



# Helium Evolution Incorporated

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All figures in C\$, unless otherwise noted

Capital Structure	(MM)
Shares Retained by Shell	3.3
Shares Issued to HEVI	34.2
Shares Issued for Subscription Receipt Conversion	41.2
<b>Basic Shares Outstanding</b>	<b>78.8</b>
Total Dilutives Outstanding	8.2
<b>Fully Diluted Shares Outstanding</b>	<b>87.0</b>
<b>Basic Management Ownership</b>	<b>21.5%</b>
<b>Long term debt (\$MM)</b>	<b>\$0.0</b>
<b>Working Capital (\$MM)</b>	<b>\$11.5</b>
<b>Helium Rights (MM acres)</b>	<b>&gt;5.0</b>

## Management

### Greg Robb - President, CEO and Director

>35 years in the Western Canadian energy industry, founded Salvo Energy Corp. in 2006

### Patrick Mills - COO

>35 years in the Western Canadian energy industry, founded Mustang Resources and Pegasus Oil & Gas

### John Kanderka - VP Land and Corporate Development

>40 years in the energy and mineral resources sectors

### Ryan Tomlinson - CFO

CPA and CMA with domestic and international O&G experience including private and public capital raises

## Board of Directors

### Jim Baker - Chairman

>40 years of resource development experience in SK and AB  
BOD - Keystone Royalty, Kinetico Resources, Hason Engineering

### Brad Wall - Independent Director

Former Premier of SK, 18 years in politics  
BOD - Whitecap Resources, NexGen Energy

### Michael Graham - Independent Director

>35 years in the energy business, former EVP of EnCana  
BOD - Halo Exploration, Saguaro Resources

### Philip Hughes - Independent Director

>35 years in the energy business, President & CEO of five E&P's  
BOD - Chairman Oceanic Wind Energy and Kinetico Resources

### Jeff Barber - Independent Director

Seasoned investment professional who co-founded a boutique M&A advisory firm in Calgary and was an investment banker prior to that  
BOD - Standard Lithium Inc.

Source: Company filings

**Company Description:** Helium Evolution Incorporated (HEVI) is a Calgary-based helium exploration and production company focused on developing assets in the southern Saskatchewan helium fairway. The Company has amassed one of the largest land positions in the Canadian helium market with >5.0MM acres of land under permit. HEVI's management team has over 200 years of combined resource development experience in the Western Canadian Sedimentary Basin and is committed to scaling the Company's exploration and development efforts across its land base to become a leading supplier of sustainably produced green helium for the growing global helium market.

## Helium's Evolution

Saskatchewan is home to a burgeoning helium industry. After an extensive review of the industry and Helium Evolution Incorporated (HEVI), we are very excited to see the future unfold. Our analysis indicates that helium development in Saskatchewan has the potential to be highly economic. This year will be pivotal as a number of companies are expecting to transition from pre-revenue explorers to revenue-generating producers. Over the coming years we expect a strong, well-funded, free cash flow generating helium industry to develop in Saskatchewan. In the medium term, we also believe that M&A could be a factor as we see helium producers as very logical acquisition targets for oil and gas producers looking to improve their ESG ranking.

As all of Saskatchewan's public helium companies are pre-revenue, assigning valuations is difficult. Our preference at this point is to be exposed to companies with the largest opportunity base, which we believe corresponds to those with the largest landholdings. North American Helium (NAH) has a multi-year head start on its peers: it has >6MM acres of land, sells ~60 MMcf/yr of purified helium to customers around the world which it expects to grow to >100 MMcf/yr within 12 months. NAH are proving to be successful explorers and developers but they are private and tightly held. We see HEVI as an attractive public alternative. HEVI has a >5MM acre land base, has identified 170 leads on its lands and expects to drill four prospects in 2022. In our opinion, HEVI has all the necessary ingredients to show significant future successes.

## Highlights

- ▶ HEVI has amassed >5 MM acres in Saskatchewan's helium fairway making the company a direct competitor to NAH (>6MM acres).
- ▶ Thus far, ~170 helium leads have been identified on HEVI lands. Leads correspond to closed structural highs that were mapped extensively in the 1960's.
- ▶ Using modern high-resolution 2D seismic data, McCord area leads were matured into HEVI's first drill-ready prospects. HEVI has three drill-ready prospects scheduled for drilling in 2022, the first being the McCord East Prospect.
- ▶ McCord was chosen mostly because the offsetting Mankota Pool provides an excellent analogue. Core data from the 1960 discovery well shows highly porous and permeable Deadwood Fm sands that tested at 30 MMcf/d total gas and 1.1% helium. Recently, NAH drilled three wells on an offsetting structure and licensed two development wells on the same feature indicating a significant discovery.
- ▶ We reviewed HEVI's technical data and estimate volumetric helium resources in McCord East ranging from 178 MMcf to 351 MMcf with a best estimate of 263 MMcf. The risked value for the prospect ranges from \$0.13 to \$0.29/sh FD with a best estimate of \$0.21/sh FD (\$0.25/sh FD unrisked).
- ▶ As soon as HEVI makes a discovery, we will re-evaluate but for now we consider two methods to determine an indicative value for the company.
- ▶ **Land value** based on peer comparison suggests a range of **\$1.25 to \$1.71/sh FD**.
- ▶ Based on HEVI's 170 leads, we expect it could drill 71 risked prospects. If we assume that the prospects average two wells each, HEVI will have a continuous drilling program extending to Q3/43 that will recover 17.2 BCF of helium between 2023 and 2050. **The BTAX NPV10 for a 71 prospect development is \$697MM or \$8.02/sh FD using the current share count.**
- ▶ A valuation ranging from \$1.25 to \$8.02/sh FD is so wide that it indicates more about what we don't know than what we do, however, it also proves that any new discovery can add significant value. We anxiously await first McCord results.

## Background/Pricing

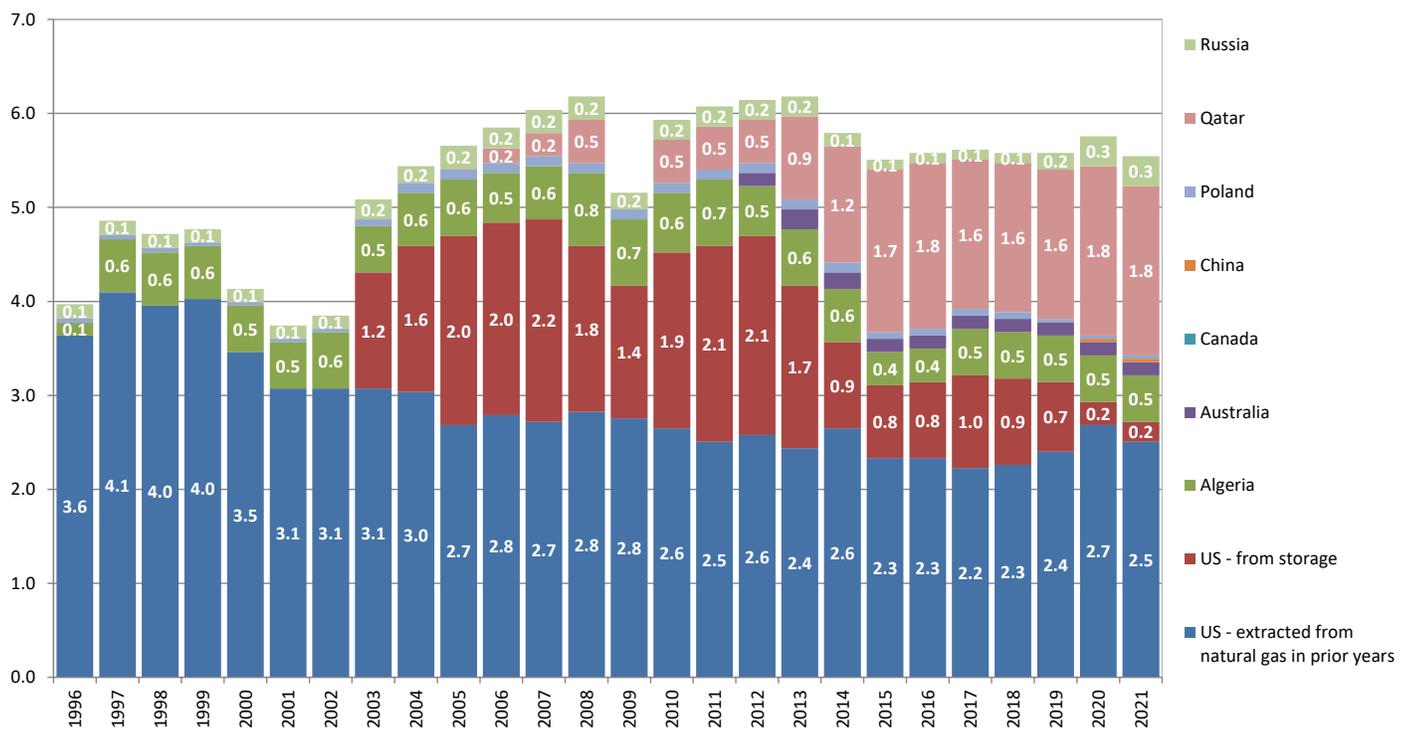
Although saying that Saskatchewan has a burgeoning hydrogen industry is technically true, the industry has been almost 70 years in the making. The recent confluence of factors including a dwindling US supply (the world's biggest user), a growing interest in ESG friendly investments, Saskatchewan's ideal geological conditions and a spike in helium pricing has caused a rush in land postings in Southern Saskatchewan and a spate of financings to fund new companies in their quests to develop producing helium fields.

As it turns out, a safe, reliable North American source of helium may be just what the market needs. The Government of Saskatchewan believes that its province offers abundant and reliable sources of clean, green helium (helium with N<sub>2</sub> as its carrier gas instead of CH<sub>4</sub> - currently >95% of global helium is produced as a by-product of natural gas or LNG production), and strives to produce 10% of the world's helium by 2030. The Saskatchewan Geological Survey has conducted two comprehensive geological studies in [2016](#) and [2021](#) to confirm that Saskatchewan has world-class helium resources and significant development opportunities. In November 2021, Saskatchewan implemented a new [Helium Action Plan](#) (HAP) which aims to improve competitiveness and increase investment across the entire helium value chain.

The global helium market is mostly controlled by five large multinational industrial gas companies: Air Products and Chemicals Inc., Air Liquide SA, Linde PLC, Messer Technologies AD and Taiyo Nippon Sanso Taiwan Inc. Because the supply and distribution of helium gas is only a small portion of the overall revenues for these companies, there isn't much transparency into the global helium market.

The United States Geological Survey (USGS) estimates [global helium production and reserves](#). USGS data indicates 2021 production at 5.5 Bcf (Figure 1) with production mostly being supplied by the US (49%), Qatar (32%), Algeria (9%), Russia (6%) and Australia (3%).

**Figure 1: USGS Global Helium Production Estimates (Bcf/yr)**



Source: USGS

Whereas 2022 was expected to be the year that new helium supplies were to come from two major LNG projects in Qatar (Ras Laffan) and Russia (Amur), it now appears that supplies will remain tight in 2022 and may even remain tight in 2023.

The Ras Laffan and Amur projects are expected to bring as much as 3.8 Bcf/yr of new supply to the market by 2026 ([Edison Research, May 2021](#)) but both projects are experiencing delays and, in addition, the US Bureau of Land Management crude helium enrichment unit is down for unplanned maintenance in January, 2022.

In Russia, a fire on October 8, 2021 and a subsequent explosion and fire on January 5, 2022 delayed the commissioning of the Amur Plant and also jeopardized existing production. Production was expected to be offline for at least six months but the subsequent Russian invasion of the Ukraine adds another level of uncertainty.

A [recent article](#) highlights the looming helium supply crunch which “may be growing more critical with each passing day” and suggests that helium is “selling for up to US\$600/Mcf”.

The first order of business for HEVI is to make a helium discovery - but it now appears that any new source will attract a willing buyer.

There is no standard benchmark pricing for helium on the world market. Prices are negotiated depending on volumes and grade but are typically kept confidential. We have found a few pricing sources and expect to find more over time as additional public companies start to produce helium, report the associated revenues and engage third-party evaluators.

- Sproule Associates Limited used a \$340/Mcf flat price in its evaluation of First Helium’s Worsley well ([First Helium Prospectus](#) P134) based on comparable helium sales in the US.
- Total Helium, with holdings in Colorado and Kansas, signed a 15 year take-or-pay contract with Linde Inc. and Praxair Inc. (Linde) at a price (backed out from P163 of Total Helium’s November 9 Listing Application which is available on [SEDAR](#)) of US\$218.75/Mcf (~\$278/Mcf) escalating at 1.5% per annum. However, Linde paid \$1.9MM up front before receiving any helium which likely had an impact on the long-term price.
- Further afield, Sproule Associates Limited used a US\$237/Mcf price escalating at 2.4% per annum in its evaluation of Renegen Limited’s Virginia Gas Field located in the Free State of the Republic of South Africa (P47 of the [Sproule Report](#)).

After careful consideration we opted to use \$340/Mcf flat pricing. We do, however, note that our helium type well has a break-even price of \$200/Mcf BTAX.

## What is Helium?

Helium is the second element (atomic number 2) and the first noble gas on the periodic table. It is a colorless, odorless, tasteless, non-toxic, inert, monatomic gas and is the second lightest and second most abundant element in the observable universe (after hydrogen) although on Earth it is relatively rare. It also has the lowest boiling point of any element which makes it invaluable in very low temperature cryogenics.

Most terrestrial helium present today is created by the natural decay of heavy radioactive elements. This occurs deep in the earth mostly in basement igneous or metamorphic rocks although radioactive shales that have elevated uranium, thorium and potassium concentrations can also be a source. The helium must migrate out of the source into traps in the overlying sedimentary cover. These traps are the same as conventional hydrocarbon traps but, because the helium molecule is very small, the seal must be very effective to accumulate helium (helium likely migrates through the seal over time but is temporarily stored by a suitably tight cap rock). There is no safe or economic way of manufacturing helium artificially and most of the world's reserves have been derived as a by-product of the extraction of natural hydrocarbon gas.

Due to its unique chemical and physical qualities, helium has become a vital element in a number of applications including in the manufacture of MRIs and semiconductors, fiber optic cable manufacturing, hard disc manufacturing and cooling, space exploration, rocketry, lifting and high-level science.

For further reading, refer to [Helium Fast Facts](#) or [about helium](#) from the US Bureau of Land Management.

