstrated
CNRL (Diluent) (Canada)	Viscosity Reduction 90% @40C	Awaiting a trial (COVID DELAY)
Petro China (Diluent reduction Canada)	Well AD05 Viscosity Reduction 90% and API increase 7.01-8.98 Tested at 15C/40C	Awaiting approval for trial (COVID DELAY)
Nexen SAGD Crude (Diluent Canada) (72,000 BOPD)	API increase 5.5 to 19.3 With 50/50 Blend of Diluent/crude & 1000 PPM MF	Will pursue after industry conditions improve
Valkor (Trinidad)	Results on other Valkor oils sufficient	Well cleaning for 5 wells. Potential for hundreds of wells (1-2 drums/well. Goal is to replace "Hot Oiling"
Valkor (Unita Basin)	Success in liquifying yellow & black waxes	Expecting ~6 drum order for trial. Potential for 250 drums/month
Valkor (Ukraine)	Results on other Valkor oils sufficient	



# Lab & Bench-Top Success- Seeking Field Trials

PROJECT	LAB RESULT	STATUS
Colombia (SELVA)– oil from 10 wells tested & 1 tank tested	Many tests on many fields/wells and tanks API increase in all at least at least 1.2 API units	Awaiting Colombian distributor
ADOC 45,000 bopd pipeline, Abu Dhabi	Liquefied paraffin-rich sludge with slight agitation	Proposal Submitted
NESL (Belarus tank cleaning) (8-350,000-barrel tanks on site all require cleaning)	Distributor reports successful testing on sludge reliquification (Bench Test)	Distributor made inquiry for 182 drums in mid- May. Proposal submitted (PO PENDING)
Colombia well 713 (CRC Montalvo/Grubb)	Lab reports MF inhibits deposition of asphaltenes and paraffin.	Awaiting Colombian Distributor
Quifa Field (Colombia)	API increase 13.4-14.7 . Viscosity drop 50% BS&W drop 50%	Awaiting Colombian distributor for next step

# Hydrocarbon Dynamics



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## **Strategic Direction and Current Priorities**

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**Bill Tarantino- CEO HCD Chemicals**

# HCD's New CEO – Bill Tarantino

- On January 2<sup>nd</sup> HCD appointed US based Bill Tarantino as CEO - Chemical Division
- Mr Tarantino is a very experienced energy executive with a strong background in oilfield chemical sales, operations and marketing
- Prior to joining HCD he was a senior executive with Baker Hughes where he had a distinguished 27 year career from 1991 to 2019
- His last position with Baker Hughes was Vice President of Business Development and Strategic Marketing – Production Chemicals based in Houston
- While at Baker Hughes he held numerous positions including Director of Operations Europe, Africa, Russian Caspian Region as well as Director of Global Accounts and Marketing
- Mr Tarantino will be responsible for HCD's entire chemical division with a particular focus on developing and implementing effective sales strategies for HCD products

# Strategic Review

The first months of 2020 were devoted to the development of a Strategic Plan that was subsequently approved by the board. It is essentially a roadmap for transforming the organization.

It followed a thorough review of Hydrocarbon Dynamics' structure, markets and its method of doing business and highlights key strategic imperatives needed to transform the company. The strategic plan employs a market-focused business approach to drive strategic and tactical decisions necessary to meet growth forecast and includes the following four key imperatives:

- redesigned business model
- marketing investment
- pricing and market intelligence
- supplement product offerings



# Strategic Review - Execute on our Strategic Plan



## Implement new business model

### HCD

- wholesale, non-service model

### Distributors

- small to mid-sized, regional, **oil field chemical companies**

### Target Customers

- initial focus on tier 3 & tier 2 producers



## Marketing investment

- focus on delivering the tools needed to drive market penetration with consistent and clear messaging

### Branding Initiative

- developed market specific branding

### Marcom

- brochure, case histories, presentations

### Sales Packets

- for distributors/agents



## Pricing and market intelligence

- most profitable markets to focus on where customer needs best fit HCD capabilities
- focus on continuous treatment applications
- understand pricing by market segment and application
- ongoing



## Supplement product offerings

- enhance program performance for specific market and application needs
- jointly with branding and pricing imperatives
- improve market penetration
- allow pricing flexibility

# Strategic Review-New Product Line and Branding

**PhaseShift™** technology suite of products

*Driving value for crude oil production, transmission and storage*

Chemical Product Line designed to advance crude oil mobility:

**HCD Multi-Flow®** technology for cleanout of wells and associated equipment

**Multi-Flow Tri-Phase™** technology for formation squeeze production enhancement

**Assur-Flow™** technology for pipeline crude oil paraffin and asphaltene control and pour point depression

**Bit-Flow™** technology for crude oil viscosity and diluent reduction, increasing bitumen/ultra-heavy oil flow

**Kleen-Flow™** technology for crude oil storage tank cleaning and crude reclamation







# Strategic Distributor and Agent Model

- Although HCD's structure hasn't profoundly changed, and HCD remains a non-service, wholesale company marketing its products through a network of distributors, a vital change was made to the type of distributor representing the organization
- HCD will market its unique products and offerings through small to mid-sized oilfield chemical companies looking for a competitive advantage
- It is essential that HCD take advantage of the strong relationships and earned trust that the oilfield chemical companies have with the producers and their chemical decision makers. Equally important is their deep understanding of the applicable treatment requirements and methods required for our products
- This will enable our distributors to penetrate markets with our truly differential products



# Current Priorities – Agent and Distributor Progress

Company Name	Brief Description	Comments:
W. Canadian Distributor #1	W. Canada oilfield chemical co. with a primary focus on bitumen viscosity and diluent reduction	currently active
W. Canadian Distributor #2	W. Canada oilfield chemical co. with a primary focus on well remediation - cleanout & squeeze, and pipeline treatment	currently active
USA Distributor #3	USA small chemical company focused on downstream, tank and equipment cleaning, fuels treatments & upstream.	newly active
USA Distributor #5	USA oilfield chemical co. focused on the Delaware basin & North Dakota	in discussion
USA Distributor #4	USA production Chemical Service provider (oilfield chemical co.)	in discussion
USA Distributor #1	USA Mid-sized oilfield chemical co. focused on Permian Basin and Eagle Ford Shale	in discussion
USA Distributor #2	USA Mid-sized oilfield chemical co. focused on the Gulf of Mexico	in discussion
Commissioned Sales Person #1	Permian Basin wax and asphaltene	newly active
Commissioned Sales Person #2	California heavy oil, asphaltenes and paraffins	active soon
Commissioned Sales Person #3	Kansas and Oklahoma paraffin issues	active soon

-  Currently on board
-  Waiting on NDA
-  Initial conversations
-  Commissioned Sales



# Current Priorities – Canada



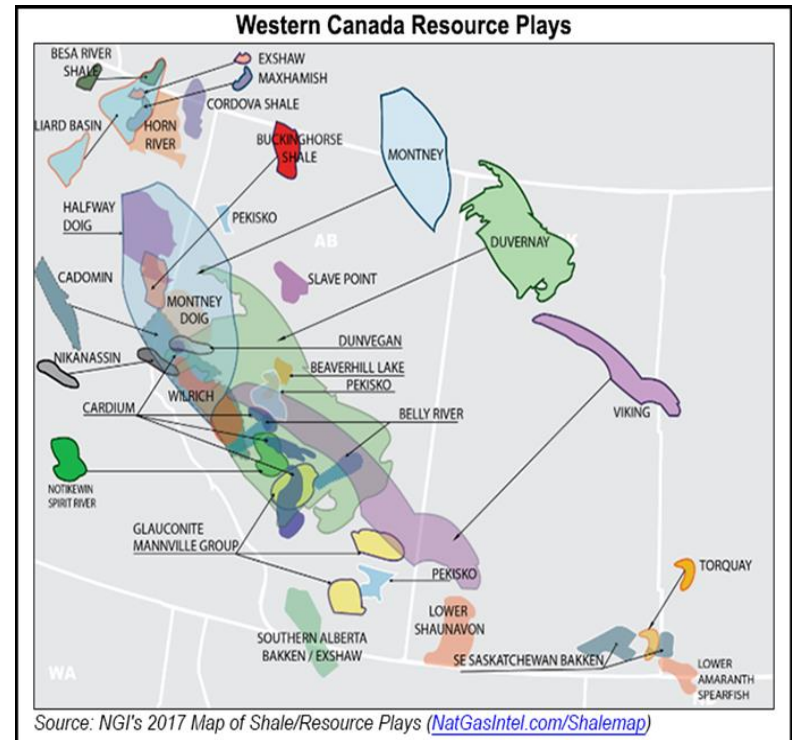
- HCD has been pursuing opportunities in the Oil Sands, Mature Fines Tailings and heavy Canadian oil sector
- In the oil sands industry HCD is seeking to replace significant quantities of “diluent” that are used to produce, transport & store heavy oil. Testing oil samples suggests the addition of Multi-Flow may reduce diluent requirements by up to 50%. Huge market with 1.6 million bpd of diluted crude is exported
- HCD has tested oils from two large producers showing significant reductions in oil and viscosities. Further testing planned and field trials being pursued



# Current Priorities – Canada

Production system cleanouts & squeeze jobs distributor activity

- Active areas: Montney shale basin, Duvernay Shale, Cardium, Belly River, Mannville Group & Viking
- Received paraffin samples from numerous locations in Western Canada – all testing with Multi-Flow has been successful
- Currently in tender process with Multi-Flow for a 16 well cleanout and a 4 well cleanout with several others waiting in the pipeline
- Squeeze potential is an untapped venture
- HCD's Salt Remover for frac flowback and water recycling market



# Current Priorities – Gulf of Mexico



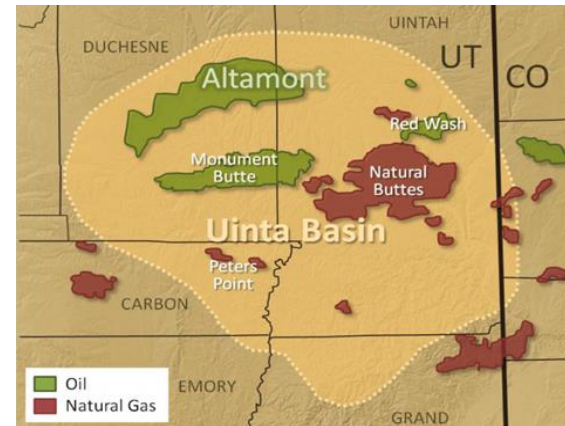
- HCD test for a large independent that produces in excess of 50,000 in the Gulf of Mexico- postponed and be rescheduled once wells are back online and evaluated
- Test to be on two to three wells on separate platforms where oil production is ~850 bopd. Purpose is to clear, and keep clear, the pipeline from wax and asphaltene build-up and evaluate efficacy of well cleanout
- Many GoM deep water producers have substantial wax and asphaltene build up that can lead to significant pressure build-up, reduce pipeline throughput, and require substantial costs in chemical applications and pigging operations
- HCD has tested several oils in conjunction with several GoM producers demonstrating the efficiency of HCD technologies on these oils
- Companies with flow assurance issues in the Gulf of Mexico include: BP, Shell, Chevron, Exxon-Mobil, BHP Conoco Phillips, Murphy Oil, Cox Oil , Fieldwood and Talos



# Current Priorities – Utah, Trinidad & Ukraine

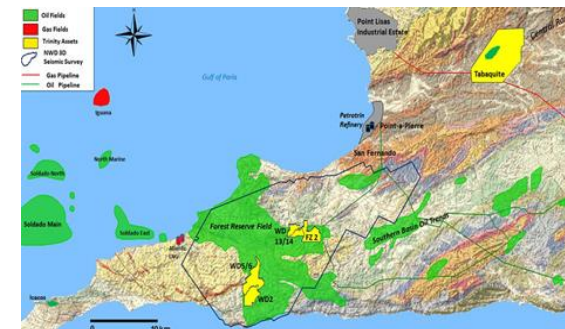
## Utah's Uinta Basin

- Opportunity reducing Pour Point (PP) of very waxy Uinta crude with a PP in excess of 130F. Testing in progress.
- Successful bench test on yellow and black wax liquification with Multi-Flow.
- Heavy oil viscosity reduction



## Trinidad heavy oil fields

- Cleanout/ viscosity reduction with potential trials on 5 wells
  - Parrylands – 800 acres 140 wells
  - Guapo – 1500 acres, 450+ wells