## Saskatchewan's Production History

Although the first helium charged reservoirs in Saskatchewan were drilled in 1952, commercial production was not pursued until 1958. In 1952, the United Canso-Consumers Co-op Battle Creek No.4-3 well located at 101/04-31-003-26W3M (star 3 on Figure 2) was drilled on a basement structural high and encountered non-combustible gas in three zones:

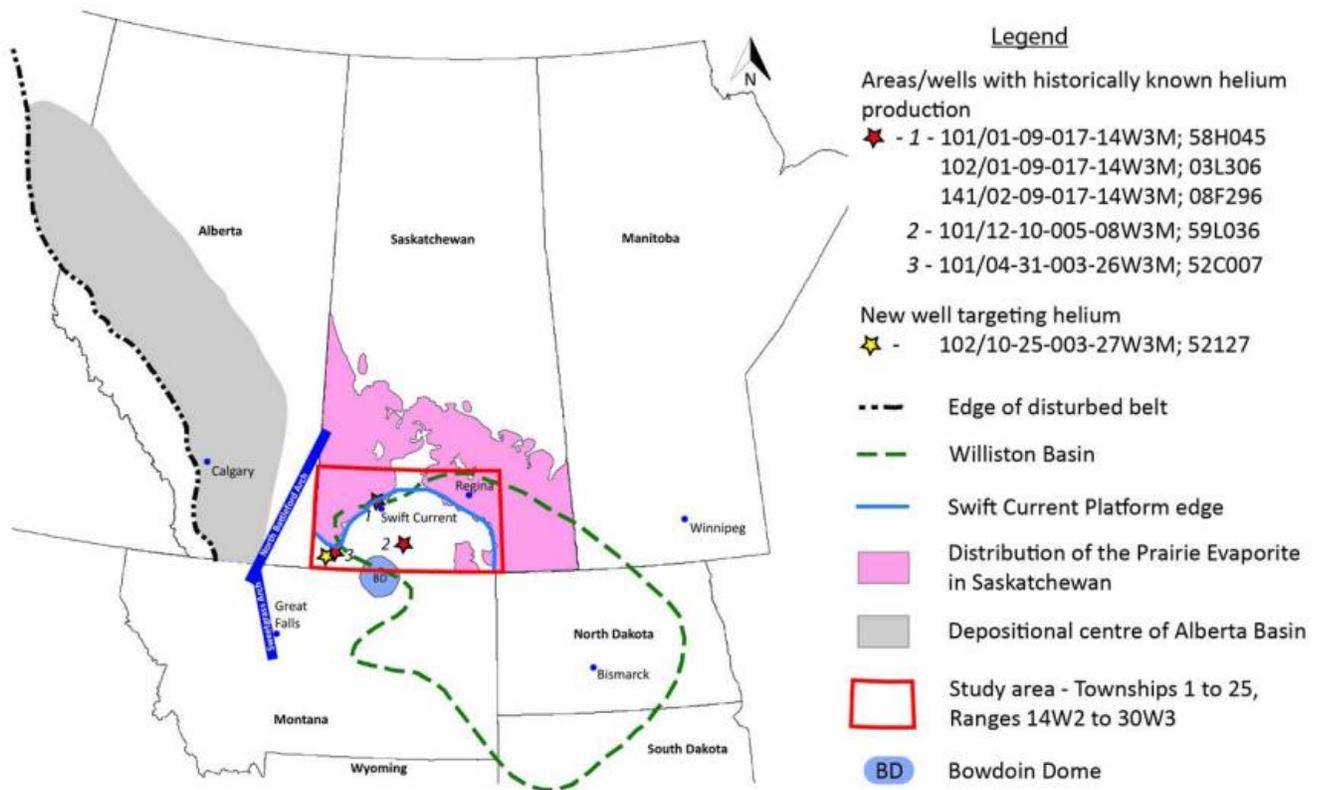
- The first zone, in Devonian Duperow Fm carbonates, tested at an AOF of 16 MMcf/d and contained 81.7% CO<sub>2</sub>, 13.5% N<sub>2</sub>, 0.14% He and 5.66% other gases.
- The second zone, completed in Devonian Dawson Bay Fm carbonates, tested at 6-7 MMcf/d of gas comprised of 95.2% N<sub>2</sub>, 0.47% He and 4.47% other gasses.
- A third zone in the Dawson Bay Fm flowed at 5.4 MMcf/d but was not tested for helium.

In 1958, the B.A. Wilhelm 101/01-09-017-14W3M well was drilled ~15km north of Swift Current on a local structural high associated with the Swift Current nose (star 1 on Figure 2). The well penetrated the Upper Cambrian Deadwood Fm and produced 1-5 MMcf/d of gas composed of 97% N<sub>2</sub>, 2% He and 1% CO<sub>2</sub>. Three additional follow-up wells were drilled at Wilhelm. In total, the wells produced 16.5 Bcf of gas and 231 MMcf of helium (~97% N<sub>2</sub> and 1.4% He) between 1963 and 1977. The 3-10 and 1-9 wells produced 46% and 41% of the gas respectively (Figure 3).

The Wilhelm wells were followed up by a helium discovery in the Texaco Wood Mountain 101/12-10-005-08W3M well which was drilled approximately 14 km SE of the town of Mankota in 1960 (star 2 on Figure 2). As with the other two discoveries drilled in 1952 and 1958, a structural basement high was targeted by the 12-10 well. A flow test over a 6 m sandstone interval in the Cambrian Deadwood Fm resulted in 16.3 to 20.0 MMcf/d of inert gas composed of 96.35% N<sub>2</sub>, 1.08% He and 2.5% other gases.

After a 43 year hiatus, NAH recommenced commercial helium production in July 2020 from its Battle Creek property. NAH now has two production facilities on-stream and plans to bring on four new production facilities before the end of Q1/23. NAH now sells ~60 MMcf/yr (~165 Mcf/d) of purified helium to customers around the world and expects to grow that to >100 MMcf/yr (274 Mcf/d) over the next 12 months.

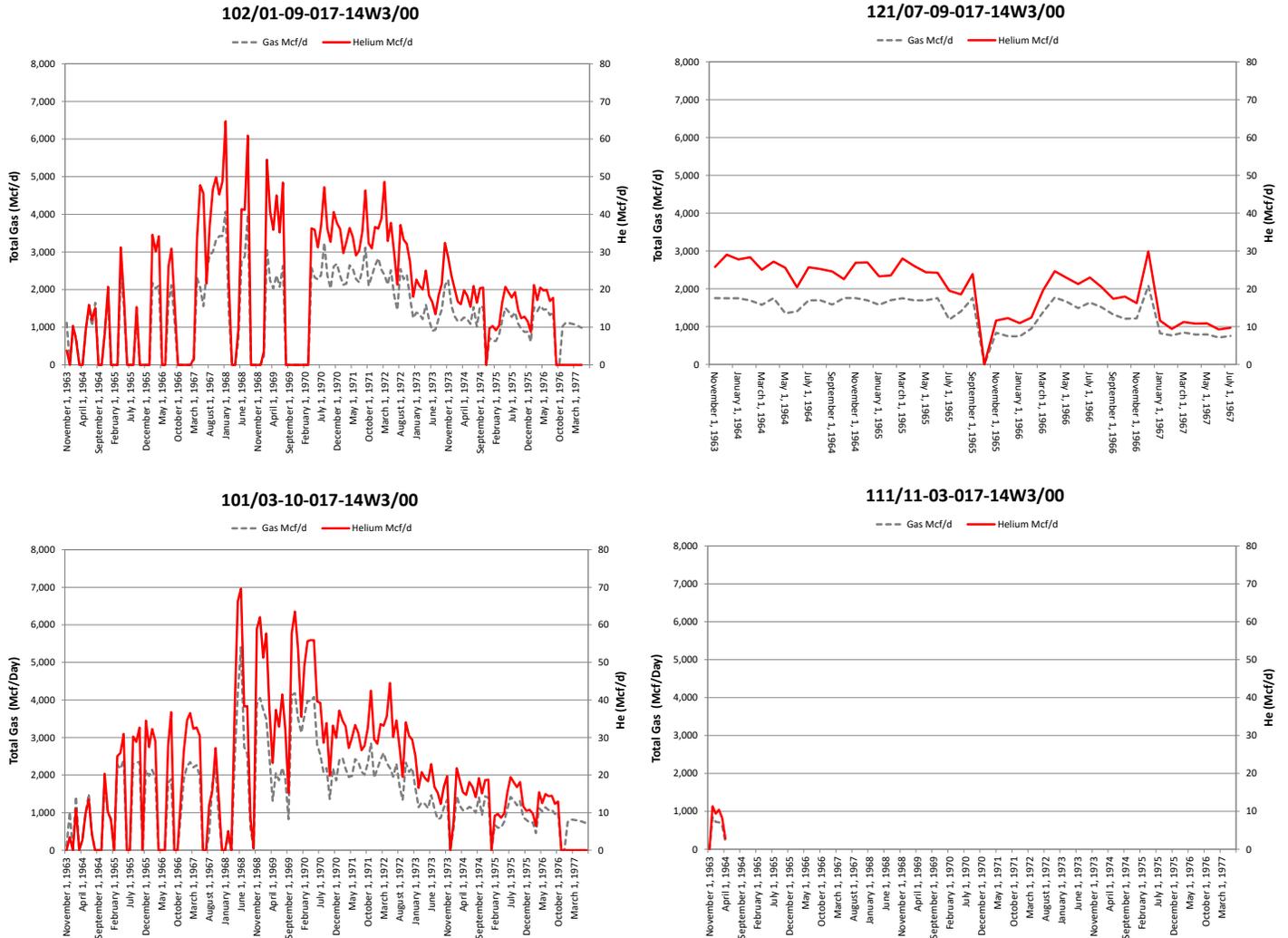
**Figure 2: Saskatchewan Helium Production History Map**



**Figure 1** – Map showing the study area, the location of the present-day structural Williston Basin, the approximate centre of the Alberta Basin (Wright et al., 1994), and the location of wells that have produced or are producing helium (past-producing wells 02-09-017-14W3M and 12-10-005-08W3M were reporting helium production in August 2016). Also included are the structural elements within the Williston Basin and surrounding area. Modified from Kent and Haidl (1993), Kent and Christopher (1994) and Wright et al. (1994).

Source: [www.saskatchewan.ca](http://www.saskatchewan.ca)

Figure 3: Wilhelm Gas/He Production History



Source: [www.saskatchewan.ca](http://www.saskatchewan.ca), Bancroft Capital

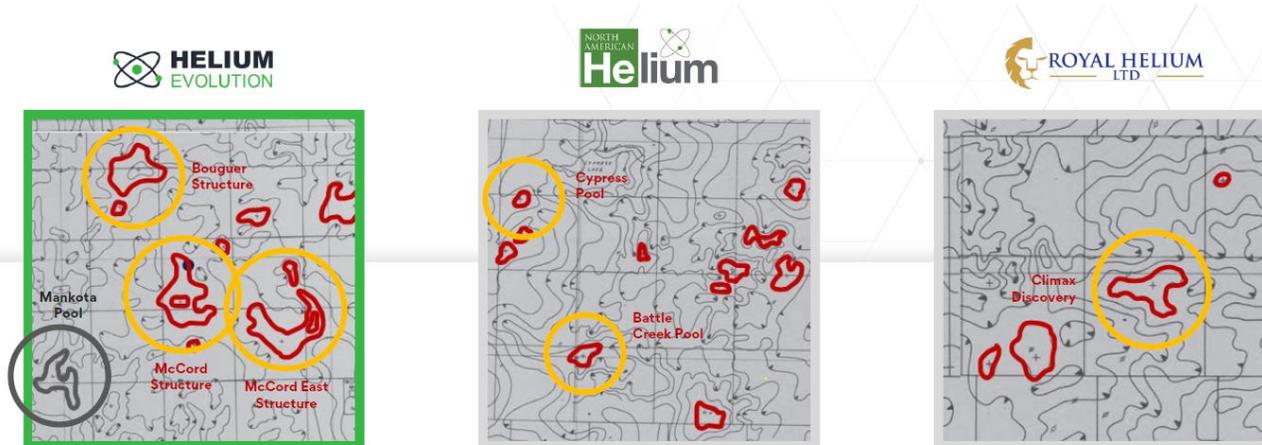
## Helium Play Concept

In their 1960 report [Helium Prospects in Southwest Saskatchewan](#) Sawatzky and Wilson stated “The location of Precambrian highs will be of prime importance to future helium exploration” – and this statement remains true today.

In 1967, the Saskatchewan Department of Mineral Resources published a series of maps showing the structure on the top of the Paleozoic surface (the “Sawatzky Maps”). To prepare the interpretation, H.B. Sawatzky used the existing seismic and well data to identify and contour localized structural trends and map structural highs. These maps are used as the starting point to identify helium drilling leads as the Paleozoic surface mimics the Precambrian basement (Figure 4).

NAH Battle Creek and Cypress producing fields both correspond with Paleozoic highs identified on the Swift Current mapsheet (Figure 4 middle). Royal Helium Ltd. has drilled four wells and has permitted two follow-up locations into a Paleozoic high at Climax (Figure 4 right). In fact, in our review, we have found that all of the helium wells drilled to date in Saskatchewan correspond with a mapped structural high on the Sawatzky Maps.

**Figure 4: Maps Showing Paleozoic Highs**



- **Seismic data acquired** for McCord and McCord East structures
- **Deep well target depth (2,800m)** in the Cambrian Deadwood formation sandstones
- Anticipated helium concentration in excess of **1.0%**<sup>1</sup>

- Recently constructed **\$32MM facility** at Battle Creek Pool<sup>2</sup>
- Battle Creek facility anticipated production of **50 MMcf/year helium**<sup>2</sup>
- **0.5-0.9% helium** at both drill locations<sup>3</sup>

- **Three wells drilled** on basement highs in the Deadwood formation<sup>4</sup>
- Indicated to have found a large helium reserve of **between 2.5 to 6 Bcf**<sup>4</sup>

<sup>1</sup>Management estimates based on historical well and associated geophysical data; Studies including Helium in Southwestern Saskatchewan: Accumulation and Geological Setting; Melinda M. Yurkowski; 2016

<sup>2</sup>North American Helium starts up second plant; Gasworld; 2021

<sup>3</sup>Moving From Resource Capture to Harvest; South of the Divide Conservation Action Program Inc. - AGM; 2020

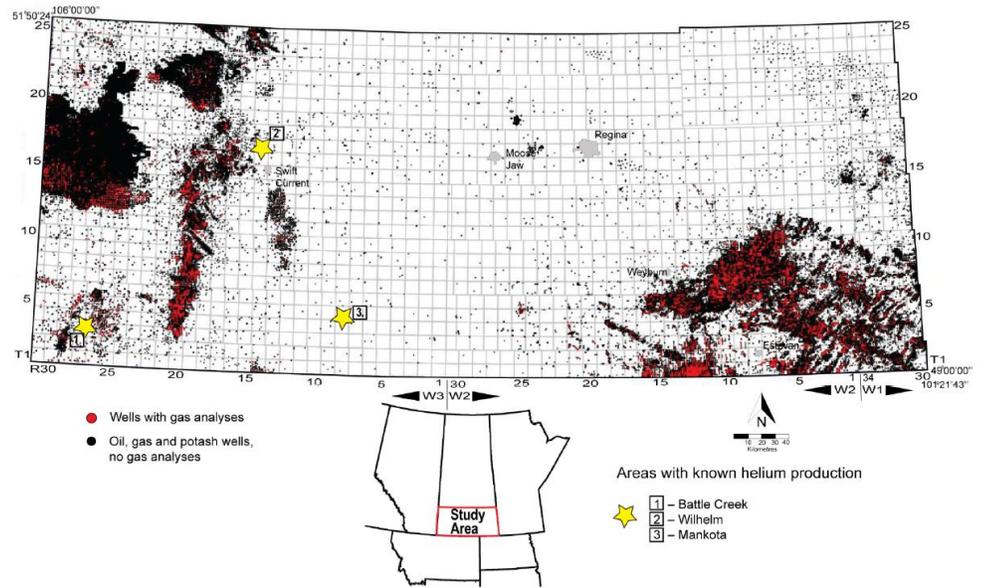
<sup>4</sup>May 12, 2021 Royal Helium news release; TMX Money; 2021

Source: Company Reports

Modern, high-resolution seismic data is used to image a lead and mature it into a drill ready prospect. Trade seismic data (2D and 3D) is abundant in the province, particularly in areas of dense hydrocarbon exploration (Figure 5). In areas of lower seismic density, new 2D seismic data can be acquired for ~\$9,000/km (~10x the price of acquiring trade data).

Seismic is essential to de-risk a prospect as local highs can be bald (no reservoir present), tight (present but without sufficient connected porosity) and wet (water-filled). The reservoir geometry and character (to some extent) can be determined using seismic data. The play is exploratory in nature but the use of seismic data greatly de-risks a prospect.

Figure 5: Map Showing Southern Saskatchewan Well Density

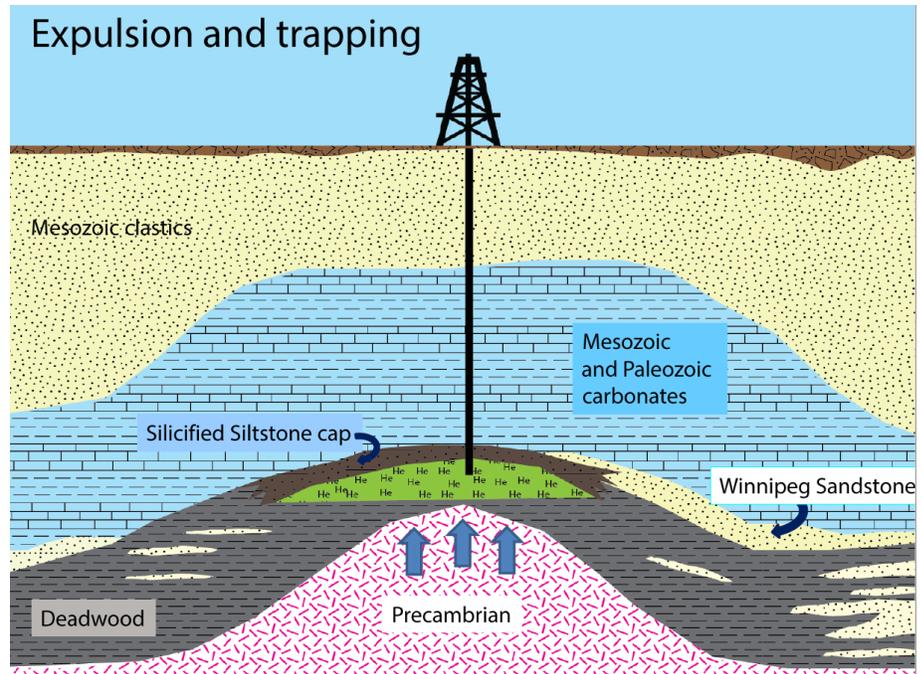
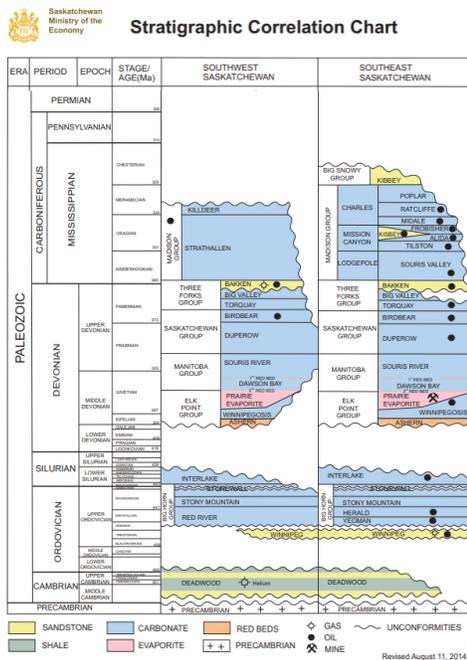


Potash, petroleum and natural gas wells with gas analysis availability overlaid in red. Abbreviations: T – Township, R – Range, W1 – west of the First Meridian, W2 – west of the Second Meridian, W3 – west of the Third Meridian.

Source: Saskatchewan Geological Survey, Open File Report 2021-2

The primary target for helium is in sandstone reservoirs located in the Cambrian Deadwood Fm (Figure 6). Two principal intervals, the Basal Sand and the Earlie Sand are prospective in southern Saskatchewan. Reservoir quality is generally good to very good with porosities ranging from 8% up to 20% in the Earlie Sands and permeabilities measuring mD to D.

Figure 6: Saskatchewan Stratigraphic Chart and Helium Trapping Schematic



Source: Saskatchewan Geological Survey

Saskatchewan has world-class helium resources because its Precambrian basement rocks contain high concentrations of Uranium (Ur) and Thorium (Th). Helium is formed through the radioactive decay of the heavy isotopes, Ur-238 (99.275% of all uranium in the earth's crust), Ur-235, and Th-232.

There is some debate over source and migration pathways but it is a fact that the Cambrian sands of the Deadwood Fm contain high concentrations of helium (up to 2%) in association with N<sub>2</sub> as a carrier gas (up to 98%). N<sub>2</sub> is not a greenhouse gas and can be safely vented at surface. Because there are no organic rich shales underlying the Deadwood Fm, very little to no hydrocarbons are found in Deadwood Fm reservoirs in Saskatchewan.

As helium has a molecular diameter of 0.2 nm, compared to 0.38 nm for methane (CH<sub>4</sub>), the seal has to be very tight to trap helium. The most effective seals are the silicified siltstone cap, which occurs at the top of the Deadwood Fm (Figure 6), salts and anhydrites. The Devonian Winnipegosis carbonates can also trap helium as they are overlain by the Prairie Evaporite which can be an effective seal (Figure 6).

### Industry Players

The comp table in Figure 7 includes companies focused on developing North American helium plays. Of the ten companies, only NAH is producing and the rest are pre-production. NAH raised \$127MM in 2021 and \$46.8MM in 2020 but the details of the financings are not public. Because it is private, NAH only discloses limited information.

**Figure 7: Comp Table for North American Helium Explorers/Producers**

Company	Ticker	Geographic Focus	Last Deal				Producer (P) or Explorer (E)	Current Price (\$/sh)	Consensus Target (\$/sh)	Upside to Target	Basic Shares (MM)	FD Shares (MM)	Basic Market Cap (\$ MM)	LT Debt (\$ MM)	30-Sep-21 Working Cap* (\$ MM)	Enterprise Value (\$ MM)	Land (M acres)	EV/ac (\$/ac)
			Type	Size (\$ MM)	Closing Date	Price (\$/sh)												
North American Helium	Private	Saskatchewan	PP	\$ 127.0	23-Nov-21	-	-	-	-	-	-	-	-	-	-	6,000	-	
Imperial Helium Corp	IHC-CAN	Alberta	IPO	\$ 14.0	18-Feb-21	\$ 0.25	E	\$ 0.19	\$ 0.88	365%	85.5	137.3	\$ 16.2	\$ -	\$ 6.0	\$ 10.2	61	\$ 169
First Helium Inc.	HELI-CAN	Alberta	IPO	\$ 9.2	19-Mar-21	\$ 0.35	E	\$ 0.48	#N/A	#N/A	65.6	100.1	\$ 31.5	\$ -	\$ 7.6	\$ 23.9	355	\$ 67
Global Helium Corp	HECO-CAN	Saskatchewan	PP	\$ 5.0	05-Oct-21	\$ 0.65	E	\$ 0.74	n/a	n/a	41.0	83.8	\$ 30.3	\$ -	\$ 4.4	\$ 26.0	1,535	\$ 17
Royal Helium Ltd.	RHC-CAN	Saskatchewan	PP	\$ 17.3	08-Jun-21	\$ 0.50	E	\$ 0.39	\$ 1.85	381%	142.2	187.4	\$ 54.7	\$ -	\$ 12.2	\$ 42.5	1,000	\$ 43
Avanti Energy Inc.	AVN-CAN	Montana/Alberta	PP	\$ 1.5	14-Sep-21	\$ 1.70	E	\$ 1.09	\$ 4.15	281%	48.8	54.8	\$ 53.2	\$ -	\$ 7.5	\$ 45.7	69	\$ 663
Blue Star Helium Limited	BNL-AUS	US, Colorado	PP	\$ 14.0	04-Nov-21	\$ 0.052	E	\$ 0.04	n/a	n/a	1,586.2	-	\$ 62.2	\$ -	\$ 2.8	\$ 59.4	265	\$ 224
Total Helium Ltd	TOH-CAN	US, Hugoton Basin	PP	\$ 12.3	08-Nov-21	\$ 1.00	E	\$ 1.20	n/a	n/a	65.6	81.1	\$ 78.7	\$ -	\$ 12.5	\$ 66.2	87	\$ 762
Desert Mountain Energy Corp.	DME-CAN	US, Arizona	PP	\$ 4.0	14-Oct-20	\$ 1.60	E	\$ 2.45	n/a	n/a	71.0	80.7	\$ 174.0	\$ -	\$ 29.1	\$ 144.9	85	\$ 1,700
Median																		\$ 221
Average																		\$ 456
Helium Evolution**	Private	Saskatchewan	PP	\$ 12.5	15-Nov-21	\$ 0.30	E	-	-	-	78.8	87.0	\$ 23.6	\$ -	\$ 11.5	\$ 12.1	5,000	\$ 2

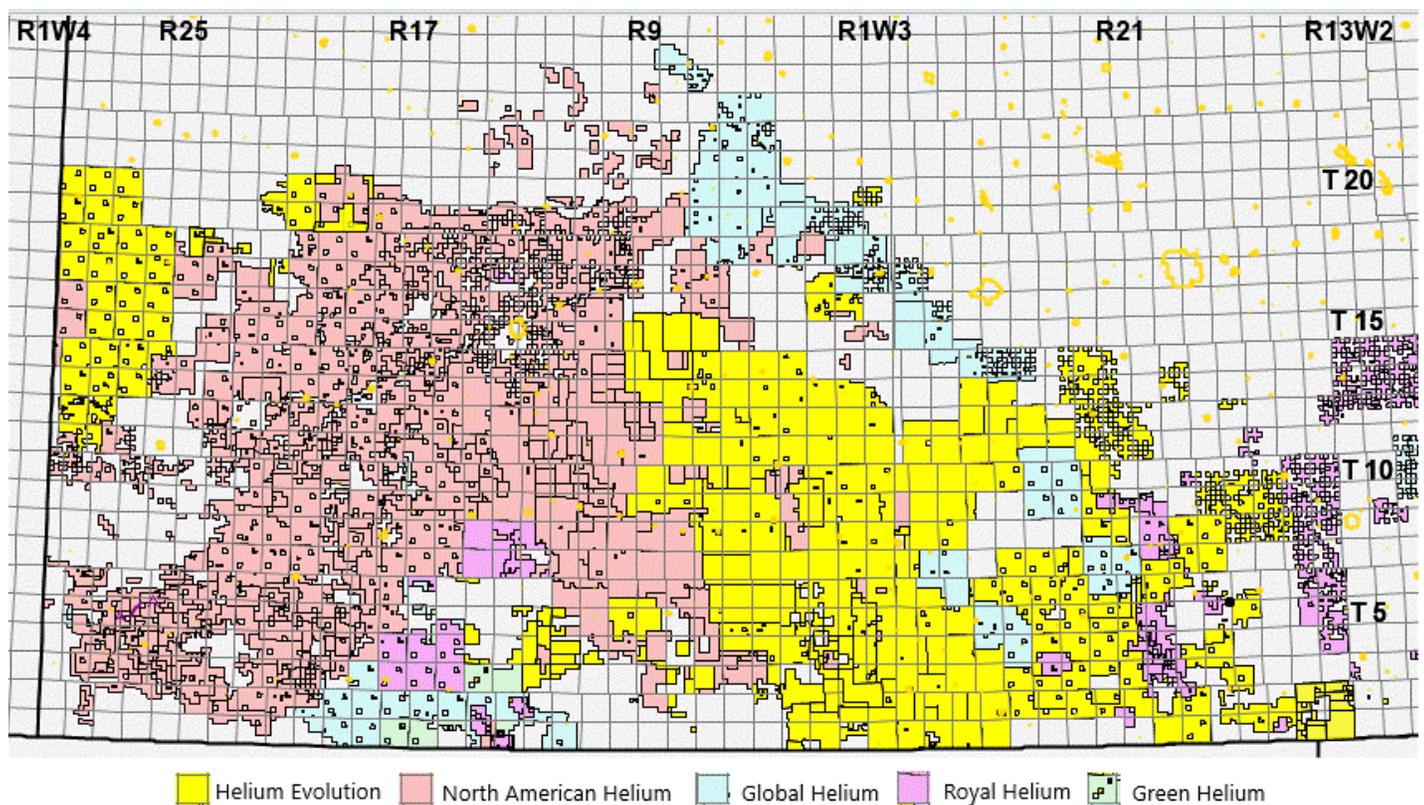
\* Plus subsequent financings

\*\*EV based on last financing price and estimated WC

Source: Company Reports, FactSet, Bancroft Capital

NAH touts itself as the largest contiguous helium landholder in the world with helium rights on >6MM acres of land (Figures 7 and 8). HEVI now holds >5MM acres of helium rights as well. The land rush will likely be over soon as most of the prospective land has already been posted.