## Ukraine

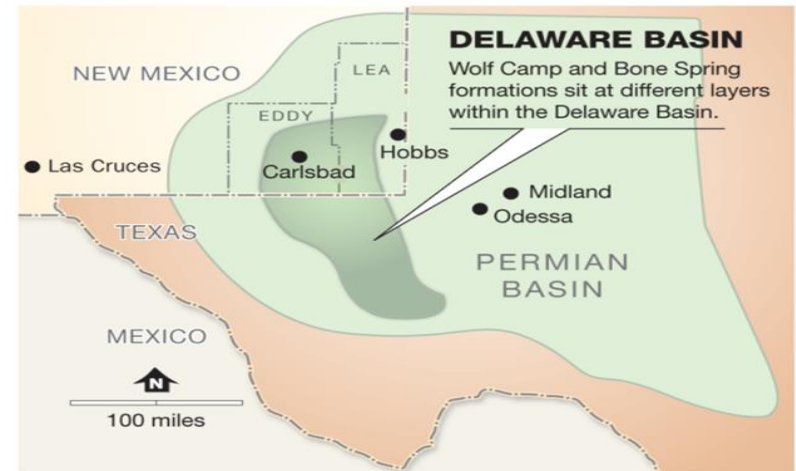
- 4 to 6 well cleanout trial on paraffinic field. Distributor estimates potential for 200+drums/month

# Current Priorities – Permian & California

## Permian & Delaware Basin

Waxy crudes in the Delaware basin, old shelf

- Paraffin issues throughout Midland Basin as well as asphaltenes



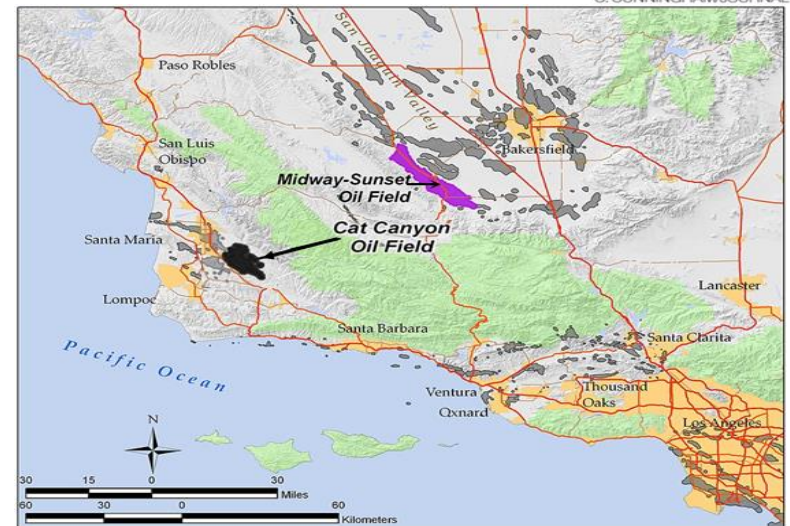
## California

Newly targeting heavy oil asphaltenes and viscosity work

- Cat Canyon (Diluent)
- San Ardo
- Midway Sunset field

Paraffin issues

San Joaquin Facilities of the Fruitvale and 10-Section leases





# Major Initiatives in India



## Mangala Development Pipeline

- Hydrocarbon Dynamics proposed a two phase trial of HCD Multi-Flow on a 6,000 bopd recirculation line associated with Mangala Pipeline (~175,000 bopd) at the Bhogat terminal after successful lab results
- Purpose of testing was to reduce the Pour Point & WAT of the crude by 15°C in order to reduce the substantial heating and flow-assurance costs
- Results showed modest reduction in pour point. Test compromised by existing sludge and discussion underway for resumption of testing



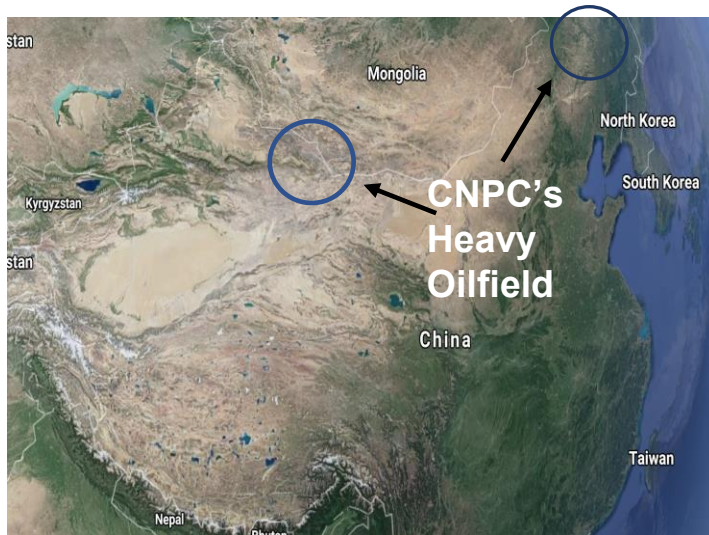
## Baghewalla Field

- A Tri-Phase Squeeze on a well in the heavy Baghewalla field, Rajasthan for one of India's largest producers. Results showed a strong increase in production before the production pump failed. Local agents are seeking expanded test on multiple wells