**Figure 8: Saskatchewan Helium Land Holders**



Source: Company Reports

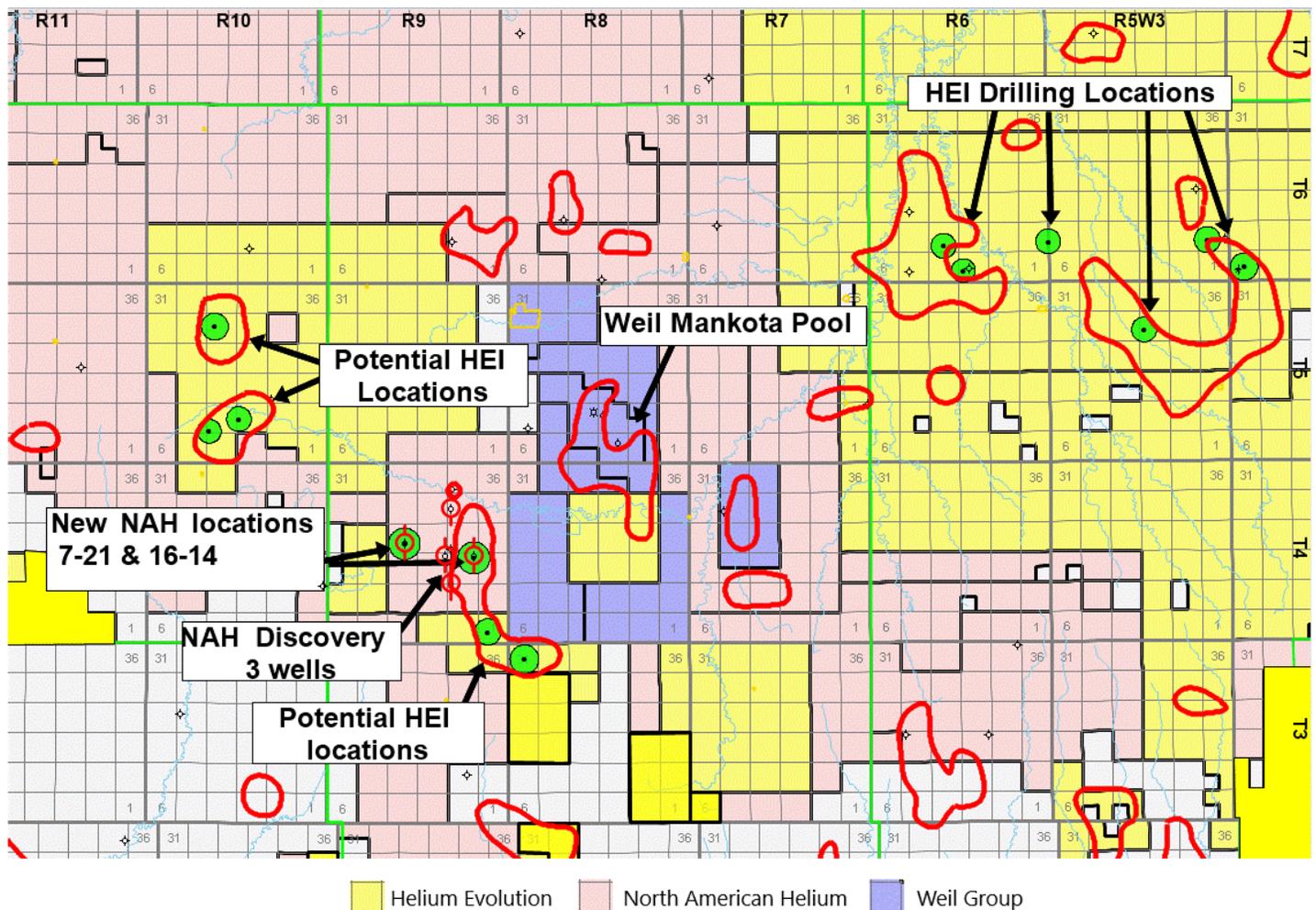
### Operations/Assets Overview

Management’s strategy was both simple and sensible – use the best available data to identify helium leads and post lands over as many of the leads as possible. Management principally used the Sawatzky Maps, complemented with geological and geophysical mapping, to determine the location of basement highs and posted the corresponding lands.

Management identified >250 leads (basement highs) on open lands and posted the lands. Thus far, they have captured ~170 of the leads, lost ~50 and ~30 are yet to be granted. Management believes that it will cost \$150M to \$200M to characterize a lead and expects to shoot additional seismic or buy trade data to mature leads into drill ready prospects.

Four drill-ready prospects (and six wells) in the McCord area (Twp 6, Rge 4-6 W3M) will be drilled in 2022 (Figure 9). Another two prospects in Twp 5, Rge 10 W3M need additional seismic data to be drill ready (Figure 9). Three offsetting NAH wells (13-11-4-9 W3M, 16-15-4-9 W3M and 5-26-4-9 W3M, Figure 9) are drilled and on confidential status until August 2022 but could provide useful data. NAH has recently licensed two additional development wells on the same feature (7-21-4-9 W3M and 16-14-4-9 W3M) indicating a significant discovery has been made.

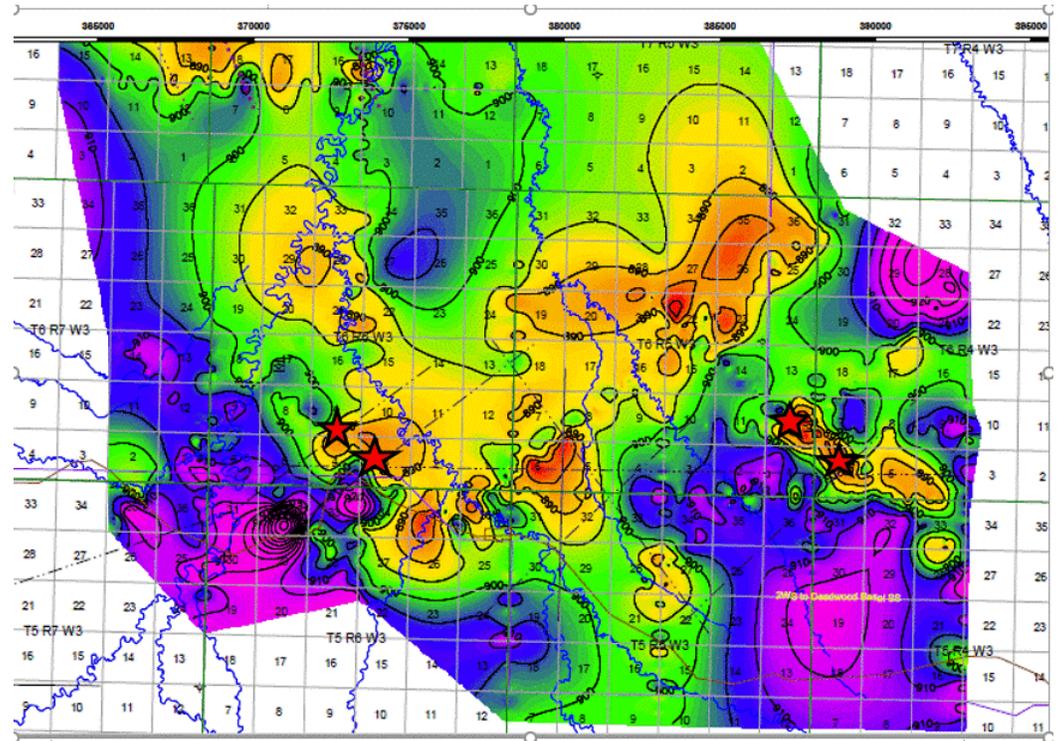
**Figure 9: McCord Area Prospects**



Source: Company Reports

Although the Sawatzky basement highs identify leads, seismic data is essential to mature a lead to a drill ready prospect. Figure 10 presents a two-way traveltime (TWT) seismic structural isochron map over the McCord area. Structural highs are identified in red and lows in purple. The four stars indicate drilling locations – two in the McCord East Prospect and two in the McCord West Prospect.

**Figure 10: TWT Seismic Structural Isochron Map (2WS to Deadwood Basal Sandstone)**



Source: Company Reports

## Resource Estimate

Saskatchewan's helium play is proven by historic production but, due to the lack of drilling, the distribution of resources and reserves is uncertain.

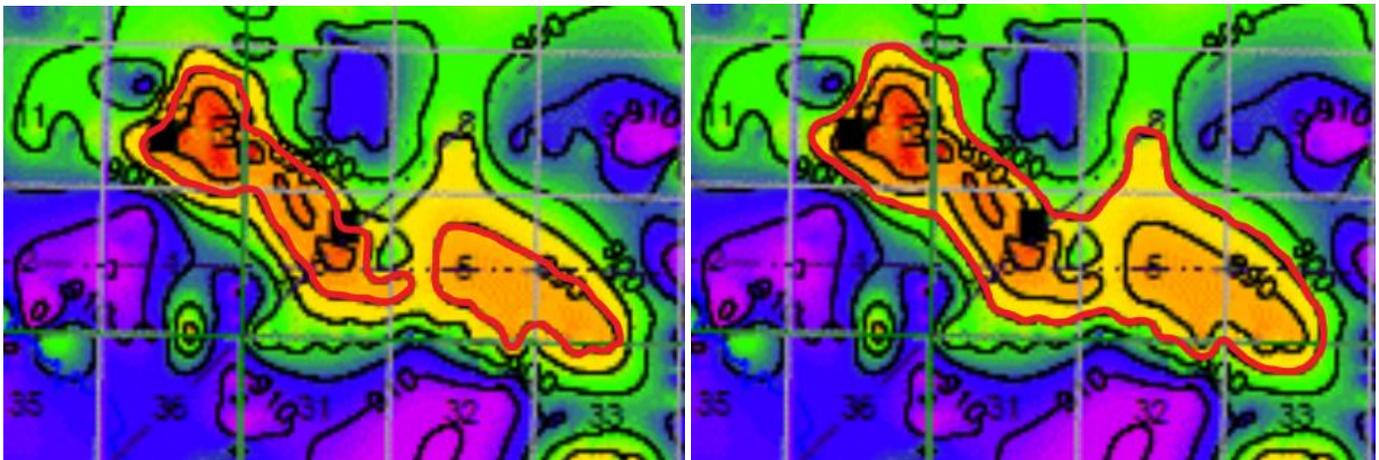
In terms of oil and gas reserves and resources, helium is considered a non-hydrocarbon by-product as defined by the Canadian Oil and Gas Evaluation Handbook (COGEH) which may be a valuable revenue stream, much like sulphur extracted from sour gas. Given that the Saskatchewan helium play is still in the exploration stage, volumetric methods are used to estimate 'helium initially-in-place' and 'recoverable helium' using the same standards as for a conventional hydrocarbon gas reservoir. As more wells come on production, decline analysis, rate transient analysis and material balance methods can be used to estimate helium resource and reserves.

Using the COGEH definitions, helium accumulations should be described as prospective resources – that is, quantities estimated to be potentially recoverable from undiscovered accumulations that are technically viable and economic to recover. Prospective resources are estimated using probabilistic methods to derive low (conservative, P90), best (realistic, P50) and high (optimistic P10) volumes.

### McCord East Prospect

McCord East is HEVI's first exploration target and is expected to drill in Q2/Q3 2022. The prospect area ranges in size from 975 ac (P90) to 1,900 ac (P10) as shown in Figure 11.

**Figure 11: McCord East Prospect P90 (975 ac) and P10 (1,900 ac) Outline**



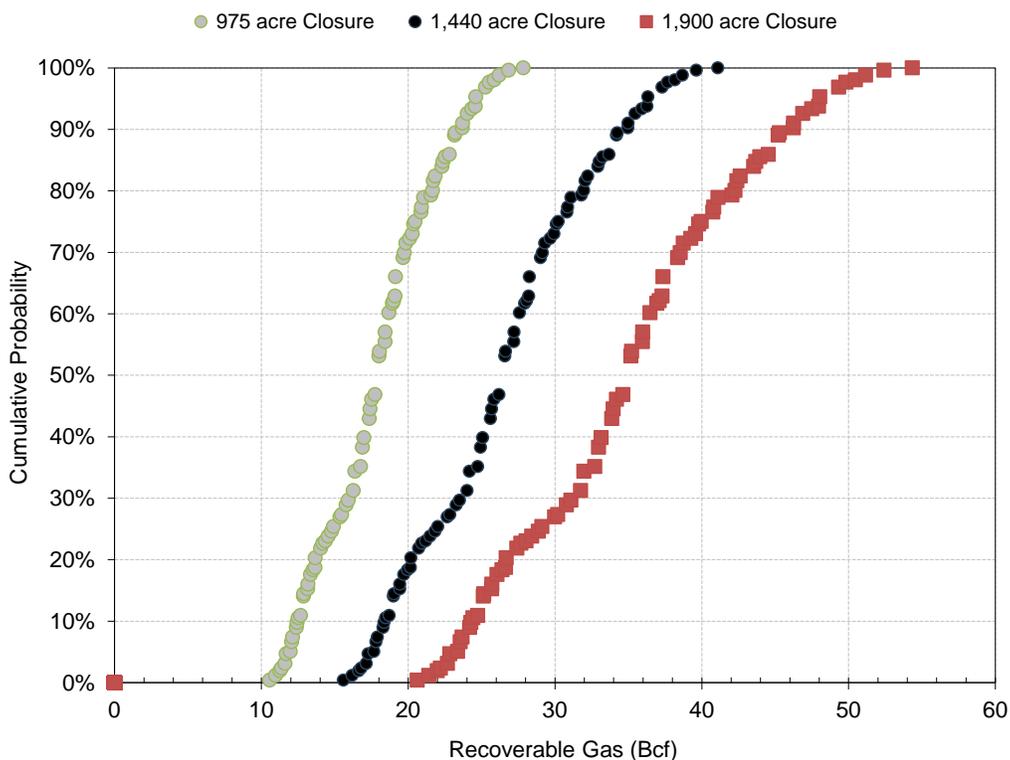
Source: Company Reports, Bancroft Capital

We worked with management to determine appropriate volumetric inputs for the McCord East Prospect. Deadwood Fm core samples were collected from 10-3-5-8W3M well in 1962 (in the Weil Mankota Pool Figure 9) which provided analogue pay, porosity and water saturation data (~35 km WSW of McCord East). For our estimate, we use:

- Net pay ranging from 5.0 – 9.0m (16.4 – 29.5 ft)
- Porosity ranging from 15 – 18%
- Water Saturation ranging from 30 – 35%
- Recovery factors ranging from 75 – 85%

Using these parameters, we calculate total gas ranging from 17.8 Bcf to 35.1 Bcf (Figure 12 and 13) and mean prospective helium resources of:

- P90 (conservative) = 178 MMcf
- P50 (realistic) = 263 MMcf
- P10 (optimistic) = 351 MMcf

**Figure 12: McCord East Prospect - Total Gas Prospective Resource Distribution**


Source: Company Reports, Bancroft Capital

**Figure 13: McCord East Prospect - P90, P50 and P10 Total Gas and Helium Prospective Resource Estimate**

Gross	Low	Best	High	Gross	Low	Best	High	Gross	Low	Best	High
Area (acre)	975	975	975	Area (acre)	1,440	1,440	1,440	Area (acre)	1,900	1,900	1,900
Net Pay (ft)	16.4	23.0	29.5	Net Pay (ft)	16.4	23.0	29.5	Net Pay (ft)	16.4	23.0	29.5
Porosity (%)	15.0%	16.5%	18.0%	Porosity (%)	15.0%	16.5%	18.0%	Porosity (%)	15.0%	16.5%	18.0%
Water Saturation, Sw (%)	35.0%	32.5%	30.0%	Water Saturation, Sw (%)	35.0%	32.5%	30.0%	Water Saturation, Sw (%)	35.0%	32.5%	30.0%
FVF, Bg (rsc/scf)	0.00486	0.00486	0.00486	FVF, Bg (rsc/scf)	0.00486	0.00486	0.00486	FVF, Bg (rsc/scf)	0.00486	0.00486	0.00486
RF (%)	75%	80%	85%	RF (%)	75%	80%	85%	RF (%)	75%	80%	85%
EUR (Bcf)	12.4	17.9	23.2	EUR (Bcf)	18.3	26.4	34.2	EUR (Bcf)	24.3	34.9	46.2
Swanson's Mean (Bcf)		17.8		Swanson's Mean (Bcf)		26.3		Swanson's Mean (Bcf)		35.1	
<b>Recoverable Helium (at 1% He)</b>				<b>Recoverable Helium (at 1% He)</b>				<b>Recoverable Helium (at 1% He)</b>			
EUR (MMcf)	124	179	232	EUR (MMcf)	183	264	342	EUR (MMcf)	243	349	462
Swanson's Mean (MMcf)		178		Swanson's Mean (MMcf)		263		Swanson's Mean (MMcf)		351	

Source: Company Reports, Bancroft Capital

## Drilling and Completions Engineering

All of HEVI's helium wells will be vertical drills; however, deviated drilling may be required in some environmentally sensitive areas. Typical drill times to the base of the Deadwood Fm (~2,650m) range from 13-15 days with an estimated drill and case cost of ~\$1.5MM.

Completion operations are relatively straightforward. The Deadwood Fm exhibits high porosity and permeability. Hydraulic fracturing of the reservoir is not required. Completion operations will consist of running in the hole with tubing and casing gun, perforating the selected Deadwood Fm interval, and performing an extended 5-10 day flow test to record pressure data and gain initial reservoir parameters. Estimated cost of this completion operation is \$0.3MM.

## McCord East Prospect Valuation

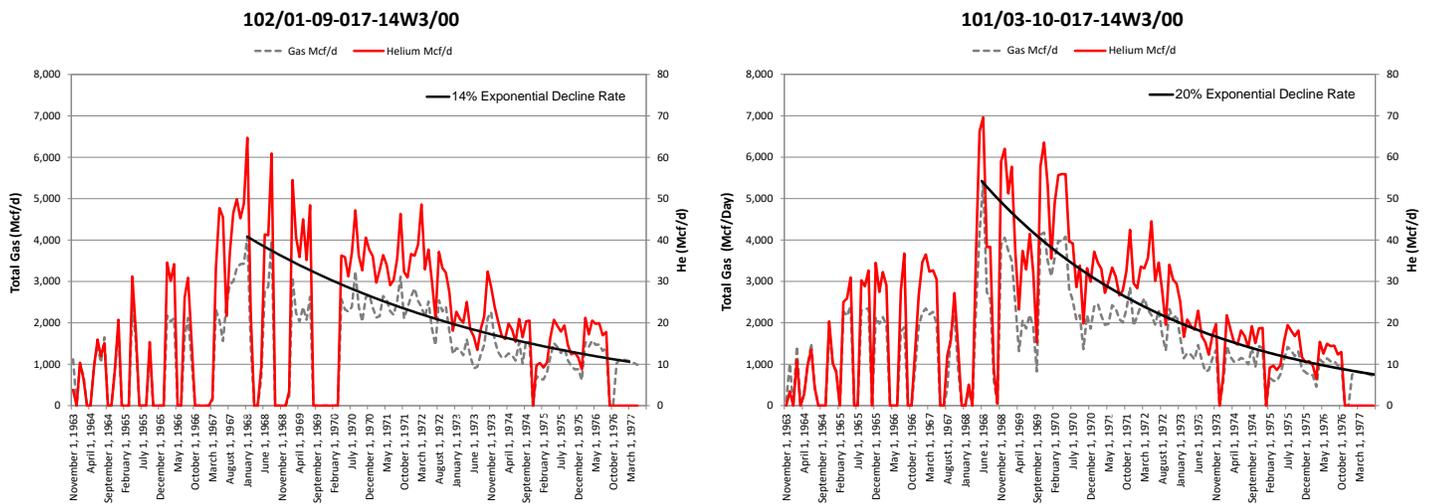
### Type Well

The longest production history in the basin comes from:

- 102/01-09-017-14W3/00 – produced 6.7 Bcf total gas and 95 MMcf of helium (1.4%) between January 1964 and July 1977, and
- 101/03-10-017-14W3/00 – produced 7.6 Bcf total gas and 107 MMcf of helium (1.4%) between November 1963 and July 1977

The wells declined exponentially at 14% and 20% respectively from their peak production rates, although production rates seemed to be more market-driven than a function of reservoir deliverability (Figure 14).

**Figure 14: Wilhelm Gas/Helium Well Production History and Decline Rates**

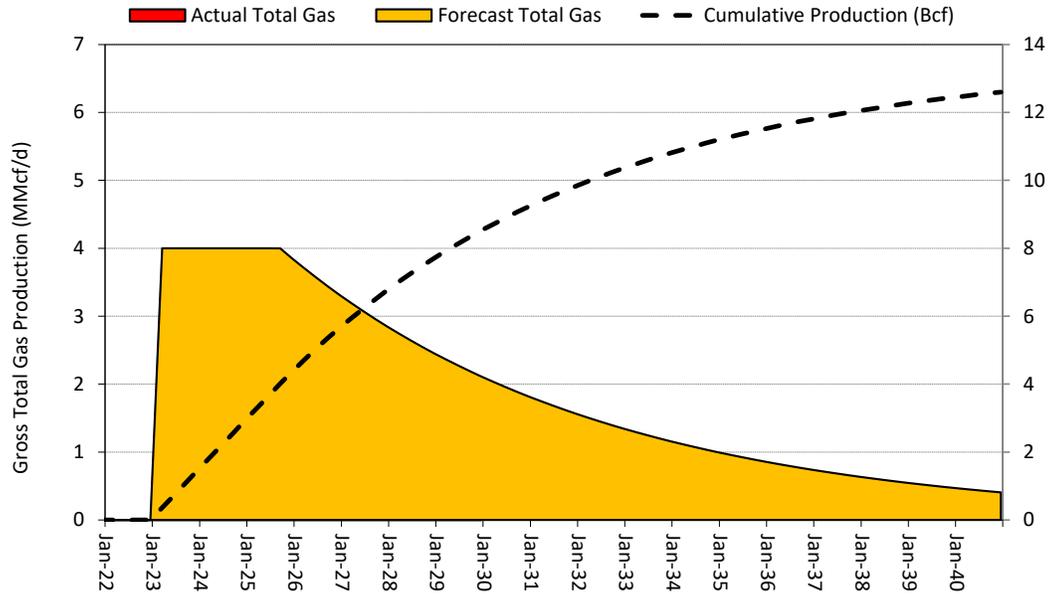


Source: [www.saskatchewan.ca](http://www.saskatchewan.ca) and Bancroft Capital

The Weil 10-3-5-8 W3M well (Weil Mankota Pool in Figure 9) provides valuable data to determine flow rates for a new well drilled in the greater McCord area. The 10-3 well was drilled to a total depth of 8,648 ft (2,635 m) and the Lower Deadwood Sand (8,390 – 8,405 ft) was flow-tested in October 1962. Shut-in formation pressures were measured at 3,422 psia (23.6 MPa). The well was flowed at rates up to 30 MMcf/d and an absolute open flow (AOF) rate of 160 MMcf/d was calculated. In other words, deliverability is not expected to be a problem for wells drilled in the greater McCord area. Although a successful McCord well would likely be capable of similar flow rates, HEVI management will limit production rates to optimize gas recovery and facilities costs.

Our type well (Figure 15) assumes a 4 MMcf/d total gas IP, flat production for 30 months and a 14% exponential decline thereafter. A single well is forecast to recover 12.6 Bcf of total gas and 126 MMcf of helium (based on a 1% helium concentration).

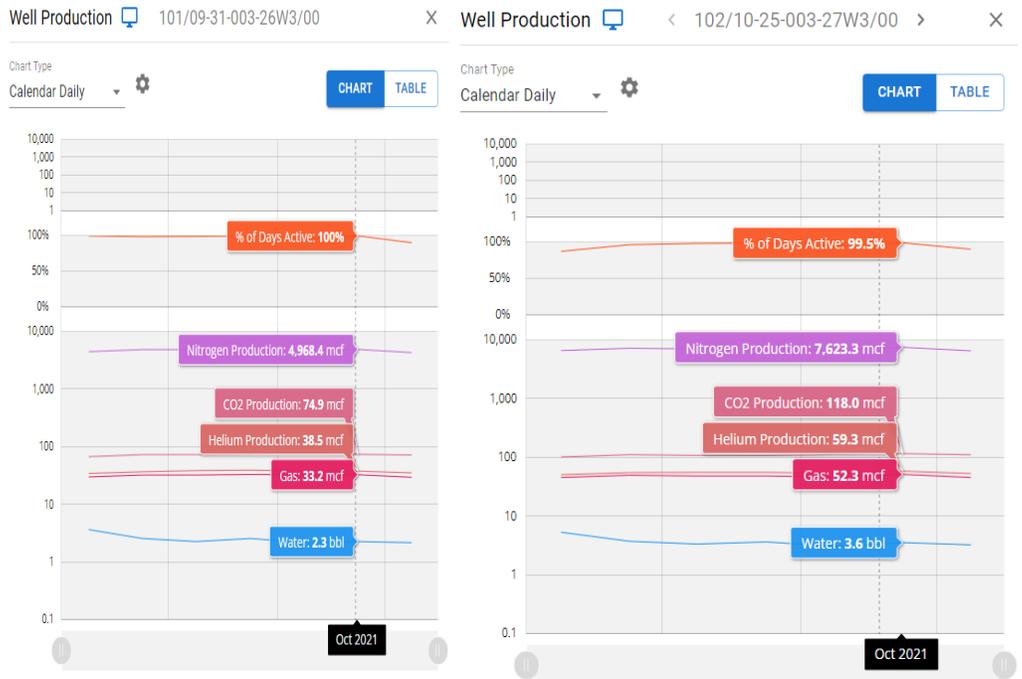
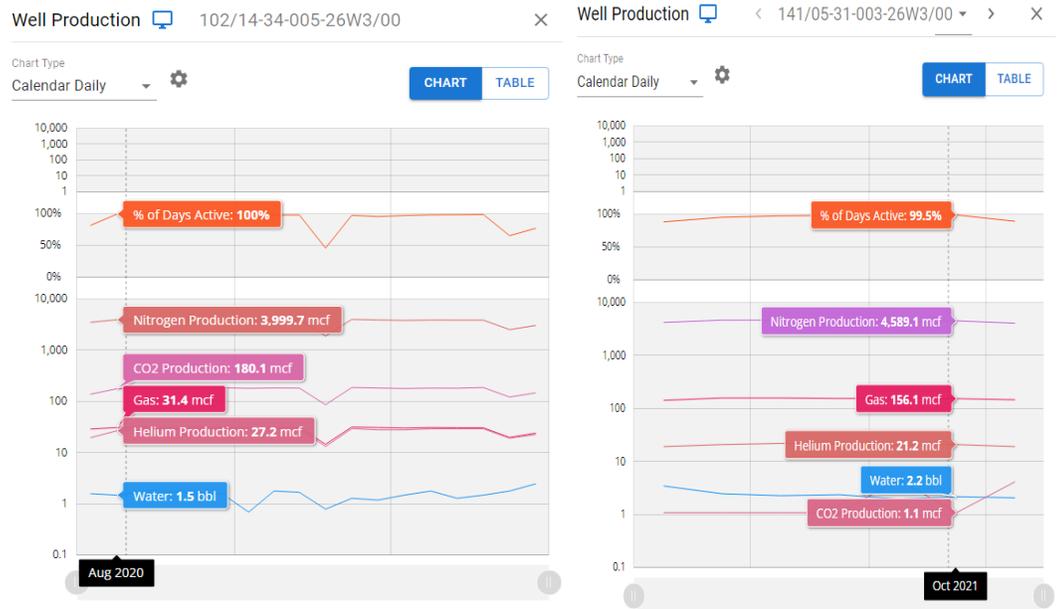
**Figure 15: HEVI Type Well**



Source: Bancroft Capital

Newly drilled NAH helium wells have been produced at constant N<sub>2</sub> gas rates of 4.0 – 7.6 MMcf/d with no decline (Figure 16). The longest production history comes from the 14-34-26-3 W3M well which has produced flat at ~4.2 MMcf/d since August 2020 (94.3% N<sub>2</sub>, 0.6% He, 0.7% CH<sub>4</sub> and 4.2% CO<sub>2</sub>).

**Figure 16: NAH Battle Creek Pool Production Plots**



Source: Petro Ninja

### Prospective Resources

Using our type well and the McCord East prospective resource estimate, we believe that it will take two to three wells to drain McCord East. We use the following assumptions in our model:

- Successful well costs of \$1.8MM to drill, case and equip and \$1.2MM D&A costs
- \$1.5MM per MMcf/d of facilities costs (~\$6MM per well)
- Operating costs of \$0.75/Mcf of total gas (\$75/Mcf helium)
- 4.25% Saskatchewan royalties and 3% founders ORR (royalty incentives may decrease the provincial royalties)
- \$340/Mcf flat helium prices (US\$270/Mcf) sold at the wellhead (i.e. no transportation costs)
- No cost or price escalation
- Risking at 33% COS (assumes two D&A wells before drilling a successful well)

For a risked case, we assume that two unsuccessful (D&A) wells are drilled before a successful prospect is drilled. The risked case characterizes the McCord East prospect but, if unsuccessful, we believe a subsequent prospect would be successful in recovering at least the P90 resources.

A summary of the McCord East P90, P50 and P10 economic runs is provided in Figure 17 and the unrisked BTAX P90, P50 and P10 economic runs are included in Figures 18, 19 and 20.

We calculate the unrisked BTAX NPV10% for McCord East prospect ranging from \$14.7MM (\$0.17/sh FD) in the P90 case to \$29.1MM (\$0.33/sh FD) in the P10 case with a best estimate (P50) of \$21.7MM (\$0.25/sh FD). The risked value for the prospect ranges from \$0.13 to \$0.29/sh FD with a best estimate of \$0.21/sh FD

**Figure 17: McCord East Prospect Valuation**

	P90 (Conservative)	P50 (Realistic)	P10 (Optimistic)
Recovered Gas (Bcf)	18	26	35
Recovered He (MMcf)	178	263	350
<b>Unrisked</b>			
Wells	2	3	3
Drilling Capital (\$MM)	\$3.6	\$5.4	\$5.4
Facilities Capital (\$MM)	\$12.0	\$18.0	\$18.0
BTAX NPV10 (\$MM)	\$14.7	\$21.7	\$29.1
BTAX NPV10/sh FD (\$)	\$0.17	\$0.25	\$0.33
BTAX Payout (Years)	3.0	3.0	3.0
<b>Risked</b>			
Wells	4	5	5
Drilling Capital (\$MM)	\$6.6	\$8.4	\$8.4
Facilities Capital (\$MM)	\$12.0	\$18.0	\$18.0
BTAX NPV10 (\$MM)	\$11.5	\$18.4	\$25.6
BTAX NPV10/sh FD (\$)	\$0.13	\$0.21	\$0.29
BTAX Payout (Years)	3.7	3.5	3.5

Source: Company Reports, Bancroft Capital

**Figure 18: McCord East P90 – Unrisked NPV10 = \$14.7MM with a 3.0 Yr Payout, Risked NPV10 = \$11.5MM with a 3.7 Yr Payout**

Gross He EUR (MMcf)	178	Remaining Gross He (MMcf)	178
Net He EUR BR (MMcf)	178	Remaining He NBR (MMcf)	178
Net He EUR AR (MMcf)	170	Remaining He NAR (MMBoe)	170
Unrisked (C\$/sh)	C\$0.17	Unrisked Payout (Years)	3.0
Risked (C\$/sh)	C\$0.13	Risked Payout (Years)	3.7

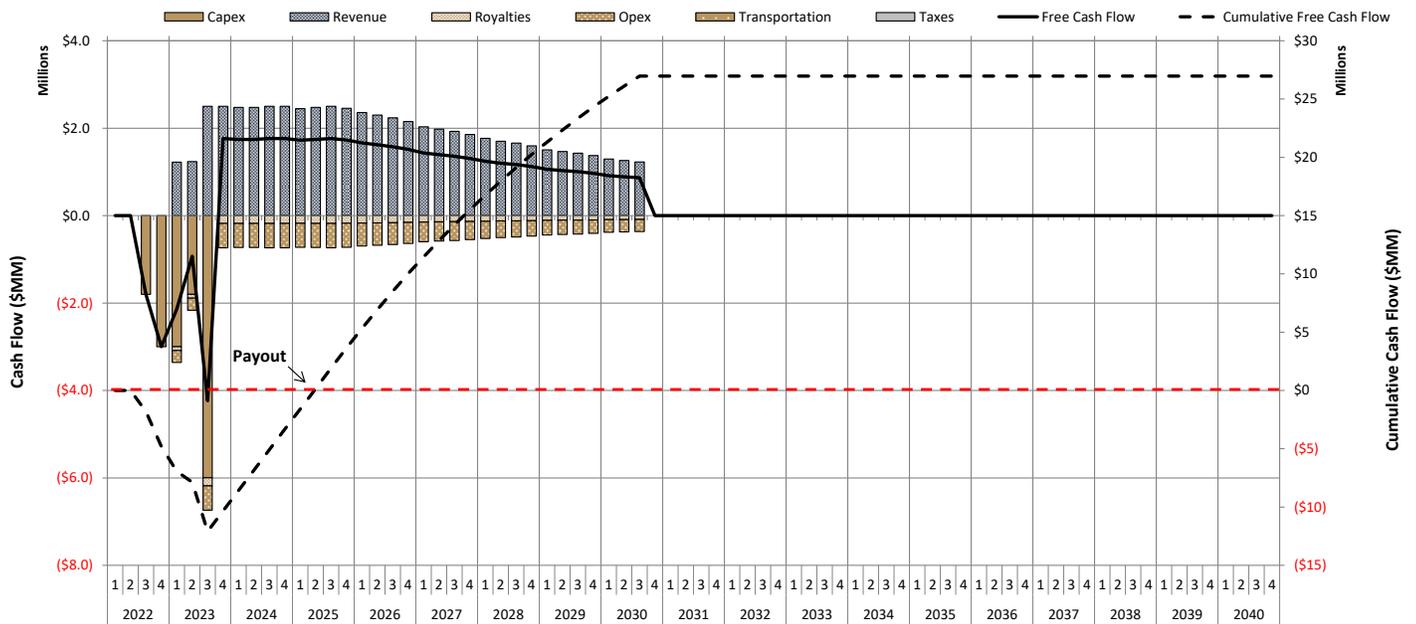
  

Unrisked NPV of Cash Flows (\$mm)		Unrisked NPV/Mcf (\$/Mcf)		
10%	C\$14.7	US\$11.1	10%	C\$2.59
				US\$62.36

Risked NPV of Cash Flows (\$mm)		Risked NPV/Mcf (\$/Mcf)		
10%	C\$11.5	US\$8.7	10%	C\$64.83
				US\$48.94

Unrisked	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033 - 2040
<b>E&amp;D</b>												
Wells	-	2	-	-	-	-	-	-	-	-	-	-
Drilling Capital (M\$)	\$1,800	\$1,800	-	-	-	-	-	-	-	-	-	-
Facilities Capital (M\$)	\$3,000	\$9,000	-	-	-	-	-	-	-	-	-	-
Total Yearly Capital (M\$)	\$4,800	\$10,800	-	-	-	-	-	-	-	-	-	-
Cumulative Capital (M\$)	\$4,800	\$15,600	\$15,600	\$15,600	\$15,600	\$15,600	\$15,600	\$15,600	\$15,600	\$15,600	\$15,600	\$15,600
<b>Production</b>												
Total Gas (Mcf/d)	-	6,016	8,000	7,962	7,292	6,277	5,402	4,649	3,049	-	-	-
He (Mcf/d)	-	60	80	80	73	63	54	46	30	-	-	-
<b>Prices</b>												
He (\$/Mcf)	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340
<b>Net Income</b>												
Revenue (M\$)	\$0	\$7,466	\$9,955	\$9,881	\$9,049	\$7,790	\$6,722	\$5,770	\$3,784	\$0	\$0	\$0
Royalties (M\$)	\$0	-\$541	-\$722	-\$716	-\$656	-\$565	-\$487	-\$418	-\$274	\$0	\$0	\$0
Operating Costs (M\$)	\$0	-\$1,663	-\$2,218	-\$2,201	-\$2,016	-\$1,735	-\$1,498	-\$1,285	-\$843	\$0	\$0	\$0
Transportation Costs (M\$)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DD&A (M\$)	\$0	-\$439	-\$586	-\$581	-\$532	-\$458	\$0	-\$339	-\$223	\$0	\$0	\$0
Net Income Before Tax (M\$)	\$0	\$4,822	\$6,430	\$6,382	\$5,845	\$5,031	\$4,342	\$3,726	\$2,444	\$0	\$0	\$0
<b>Free Cash Flow</b>												
Yearly (M\$)	(\$4,800)	(\$5,538)	\$7,015	\$6,963	\$6,377	\$5,489	\$4,737	\$4,066	\$2,667	\$0	\$0	\$0
Cumulative (M\$)	(\$4,800)	(\$10,338)	(\$3,323)	\$3,640	\$10,017	\$15,507	\$20,244	\$24,310	\$26,976	\$26,976	\$26,976	\$26,976



Source: Company Reports, Bancroft Capital

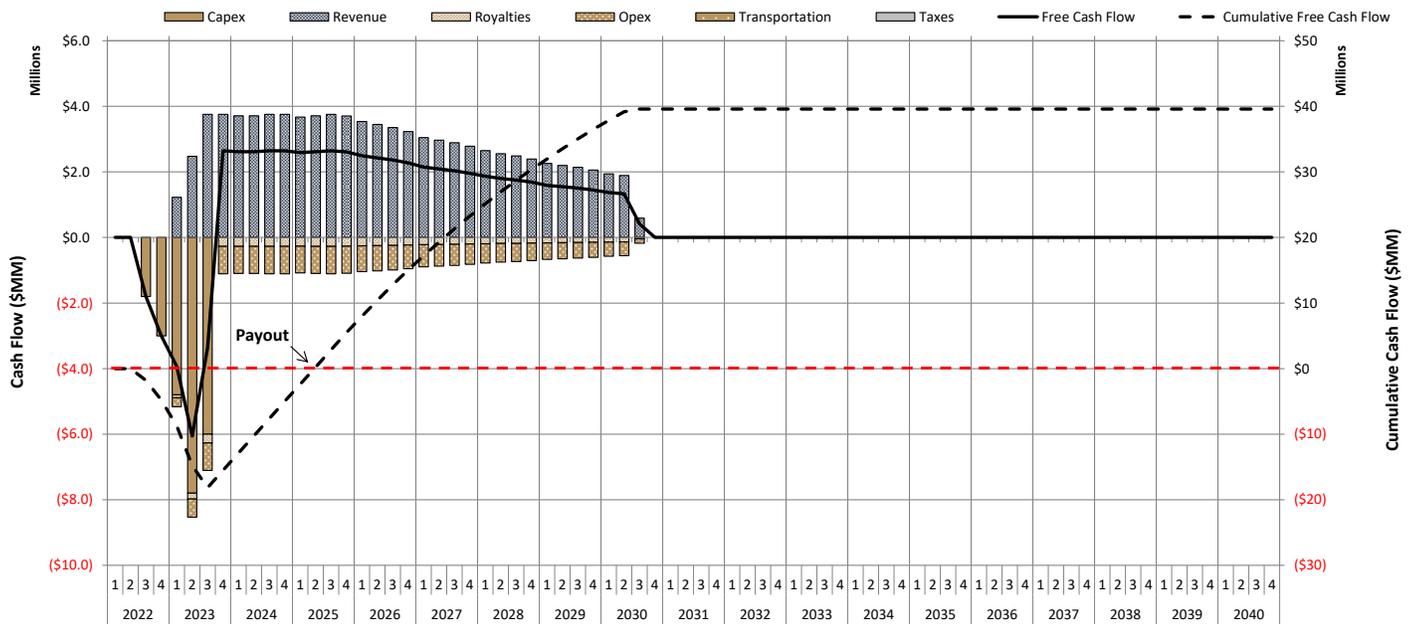
**Figure 19: McCord East P50 – Unrisked NPV10 = \$21.7MM with a 3.0 Yr Payout, Risked NPV10 = \$18.4MM with a 3.5 Yr Payout**

Gross He EUR (MMcf)	263	Remaining Gross He (MMcf)	263
Net He EUR BR (MMcf)	263	Remaining He NBR (MMcf)	263
Net He EUR AR (MMcf)	252	Remaining He NAR (MMBoe)	252
Unrisked (C\$/sh)	C\$0.25	Unrisked Payout (Years)	3.0
Risked (C\$/sh)	C\$0.21	Risked Payout (Years)	3.5

Unrisked NPV of Cash Flows (\$mm)		Unrisked NPV/Mcf (\$/Mcf)		
10%	C\$21.7	US\$16.4	10%	C\$82.43
Risked NPV of Cash Flows (\$mm)		Risked NPV/Mcf (\$/Mcf)		
10%	C\$18.4	US\$13.9	10%	C\$69.80

Unrisked	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033 - 2040
<b>E&amp;D</b>												
Wells	-	3	-	-	-	-	-	-	-	-	-	-
Drilling Capital (M\$)	\$1,800	\$3,600	-	-	-	-	-	-	-	-	-	-
Facilities Capital (M\$)	\$3,000	\$15,000	-	-	-	-	-	-	-	-	-	-
Total Yearly Capital (M\$)	\$4,800	\$18,600	-	-	-	-	-	-	-	-	-	-
Cumulative Capital (M\$)	\$4,800	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400
<b>Production</b>												
Total Gas (Mcf/d)	-	9,030	12,000	11,961	10,935	9,413	8,100	6,972	3,565	-	-	-
He (Mcf/d)	-	90	120	120	109	94	81	70	36	-	-	-
<b>Prices</b>												
He (\$/Mcf)	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340
<b>Net Income</b>												
Revenue (M\$)	\$0	\$11,206	\$14,933	\$14,844	\$13,570	\$11,681	\$10,080	\$8,652	\$4,424	\$0	\$0	\$0
Royalties (M\$)	\$0	-\$812	-\$1,083	-\$1,076	-\$984	-\$847	-\$731	-\$627	-\$321	\$0	\$0	\$0
Operating Costs (M\$)	\$0	-\$2,497	-\$3,327	-\$3,307	-\$3,023	-\$2,602	-\$2,246	-\$1,928	-\$986	\$0	\$0	\$0
Transportation Costs (M\$)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DD&A (M\$)	\$0	-\$659	-\$878	-\$873	-\$798	-\$687	\$0	-\$509	-\$260	\$0	\$0	\$0
Net Income Before Tax (M\$)	\$0	\$7,238	\$9,645	\$9,587	\$8,765	\$7,545	\$6,510	\$5,588	\$2,857	\$0	\$0	\$0
<b>Free Cash Flow</b>												
Yearly (M\$)	(\$4,800)	(\$10,703)	\$10,523	\$10,460	\$9,563	\$8,232	\$7,103	\$6,097	\$3,118	\$0	\$0	\$0
Cumulative (M\$)	(\$4,800)	(\$15,503)	(\$4,980)	\$5,481	\$15,044	\$23,275	\$30,379	\$36,476	\$39,593	\$39,593	\$39,593	\$39,593