## Assam

- Hydrocarbon Dynamic's team has approached management at Assam to treat wax deposition in non-piggable 34km pipeline that transports 4,400 bopd

# Opportunities with CNPC in China



Last year saw successful results from single well field trials in CNPC's Heavy Oil field in North West China where expensive diluent is used for viscosity reduction, and by adding Multi-Flow

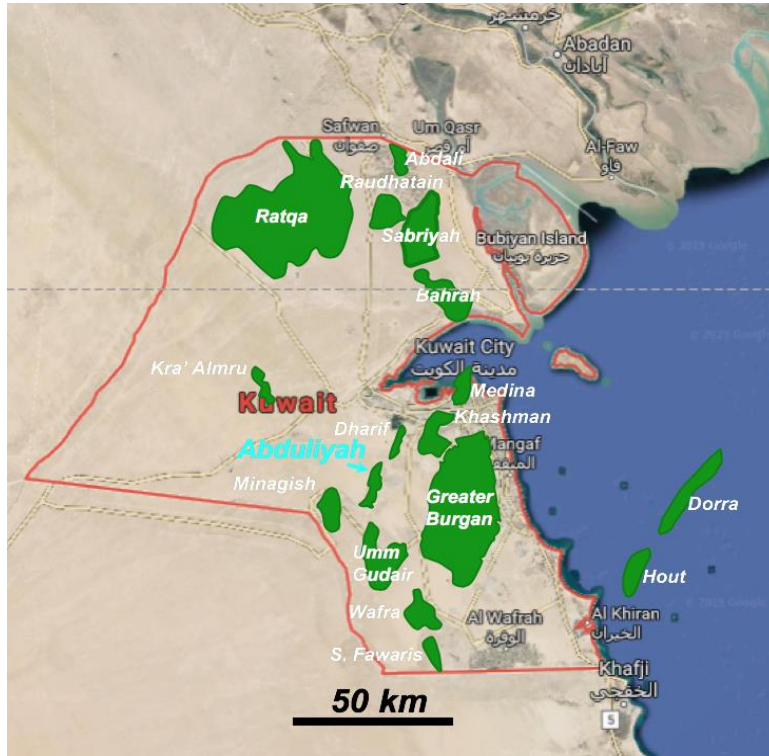
- Diluent use was reduced by 40%,
- Viscosity was reduced by 65%
- Production increased by 22%

In 2020 COVID has impacted progress in China however positive discussions continue until HCD can return

- HCD is attempting to follow up on above success and secure trial on a cluster of ~80 wells
- HCD had been invited by CNPC to develop protocols on treating pipeline with asphaltene issues in Northern at one of Chinas largest onshore fields with Estimated OIP of 16 billion bbls and 3.6 billion bbls recoverable

Shear rate s <sup>-1</sup>	Temperature °C	Viscosity Mpa · s (without MF)	Viscosity Mpa · s (Two days after injecting MF)	Reducing %	Viscosity Mpa · s (Four days after injecting MF)	Reducing %
170	20	1496.04	1165.89	22.07%	512.76	65.73%
170	30	813.82	704.3	13.46%	279.74	65.63%
170	50	300.96	291.51	3.14%	104.23	65.37%

# Proposed Trial in Greater Burgan Field, Kuwait



- HCD's distributor GCD has reported that the Kuwait Oil Company performed a well test in the Greater Burgan oilfield and they anticipate receiving confirmation of a successful result
- The Greater Burgan field is the largest sandstone reservoir ever discovered and 4<sup>th</sup> largest producing field in the world
- The objective of the trial was reducing crude oil viscosity in order to reduce well maintenance (by improving ESP pump efficiency). This could reduce costs, improve flow rate and increase oil recovery
- Previous Independent laboratory tests on Kuwait samples have showed substantial reduction in viscosity with the addition of Multi-Flow, augmenting potential of the field trial