Source: Company Reports, Bancroft Capital

**Figure 20: McCord East P10 – Unrisked NPV10 = \$29.1MM with a 3.0 Yr Payout, Risked NPV10 = \$25.6MM with a 3.5 Yr Payout**

Gross He EUR (MMcf)	350	Remaining Gross He (MMcf)	350
Net He EUR BR (MMcf)	350	Remaining He NBR (MMcf)	350
Net He EUR AR (MMcf)	335	Remaining He NAR (MMBoe)	335
Unrisked (C\$/sh)	C\$0.33	Unrisked Payout (Years)	3.0
Risked (C\$/sh)	C\$0.29	Risked Payout (Years)	3.5

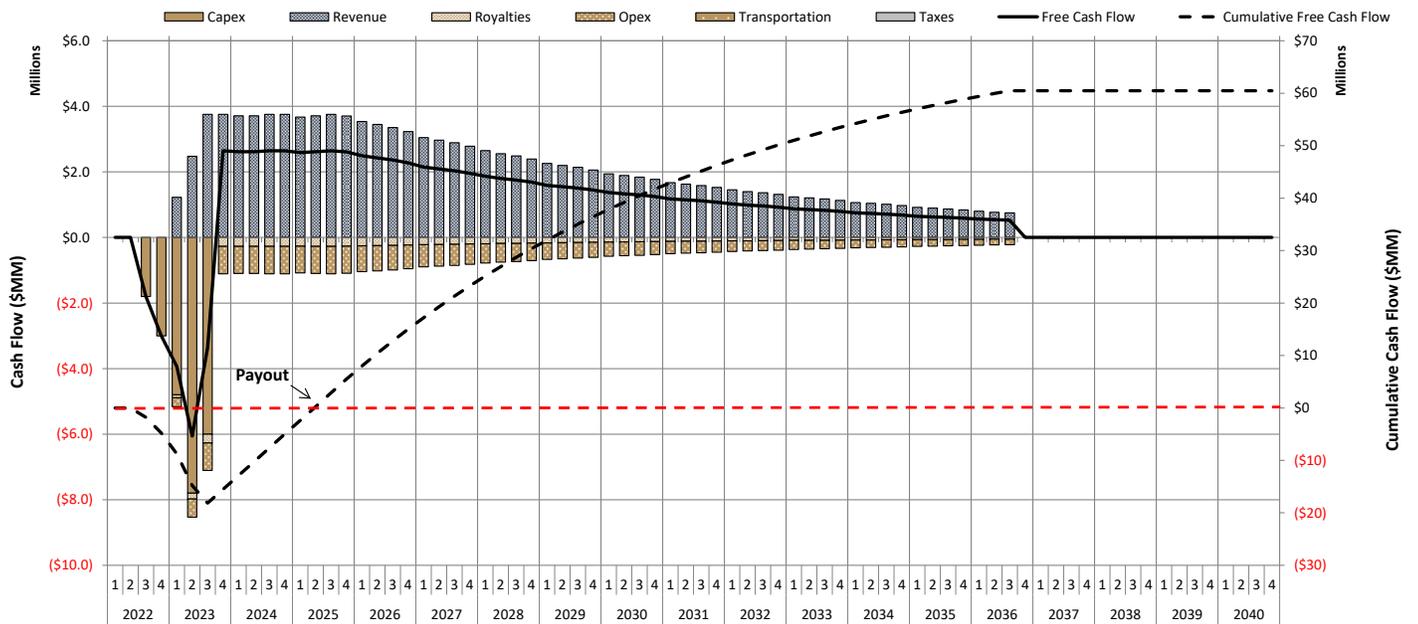
  

Unrisked NPV of Cash Flows (\$mm)		Unrisked NPV/Mcf (\$/Mcf)		
10%	C\$29.1	US\$22.0	10%	C\$83.21
		US\$62.83		

Risked NPV of Cash Flows (\$mm)		Risked NPV/Mcf (\$/Mcf)		
10%	C\$25.6	US\$19.4	10%	C\$73.22
		US\$55.28		

Unrisked	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033 - 2040
<b>E&amp;D</b>												
Wells	-	3	-	-	-	-	-	-	-	-	-	-
Drilling Capital (M\$)	\$1,800	\$3,600	-	-	-	-	-	-	-	-	-	-
Facilities Capital (M\$)	\$3,000	\$15,000	-	-	-	-	-	-	-	-	-	-
Total Yearly Capital (M\$)	\$4,800	\$18,600	-	-	-	-	-	-	-	-	-	-
Cumulative Capital (M\$)	\$4,800	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400	\$23,400
<b>Production</b>												
Total Gas (Mcf/d)	-	9,030	12,000	11,961	10,935	9,413	8,100	6,972	6,001	5,166	4,446	-
He (Mcf/d)	-	90	120	120	109	94	81	70	60	52	44	-
<b>Prices</b>												
He (\$/Mcf)	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340
<b>Net Income</b>												
Revenue (M\$)	\$0	\$11,206	\$14,933	\$14,844	\$13,570	\$11,681	\$10,080	\$8,652	\$7,447	\$6,411	\$5,532	\$14,669
Royalties (M\$)	\$0	-\$812	-\$1,083	-\$1,076	-\$984	-\$847	-\$731	-\$627	-\$540	-\$465	-\$401	-\$1,064
Operating Costs (M\$)	\$0	-\$2,497	-\$3,327	-\$3,307	-\$3,023	-\$2,602	-\$2,246	-\$1,928	-\$1,659	-\$1,428	-\$1,232	-\$3,268
Transportation Costs (M\$)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DD&A (M\$)	\$0	-\$659	-\$878	-\$873	-\$798	-\$687	\$0	-\$509	-\$438	-\$377	-\$325	-\$863
Net Income Before Tax (M\$)	\$0	\$7,238	\$9,645	\$9,587	\$8,765	\$7,545	\$6,510	\$5,588	\$4,810	\$4,141	\$3,573	\$9,474
<b>Free Cash Flow</b>												
Yearly (M\$)	(\$4,800)	(\$10,703)	\$10,523	\$10,460	\$9,563	\$8,232	\$7,103	\$6,097	\$5,248	\$4,518	\$3,898	\$10,337
Cumulative (M\$)	(\$4,800)	(\$15,503)	(\$4,980)	\$5,481	\$15,044	\$23,275	\$30,379	\$36,476	\$41,724	\$46,242	\$50,140	\$60,477



Source: Company Reports, Bancroft Capital

## Facilities

Given that 77% of the cost of bringing on a new well is related to facilities, we would be remiss to exclude them from this report. Based on company guidance, facilities are budgeted at \$1.5MM/MMcf/d meaning that each single new well requires \$6MM in facilities capital (vs. \$1.8MM for a well).

Currently, there are two processing facilities options available: permanent facilities and portable, skid-mounted units. Both processing options utilize Membrane/Pressure Swing Adsorption (PSA) technology. The Mankota facility and both of NAH Battle Creek and Cypress facilities are permanent processing facilities.

Management plans to use portable, skid-mounted units as it expects most pools to be drained by 1-5 wells per pool. This will allow maximum flexibility as facilities can be redeployed to new fields as older fields are depleted. Manufacturing companies are also making these skid-mounted units 'pseudo-expandable' to allow for additional throughput volumes as fields are developed with new wells.

### Helium Processing Facilities

The gas composition (referred to herein as "feed gas") in the Mankota/McCord area is 96.5% N<sub>2</sub>, 1% He, 2% CH<sub>4</sub>, and 0.5% CO<sub>2</sub>, with traces of other impurities, such as Argon. Many critical design considerations go into a helium-processing facility, one of the most important of which is the composition of the feed gas.

The overall purpose of the processing facility is to separate the helium from other components (impurities such as N<sub>2</sub> and CO<sub>2</sub>) in the feed gas stream, resulting in purified helium. Separation can be accomplished through two sequential principal technologies: 1) Membrane technology and 2) Pressure Swing Adsorption (PSA) technology. First, feed gas flows through the membrane system that removes the majority of the N<sub>2</sub> and CO<sub>2</sub>. Then, the 'back-end' PSA system purifies the helium into a saleable product.

Both technologies have been around for many years in various forms and applications:

- **Membrane Technology:** The 'upfront' membrane unit of the facility removes the majority of impurities, such as N<sub>2</sub> and CO<sub>2</sub>, from the feed gas stream. Membranes separate the feed gas into two streams. One stream contains impurities, while the other stream is rich in helium as the impurities have been removed. During this process, approximately 95-97% of the N<sub>2</sub> and CO<sub>2</sub> in the feed gas stream is removed by the membranes and sent to the vent stack.

The membrane technology has now taken the original feed stream, with a composition of 1% helium, and created the helium rich stream, composed of 50-55% helium. A large portion of the N<sub>2</sub> carrier gas is removed by the membrane separation process and the resulting 'volume' associated with the overall helium rich stream is a magnitude smaller than the original feed volume. This allows for a much smaller volume entering the PSA system, thus reducing the required PSA capital costs as the size of columns, vessels, piping etc. are smaller and more manageable.

- **PSA Technology:** After the membrane system, the helium rich stream enters the PSA system for further purification. Pressure swing adsorption is a cyclic adsorption process for gas separation and purification. The PSA process consists of a series of adsorbent columns, piping/valving, recycle systems, and a Programmable Logic Controller (PLC). Depending on the processing design, helium purities through a membrane/PSA system can range from 90%+ (typical balloon helium) to higher purities upwards of 99.999% (MRI's, Aerospace) helium. Helium purity is generally increased by increasing the number and size of the PSA columns and by increasing the number of recycles through the PSA system.

Membrane and PSA processing equipment is currently being used by all helium producers in both Canada and the USA.

### Membrane Separation

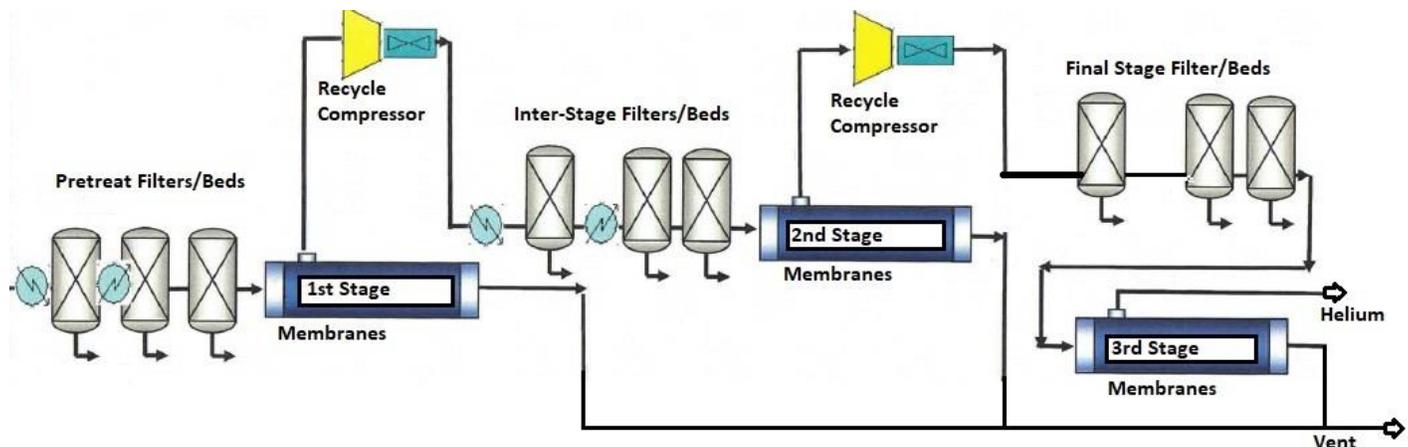
The helium content of a gas can be upgraded, or purified, using high-pressure membranes. Membranes work on the principle of selective permeation through a membrane surface which makes them unique for separating helium from the gas stream.

Compared to larger molecules like  $N_2$  and  $CO_2$ , helium is more soluble in the membrane material. The helium passes through the membrane at a higher rate and exits out the side of the membrane; while other gases like  $N_2$  (impurities) pass through the membrane.

A typical membrane process flow diagram is shown in Figure 21.

- The pre-treat, inter-stage and final stage filters/beds remove small amounts of free liquid and particles from the feed gas stream.
- The membranes increase the helium concentration of the gas stream and filter out  $N_2$  and other impurities which are then sent to the vent stack.
- Upon exit from the third-stage membranes, the gas stream contains ~55% He, ~43%  $N_2$  and 2% other waste gases. The rich helium then goes into the PSA system where it is further purified and ultimately loaded onto tube trailers as marketable helium.

**Figure 21: Typical Membrane Process Flow Diagram**



Source: Company Reports

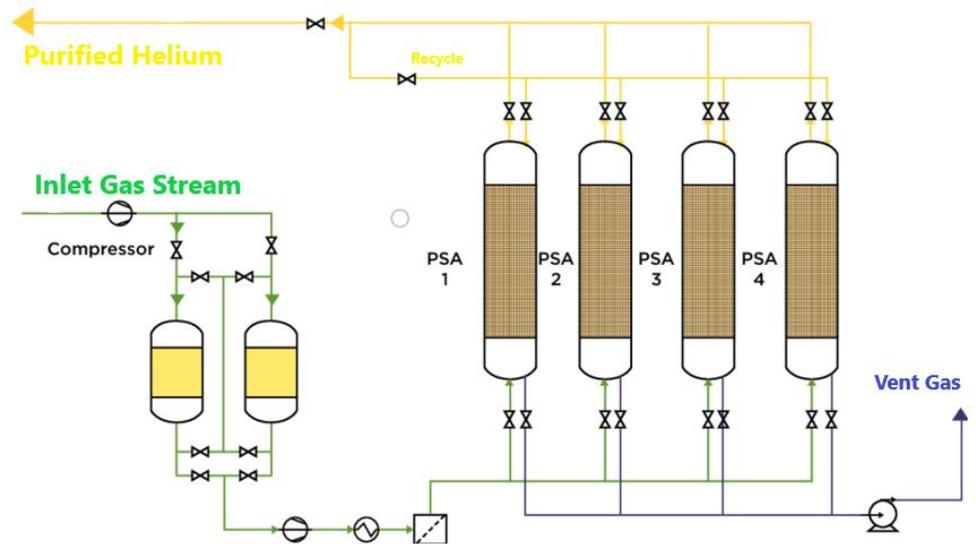
### Pressure Swing Adsorption

PSA is at the forefront of gas separation technology ( $N_2$ ,  $CO_2$ ,  $O_2$ , etc.). It is also a proven technology for helium separation and purification. PSA systems used in the industry can vary from one or two adsorbent columns/beds, up to many beds in series to achieve higher helium purification. The 'beds' are made of adsorbents such as zeolite and silica which are designed to absorb specific gas molecules.