# Other Priorities in the Middle East



## ***Saudi Arabia***

- Aramco have provided the data for a pilot tank for clean-up, HCD have submitted a proposal and engaged with local tank contractors and Aramco have done some initial lab testing. After COVID restrictions ease again we can pursue the remaining tests and reschedule the tank clean

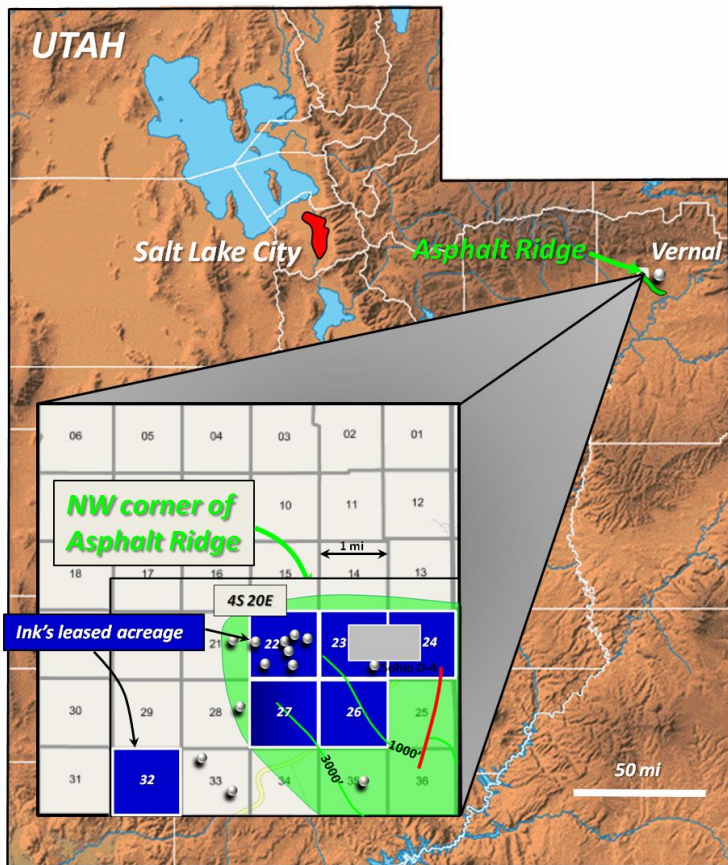
## ***Iraq***

- GCD (HCD's Middle East Distributor) has proposed two pilot trials to Basrah Oil Company (BOC): a tank clean and a pipeline clean-up. BOC operates the giant oilfields of Southern Iraq including Rumaila & produce on the order of 3.2 million barrels of oil per day
- BOC have performed their own lab tests and have reported successful results including viscosity reduction, API uplift and no precipitates (i.e. HCD does not foul BOC crude)

## ***Oman***

- GCD has progressed HabHab project to a 3 well pilot evaluation & design and is negotiating the final list of operators/contractors

# Upstream Project – Utah



- Utah Oil Sands are estimated by the Utah Geological Survey (UGS) to contain 14-15 billion barrels of oil.
- Indago has leased 3,459 acres over part of Asphalt Ridge in the Uinta Basin. Independent certifiers, Netherland Sewell & Associates, have estimated an OOIP of 141.7 million barrels (mmbbl), and Contingent Resources of 12.4 mmbbl of 2C.
- 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 within INK's acreage report oil saturation of 65.6% of 10-14<sup>0</sup> API oil in sandstones with porosity of 30.3% & permeability of 524 mD
- HCD signed MOU with Valkor that envisages Valkor will fund 3 vertical wells or 1 horizontal well to earn up to 65% in deeper areas and up to 85% in the shallow 'mineable' areas by spending US\$250,000 on studies and then installing processing facilities.





# The Year Ahead

- It is not possible for HCD to predict when the oil industry will return to pre-oil price collapse and pre- COVID 19 levels
- After significant momentum last year, HCD's activity has been curtailed as our customers and potential customers cut deep into their budgets with many shutting in oil production
- HCD will use this period to build its distributor and sales network, target specific basins and producers, refine and re-price its product mix and, if necessary, implement further cost saving measures if the commercial environment does not recover
- As soon as practicable, HCD will work with its partners and customers to resume or commence field testing in the Gulf of Mexico, other US basins, Canada, India, Kuwait and Columbia to build on past successful laboratory testing
- Above all HCD will remain flexible in adapting to the industry and investment climate it finds itself in and will always look for opportunities to enhance shareholder value