PSA is a cyclic adsorption process for gas separation and purification. The systematic pressuring and depressurizing of these adsorbent beds purifies the gas stream as it flows through the various columns.

PSA facilities consist of a series of adsorbent beds or vessels, piping/valving, recycling systems, and a PLC to control the overall process system. The process uses temperature or pressure to cause selective adsorption of different sized gas molecules into a medium with a large surface area consisting of uniformly sized pore spaces. These technologies are time-tested, reliable, and can be deployed at small scale. A simplistic PSA process flow diagram is shown in Figure 22.

**Figure 22: PSA Process Flow Diagram**



Source: Company Reports

The Inlet gas enters the PSA system after the helium has been partially purified through the membrane system. Feed gas runs through the columns which are filled with the desired adsorbent materials depending on the gas composition. Each column is pressurized for a predetermined period, then depressurized to atmospheric pressure so the low-adsorbing gas will slowly leave the column first, followed by the other gases. This cyclical process is repeated in each column, thus purifying the stream to the desired helium concentration. Pressure and temperature are critical in the process design, as are the number of columns, beds, number of pressure equalization steps per cycle, cycle time, bed length, and bed diameter, all of which are equally important design considerations.

### Tube Trailer Transport

Helium remains as a gas throughout the production process from the wellhead to the tube trailers. Purified helium from the PSA is ultimately loaded onto tube trailers and trucked to market. Tube trailer sizes range from 100 – 400 Mcf capacity. The most common tube trailer consists of 10-12 cylindrical tubes on a trailer bed with 175 Mcf capacity at a pressure rating from 2,000-4,000 psi.

## Valuation

As soon as the company has a discovery we will re-evaluate HEVI but for now we consider two methods to determine an indicative value for the company.

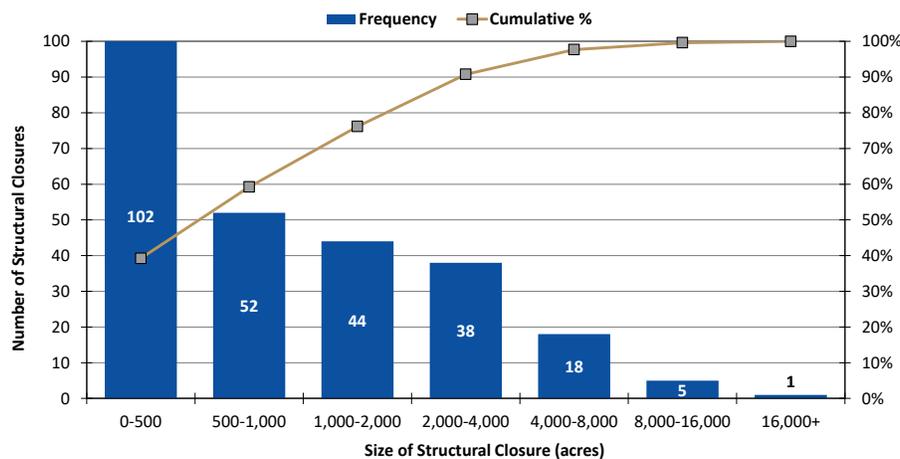
- Using land value based on peer comparisons, we estimate value at \$1.25 to \$1.71/sh FD.
- Based on the identified leads on HEVI's lands, we believe the company could drill 212 unrisks prospects or 71 risks (33% chance of success - COS). If we assume the prospects average two wells each, the company will have a continuous drilling program extending to Q3/43 and recover 17.2 Bcf of helium by YE2050. The BTAX NPV10 for the development is \$697MM or \$8.02/sh FD.

We prefer a DCF-based valuation but we'll need to see a discovery first. We're hoping to see successful discoveries at McCord in Q2/Q3.

### Land Value Based On Peer Comparison

As previously stated, management posted lands based on the locations of the structural highs on the Sawatzky maps. We reviewed the Sawatzky Swift Current map (Twp 1-30, Rge 1-20 W3M) and measured the areal extent of each of the mapped closures. In total we identified 260 structural closures within the helium fairway ranging in size from ~247 acres to ~19,000 acres. We grouped the closures into bins by size to create a histogram (Figure 23).

**Figure 23: Histogram of the Size of Closed Structural Highs on the Swift Current Sawatzky Map**



Bin (acres)	Number	Frequency	Cumulative %
0-500	102	39.2%	39.2%
500-1,000	52	20.0%	59.2%
1,000-2,000	44	16.9%	76.2%
2,000-4,000	38	14.6%	90.8%
4,000-8,000	18	6.9%	97.7%
8,000-16,000	5	1.9%	99.6%
16,000+	1	0.4%	100.0%
Total	260		

Source: Saskatchewan Geological Survey, Bancroft Capital

As expected, the frequency decreases with size. For the 260 prospects, the average size is 1,742 acres. If we multiply the company's 170 identified leads (or closed structural highs identified on the Sawatzky maps) by 1,742 acres, we estimate that 296M acres of HEVI's land are located on closed structural highs. That equates to 5.9% of HEVI's lands that should be located on closed structural highs and that are prospective for helium accumulations.

The average EV/acre for the comps is \$456/ac (Figure 7) and if we exclude the highest and lowest EV/acre value, the average is \$321/ac. Multiplying 296M acres of prospective land by \$456/acre generates a land value of \$135MM which, after adding \$11.5MM of positive working capital and \$2.5MM of dilutive proceeds, gives a \$149MM fully diluted EV for HEVI (\$1.71/sh). Using the \$350/ac EV/acre value generates a \$109MM fully diluted EV (\$1.25/sh).

### DCF of a Continuous Drilling Program

We use the histogram again to determine how many drillable prospects will be generated on the ~170 leads identified by HEVI management. We assume the size distribution of the structural closures is the same over the HEVI lands as it is for the Swift Current Sawatzky map (which seems reasonable when we visually examine the map and HEVI's corresponding lands).

We further assume that leads up to 2,000 acres will generate one drillable prospect, leads between 2,000 and 8,000 acres will generate two drillable prospects and leads >8,000 acres will generate three drillable prospects.

Using this logic, the company should be able to drill 214 unrisksed prospects or 71 risksed prospects using a 33% COS (Figure 24).

**Figure 24: HEVI Unrisksed and Risksed Prospect Estimate**

Bin (acres)	Frequency	Distrabution of Structural Closures	Drillable Prospects per Closure	Prospects	Risksed Prospects (33% COS)
0-500	39.2%	67	1	67	22
500-1,000	20.0%	34	1	34	11
1,000-2,000	16.9%	29	1	29	9
2,000-4,000	14.6%	25	2	50	16
4,000-8,000	6.9%	12	2	24	8
8,000-16,000	1.9%	3	3	10	3
16,000+	0.4%	1	3	2	1
		170		214	71

Source: Saskatchewan Geological Survey, Company Reports, Bancroft Capital

Similar to the McCord East Prospect, we expect that successful prospects will require one to five wells to drain. However, if we assume that the prospects average two wells each, we believe the company will have a continuous drilling program extending to Q3/37 to drill the 71 prospects (142 wells). To model the program we use the same assumptions as for the McCord East Prospect but further assume:

- Four production wells in 2023 and adding seven production wells/year in 2024+
- \$7.0MM/yr in miscellaneous costs (land and seismic)

The economic run is presented in Figure 25.

It should be noted that the company would need to find an outside source of capital to complete this program (probably a combination of debt and equity) but the development starts generating positive free cash flow in Q4/25 and pays out in Q1/28.

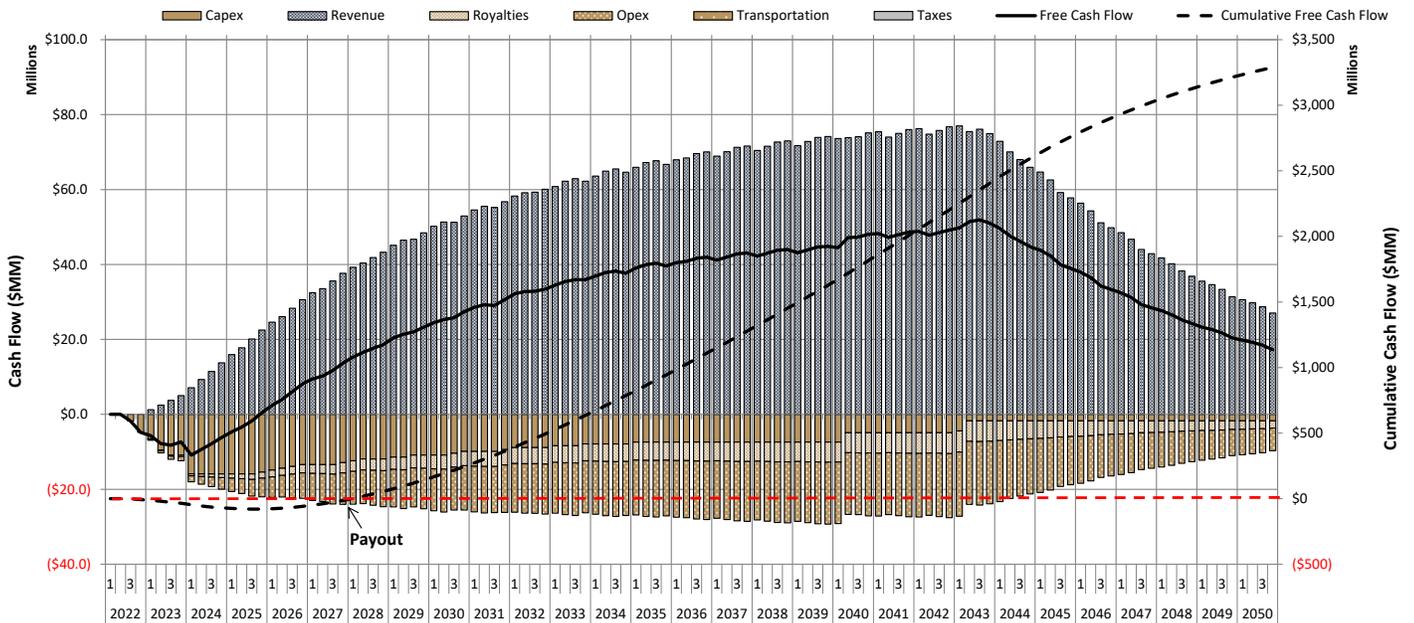
The BTAX NPV10 for the development is \$697MM or \$8.02/sh FD using the current share count. The 142 wells are forecast to recover 17.2 Bcf of helium between 2023 and 2050.

Figure 25: DCF for a 71 Prospect Continuous Drilling Program (Drilling 142 Wells in Total)

	10%	US\$697.4	US\$526.5	10%	US\$40.64	US\$30.68						
Gross He EUR (MMcf)	17,162	Remaining Gross He (MMcf)	17,162									
Net He EUR BR (MMcf)	17,162	Remaining He NBR (MMcf)	17,162									
Net He EUR AR (MMcf)	16,432	Remaining He NAR (MMBoe)	16,432									
Unrisked (C\$/sh)	C\$8.02	Unrisked Payout (Years)	5.7									
Risked (C\$/sh)	-	Risked Payout (Years)	-									

	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033 - 2050
<b>E&amp;D</b>												
Wells	-	4	7	7	7	7	7	7	7	7	7	75
Drilling Capital (M\$)	\$3,600	\$9,900	\$12,600	\$12,600	\$12,600	\$12,600	\$12,600	\$12,600	\$12,600	\$12,600	\$12,600	\$128,700
Facilities Capital (M\$)	\$3,000	\$21,000	\$44,000	\$43,500	\$37,000	\$33,500	\$28,500	\$25,000	\$22,500	\$19,500	\$16,000	\$78,000
Miscellaneous Capital (M\$)	-	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000	\$7,000	\$126,000
Total Yearly Capital (M\$)	\$6,600	\$37,900	\$63,600	\$63,100	\$56,600	\$53,100	\$48,100	\$44,600	\$42,100	\$39,100	\$35,600	\$332,700
Cumulative Capital (M\$)	\$6,600	\$44,500	\$108,100	\$171,200	\$227,800	\$280,900	\$329,000	\$373,600	\$415,700	\$454,800	\$523,500	\$823,100
<b>Production</b>												
Total Gas (Mcf/d)	-	10,038	33,529	61,471	88,273	112,203	132,776	150,515	165,798	178,962	190,248	198,687
He (Mcf/d)	-	100	335	615	883	1,122	1,328	1,505	1,658	1,790	1,902	1,987
<b>Prices</b>												
He (\$/Mcf)	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340	\$340
<b>Net Income</b>												
Revenue (M\$)	\$0	\$12,458	\$41,609	\$76,285	\$109,547	\$139,244	\$164,775	\$186,789	\$205,755	\$222,091	\$236,744	\$4,439,629
Royalties (M\$)	\$0	-\$903	-\$3,017	-\$5,531	-\$7,942	-\$10,095	-\$11,946	-\$13,542	-\$14,917	-\$16,102	-\$17,164	-\$321,873
Operating Costs (M\$)	\$0	-\$2,775	-\$9,270	-\$16,996	-\$24,406	-\$31,023	-\$36,711	-\$41,616	-\$45,841	-\$49,481	-\$52,745	-\$989,123
Transportation Costs (M\$)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
DD&A (M\$)	\$0	-\$733	-\$2,448	-\$4,487	-\$6,444	-\$8,191	\$0	-\$10,988	-\$12,103	-\$13,064	-\$13,926	\$0
Net Income Before Tax (M\$)	\$0	\$8,046	\$26,875	\$49,271	\$70,754	\$89,935	\$106,426	\$120,644	\$132,894	\$143,445	\$152,909	\$2,867,478
<b>Free Cash Flow</b>												
Yearly (M\$)	(\$6,600)	(\$29,121)	(\$34,278)	(\$9,341)	\$20,598	\$45,026	\$68,018	\$87,031	\$102,897	\$117,409	\$131,235	\$425,431
Cumulative (M\$)	(\$6,600)	(\$35,721)	(\$69,999)	(\$79,340)	(\$58,742)	(\$13,716)	\$54,302	\$141,334	\$244,231	\$361,640	\$492,875	\$3,288,807



Source: Company Reports, Bancroft Capital



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